Federal Energy Regulatory Commission
Office of Energy Projects
Washington, DC 20426

Freeport LNG Liquefaction Project
Phase II Modification Project

FINAL ENVIRONMENTAL IMPACT STATEMENT



Freeport LNG Development, L.P
FLNG Liquefaction, LLC
FLNG Liquefaction 2, LLC
FLNG Liquefaction 3, LLC

Docket Nos. CP12-509-000
CP12-29-000
PF11-2-000
FERC/EIS-0250F
DOE Docket Nos. FE10-161-LNG
FE11-161-LNG

Cooperating Agencies:

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WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:
OEP/DG2E/Gas 3
Freeport LNG Development, L.P.
FLNG Liquefaction LLC
FLNG Liquefaction 2, LLC
FLNG Liquefaction 3, LLC
Docket Nos. CP12-509-000
CP12-29-000

TO THE PARTY ADDRESSED:

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared a final Environmental Impact Statement (EIS) for the Freeport LNG Phase II Modification Project and the Liquefaction Project (Projects) proposed by Freeport LNG Development, L.P., FLNG Liquefaction LLC, FLNG Liquefaction 2, LLC, and FLNG Liquefaction 3, LLC (collectively referred to as Freeport LNG) in the above-referenced dockets. Freeport LNG requests authorization to export up to 13.2 million tons of liquefied natural gas (LNG) per year from its proposed Liquefaction Plant and associated facilities in Brazoria County, Texas and modify its previously approved Phase II Project facilities within the Town of Quintana.

The final EIS assesses the potential environmental effects of the construction and operation of the Liquefaction Project and Phase II Modification Project in accordance with the requirements of the National Environmental Policy Act (NEPA). The FERC staff concludes that approval of the Projects would have some adverse impacts; however, most of these impacts would be reduced to less than significant levels with the implementation of Freeport LNG's proposed mitigation and the additional measures recommended by the FERC staff in the final EIS.

The United States Department of Energy, United States Environmental Protection Agency, United States Department of Transportation (USDOT), the United States Army Corps of Engineers, and the National Oceanic Atmospheric Administration (NOAA) Fisheries participated as cooperating agencies in the preparation of the final EIS. Cooperating agencies have jurisdiction by law or special expertise with respect to resources potentially affected by the proposal and participate in the NEPA analysis. The USACE, USEPA, and USDOE can adopt and use the EIS to support their respective permit decisions after an independent review of the document. The USDOT and NOAA Fisheries cooperated in the preparation of this final EIS because of their special expertise with respect to resources potentially affected by the proposal. Although the cooperating agencies provided input on the conclusions and recommendations presented in the final EIS, the agencies will present their own conclusions and recommendations in their respective Records of Decision or other determinations for the Projects.

The proposed Phase II Modification Project includes modification to the previously authorized, but not constructed, LNG vessel berthing dock, LNG transfer pipelines, LNG unloading arms; and the access road system. In addition, Freeport LNG would either eliminate or modify components of the previously authorized facility.

The Liquefaction Project consists of multiple components, including facilities at and adjacent to the existing Quintana Island terminal and facilities located beyond Quintana Island. The Liquefaction Plant, located at and adjacent to the existing Quintana Island terminal, would consist of three propane pre-cooled mixed refrigerant liquefaction trains, each capable of producing a nominal 4.4 million metric tons per annum of LNG for export, which equates to a total liquefaction capacity of approximately 1.8 billion cubic feet per day of natural gas.

To support the Liquefaction Plant, Freeport LNG proposes to construct a natural gas Pretreatment Plant located about 2.5 miles north of the existing Quintana Island terminal. The Pretreatment Plant would process the gas for liquefaction. In addition several interconnecting pipelines and utility lines including a five-mile-long, 12-inch-diameter boil-off gas feed pipeline from the Quintana Island terminal to the Pretreatment Plant (referred together as the Pipeline/Utility Line System). The Liquefaction Plant, the Pretreatment Plant, and the Pipeline/Utility Line System, together with the associated appurtenant structures, are collectively referred to as the Liquefaction Project.

The final EIS has been placed in the public files of the FERC and is available for distribution and public inspection at:

Federal Energy Regulatory Commission
Public Reference Room
888 First Street NE, Room 2A
Washington, DC 20426
(202) 502-8371

A limited number of copies of the final EIS are available from the Public Reference Room identified above. The FERC staff mailed copies of the final EIS to federal, state, and local government representatives and agencies; elected officials; environmental and public interest groups; Native American tribes; potentially affected landowners and other interested individuals and non-governmental organizations; newspapers and libraries in the project area; and parties to this proceeding. In addition, the final EIS is available for public viewing on the FERC's website (www.ferc.gov) using the eLibrary link.

Questions?

Additional information about the Projects is available from the Commission's Office of External Affairs, at (**866) 208-FERC,** or on the FERC (www.ferc.gov) using the eLibrary link. Click on the eLibrary link, click on "General Search," and enter the docket number excluding the last three digits in the Docket Number field (i.e., CP12-509, CP12-29). Be sure you have selected an appropriate date range. For assistance, please contact FERC Online Support at FERConlinesupport@ferc.gov or toll free (866) 208-3676; for TTY, contact (202) 502-8659. The eLibrary link also provides access to the texts of formal documents issued by the Commission, such as orders, notices, and rulemakings.

In addition, the Commission offers a free service called eSubscription that allows you to keep track of all formal issuances and submittals in specific dockets. This can reduce the amount of time you spend researching proceedings by automatically providing you with notification of these filings, document summaries, and direct links to the documents. Go to http://www.ferc.gov/docs-filing/esubscription.asp.

Kimberly D. Bose

Secretary

ENVIRONMENTAL IMPACT STATEMENT
FREEPORT LNG
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ACRONYMS AND ABBREVIATIONS

AAQS	ambient air quality standards
ACHP	Advisory Council on Historic Preservation
AEGLs	Acute Exposure Guideline Level
AirData	USEPA AirData database
amsl	above mean sea level
ANSI	American National Standards Institute
APE	Area of Potential Effect
AQCRs	Air quality control regions
ATWS	additional temporary workspace
BA	Biological Assessment
BACT	Best Available Control Technology
BCC	Birds of Conservation Concern
Bcf	billion cubic feet
Bcf/d	billion cubic feet per day
BCGCD	Brazoria County Groundwater Conservation District
BCR 37	Bird Conservation Region 37
bgs	below ground surface
BIA	Bureau of Indian Affairs
BLEVE	boiling-liquid-expanding-vapor explosion
BOG	boil-off gas
Brazos Pilots	Brazos Pilots Association
BWA	Brazosport Water Authority
BWE	Ballast Water Exchange
CAA	Clean Air Act
CAER	Community Awareness & Emergency Response
CCC	Coastal Coordination Council
CCMA	Center for Coastal Monitoring and Assessment
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	Methane
CMP	Coastal Management Program
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
COTP	Captain of the Port
CR	County Road
CWA	Clean Water Act
CWS	Construction workspace
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
dBA	decibels on the A-weighted scale
DMPA	Dredged Material Placement Area
DO	dissolved oxygen
Dow	Dow Chemical Company
EA	Environmental Assessment
EAP-EA	Export Authorization Project Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EI	Environmental Inspector

EIS	Environmental Impact Statement
ESA	Endangered Species Act
ESD	emergency shutdown
F	Fahrenheit
FEED	Front-End Engineering Design
FEMA	Federal Emergency Management Agency
FERC or Commission	Federal Energy Regulatory Commission
FHC	Freeport Harbor Channel
FIRM	Flood Insurance Rate Map
FLDP	Facility Lighting Design Plan
FLNG	Freeport LNG
FM	Farm-to-Market
FMP	Fishery Management Plans
FOC	Freeport Oil Company
Freeport LNG's Procedures	Refers collectively to Freeport Plan that includes FERC's Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures and Freeport LNG's two variances to these procedures
FWS	U.S. Fish and Wildlife Service
g	Acceleration due to gravity
GCBO	Gulf Coast Bird Observatory
GHG	greenhouse gas
GMFMC	Gulf of Mexico Fishery Management Council
gpd	gallons per day
gpm	gallons per minute
H_2S	hydrogen sulfide
H2SO4	sulfuric acid mist
HAPs	Hazardous Air Pollutants
HAZID	hazard identification
HAZOP	hazard and operability
HDD	Horizontal directional drill
HG-AQCR	Metropolitan Houston-Galveston Intrastate AQCR
HGB	Houston-Galveston-Brazoria
hp	Horsepower
ICW	Intracoastal Waterway
INEOS	INEOS Group Limited
IPCC	Intergovernmental Panel on Climate Change
ISDs	Independent School Districts
km	Kilometers
kV	Kilovolt
LAER	Lowest Achievable Emission Rate
L_{dn}	day-night sound level
L_{eq}	equivalent sound level
LFL	lower flammability limit
Liquefaction Plant	Liquefaction trains and their support facilities
LNG	Liquefied Natural Gas
L_{Night}	night sound level
L_{max}	maximum impact noise level
LOI	Letter of Intent
LOS	Level of Service
LPG	liquefied propane gas

LULC	Land Use/Land Cover
m^3	cubic meter
m^3/hr	cubic meters per hour
MACT	Maximum Achievable Control Technology
MARPOL	International Convention for the Prevention of Pollution from Ships
MBTA	Migratory Bird Treaty Act
mph	miles per hour
MLV	mainline valve
MMPA	Marine Mammal Protection Act
MMscfd	million standard cubic feet per day
MOU	Memorandum of Understanding
MP	milepost
MSA	Magnuson-Stevens Fishery Conservation and Management Act
msl	mean sea level
mtpa	million metric tons per annum
N_2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAISA	National Aquatic Invasive Species Act of 2003
NANPCA	Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990
NCA	National Climate Assessment
NAVD 88	North American Vertical Datum 1988
NBS	Neotropical Bird Sanctuary
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NGA	Natural Gas Act
NGL	Natural Gas Liquid
NHPA	National Historic Preservation Act
NISA	National Invasive Species Act of 1996 (NISA)
NNSR	Nonattainment New Source Review
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries	NOAA's National Marine Fisheries Service
NOAA/NOS	National Oceanic and Atmospheric Administration/National Oceanic Survey
NOI	Notice of Intent
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSA	Noise Sensitive Area
NSPS	New Source Performance Standards
NSR	New Source Review
NWR	National Wildlife Refuge
O_3	Ozone
ODMDS	Ocean Dredged Material Disposal Site
OEP	Commission's Office of Energy Projects
OPF	New operational footprint
Pb	Lead
PHMSA	Pipeline and Hazardous Materials Safety Administration
P&IDs	Piping and Instrument Diagrams
PJD	Preliminary Jurisdictional Determination
PM_{10}	Respirable Particulate

$PM_{2.5}$	Fine Particulate
ppm	parts per million
ppmv	parts per million on a volume basis
PSD	Prevention of Significant Deterioration
psi	pounds per square inch
psig	pounds per square inch gauge
PSM	Process Safety Management of Highly Hazardous Chemicals; Explosives and Blasting Agents
PUC	Public Utility Commission
RFP	Reasonable Further Progress
RHA	Rivers and Harbors Act of 1899
RRC	Railroad Commission of Texas
SAFMC	South Atlantic Management Fishery Council
SAV	submerged aquatic vegetation
SEP	surface emissive power
SH	State Highway
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	sulfur dioxide
SPCC Plan	Spill Prevention, Control and Countermeasure Plan
Supplemental NOI	Supplemental Notice of Intent to Prepare an Environmental Impact Statement for the Planned Liquefaction Project, Request for Comments on Environmental Issues, and Notice of Public Scoping Meeting
SWPPP	Stormwater Pollution Prevention Plan
TAC	Texas Administrative Code
TBBA	Texas Bird Breeding Atlas
TCEQ	Texas Commission for Environmental Quality
TCMP	Texas Coastal Management Program
TDCJ	Texas Department of Criminal Justice
TPWD	Texas Parks and Wildlife Department
tpd	tons per day
TRRP	Texas Risk Reduction Program
TxDOT	Texas Department of Transportation
tpy	tons per year
UFL	upper flammability limit
ug/m^3	Micrograms per Cubic Meter
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCG	U.S. Coast Guard
USDOE	U.S. Department of Energy
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection
USGCRP	United States Global Change Research Program
USGS	United States Geological Survey
UTC	Upper Texas Coast
VOC	volatile organic compound
WMA	Wildlife Management Area
WSA	Waterway Suitability Assessment
yd^3	cubic yards

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Introduction

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared this final Environmental Impact Statement (EIS) to assess the environmental impact associated with the construction of facilities proposed by Freeport LNG.[1] We[2] prepared this EIS in accordance with the requirements of the National Environmental Policy Act (NEPA) and the Commission's implementing regulations under Title 18 Code of Federal Regulations (CFR) Part 380.

Freeport LNG has submitted separate proposals to the Commission for authorization under Section 3(e) of the Natural Gas Act (NGA) to: (1) modify previously authorized facilities at Freeport LNG's existing Quintana Island terminal known as the Phase II Modification Project in Docket No. CP12-29-000 for support of liquefied natural gas (LNG) export or import; and (2) develop new liquefaction facilities and LNG export capacity known as the Liquefaction Project in Docket No. CP12-509-000 (collectively referred to as the Projects).

The purpose of the EIS is to inform the FERC decision-makers, the public, and the permitting agencies about the potential adverse and beneficial environmental impacts of the proposed Projects and its alternatives, and recommend mitigation measures that would reduce adverse impacts to the extent practicable. We prepared this analysis based on information provided by Freeport LNG and further developed from data requests, field investigations, scoping, literature research, and contacts with or comments from federal, state, and local agencies, and individual members of the public.

The U.S. Department of Energy (USDOE) has exclusive jurisdiction over the export of natural gas as a commodity in accordance with Section 3(c) of the NGA. The USDOE has delegated to the Commission authority to approve or disapprove the construction and operation of particular natural gas facilities, the site at which such facilities will be located, and the place of entry for imports or exit for exports. Therefore, the FERC is the lead federal agency for the preparation of this final EIS in compliance with the requirements of NEPA. The USDOE, U.S. Environmental Protection Agency (USEPA), U.S. Department of Transportation (USDOT), the U.S. Army Corps of Engineers (USACE), and the National Oceanic and Atmospheric Administration (NOAA) - Office of Protected Resources, are cooperating agencies for the development of the final EIS consistent with the Council on Environmental Quality (CEQ) regulations for implementation of NEPA. These cooperating agencies have jurisdiction by law or special expertise with respect to the environmental resource issues associated with the Projects, and participated in the environmental analysis.

[1] Freeport LNG Development, L.P., FLNG Liquefaction, LLC, FLNG Liquefaction 2, LLC, and FLNG Liquefaction 3, LLC.

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

Proposed Action

The proposed Phase II Modification Project includes modification to the previously authorized, but not constructed LNG, vessel berthing dock, LNG transfer pipelines, LNG unloading arms, and the access road system. In addition, Freeport LNG would not construct components of the previously authorized Phase II Project, including vaporization equipment that was approved to increase the Quintana Island terminal's sendout capacity.

The Liquefaction Project consists of multiple components, including a Liquefaction Plant at and adjacent to the existing Quintana Island terminal and facilities located beyond Quintana Island. The Liquefaction Plant would consist of three propane pre-cooled mixed refrigerant liquefaction trains, each capable of producing a nominal 4.4 million metric tons per annum (mtpa) of LNG (13.2 mtpa total) for export, which equates to a total liquefaction capacity of approximately 1.8 billion cubic feet per day of natural gas.

In support of the Liquefaction Plant, Freeport LNG proposes to construct a natural gas Pretreatment Plant located about 2.5 miles north of the existing Quintana Island terminal. The Pretreatment Plant would process the gas for liquefaction. In addition, several interconnecting pipelines and utility lines including a 5.0-mile-long, 12-inch diameter boil-off gas (BOG) pipeline from the terminal to the Pretreatment Plant (referred together as the Pipeline/Utility Line System). The Liquefaction Plant, the Pretreatment Plant, and the Pipeline/Utility Line System, together with the associated appurtenant structures, are collectively referred to as the Liquefaction Project.

Public Outreach and Comments

On January 5, 2011, the Director of the Office of Energy Projects granted Freeport LNG's request to utilize our Pre-Filing Process for the Liquefaction Project. On August 11, 2011, we issued a *Notice of Intent to Prepare an Environmental Assessment for the Planned Liquefaction Project and Request for Comments on Environmental Issues and Notice of Public Scoping Meeting* (NOI). The NOI was mailed to interested parties, including federal, state, and local officials; agency representatives; conservation organizations; Native American tribes; local libraries and newspapers; and property owners in the project area. On September 8, 2011, we conducted a scoping meeting in Lake Jackson, Texas to provide the public an opportunity to learn about the Liquefaction Project, FERC's process, and provide comments on the record. Four, out of the approximately 20 members of the public attending the scoping meeting provided comments.

After Freeport LNG filed the application for the Phase II Modification Project on December 9, 2011, we determined the need to analyze both projects in a single EIS. On July 19, 2012, we issued a *Supplemental Notice of Intent to Prepare an Environmental Impact Statement for the Planned Liquefaction Project, Request for Comments on Environmental Issues, and Notice of Public Scoping Meeting* (Supplemental NOI). The Supplemental NOI included both the Liquefaction Project and the Phase II Modification Project and was mailed to interested parties on our environmental mailing list.

On August 9, 2012, we conducted a second public scoping meeting in Lake Jackson, Texas to provide an opportunity for the public to learn more about the newly proposed modifications to the proposed export terminal and Pretreatment Plant, and to provide comments on environmental issues to be addressed in the EIS. At this scoping meeting, we received 24 comments from the approximately 80 members of the public attending the scoping meeting. Prior to issuance of the draft EIS, we received a total of 190 comment letters and two petitions (a petition in opposition signed by 323 people associated with the Liquefaction Project, and a second petition in opposition signed by 57 landowners from Quintana Island).

Issues identified during the scoping process and public meetings included: alternatives to the various locations of the Projects; concerns about safety such as the potential for fires, explosions, and spills, concerns about emergency response capability; the ability of the facility to withstand hurricanes and their associated storm surges; climate change; traffic impacts during construction; visual and lighting impacts; noise and vibration during construction and operation; and air quality impacts on residents and wildlife.

On March 14, 2014, we issued a Notice of Availability (NOA) for the draft EIS. The draft EIS was mailed to stakeholders on our environmental mailing list (see distribution list in appendix A) including landowners, the cooperating agencies, and those who previously made comments during the scoping process. The Federal Register notice issued on March 21, 2014, established a 45-day comment period ending on May 5, 2014; described procedures for filing comments on the draft EIS; and announced the time, date, and location of a public comment meeting on the draft EIS. These announcements also described how additional information on the proposed Projects could be obtained from the Commission's Office of External Affairs and on the FERC's Internet website.

On April 16, 2014 a public comment meeting was held in Lake Jackson, Texas to provide interested individuals an opportunity to present comments on the analysis of the environmental impacts of the proposed Projects as described in the draft EIS. Twenty-two individuals, of the approximately 110 members of the public in attendance, provided oral comments. We also received 104 comment letters on the draft EIS as of May 30, 2014.

Issues included concerns regarding: air pollution (including air toxics, greenhouse gases, deposition impacts; and compliance with the National Ambient Air Quality Standards), safety and lack of an emergency response plan, construction traffic, noise and dust, lack of housing for construction workers, visual impacts, impacts on property values, water use and Freeport LNG's source of water, land use impacts, ability to safely build the facility on dredge spoils, impacts on the historic Town of Quintana, expanding the scope of the cumulative impact analysis and alternatives analysis, recreational impacts, noxious odors, and the positive impacts from job creation.

The public hearing transcripts and all written comments on the draft EIS are part of the public record for the Projects. All comments received on the draft EIS and the FERC Staff's responses to these comments are provided in Appendix L of the final EIS. Changes were made in the text of the final EIS in response to the comments on the draft EIS and in order to include updated information that became available following issuance of the draft EIS.

Alternatives Considered

We conducted an alternatives analysis for the Liquefaction Project and Phase II Modification Project and found no other practicable alternative that would result in less environmental impact that would still address the purpose and need of the Projects. Alternatives considered included the No Action Alternative, system alternatives, and site alternatives.

With respect to the No Action Alternative, we conclude that this alternative is not viable as Freeport LNG would not be able to provide U.S. natural gas producers with new access to global gas suppliers and meet Freeport LNG's contractual obligations.

For the Phase II Modification Project, we determined that the location, design, and purpose is wholly dependent on the existing plant facilities and operations at the Quintana Island terminal; therefore, other geographically separate sites beyond the terminal were not evaluated and no system alternatives exist that could achieve the terminal's operational flexibility and capabilities.

With respect to system alternatives for the Liquefaction Project, we analyzed other proposed LNG export facilities on the West Coast, Gulf Coast, and East Coast of the United States and whether these could be considered system alternatives. In all cases we found that these alternatives would not address the Liquefaction Project's purpose and would not offer any significant environmental advantage.

We considered the possibility of expanding the size of another proposed LNG export terminal to address Freeport LNG's desired export capacity. However, this alternative would involve further impacts such as: construction of additional liquefaction infrastructure plus the potential need for expanded docking facilities. Hence, the environmental impacts would not be significantly different than those that would occur as a result of Freeport LNG's proposal.

We evaluated site alternatives for the components of the Liquefaction Project, but did not find any viable alternatives. Siting of the Liquefaction Plant was dictated by the need to be close to the existing offloading areas, LNG storage tanks, docking area, and other existing LNG infrastructure at the Quintana Island terminal. The proposed siting makes maximum use of the available areas within the existing Quintana Island terminal.

We also evaluated the feasibility of lowering the pad elevation of the Liquefaction Plant to determine whether this would lessen impacts on visibility, noise, safety, stormwater, and site engineering. We conclude that this would not provide substantial improvements in visibility and noise attenuation, and would result in significant geological safety, engineering, traffic and soil disposal issues.

With respect to the siting of the Pretreatment Plant, we assessed ten alternative sites, all of which were deemed unsuitable due to site constraints and environmental impacts, except for one site. However, based on comments from residents regarding the lack of a suitable evacuation route in case of emergency at the alternative site, and concerns about noise, air emissions, water

discharges, materials storage, and flood protection, we determined that the proposed site is the preferred site.

With respect to siting of the Pipeline/Utility Line System, the main alternative siting criteria were the functional interdependency and geographic locations of the proposed process facilities (Liquefaction Plant and Pretreatment Plant), Freeport LNG's existing natural gas sendout pipeline, and the existing sendout pipeline meter station at Stratton Ridge. The Liquefaction Plant, Pretreatment Plant, and Stratton Ridge Meter Station represent fixed receipt or delivery points for the natural gas transported by the sendout pipeline and utilized in the liquefaction process. The existing sendout pipeline route constitutes the preferred route as it follows an existing right-of-way and minimizes environmental impacts.

Environmental Impacts and Mitigations

We evaluated the construction and operation impacts of the proposed Liquefaction Project and Phase II Modification Project, as minimized by Freeport LNG's proposed mitigation measures, on geology, soils, water resources, vegetation, wildlife, fisheries, special status species, land use, visual resources, socioeconomics, cultural resources, air quality, noise, and safety. Where necessary, we are recommending additional mitigation measures to minimize or avoid impacts on the above resources. Section 5.15 of this final EIS contains the mitigation measures that we recommend be attached as conditions to any authorization issued by the Commission.

We requested that the U.S. Fish and Wildlife Service (USFWS) and NOAA's National Marine Fisheries Service (NOAA Fisheries) consider the draft EIS as the official Biological Assessment (BA) for the Projects. To date, we received no comments from these agencies. We are recommending that Freeport LNG complete consultation with these agencies in compliance with the Endangered Species Act (ESA).

To ensure that our responsibilities under Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations are met, we are recommending that Freeport LNG not begin construction until all outstanding survey and evaluation reports have been reviewed and we provide written notification to proceed.

Also, to ensure consistency with the requirements of the Coastal Zone Management Act (CZMA), we are recommending that Freeport LNG not begin construction until it files Texas' determination of the consistency with the applicable provisions of the CZMA for the Projects.

The Projects would predominantly result in direct impacts on waterbodies, wetlands, socioeconomics (construction traffic and housing of construction workers), safety, air quality and noise. We also considered the cumulative impacts of the proposed Projects with other past, present, and reasonably foreseeable actions in the Brazoria County region. These affected resources are described below along with mitigation to minimize such impacts.

Waterbodies

Along the Freeport Harbor Channel and Intracoastal Highway (ICW), dredging of approximately 1,333,000 cubic yards of material would be required to expand the existing berthing dock,

construction docks, firewater intake, and to modify the previously approved Phase II dock. To minimize impacts associated with dredging, Freeport LNG has developed a Dredging Plan that outlines procedures to minimize the spread of turbidity in surface waters. The construction of the Projects would involve crossing and or work within 28 waterbodies. To minimize impacts on surface waters, Freeport LNG would adhere to FERC's Upland Erosion Control, Revegetation, and Maintenance Plan, and FERC's Wetland and Waterbody Construction and Mitigation Procedures herein referred to as Freeport LNG's Procedures. In addition, Freeport LNG would adhere to its Spill Prevention, Control and Countermeasure Plan (SPCC Plan), and would use horizontal directional drilling (HDD) technology to entirely avoid construction impacts on six waterbody crossings along the Pipeline/Utility Line System route.

Discharge of ballast water in the terminal's berthing area could provide a pathway for the introduction of exotic aquatic nuisance species into U.S. coastal waters. However, operation of the Liquefaction Project would not result in any increase in the maximum number of vessel visits (400 per year) that were previously authorized by the Commission and Freeport LNG would be required to comply with strict U.S. Coast Guard (USCG) regulations over the discharge of ballast water designed to prevent introduction of exotic species into U.S. waters. Given the above mitigation, we conclude that impacts on waterbodies would not be significant.

Wetlands

The Projects would result in temporary impacts on 25.7 acres and permanents impacts on 19.6 acres of wetlands. Additional wetlands would have temporary impacts from sedimentation due to turbidity from dredging activities. The implementation of the Freeport LNG's Procedures would minimize impacts on wetlands. Freeport LNG would also adhere to requirements of a Stormwater Pollution and Prevention Plan (SWPPP Plan) and its SPCC Plan to ensure the avoidance of indirect impacts from stormwater runoff and or accidental spills on the wetlands. Freeport LNG would also provide compensatory mitigation for wetlands in accordance with the USACE regulatory requirements.

Freeport LNG submitted a wetland mitigation plan that provides for compensatory wetlands to address permanent wetland impacts from the Projects. In consideration of the type, condition, and extent of wetlands affected by the Project, we conclude that once the USACE approves the Compensatory Wetland Mitigation Plan, impacts on wetlands would be sufficiently offset. We further conclude that the impact on wetlands would not be significant.

Socioeconomics

The Liquefaction Project would require, during the peak construction period, greater than 3,000 temporary construction workers and operation of the Liquefaction Project facilities would require the addition of about 163 permanent workers, significantly greater than that required for the original Quintana Island terminal. With existing constraints on housing, there would be difficulties for workers to find long term housing and there would be increased congestion of roadways near the Projects. However, there are sufficient resources (*i.e.*, emergency services, roadway capacity, school system and other municipal services) to address both the temporary

influx of workers who may want to move to the area, and the permanent workers to fill the 163 job openings.

Freeport LNG filed a Transportation Management Plan that provides specific mitigation measures it would carry out to help control and minimize the impacts of construction traffic to the extent possible (see appendix I). Nearby residents, especially those of the Town of Quintana, would be affected by the large increase in construction and worker vehicle traffic. We conclude that construction traffic would result in significant and unavoidable impacts on the residents of the Town of Quintana during construction of the Liquefaction Plant and Phase II Modification Projects. For the wider Brazoria County, our recommendations and Freeport LNG's construction plans would mitigate these impacts and they would not be significant.

For other socioeconomic factors, we conclude that the construction and operation of the Projects would not have a significant adverse impact on local public services, property values, and disadvantaged communities.

Safety and Reliability

We evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, including a review of the cryogenic design of the facilities proposed for liquefaction, related facilities, and safety systems. Based on our technical review of the preliminary engineering designs, we conclude that sufficient safeguards would be included in the facility designs to mitigate the potential for an incident that could damage the facility, injure operating staff, or impact the safety of the off-site public.

As part of our review, we also assessed the potential for public safety impacts using the information which Freeport LNG supplies to comply with the federal siting standards in 49 CFR 193.

To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of the final design, prior to commissioning, prior to the introduction of hazardous fluids, and prior to commencement of service. This includes a recommendation for a detailed Emergency Response Plan that Freeport LNG should addresses on-site and off-site emergency response for both the LNG terminal site and the Pretreatment Plant. Based on our review of Freeport LNG's siting analyses, we conclude that potential hazards from the Projects would also not have a significant impact on public safety and would only represent a slight increase in risk to the nearby public.

Air Quality

Air emissions during the construction of the proposed Projects would consist of tailpipe emissions (due to fossil fuel combustion from equipment and vehicles) and fugitive dust (ground and roadway dust).

These emissions would be temporary and may vary in intensity and composition over the 4.5 years of construction. The construction emissions may affect air quality in the region and cause

elevated dust and pollutant levels in close proximity to residents of the Town of Quintana Island and near to the Pretreatment Plant. Freeport LNG must comply with General Conformity; thus, we are recommending that Freeport LNG offset the emissions of nitrogen oxides (NO_x) and volatile organic compounds (VOC) from construction, obtain a specific commitment from the Texas Commission on Environmental Quality (TCEQ) to account for emissions of NO_x and VOC in the region's State Implementation Plan (SIP), or otherwise comply with a General Conformity demonstration under the Clean Air Act (CAA).

Air emissions from the operation of the Liquefaction and Pretreatment Plants stationary sources would be minimized by using electric-powered equipment, high-efficiency equipment, state of the art emission controls, burning natural gas, and using proper maintenance and operating procedures. In addition, Freeport LNG would obtain air quality permits from the USEPA and the TCEQ for the Liquefaction Plant and the Pretreatment Plant.

The ship emissions associated with the proposed Projects would be minimized by the use of BOG as the primary fuel in the LNG boilers and engines, and the use of low-sulfur marine diesel in the tug vessels.

As part of the TCEQ permitting process, Freeport LNG used an air quality model to estimate the air quality impacts from the facility. The model demonstrated that air quality impacts from the facilities and surrounding industrial facilities would not exceed the National Ambient Air Quality Standards (NAAQS). We updated this air quality model using revised emissions from the LNG vessels and escort vessels. We confirmed that, although cumulative impacts from all the industrial facilities in the area combined with operation of the Projects would exceed the NAAQS for particulate matter less than 2.5 micrometers, Freeport LNG's facilities are not the cause of the exceedance. Thus, we conclude that impacts on air quality would not be significant.

Noise

Residents in the immediate vicinity of the construction activities at the Pretreatment and Liquefaction Plant would experience an increase in noise during the 48-54 months of construction, but this would vary in intensity during the construction period and be confined to daytime hours. Certain construction activities at the Liquefaction Plant, such as HDD work, dredging, and pile driving, would have 24-hour or impulse noise impacts, and result in greater annoyance of the residents on Quintana Island. Based upon Freeport LNG's noise estimates, noise from pile driving at the Liquefaction Plant would be indistinctly heard by Quintana Island residents with noise increases up to 21 decibels on the A-weighted scale (dBA) over background noise levels and above 55 dBA for up to 3 years. Dredging activities have the potential for 24-hour per day elevated noise impacts sustained over approximately 120 days. Freeport LNG has estimated that the noise from dredging would be greater than a 55 dBA day-night average sound level (L_{dn}) at one residence. To address noise concerns associated with both pile driving and dredging, we are recommending that Freeport LNG submit a Construction Noise Mitigation Plan that outlines measures to reduce dredging noise to no greater than 55 dBA L_{dn} at all Noise Sensitive Areas (NSA), and includes mitigation measures to reduce pile driving noise to no greater than 10 dBA over background levels. However, the pile-driving noise represents a

doubling of existing ambient noise over a 3 year period, and would be a significant and unavoidable adverse impact on the residents of the Town of Quintana during construction.

HDD noise for the pipeline construction would elevate noise levels at several NSAs; however, at locations where noise would be above 55 dBA L_{dn}, Freeport LNG committed to install mitigation to reduce noise to below 55 dBA L_{dn} where technically feasible.

Operation of the Pretreatment Plant would increase overall noise for nearby residents; however, the noise attributable to the Pretreatment Plant would remain below 55 dBA L_{dn} at the NSAs. Operational noise at the Liquefaction Plant would remain below 55 dBA L_{dn}, except in some locations, where Freeport LNG has purchased the properties to address this issue. We are recommending that Freeport LNG conduct a noise survey to confirm compliance with operational noise level requirements at both the Pretreatment and Liquefaction Plants.

The Liquefaction Plant, ship loading, and LNG vessel movement would be another source of operational noise for residents on Quintana Island. LNG vessel movement noise impacts have been determined to stay below a noise level of 55 dBA L_{dn} and the vibration impacts from LNG vessel movement would remain below the American National Standards Institute (ANSI) Clearly Perceptible Vibration Threshold. In addition, Freeport LNG would monitor noise to ensure that impacts from ships would not be significant.

In summary, construction of the Projects would result in significant and unavoidable noise impacts on the residents of the Town of Quintana; however our recommended mitigation measures would reduce these impacts during the 4.5 years of construction. With the additional recommendations discussed above, operational noise and vibration would be minimized and not result in significant impacts on residents.

Cumulative Impacts

As detailed in each section of the final EIS, we determined that most impacts on each resource affected by the Projects would not be significant. However, the large number of workers at the Quintana Island terminal, the extended construction period, and large area of construction would result in aggregate adverse impacts from significant noise and traffic impacts as well as adverse dust and air pollutants during construction.

Freeport LNG's Projects would not have any significant and readily identifiable cumulative impacts with other projects in the area. While some additive effects would occur, no compounding effects have been identified. Many such effects would be precluded by the degree of geographic separation between the various projects, which is also the case with visual impacts. Construction and operation of the Projects along with other facilities would produce impacts additive to the existing air quality problems in Brazoria County; however we conclude that the Projects would not be the primary cause of any violation of the NAAQS.

With respect to socioeconomic factors, Freeport LNG's Projects would contribute to cumulative impacts as a result of the increased demand for housing for construction workers in the nearby are and there would be associated additional burdens on road usage and public services.

However, these impacts would essentially be additive rather than compounding. Some socioeconomic impacts on the Town of Quintana would be positive such as the additional tax base. Overall, cumulative impacts associated with Freeport LNG's Projects should not result in significant additional burdens on public services, housing, or other socioeconomic factors in Freeport, Brazosport, and across Brazoria County.

Conclusions

Construction and operation of Freeport LNG's Liquefaction Project and the Phase II Modification Project would result in mostly temporary and short-term environmental impacts. Based upon the mitigation that Freeport LNG has identified, and our recommendations, we conclude that the Projects would be in compliance with the ESA, the NHPA, the CAA, and the CZMA.

We further conclude that if the Liquefaction Project and the Phase II Modification Project are constructed and operated in accordance with Freeport LNG's application, proposed mitigation, and our recommendations presented in section 5.15 of the final EIS, the Projects would result in some adverse environmental impacts. The impacts would not be significant except for the traffic and noise impacts on the residents of the Town of Quintana during construction. The principal reasons for our decision include:

- the site of the Liquefaction Plant would be an expansion of an existing, operating LNG import terminal with existing LNG storage tanks and berthing and loading/unloading facilities;

- Freeport LNG would implement its dredging plan to minimize impacts on in-water resources, implement the use of Freeport LNG's Procedures to minimize construction impacts on soils, wetlands, and waterbodies, and use the HDD method to minimize impacts on wetlands and waterways;

- adequate safety features would be incorporated into the design and operation of the Projects;

- the Pipeline/Utility Line System follows the existing sendout pipeline and would be contained within the already disturbed right-of-way;

- the Projects would have no effect or would be not likely to adversely affect any federally or state-listed threatened or endangered species;

- air emissions from the Projects would not exceed the NAAQS, and noise and vibration impacts would be minimized as much as practicable; and

- the FERC's environmental and engineering inspection and mitigation monitoring program for the Projects would ensure compliance with all mitigation measures and conditions of any FERC Authorization.

INTRODUCTION

SECTION 1

1.0 INTRODUCTION

The staff of the Federal Energy Regulatory Commission (FERC or Commission) prepared this final Environmental Impact Statement (EIS) to assess the environmental impacts associated with the construction and operation of facilities proposed by Freeport LNG[3] in accordance with the requirements of the National Environmental Policy Act (NEPA). The proposed liquefied natural gas (LNG) facilities would be located in Brazoria County, Texas.

Freeport LNG submitted two applications to the Commission for authorization to (1) modify previously authorized facilities on Quintana Island known as the Phase II Modification Project in Docket No. CP12-29-000, and (2) develop new liquefaction and LNG export facilities known as the Liquefaction Project in Docket No. CP12-509-000 (collectively called Projects). This final EIS analyzes the effects of these two interconnected projects. This final EIS was prepared to respond to comments received on this draft EIS. The Commission will use this final EIS in its decision-making process to determine whether to authorize Projects.

The FERC is the federal agency responsible for evaluating applications to construct and operate interstate natural gas facilities. We[4] prepared this final EIS in compliance with the requirements of NEPA and the Council on Environmental Quality (CEQ) regulations for implementing NEPA (Title 40 Code of Federal Regulations [CFR] Parts 1500-1508), and the Commission's regulations for implementing the NEPA (Title 18 CFR Part 380).

The vertical line in the margin identifies text that is new or modified in this final EIS and differs materially from corresponding text in the draft EIS. Changes were made to address comments from cooperating agencies and other stakeholders on the draft EIS, incorporate modifications to the Projects after publication of the draft EIS, update information included in the draft EIS, and incorporate information filed by Freeport LNG in response to our recommendations in the draft EIS and our environmental information request. As a result of the changes, six of the recommendations identified in the draft EIS are no longer applicable to the Project and do not appear in this final EIS. In addition, six recommendations identified in the draft EIS have been substantively modified in the final EIS, and four new recommendations have been added to the final EIS.

The U.S. Department of Energy (USDOE), U.S. Environmental Protection Agency (USEPA), U.S. Department of Transportation (USDOT), the U.S. Army Corps of Engineers (USACE), and the National Oceanic and Atmospheric Administration (NOAA) - Office of Protected Resources are cooperating agencies for the development of the final EIS. A cooperating agency has jurisdiction by law or special expertise with respect to environmental impacts involved with the proposal, and is involved in the NEPA analysis.

[3] Refers to the collective applicants: Freeport LNG Development L.P., FLNG Liquefaction, LLC, FLNG Liquefaction 2, LLC, and FLNG Liquefaction 3, LLC

[4] "We," "us," and "our" refer to the environmental staff of the Office of Energy Projects.

1.1 REGULATORY BACKGROUND

The proposal involves the construction of facilities necessary to export LNG to foreign countries, and amending the operation of the previously authorized facilities, which requires Commission approval under Natural Gas Act (NGA) Section 3.[5] While Section 3(a) provides that an application shall be approved if the proposal "will not be inconsistent with the public interest," Section 3 also provides that an application may be approved "in whole or in part, with such modification and upon such terms and conditions as the Commission may find necessary or appropriate." Section 3(a) also provides that for good cause shown, the Commission may make supplemental orders as it may find "necessary or appropriate."

The USDOE has exclusive jurisdiction over the export of natural gas as a commodity. USDOE delegated to the Commission authority to approve or disapprove the construction and operation of particular facilities, the site at which such facilities would be located, and the place of entry for imports or exit for exports. However, the USDOE Secretary has not delegated to the Commission any authority to approve or disapprove the import or export of the commodity itself as part of the Commission's public interest determination.

Freeport LNG filed an application for the Phase II Modification Project on December 9, 2011 in Docket No. CP12-29-000 proposing to modify the following previously approved facilities:

- the LNG vessel berthing dock;
- the LNG transfer pipelines;
- the LNG unloading arms; and
- the access road system.

The Phase II Modification Project would enable Freeport LNG to import and export LNG at the Quintana Island terminal. Freeport LNG also proposes to eliminate the vaporization equipment that was proposed to increase the sendout capacity of its existing Quintana Island terminal. This action would eliminate the need for some of the associated support equipment, interdependent infrastructure, and appurtenant facilities that were previously authorized.

On January 5, 2011, the Commission staff granted Freeport LNG's request to use the FERC's pre-filing environmental review process and assigned the Liquefaction Project pre-filing Docket No. PF11-2-000. Subsequently, staff determined that the Phase II Modification Project was an interconnected action and would be analyzed in a single EIS with the Liquefaction Project.

On August 31, 2012, Freeport LNG filed an application under Section 3 of the NGA for the Liquefaction Project in Docket No. CP12-509-000, which would consist of multiple components, including facilities at and adjacent to the existing LNG terminal and facilities located beyond Quintana Island. The main liquefaction components, located at and adjacent to the existing LNG terminal, would consist of three propane pre-cooled mixed refrigerant liquefaction trains, each capable of producing a nominal 4.4 million metric tons per annum (mtpa) of LNG (13.2 mtpa in

[5] The regulatory functions of section 3 of the Natural Gas Act were transferred to the Secretary of Energy in 1977 pursuant to section 301(b) of the Department of Energy Organization Act. 42 U.S.C. § 7151(b) (2006).

aggregate) for export, which equates to a total liquefaction capacity of approximately 1.8 billion cubic feet per day (Bcf/d) of natural gas.[6] These trains and their support facilities are collectively referred to as the Liquefaction Plant. In addition to the Liquefaction Plant, Freeport LNG proposes to construct various facilities, both at and adjacent to the terminal and beyond Quintana Island, to support the liquefaction and export operation. These facilities include a proposed natural gas pretreatment plant (Pretreatment Plant) located about 2.5 miles north of the existing Quintana Island terminal, several interconnecting pipelines and utility lines including a 5-mile long, 12-inch-diameter boil-off-gas (BOG) feed gas line from the terminal to the Pretreatment Plant (Referred together as the Pipeline/Utility Line System), and appurtenant structures. The Liquefaction Plant, the Pretreatment Plant, and the Pipeline/Utility Line System, together with the associated appurtenant structures, are collectively referred to as the Liquefaction Project. Figure 1-1 shows the location of the existing and proposed Freeport LNG Liquefaction Project facilities and regional setting. Figures 1-2 and 1-3 show the Liquefaction Project proposed facility layout at the Quintana Island terminal and at the Pretreatment Plant, respectively. The layout for the Phase II Modification Project is shown in figure 1-4.

1.2 PROJECT PURPOSE

Freeport LNG indicates in its application that the proposed Liquefaction Project would allow for exportation of domestic natural gas to the global market and meet its contractual obligations.

The existing Freeport LNG facility was approved by the Commission for the sole purpose of importing foreign-sourced LNG, storing and re-vaporizing that LNG, and delivering natural gas to United States markets. The Phase II Modification Project would modify the existing terminal to meet Freeport LNG's plans for exportation of LNG under the Liquefaction Project.

Under Section 3 of the NGA, the FERC considers as part of its decision to authorize natural gas facilities, all factors bearing on the public interest. Specifically, regarding whether to authorize natural gas facilities used for importation or exportation, the FERC shall authorize the proposal unless it finds that the proposed facilities would not be consistent with the public interest.

1.2.1 U.S. Army Corps of Engineers

The Projects have a water-dependency purpose as it relates to the liquefaction and subsequent exportation of domestic natural gas. LNG vessels would be utilized to transport LNG to worldwide markets. The Projects requires marine berths for loading and unloading of LNG vessels for waterborne transport of LNG. A portion of the marine facilities required for the export of LNG are already operational and additional facilities would be constructed to support import or export of LNG.

[6] Each train is capable of producing 4.48 mtpa of LNG; beyond the 4.4 mtpa that would be available for export, the remaining 0.08 mtpa would become BOG to be used as fuel gas for the Pretreatment Plant or would constitute "unaccounted-for" gas in the liquefaction process.

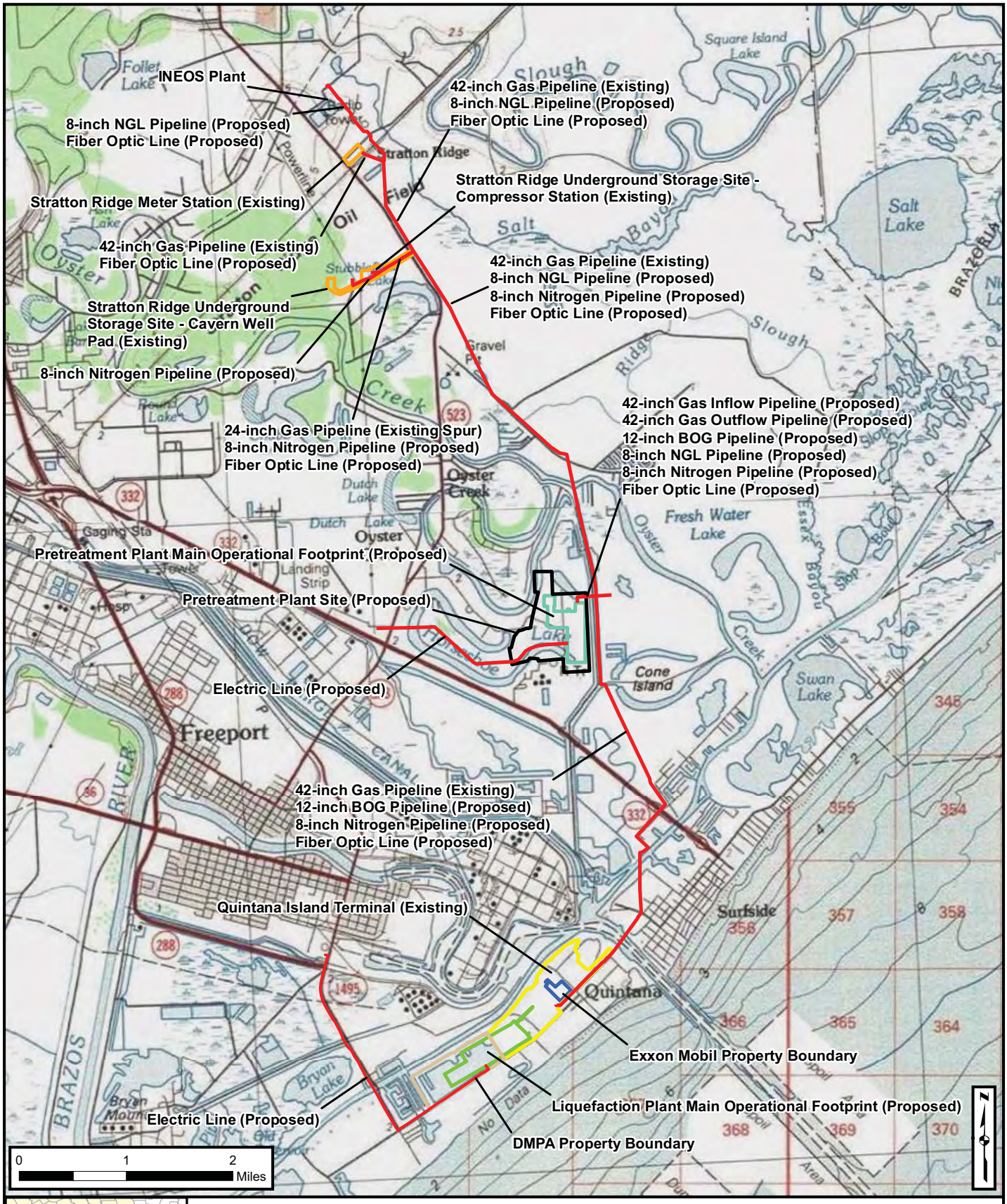


Figure 1-1
Freeport LNG - Liquefaction Project
Project Facilities - Regional Setting
Brazoria County, Texas

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Figure 1-2

Freeport LNG - Liquefaction Project

Proposed Liquefaction Facilities and Workspace Layout at and Adjacent to Quintana Island Terminal

Brazoria County, Texas

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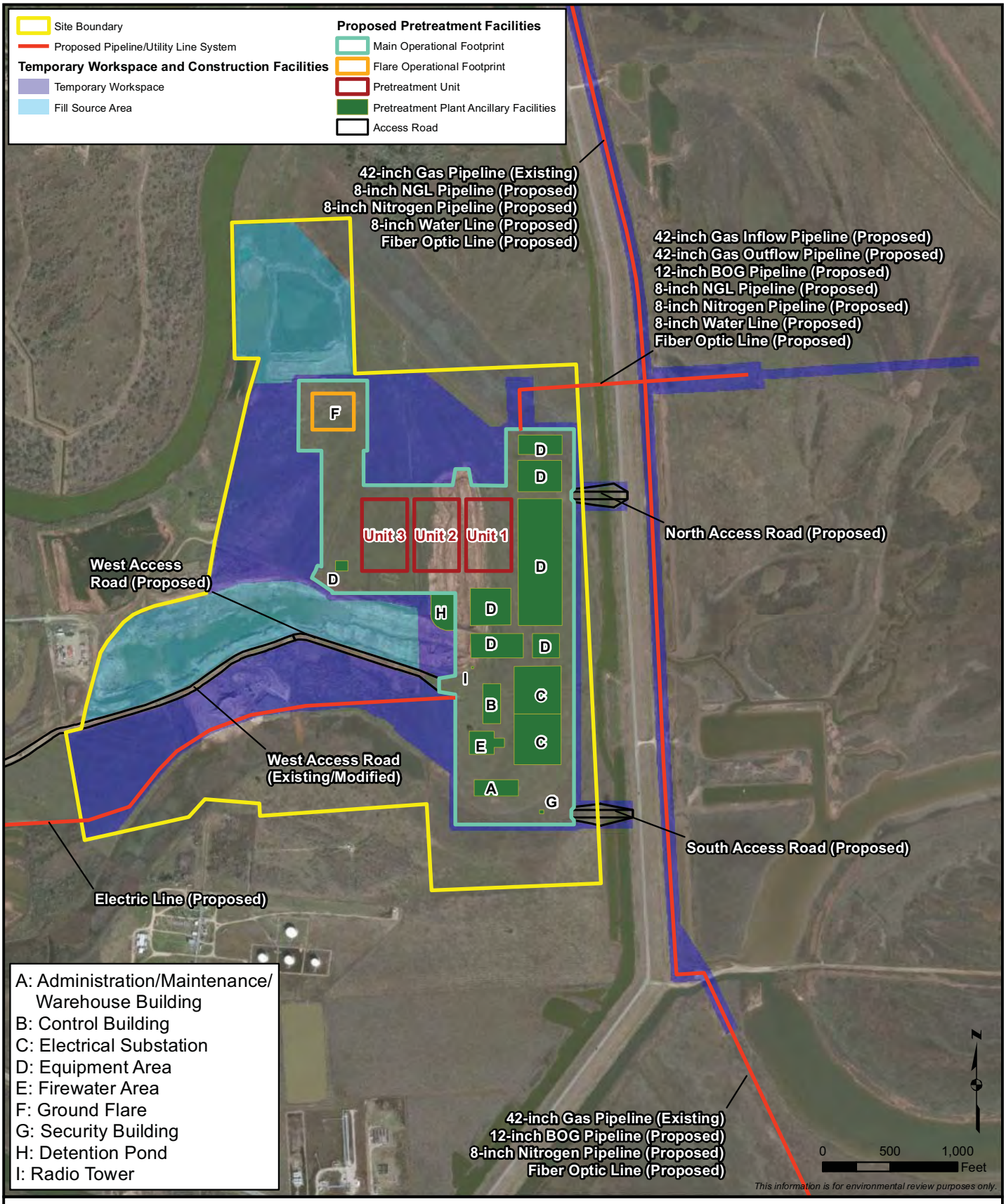


Figure 1-3

Freeport LNG - Liquefaction Project

Proposed Facilities and Workspace Layout at the Pretreatment Plant Site

Brazoria County, Texas

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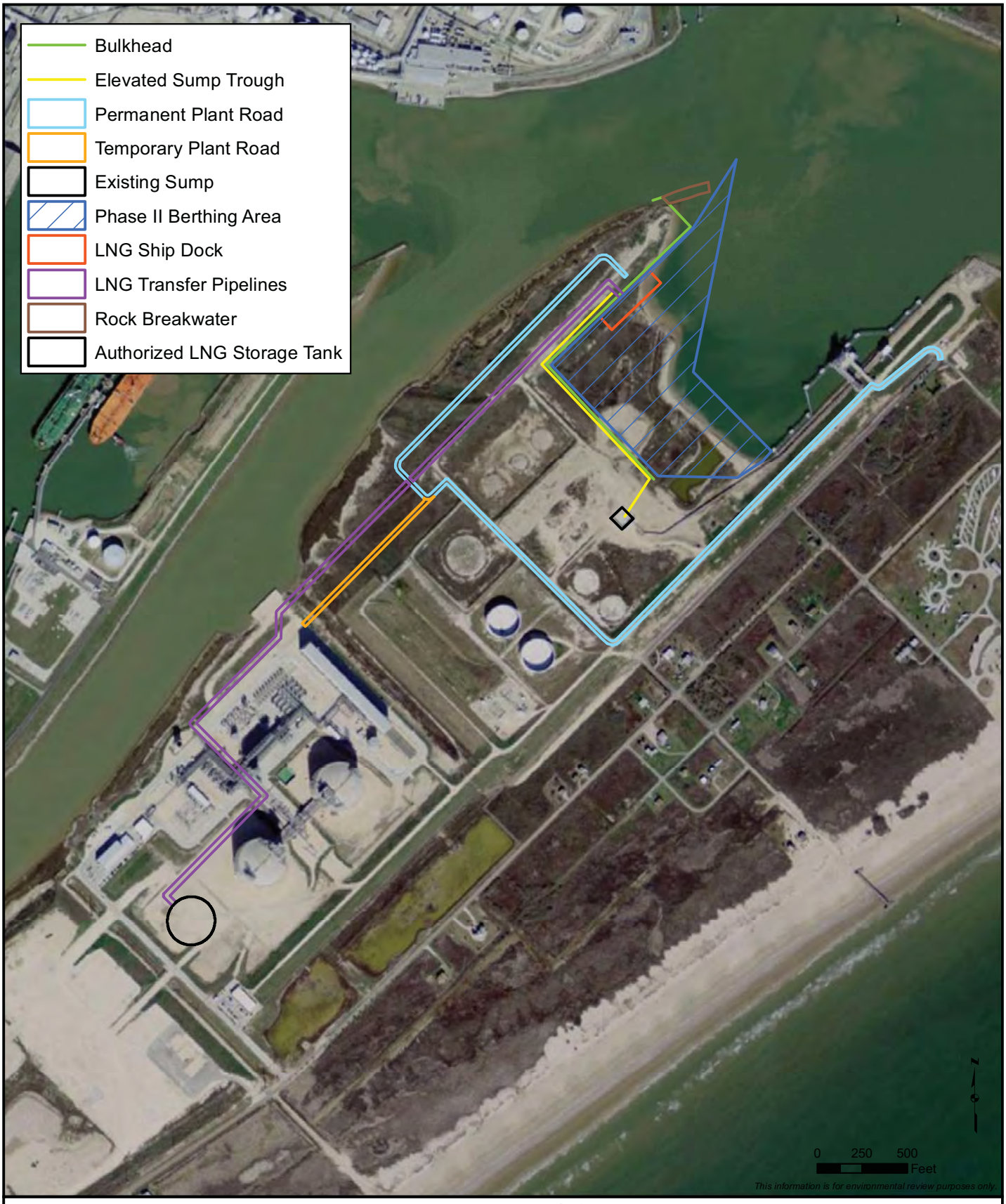


Figure 1-4

Freeport LNG - Phase II Modification Project

Proposed Facilities and Components at the Quintana Island Terminal

Brazoria County, Texas

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1.2.2 U.S. Department of Energy

The USDOE's Office of Fossil Energy must meet its obligation under Section 3 of the NGA to authorize the import and export of natural gas, including LNG, unless it finds that the import or export is not consistent with the public interest. The purpose and need for USDOE action is to respond to the Freeport LNG's application for authority to export LNG from the Quintana Island terminal under Dockets FE10-160-LNG, FE10-161-LNG, FE12-06-LNG, and FE11-161-LNG.

The USDOE is conducting its review under Section 3 of the NGA to evaluate the application for long-term, multi-contract authorization to export up to 2.8 Bcf/d of domestic natural gas as LNG for a 20-year period, commencing the earlier of the date of first export or five years from the date of issuance of the requested authorization. Freeport LNG seeks to export the LNG to any country: (1) with which the United States does not have a free trade agreement requiring the national treatment for trade in natural gas and LNG; (2) that has, or in the future develops, the capacity to import LNG; and (3) with which trade is not prohibited by U.S. law or policy.

The USDOE has approved Freeport LNG's application under Docket Nos. FE10-160-LNG, and FE12-06-LNG to allow up to 2.8 Bcf/d of natural gas to U.S. free-trade countries. In Order 3282 on May 17, 2013, contingent on FERC siting approval, the USDOE approved export of up to 1.4 Bcf/d of natural gas to non-free-trade countries. Application FE11-161-LNG, for the export of an additional 1.4 Bcf/d of natural gas to non-free-trade countries received conditional approval by USDOE on November 15, 2013 for 0.4 Bcf/d, which in total would allow Freeport LNG to export 1.8 Bcf/d to non-free-trade countries (and 2.8 Bcf/d to free-trade countries). Freeport LNG's FERC application is for 1.8 Bcf/d, and if Freeport LNG proposed to export more than this amount, it would be required to submit an additional application to the FERC.

1.3 PURPOSE AND SCOPE OF THE EIS

This final EIS was prepared to respond to comments received on the draft EIS. The distribution list for this final EIS is provided in appendix A.

Our principal objectives in preparing this final EIS are to:

- identify and assess potential impacts on the natural and human environment that would result from the implementation of the proposed actions;
- describe and evaluate reasonable alternatives to the proposed actions that would avoid or minimize adverse effects on the environment;
- identify and recommend specific mitigation measures, as necessary, to minimize the environmental impacts; and
- facilitate public involvement in identifying the significant environmental impacts.

The Commission will consider the findings of this final EIS as well as non-environmental issues in its review of these proposals to determine whether to authorize the Liquefaction Project and

the Phase II Modification Project. Environmental impact assessment and mitigation development are important factors in the overall public interest determination.

Under Section 3 of the NGA, the FERC considers as part of its decision to authorize natural gas facilities, all factors bearing on the public interest. Specifically, regarding whether to authorize natural gas facilities used for importation or exportation, the FERC shall authorize the proposal unless it finds that the proposed facilities would not be consistent with the public interest.

1.3.1 U.S. Environmental Protection Agency Role

The USEPA is tasked with implementation of the Clean Air Act (CAA). USEPA's greenhouse gas (GHG) Tailoring Rule, issued in May 2010, established thresholds for permitting GHG emissions under the CAA. Additional detail can be found in section 4.11 of this EIS. Freeport LNG, on December 21, 2011, filed an application with the USEPA Region VI office for a GHG Prevention of Significant Deterioration (PSD) Permit and USEPA issued the draft Permit on December 2, 2013. Freeport LNG has notified us that they intend to transfer the GHG PSD Permit to the Texas Council on Environmental Quality if the Texas GHG program is approved by the USEPA. If it is not approved, Freeport LNG would continue the permitting action through the USEPA. The USEPA is required to ensure that its GHG Permit (appendix B) would not violate the Endangered Species Act (ESA), Clean Water Act (CWA), and the National Historic Protection Act (NHPA). To ensure this, the USEPA has agreed to be a cooperating agency and will use this final EIS to document its compliance with the aforementioned laws.

1.3.2 U.S. Army Corps of Engineers Role

The Projects would impact areas within the Galveston District of the USACE. Wetlands in the area of the Projects are regulated at the federal and state levels. The USACE elected to cooperate in preparing this final EIS because it has jurisdictional authority pursuant to Section 404 of the CWA (33 United States Code [USC] 1344), which governs the discharge of dredged or fill material into water of the United States, and Section 10 of the Rivers and Harbors Act of 1899 (RHA) (33 USC 403), which regulates any work or structures that potentially affect the navigable capacity of a waterbody.

The USACE must comply with the requirements of the NEPA before issuing permits under these statutes. In addition, when a Section 404 discharge is proposed and a standard permit is required, the USACE must consider whether the proposed Section 404 discharge represents the least environmentally damaging, practicable alternative pursuant to the CWA Section 404(b)(1) guidelines. The USACE must also carry out its public interest review process before a standard permit can be issued. Although this final EIS addresses environmental impacts associated with the Projects as they relate the USACE's jurisdictional permitting authority, it does not serve as a public notice for any USACE permits or take the place of the USACE's permit review process.

1.3.3 U.S. Department of Transportation Role

Under 49 USC 60101, the USDOT has prescribed the minimum federal safety standards for LNG facilities. Those standards are codified in 49 CFR Part 193 and apply to the siting, design, construction, operation, maintenance, and security of LNG facilities. A portion of the National Fire Protection Association (NFPA) Standard 59A, "Standard for the Production, Storage, and Handling of Liquefied Natural Gas," is incorporated into these requirements by reference, with regulatory preemption in the event of conflict. In accordance with the 1985 Memorandum of Understanding (MOU) on LNG facilities and the 2004 Interagency Agreement on the safety and security review of waterfront import/export LNG facilities, the USDOT participates as a cooperating agency and assists in assessing any mitigation measures that may become conditions of approval for any project. USDOT staff has reviewed FERC staff's analysis and provided comments on our conclusions regarding compliance with the Part 193 regulations.

1.3.4 National Oceanic and Atmospheric Administration Role

The NOAA Office of Protected Resources (OPR) is a headquarters program office of NOAA's National Marine Fisheries Service (NOAA Fisheries), under the U.S. Department of Commerce, with responsibility for protecting marine mammals and threatened/endangered marine life. NOAA's OPR works to conserve, protect, and recover species under the ESA and the Marine Mammal Protection Act (MMPA).

To ensure that impacts on threatened/endangered species are minimized, the NOAA's OPR has agreed to be a cooperating agency and assist the FERC in ensuring that this final EIS documents compliance with the aforementioned laws.

1.4 PUBLIC REVIEW AND COMMENT

1.4.1 Liquefaction Project

As previous stated, on January 5, 2011, the FERC's Director of the Office of Energy Projects (OEP) granted Freeport LNG's request to utilize our Pre-Filing Process. This review process was established to facilitate and encourage early involvement by citizens, governmental entities, non-governmental organizations, and other interested parties. As part of this process, the FERC assigned the Liquefaction Project an individual Pre-Filing Docket No. PF11-2-000. During the Pre-Filing Process, we worked with Freeport LNG and stakeholders to identify and resolve issues, where possible, prior to Freeport LNG's filing of a formal application with the FERC.

As part of the Pre-Filing Process, Freeport LNG sent notification letters to landowners, government officials and the general public informing them about the Liquefaction Project and inviting them to attend Freeport LNG-sponsored open houses to acquire information, ask questions, and to express their comments and concerns. Notifications of the open houses were also published in local newspapers. Table 1.4.1-1 provides a list of public open houses held for the Liquefaction Project.

Table 1.4.1-1

List of Public Open Houses Held for the Freeport LNG Liquefaction Project

Date of Meeting	Meeting Location
February 23, 2011	Quintana Island terminal
February 24, 2011	Clute, TX
July 28, 2011	Quintana Island terminal
February 2, 2012	Lake Jackson, TX

1.4.2 Phase II Modification Project

Prior to filing its application for the Phase II Modification Project, Freeport LNG submitted to the Commission, on November 18, 2011, a request for a determination by the Director of the OEP that the Phase II Modification Project would not be subject to the Commission's otherwise mandatory Pre-Filing Process. On December 6, 2011, the Director of OEP issued a Letter Order finding that the proposal to modify the authorization granted by the September 26, 2006 Order would be exempt from the Commission's Pre-Filing Process because the number of LNG vessels ship-calls would not change and it would remain within the existing Quintana Island terminal.

Freeport LNG filed its application for the Phase II Modification Project on December 9, 2011, in Docket No. CP12-29-000. We issued a Notice of Application on December 21, 2011 indicating that the public comment period would close on January 11, 2012. We continued to receive and accept comments after the close of the comment period. After Freeport LNG filed the application, it was determined that the Phase II Modification Project may be used for both import and export activities and would be constructed concurrently with the Liquefaction Project. Thus, we are analyzing the Projects in this final EIS.

1.4.3 Public Scoping Period for Liquefaction Project and Phase II Modification Project

On August 11, 2011, we issued a *Notice of Intent to Prepare an Environmental Assessment for the Planned Liquefaction Project and Request for Comments on Environmental Issues and Notice of Public Scoping Meeting* (NOI). The NOI was mailed to interested parties, including federal, state, and local officials; agency representatives; conservation organizations; Native American tribes; local libraries and newspapers; and property owners in the area. On September 8, 2011, we conducted a scoping meeting in Lake Jackson, Texas to provide the public an opportunity for the public to learn about the Liquefaction Project, FERC's process, and provide comments on the record. Four members of the public provided comments at the scoping meeting.

Since the issuance of the August 11, 2011 NOI, Freeport LNG proposed changes to the facilities and the scope of our review has changed such that the staff determined that review of the Liquefaction Project would require an EIS. On July 19, 2012, we issued a *Supplemental Notice of Intent to Prepare an Environmental Impact Statement for the Planned Liquefaction Project, Request for Comments on Environmental Issues, and Notice of Public Scoping Meeting* (Supplemental NOI). This Supplemental NOI included both the Liquefaction Project and the Phase II Modification Project and was mailed to interested parties, including federal, state, and

local officials; agency representatives; conservation organizations; Native American tribes; local libraries and newspapers; and property owners in the area.

On August 9, 2012, we conducted a second public scoping meeting in Lake Jackson, Texas to provide an opportunity for the public to learn more about the newly proposed modifications to the proposed export terminal and Pretreatment Plant and to provide comments on environmental issues to be addressed in the EIS. Twenty four people commented at the meeting.

Issuance of the Supplemental NOI also opened the time period for receiving written comments and established a scoping closing date of August 20, 2012. The FERC continued to receive and accept comments after the close of the comment period. Prior to issuance of the draft EIS, we had received a total of 190 comment letters and two petitions (a petition in opposition signed by 323 people associated with the Liquefaction Project, and a second petition in opposition signed by 57 landowners from Quintana Island).

Issues identified during the public comment process and public meetings included: alternatives to the various project locations; concerns about safety such as the potential for fires, explosions, and spills, concerns about emergency response capability; the ability of the facility to withstand hurricanes and their associated storm surges; climate change; traffic impacts during construction, visual impacts, lighting impacts, noise and vibration during construction and operation, air emissions and concerns about air quality impacts on residents and wildlife.

Issues identified during the public scoping process that are within the scope of the environmental analysis are summarized in table 1.4.3-1 and are addressed in the applicable sections of this final EIS.

Table 1.4.3-1

Issues Identified During the Scoping Period

Issue	Specific Comments	final EIS Section Where Comments are Addressed
Alternatives	Consideration of alternatives that reduce impacts on fish and wildlife resources, relocate facilities to Freeport-owned industrial parcels (including Site A) and away from residential areas, consideration for alternative location adjacent to salt dome storage facility on Farm-to-Market (FM) Route 523.	3.0
Water Use and Quality	Impacts of increased vessel traffic on water quality; impacts on water quality as a result of air pollution; placement of proposed pipelines in proximity to one of Quintana's public water systems.	4.3
Surface Waters	Surface and groundwater contamination; effects of hurricane/storm surge and the washing of wastes/contaminated materials into surrounding community.	4.3.2
Wetlands	Wetland mitigation plan (*i.e.,* mitigation should benefit as many species as possible); loss of wetlands, contamination of wetlands as a result of hurricane/storm surge.	4.3.5
Vegetation	Impacts on native coastal prairie vegetation and submerged aquatic vegetation (SAV), invasive species control measures/plan.	4.4

Table 1.4.3-1

Issues Identified During the Scoping Period

Issue	Specific Comments	final EIS Section Where Comments are Addressed
Fish and Wildlife	Loss of important habitat; effects of habitat loss on survival of migratory birds; effects of habitat loss on productivity and diversity of bird species; effects to avian resources as a result of bird strikes on LNG storage tanks and other tall structures; impacts on aquatic resources (including discharge of ballast water); impacts on Brazoria County National Wildlife Refuge (NWR); consideration of construction windows to reduce impacts on migratory birds; donation of land to the City of Quintana in the amount Freeport LNG would be using to mitigate wildlife impacts.	4.5
Threatened, Endangered, and Special-Status Species	State threatened/endangered bird species use of Quintana Island habitats; impacts on federally and state-listed rare, threatened, and endangered species and their habitats within five miles of the Projects.	4.6
Land Use, Recreation, and Visual Resources	Loss of eco-tourism attractions (hot spot for neotropical migratory birds); interaction of recreational boat traffic and LNG vessels; relocation of boat ramp; loss of important farmland (soils); visual impacts on nearby residents (including light pollution); impacts on estuarine recreation (including businesses: Kirby Marina and Tempest Marine).	4.7
Socioeconomics	Effects of construction truck traffic on traffic levels, and on Quintana Island bridge traffic; loss of property values; lower quality of life for nearby residents/environmental justice issues, increased gas production/climate change issues; tax abatements would not benefit Freeport residents; few permanent jobs in facilities for local citizens; effects of increased shipping and marine traffic; economic effect of exporting resources that could be used domestically	4.8
Cultural Resources	Effects of the Projects on historic cemetery maintenance, and restoration efforts; availability and access to an existing cemetery given Freeport LNG's security concerns.	4.9
Reliability and Safety	Proximity of homes to proposed terminal site location; potential terrorism issues, public safety concerns (island does not have adequate evacuation route for residents, limited access for first responders, air pollution; fail safe valves on pipeline); increased demands on the United States Coast Guard for protection of shoreline security; hurricane/storm surge poses threat to facility.	4.10
Air Quality and Noise	Noise and air pollution from influx of construction workers; impacts on air quality both locally and cumulatively from Project facilities, air impacts from shipping and construction traffic; air and noise pollution effects on wildlife (especially birds); and construction and operational noise, vibration, and air pollution impacts on nearby residents.	4.11

1.4.4 Draft EIS Public Hearing and Public Comments

On March 14, 2014 we issued a Notice of Availability (NOA) on the draft EIS. The draft EIS was mailed to stakeholders on our environmental mailing list (see distribution list in appendix A) including landowners, the cooperating agencies, and those who previously made comments during the scoping process. In accordance with CEQ regulations, the Federal Register notice established a 45-day comment period ending on May 5, 2014; described procedures for filing comments on the draft EIS; and announced the time, date, and location of a public comment meeting on the draft EIS. These announcements also described how additional information on the proposed Projects could be obtained from the Commission's Office of External Affairs and on the FERC's Internet website.

On April 16, 2014, a public hearing was held in Lake Jackson, Texas to hear oral comments on the draft EIS. The meeting provided interested individuals including landowners and groups, an opportunity to present comments on the analysis of the environmental impacts of the proposed Projects as described in the draft EIS. Twenty-two individuals, of the approximately 110 members of the public in attendance, provided oral comments.

Issues identified at the public comment meeting included concerns about air pollution (including air toxics, greenhouse gases, deposition impacts and compliance with the air quality standards), safety and lack of an emergency response plan, construction traffic, noise, dust, lack of housing for construction workers, visual impacts, impacts on property values, water use and Freeport LNG's source of water, land use impacts, ability to safely build the facility on dredge spoils, impacts on the historic Town of Quintana, expanding the scope of the cumulative impact analysis and alternatives analysis, recreational impacts, noxious odors, and the positive impacts from job creation.

In addition to the public comment meeting, we held a public site visit the morning of April 17, 2014, during which time we met with local residents in the areas of Hide-Away on the Gulf, Turtle Cove, and Quintana Island. Landowners escorted us to areas where residents' viewsheds and ambient noise levels would be impacted by construction and operation of the Liquefaction Plant and the Pretreatment Plants. Verbal comments regarding water withdrawals from the local water supply, and air quality issues, were made. Quintana Island evacuation routes were pointed out to us and residents made verbal comments regarding the concerns about the evacuation routes and potential alternative sites. The Seaway Dredged Material Placement Area on Quintana Island was also visited.

We received 104 comment letters on the draft EIS as of May 30, 2014. The public hearing transcripts and all written comments on the draft EIS are part of the public record for the Projects. Comments received on the draft EIS and the FERC Staff's responses to these comments are provided in appendix L of the final EIS. Changes were made in the text of the final EIS in response to the comments on the draft EIS and in order to include updated information that became available following issuance of the draft EIS. In addition to the comment letters received, there were requests to extend the length of the comment period. We note that although FERC's public comment period began on March 14, 2014 and ended on May 5, 2014, we accepted comments on the final EIS up to May 30, 2014.

1.4.5 Final EIS

In accordance with CEQ regulations implementing NEPA, no agency decision on the proposed action may be made until 30 day after the EPA publishes a NOA of the final EIS in the Federal Register. However, CEQ regulations provide an exception to this rule when an agency decision is subject to a formal internal appeal process that allows other agencies or the public to make their views known. This is the case at the FERC, where any Commission decision on the proposed action would be subject to a 30-day rehearing period. Therefore, the FERC decision may be made and recorded concurrently with the publication of the final EIS.

1.5 NONJURISDICTIONAL FACILITIES

The facilities for the Liquefaction Project and the Phase II Modification Project that are under the FERC's jurisdiction are described in detail in section 2.0 of this final EIS. Occasionally, proposed projects have associated facilities not under the jurisdiction of the FERC. Nonjurisdictional facilities may be integral to the need for a proposed project or they may merely be associated as a minor, non-integral component of the jurisdictional facilities.

Our review of associated facilities for the Liquefaction Project identified the following nonjurisdictional components: a Natural Gas Liquid (NGL) pipeline, nitrogen pipeline, utility lines (electric, water, and fiber optic), and associated appurtenant facilities. The electric lines, including a 2.93-mile-long 138 kilovolt (kV) line that would serve the new Liquefaction Plant, would be installed on the same poles as the Quintana Island terminal's existing 69 kV electric transmission line.

The new 138 kV line supplying the Liquefaction Plant would connect with the Cortez substation on the south side of the Liquefaction Plant and would provide approximately 600 to 700 megawatts of power. Beyond this line installation, no substantial system upgrades would be required to supply the anticipated electric load. A proposed 2-mile-long, 138 kV electric line would connect the Pretreatment Plant with the existing electric transmission corridor and would be located about 1.6 miles west of the plant's operational footprint. The design, construction, and operation of the electric lines would be done by CenterPoint Energy.

The nonjurisdictional facilities may be authorized and regulated by federal, state, and local agencies other than the FERC. For example, the electric transmission lines at the terminal and the Pretreatment Plant would require approval from various authorities, including the Town of Quintana, the City of Oyster Creek, the Texas Public Utility Commission (PUC), and, if waters of the U.S. are affected, the USACE. However, to facilitate a complete and thorough environmental review, we have identified the environmental impacts for the associated nonjurisdictional facilities, and these are discussed throughout section 4.0.

1.6 PERMITS, APPROVALS, AND REGULATORY REQUIREMENTS

As the lead federal agency for the Projects, the FERC is required to comply with Section 7 of the ESA, the Magnuson-Stevens Fishery Conservation and Management Act (MSA), Section 106 of the NHPA, General Conformity under the CAA, and the Coastal Zone Management Act (CZMA). Each of these statutes has been taken into account in the preparation of this document.

Section 7 of the ESA, as amended, states that any project authorized, funded, or conducted by any federal agency (*e.g.*, FERC) should not pose "… adverse modification of habitat of an endangered or threatened species that is determined to be critical habitat." (16 USC Section 1536(a)(2)(1988)). The FERC, or Freeport LNG as a non-federal party, is required to consult with the U.S. Fish and Wildlife Service (FWS) and NOAA Fisheries to determine whether any federally-listed or proposed threatened/endangered species or their designated critical habitat occur in the vicinity of the proposed Project. Formal consultation is required if an action is likely to "adversely affect" listed species and designated critical habitat. The FERC is then

required to prepare a Biological Assessment (BA) to identify the nature and extent of adverse impact, and to recommend measures that would avoid the habitat and/or species, or would reduce potential impacts to acceptable levels. If, however, the FERC determines that no federally-listed or proposed threatened/endangered species, or their designated critical habitat, would be affected by the proposed Project, no further action is necessary under the ESA. We request that the FWS and NOAA accept the information provided in this EIS as the BA for the Projects. See section 4.6 of this final EIS for the status of this review.

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under federal Fishery Management Plans (FMPs). The MSA requires federal agencies to consult with NOAA Fisheries on all actions or proposed actions authorized, funded, or undertaken by the agency that may adversely affect EFH (MSA Section 305(b)(2)). Although absolute criteria have not been established for conducting EFH consultations, NOAA Fisheries recommends consolidating EFH consultations with interagency coordination procedures required by other statutes, such as the NEPA, or the ESA (50 CFR 600.920(e)) in order to reduce duplication and improve efficiency. As part of the consultation process, we prepared an EFH Assessment included in section 4.5.5 of this final EIS.

Section 106 of the NHPA requires the FERC to take into account the effects of its undertakings on properties listed in or eligible for listing in the National Register of Historic Places (NRHP) and to afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on the undertaking. The FERC has requested that Freeport LNG, as a non-federal party, assist in meeting the FERC's obligation under Section 106 by preparing the necessary information and analyses as required by the ACHP regulations at 36 CFR 800. See section 4.9.4 of this final EIS for the status of this review.

The CZMA calls for the "effective management, beneficial use, protection, and development" of the nation's coastal zone and promotes active state involvement in achieving those goals. As a means to reach those goals, the CZMA requires participating states to develop management programs that demonstrate how these states would meet their obligations and responsibilities in managing their coastal areas. In the state of Texas, the Texas Coastal Zone Management Program (CZMP) is responsible for administering the CZMA. The CZMA provides that states have the authority to review federal projects to determine whether activities are consistent with their coastal management program. If a state finds that the activity is not consistent, the federal agency may not authorize the activity. Freeport LNG is responsible for preparing and submitting an application that establishes the Liquefaction Project's consistency with the enforceable policies contained in the CZMP. See section 4.7.4 of this final EIS for additional discussion of the Texas CZMP.

At the federal level, required permits and approval authority outside of the FERC's jurisdiction include compliance with the CWA, the RHA, the CAA, and U.S. Coast Guard (USCG) regulations relating to LNG waterfront facilities. All major permits, approvals, and consultations that may be required for the proposed actions are identified in table 1.6-1. The FERC encourages cooperation between applicants and state and local authorities, but this does not mean that state and local agencies, through application of state and local laws, may prohibit or

unreasonably delay the construction or operation of facilities approved by the FERC. Any state or local permits issued with respect to jurisdictional facilities must be consistent with the conditions of any authorization issued by the FERC.[7]

[7] See, *e.g.*, Schneidewind v. ANR Pipeline Co., 485 U.S. 293 (1988); National Fuel Gas Supply v. Public Service Commission, 894 F.2d 571 (2d Cir. 1990); and Iroquois Gas Transmission System, L.P., *et al*., 52 FERC 61,091 (1990) and 59 FERC 61,094 (1992).

Table 1.6-1

Permits, Approvals, and Clearances for Liquefaction Project and Phase II Modification Project

Agency	Permit/Approval - Regulatory Scope	Project / Facility Applicability	Authorization/ Interaction Required	Status
FEDERAL				
USDOE, Office of Fossil Energy	Section 3 – Natural Gas Act (NGA) Export Authorization	Liquefaction Project	Authorization	Filing Date: December 17, 2010 Free Trade Agreement (FTA) Countries Export Order Issuance Date: February 10. 2011 1st Non-FTA Countries Anticipated Authorization Issuance Date: May 17, 2013 2nd Non-FTA Countries Authorization Issuance Date: November 15, 2013
FERC	Section 3 - NGA	Liquefaction Project	Authorization	Filing Date: August 31, 2012 FERC Review in Process
		Modification Project	Authorization	Filing Date: December, 9, 2011 FERC Review in Process
USACE – Galveston District Regulatory Branch	Section 404 – Clean Water Act Section 10 Rivers and Harbors Act	Liquefaction & Phase II Modification Projects	New permit for Liquefaction Project and Phase II Modification Project	Filing Date: June 14, 2013 Anticipated Authorization Date: September 2014
USACE - Galveston District Real Estate Division and Office Counsel		Liquefaction & Phase II Modification Projects	Approval/ Coordination for Dredge Spoil Disposal (For new LNG berthing dock, new construction dock, and new firewater intake structure)	Anticipated Filing Date: December 20, 2013 Anticipated Authorization Date: September 2014
NOAA Fisheries – Habitat Conservation Division	Section 7 – Endangered Species Act Magnuson- Stevens Fishery Conservation and Management Act Marine Mammal Protection Act	Liquefaction & Phase II Modification Projects	Consultation	Consultation Process ongoing
NOAA Fisheries - Protected Resources Division		Liquefaction & Phase II Modification Projects	Consultation	Consultation Process ongoing

Table 1.6-1

Permits, Approvals, and Clearances for Liquefaction Project and Phase II Modification Project

Agency	Permit/Approval - Regulatory Scope	Project / Facility Applicability	Authorization/ Interaction Required	Status
FWS	Section 7 – Endangered Species Act Migratory Bird Treaty Act	Liquefaction & Phase II Modification Projects	Consultation	Consultation Process ongoing
USEPA - Region VI	Section 402 – Clean Water Act – National Pollutant Discharge Elimination System	Liquefaction & Phase II Modification Projects	Industrial Storm Water Permit	Coordinating with USEPA on renewal of existing National Pollutant Discharge Elimination System (NPDES) permits and permitting of Liquefaction Plant
		Liquefaction Project	Process Waste Water Discharge Permit	Anticipated Filing Date: December2016 Anticipated Authorization Date: June 2017
		Liquefaction & Phase II Modification Projects	Storm Water Construction Permit	Anticipated Filing Date (Notice of Intent): August 2014 Anticipated Authorization Date: August 2014 Plan (SWPPP) to cover all project facilities)
	40 CFR 52 GHG Tailoring Rule – Federal Implementation Plan	Liquefaction Project	Prevention of Significant Deterioration (PSD) Permit for GHG Emissions	Filing Date (Original Application): December 16, 2011 Draft PSD Permit Issues: December 2013 Anticipated Authorization Date: September 2014 ***Application being moved to TCEQ jurisdiction***
U.S. Department of Homeland Security – U.S. Coast Guard	33 CFR 127, Waterfront Facilities Handling Liquefied Natural Gas and Liquefied Hazardous Gas	Liquefaction & Phase II Modification Projects	Letter of Recommendation	Not required - authorization complete
STATE				
Railroad Commission of Texas (RRC) with notification to EPA	NPDES Storm Water Construction Permit	Liquefaction & Phase II Modification Projects	Permit	Anticipated Filing Date (Notice of Intent): August 2014 Anticipated Authorization Date: August 2014 (Amended permit and SWPPP to cover all project facilities)

Table 1.6-1

Permits, Approvals, and Clearances for Liquefaction Project and Phase II Modification Project

Agency	Permit/Approval - Regulatory Scope	Project / Facility Applicability	Authorization/ Interaction Required	Status
Railroad Commission of Texas	Coastal Management Plan Consistency Determination	Liquefaction & Phase II Modification Projects	Review	Filing Date: June 14, 2013 Anticipated Authorization Date: July 2014
	Section 401 Water Quality Certification	Liquefaction & Phase II Modification Projects	Certification (concurrent with Section 404 Permit)	Filing Date: June 14, 2013 Anticipated Authorization Date: July 2014
	Hydrostatic Discharge Permit	Liquefaction Project	Permit	Anticipated Filing Date: July 2015 Anticipated Authorization Date: October 2015
	Organization Report and Operator Number (P-5)	Liquefaction Project	Registration	Anticipated Filing Date: December 2015 Anticipated Authorization Date: May 2015
	Permit to Operate a Pipeline (T-4)	Liquefaction Project	Permit	Anticipated Filing Date: December 2015 Anticipated Authorization Date: May 2015
	New Construction Report (PS-48)	Liquefaction Project	Permit	Anticipated Filing Date: December 2015 Anticipated Authorization Date: May 2015
	Texas Intrastate Pipeline Questionnaire (PS-8000A)	Liquefaction Project	Questionnaire	Anticipated Filing Date: December 2015 Anticipated Authorization Date: May 2015
Texas Commission for Environmental Quality (TCEQ) - Air Permits Division	30 Texas Administrative Code (TAC) Chapter 116 - Permit to Construct	Liquefaction Plant	New Source Review (NSR) Pre-construction Air Permit	Filing Date: December 20, 2011 Anticipated Authorization Date: April 2014
	30TAC Chapter 116 - Permit to Construct	Pretreatment Plant	NSR Pre-construction Air Permit	Filing Date (Amended Application): July 18, 2012 Anticipated Authorization Date: April 2014
	40 CFR 52 GHG Tailoring Rule – Federal Implementation	Liquefaction Project	Prevention of Significant Deterioration (PSD) Permit for GHG Emissions	Filing Date (Original Application): December 16, 2011 Draft PSD Permit Issues: December 2013 Anticipated Authorization Date: September 2014

Table 1.6-1

Permits, Approvals, and Clearances for Liquefaction Project and Phase II Modification Project

Agency	Permit/Approval - Regulatory Scope	Project / Facility Applicability	Authorization/ Interaction Required	Status
	Plan			***Application being from USEPA jurisdiction***
	30 TAC Chapter 122 – Operating Permit	Liquefaction Plant	Title V Site Operating Permit	Filing Date: August 29, 2011 Authorization Date: November 8, 2011
	30 TAC Chapter 122 – Operating Permit	Pretreatment Plant	Title V Site Operating Permit	Anticipated Filing Date: November 2015 Anticipated Authorization Date: September 2016
Texas TCEQ	Temporary Water Use Appropriatio n Permit	Liquefaction Project	Permit	Anticipated Filing Date: August 2014 Anticipated Authorization Date: December 2014
Texas Parks and Wildlife Department (TPWD)	Listed Species Clearance	Liquefaction & Phase II Modification Projects	Clearance	Consultation ongoing Anticipated authorization date concurrent with draft EIS issuance
Texas Historical Commission - State Historic Preservation Office	Section 106 National Historic Preservation Act Consultation	Phase II Modification Project	Consultation	Consultation Letter sent: December 9, 2011 Receipt of Comment: December 14, 2011
		Liquefaction/ Pipelines & Utilities	Consultation	Informational Update Letter and Request for Clearance sent: April 20, 2012 Receipt of Comment: May 8, 2012
		Pretreatment	Consultation	Request for Clearance sent: June 18, 2012 Receipt of Comment: July 3, 2012
Public Utility Commission of Texas	Certificate of Convenience and	Liquefaction Project	Authorization	Filing Date (by CenterPoint): October 2012 Authorization Date: January 2014

Table 1.6-1

Permits, Approvals, and Clearances for Liquefaction Project and Phase II Modification Project

Agency	Permit/Approval - Regulatory Scope	Project / Facility Applicability	Authorization/ Interaction Required	Status
LOCAL				
Brazoria County	Building Permits	Liquefaction & Phase II Modification Projects	Permit	Anticipated Filing Date: January 2014 Anticipated Authorization Received: February 2014
Brazoria County Floodplain Administrator	Permit for Construction in a Zone "VE" or Variance as: functionally dependent use"	Liquefaction & Phase II Modification Projects	Permit or Variance	Anticipated Filing Date: August 2014 Anticipated Authorization Date: Oct 2014
Velasco Drainage District	Levee/Ditch Crossing Permit Section 408 Clearance for CR 690 Levee from COE through Velasco Drainage District as a precursor to Levee/Ditch Crossing Permit	Liquefaction Project	Permit	Filing Date: August 2014 Anticipated Authorization Date: October 2014

DESCRIPTION OF THE PROPOSED ACTION

SECTION 2

2.0 DESCRIPTION OF THE PROPOSED ACTION

The Liquefaction Project and Phase II Modification Project would involve the construction and operation of the Liquefaction Plant, Pretreatment Plant, other aboveground facilities and associated pipeline and utilities. The environmental analysis contained in this final EIS evaluates the facilities proposed for both the Liquefaction Project and the Phase II Modification Project.

2.1 LIQUEFACTION PROJECT

2.1.1 Liquefaction Plant

As indicated in figure 1-2, the Liquefaction Plant would be located on Quintana Island near Freeport, Texas, on the west end of the existing terminal and on adjacent industrial-zoned property that was formerly a dredged material placement area (DMPA).

The Liquefaction Plant consists of three liquefaction trains (Trains 1, 2, and 3) positioned in parallel and occupying a 2,140-foot-long by 860-foot-wide rectangular footprint west of the existing process area. Most of the Train 1 footprint, along with various ancillary facilities (utility area, maintenance/warehouse building, reception building, control room, security building, electric substations, fire suppression foam system, LNG containment sump, standby generator, trucking unloading area, car parking areas), would be located on the existing terminal property, in an area where more than two thirds of the acreage constituted temporary construction workspace during Phase I terminal construction.

The remainder of the Train 1 footprint and the entire Train 2 and Train 3 footprints, along with various ancillary facilities (electric substations, propane and mixed refrigerant storage area, liquefaction ground flare, truck unloading area, guard house), would be located adjacent to and beyond the western boundary of the existing terminal property. Construction and start-up of the initial liquefaction train (Train 1) and the first pretreatment train at the Pretreatment Plant is expected to be completed in approximately 48 months. Completion and start-up of each additional liquefaction and pretreatment train (Trains 2 and 3) is expected to sequentially follow Train 1 at approximately 6-9 month intervals.

In addition to the three liquefaction trains, aboveground infrastructure would include chemical and utility storage units, pipe racks and pipes, LNG troughs and an associated sump, a ground flare, a control room, a guard house, a security building, a reception building, a maintenance building, a warehouse/office building, a fire suppression unit, three electric substations, plant roads, and a ground flare.

Process cooling for the liquefaction trains would be provided by conventional air coolers (fin fans), arranged in longitudinal rows alongside each train. Each train would have independent electric motor-driven refrigeration compressors and other compressors. Refrigerant storage would be common for all three trains.

New process equipment and structures outside of the Liquefaction Plant would include two blowers (one at each LNG berthing dock [existing Phase I and proposed Phase II]) and four BOG

compressors (one regular compressor and three booster compressors in tandem in the Phase I process area), together with natural gas piping, nitrogen piping, LNG piping/troughs, and fiber optic cabling between the Liquefaction Plant and process area facilities (existing Phase I and proposed Phase II) to the east. A narrow walkway would be constructed over the existing drainage channel that would otherwise separate the Phase I administration building from the Liquefaction Plant's administration building to the east. The driveway would facilitate pedestrian and cart access between the two buildings.

The Liquefaction Project would include a new permanent construction dock located on the south shore of the Intracoastal Waterway (ICW), near the northwest corner of the Liquefaction Plant site. The existing shoreline would be recessed to accommodate the 300-foot-long by 60-foot-wide concrete dock platform, which would be mounted on piles. Land access would be provided by a new permanent plant road between the dock and the Liquefaction Plant. A new permanent firewater intake structure would be located on the south shore of the ICW also. The structure would consist of a 50-foot-long by 20-foot-wide concrete platform mounted on piles. The platform would support two diesel-driven pumps to withdraw water at the 5,000 gallons per minute (gpm) rate required for fire suppression.

A stormwater collection basin approximately 1,130 feet long by 945 feet wide would be constructed in the northwest corner of the former DMPA. This basin would receive stormwater from the western sector of the Liquefaction Plant site during construction and operation. Stormwater would be discharged to the ICW through an outfall located at the north end of the basin. No modifications are proposed to the levee system as part of the Liquefaction Project or the Phase II Modifications.

The major components associated with the new Liquefaction Plant would include three propane pre-cooled mixed refrigerant LNG trains (Trains 1, 2, and 3), capable of liquefying a total of 1.8 Bcf/d of natural gas, producing up to 4.48 mtpa of LNG and including or sharing the following:

- multi-stage mixed refrigerant compressors with electric motor drivers;
- multi-stage propane compressors with electric motor drivers;
- heat exchangers;
- storage for propane refrigerant, and make-up ethylene;
- nitrogen utility unit;
- plant air utility unit;
- stormwater system;
- firewater system;
- fire and gas detection and safety systems;
- control systems and electrical infrastructure;
- utilities and distribution systems;
- metering facilities for gas and LNG;
- piping, pipe racks, LNG troughs, foundations, and ancillary structures;
- LNG sump;
- refrigerant sump;
- control room;

- maintenance building;
- warehouse/office building;
- security building;
- reception building;
- utility area;
- flare; and
- electric substations (3).

The new Liquefaction Plant site modifications would include:

- augmentation of soils;
- addition of new piles and paving;
- addition of new plant roads;
- addition of a temporary concrete batch plant;
- addition of new truck unloading and turning areas; and
- addition of a stormwater collection basin.

In addition, other supporting facilities would be necessary, including:

- two blowers, one at the existing Phase I marine berthing dock and one at the authorized (but yet to be constructed) Phase II marine berthing dock;
- replacement installation of higher capacity in-tank pumps;
- an aggregate barge dock on the ICW;
- a construction dock and fire water intake structure on the ICW;
- one BOG compressor at Phase I process area;
- three BOG booster compressors at Phase I process area;
- the expansion and integration of electrical systems, lighting systems, security systems, emergency shutdown (ESD) system, telecom, information technology, closed-circuit television, potable and service water systems;
- the integration with LNG transfer lines;
- modifications and expansion of plant roads; and
- Seaway DMPA laydown area.

2.1.2 Pretreatment Plant Facilities

The proposed Pretreatment Plant site is located about 2.5 miles northeast of Freeport, Texas and 2.5 miles north of Quintana Island. The is located west of County Road (CR) 690, about 0.7 mile north of the intersection of CR 690 and State Highway (SH) 332. (See figure 1-3).

The proposed Pretreatment Plant would occupy an operational footprint of approximately 113.4 acres in the eastern sector of a 276.3-acre property for which Freeport LNG has secured a purchase option. The main plant footprint would include three natural gas pretreatment units (Units 1, 2, and 3) located in parallel in the northwest section and various support facilities. The ground elevation of the main plant footprint would be raised from an average of three feet above mean sea level (amsl) to approximately eight feet amsl.

The only facilities outside of the Pretreatment Plant's elevated main footprint would be a ground flare system consisting of a flare for the pressure relief vent (with associated aboveground piping) and the emergency NGL flare (with associated aboveground piping). The ground flare system would be located approximately 400 feet to the north of Unit 3. One new approximately 400-foot-long access road and one new approximately 450-foot-long access road would respectively connect the northern and southern sectors of the plant to CR 690 directly to the east. An existing private road extending north and east from SH 332 to the property would be modified and extended through the property to provide site access from the west.

The Pretreatment Plant would be connected to Freeport LNG's existing 42-inch-diameter natural gas sendout pipeline, which extends from the Stratton Ridge meter station to the Quintana Island terminal and runs about 630 feet east of the plant fence line, in the eastern Velasco Ditch. This borrow ditch fringes the eastern side of the Velasco Levee and CR 690. CR 690 is situated atop of the Velasco Levee; both the road and the levee would be crossed at one location by the various pipelines and utility lines (excluding the electric line) that would connect the Pretreatment Plant with the Liquefaction Plant and other facilities. These latter facilities include the sendout pipeline itself, a new gas inflow pipeline that would deliver gas from the sendout pipeline to the Pretreatment Plant and a new gas outflow pipeline that would deliver treated gas back to the sendout pipeline for transportation to the Liquefaction Plant.

The following is a detailed list of the major components associated with the proposed Pretreatment Plant:

- natural gas pretreatment units (Units 1, 2, and 3) each containing;
    - amine sweetening system to remove carbon dioxide (CO_2) and sulfur compounds;
    - mercury removal unit (in-line unit);
    - molecular sieve dehydration system to remove water;
    - electric compression units; and
    - miscellaneous storage vessels;
- storage for amine solution, aqueous ammonia, liquid nitrogen, heating medium, slop, and treated (demineralized) water;
- NGL removal unit;
- ground flare (combined emergency NGL and pressure relief vent flares);
- combustion turbine/heat recovery system;
- two emergency electric generators;
- firewater pump system;
- control room;
- maintenance building;
- administration building;
- security building;
- two electric substations;
- utility areas; and
- three access roads.

2.1.3 Pipeline/Utility Line System

The Pretreatment Plant would receive gas via a 0.51-mile-long, 42-inch-diameter inflow pipeline that would tie in with the existing 42-inch-diameter sendout pipeline and run east for 0.16-mile, then west and south for 0.35-mile, crossing the Velasco Levee and the northern fence line of the Pretreatment Plant. This looped configuration is necessary for all the pipelines and utility lines that cross the levee, to maintain a 300-foot separation (stipulated by the Velasco Drainage District) between the centerline of the levee and the exit points for the horizontal directional drills (HDDs) that would be used to cross the levee. The standard operating pressure of the incoming gas would be 700 pounds per square inch gauge (psig).

After treatment, the gas would be run through an on-site compressor to increase its pressure to approximately 1,100 psig and would then be delivered back into the sendout pipeline via a 42-inch-diameter outflow. Feed gas to provide power for the pretreatment turbine would be derived from the BOG that originates at the LNG storage tanks at the terminal. The BOG would be transported from the terminal to the Pretreatment Plant via the proposed 12-inch-diameter, 5.1-mile-long BOG pipeline.

In addition to the removal of trace constituents, the liquefaction process requires that the heavier hydrocarbon components of the source gas be removed. These NGLs (butanes, pentanes, and ethane) would be removed at the Pretreatment Plant and transported north to the INEOS Group Limited (INEOS) Plant for commercial use via the proposed 8-inch-diameter, 6.2-mile-long NGL pipeline.

Both the Pretreatment Plant and the terminal would require nitrogen for purging. Of the total 3.4 million standard cubic feet per day (MMscfd) of nitrogen required, 2.8 MMscfd (82 percent) would be supplied to the terminal and 0.6 MMscfd (18 percent) would be supplied to the Pretreatment Plant.

The nitrogen would be obtained from an interconnection with the existing Air Liquide nitrogen pipeline that is located in the multi-pipeline corridor running north-south about 750 feet west of the compressor station at Freeport LNG's Stratton Ridge underground storage site. This interconnect would involve a hot tap on Air Liquide's distribution header, which is located on the west side of the multi-pipeline corridor, about 920 feet from the compressor station. A meter station would be constructed within the compressor station fence line. The meter station and the approximately 0.35-mile-long section of new pipe between the meter station and the tie-in location on the existing nitrogen pipeline would be constructed and operated by Air Liquide. The remaining 9.2 miles of nitrogen pipeline between the meter station, the Pretreatment Plant, and the terminal would be constructed by Freeport LNG.

To enable integrated and synchronized control of the Liquefaction Project's proposed process facilities (pretreatment and liquefaction) and other facilities at the terminal, the Stratton Ridge underground storage site, the Stratton Ridge meter station, and the INEOS Plant, an 11.33-mile-long interconnecting network of fiber optic cabling would be installed, following the same route system as the existing 42-inch-diameter sendout pipeline and the various proposed pipelines described above.

Freeport LNG would require an estimated 38,400 gallons per day (gpd) of process water at the Pretreatment Plant. Fire water and potable water would also be needed. Freeport LNG proposes to reduce a portion of its water requirement via the use of mole sieve equipment which strips water from natural gas. The remainder of the required process water would be obtained from a municipal water supply that is being planned by the City of Freeport to support another development in the vicinity of the pretreatment facilities. The 4.7-mile-long water line from Dow Chemical that was described in the draft EIS is no longer proposed.

Table 2.1.3-1 provides a summary of proposed pipelines associated with the Liquefaction Project.

Table 2.1.3-1

Proposed Pipelines Associated with the Liquefaction Project

Pipeline	Location	Diameter (inches)	Length (Miles)	Standard Operating Pressure (PSI)
BOG	Quintana Island terminal to Pretreatment Plant	12	5.1	1,100
Natural Gas Interconnect Inflow Pipeline	From Freeport LNG's existing 42-inch-diameter sendout pipeline to Pretreatment Plant	42	0.51	700
Natural Gas Interconnect Outflow Pipeline	From Pretreatment Plant to Freeport LNG's existing 42-inch-diameter sendout pipeline	42	0.51	1,100
Nitrogen Pipeline	From hot tap on existing Air Liquide nitrogen pipeline just west of compressor station at Freeport LNG's Stratton Ridge underground storage site to Quintana Island terminal	8	9.6	145
NGL Pipeline	Pretreatment Plant to INEOS Plant located approximately 0.4 mile north of Freeport LNG's Stratton Ridge meter station	8	6.2	NA

Other related facilities include:

Stratton Ridge Meter Station - Modifications to meter station to allow bidirectional flow in existing 42-inch-diameter gas pipeline.

Appurtenances for the Natural Gas Pipeline System

- 42-inch mainline valve (MLV) located near terminus of gas inflow/outflow pipelines;
- 42-inch ESD side valve located on 42-inch-diameter gas inflow pipeline;
- 42-inch ESD side valve located on 42-inch-diameter gas outflow pipeline; and
- MLV and ESD side valves located within the Pretreatment Plant fence line.

Appurtenances for the BOG Pipeline

- Pig[8] launcher/receiver located at each end of BOG pipeline;
- ESD valve located with pig receiver at each end of BOG pipeline; and
- Pig launchers/receivers and ESD valves located within the terminal and Pretreatment Plant fence lines.

2.2 PHASE II MODIFICATION PROJECT

The Phase II Modification Project is proposed to modify the authorized, but not yet constructed, Phase II Project. The Phase II Project, as modified by this proposal, would serve Freeport LNG's existing import and re-export operations, and the proposed Liquefaction Project.

The Phase II Modification Project would be located entirely within Freeport LNG's existing leased area and would be adjacent to or within the boundaries of the existing Phase I facilities at the Quintana Island terminal. The proposed Phase II Modification Project is shown on previously referenced figure 1-4. The major components of the Phase II Modification Project are:

- reorientation of the Phase II dock based on recommendations from the Brazos Pilots Association (Brazos Pilots);
- decreasing the diameter of the two LNG transfer pipelines from 32 inches to 26 inches;
- reducing the number of LNG unloading arms from four to three; and
- modifying the access roads at the terminal.

These facilities are described below in table 2.2-1.

Table 2.2-1

Phase II Modification Project

Equipment Type	No. of Units	Description
Phase II Dock	1	88,000 m^3 to 180,000 m^3 vessel capacity
LNG Transfer Arm	3	16-inch-outside diameter
Vapor Return Arm	1	16-inch-outside diameter
LNG Transfer Pipeline	2	26-inch-diameter pipe-in-pipe
Access Road System	1	23-feet-wide, 7,000-feet-long

2.2.1 Phase II Dock

LNG vessels would use two single berthing docks for cargo transfers at the Quintana Island terminal. One dock was constructed as part of Freeport LNG's Phase I Project; the other is one of the modified facilities associated with the proposed Phase II Modification Project. Specifically, the orientation of the Phase II dock would be modified to accommodate maneuvering preferences of the Brazos Pilots, but would remain principally located north of and opposite the Phase I dock at the east end of the terminal.

[8] Pipeline pigs are devices used to internally inspect and/or clean gas pipelines.

The proposed berthing area for the Phase II dock would be approximately 1,340 feet wide at its entrance and approximately 830 feet wide at its base. Freeport LNG would install a 432-foot-long bulkhead consisting of corrugated steel piling. Freeport LNG would install protective rock rip-rap along the entire shoreline slope of the expanded berthing area, including the bulkhead location. In addition, an approximately 100-foot-long rock breakwater and adjoining 148-foot-long current diversion structure would be installed peripheral to the Phase II dock, extending east from the same northeastern land extremity. This structure has been requested by the Brazos Pilots Association to assist with safe ship maneuvering into and out of the dock basin.

The berthing area for the Phase II dock would be dredged roughly perpendicular to the Freeport Harbor Channel (FHC) to a depth of -46.5 feet (North American Vertical Datum 1988 [NAVD 88]) with an allowable over-depth of 2.0 feet. This would match the adjacent channel depth. Prior to dredging, approximately 60,000 cubic yards (yd^3) of surface material within the berth area but outside of the originally proposed Phase I dock footprint would be excavated with onshore equipment to a depth of -5.0 feet (NAVD 88) and used elsewhere as fill material during site preparation.

Following shore-based excavation, construction of the Phase II dock would involve the hydraulic dredging of approximately 1,188,000 yd^3 of material to expand the existing berth area. The dredged material would be pumped to an existing DMPA. Any disposal area would require approval from the USACE prior to placement of the dredged material.

The Phase II dock would be sized to accommodate vessels with a maximum length of 980 feet and a cargo capacity of up to 180,000 cubic meters (m^3). The jetty platform would be a single-level reinforced concrete beam and slab structure supported on piles and measuring approximately 100 feet long by 90 feet wide. It would have a nominal maximum elevation of 25 feet (NAVD 88). An approximately 30-foot-wide by 45-foot-long extension would support affiliated dock structures such as the shore-mounted gangway and the jetty control building. The surface of the jetty platform would slope landward to drain away rainwater and potential LNG discharges from the waterway.

The Phase II Modification Project would not result in any additional LNG vessel transits to or from the terminal beyond the level accommodated by current authorizations.

2.2.2 Transfer Facilities

Freeport LNG would modify the transfer facilities in two ways: by (1) reducing the number of LNG transfer arms from four to three; and (2) decreasing the diameter of the two LNG transfer pipelines from 32 inches to 26 inches.

2.2.3 Access Road System

Land access within the Phase II Modification Project site during construction and operation would require development of an approximately 7,000-foot-long plant road system. Approximately 3,820 feet of the plant road system is currently operational but may require some

improvement; the remaining 3,180 feet would require new construction. The road system would provide access both to the new marine berthing dock and to the Liquefaction Project's temporary construction workspace located on the east side of the terminal.

2.3 LAND REQUIREMENTS

The Liquefaction Project would require an overall construction workspace of 649.3 acres, of which 269.1 acres would constitute the operational footprint of the proposed facilities. Included in the construction workspace is a 50-acre area within the Seaway DMPA south of the site on the southern side of Lamar Street, which would be used temporarily for construction laydown and for temporary warehouse facilities (See figure 2.3-1). The area would be accessed by graded roads off Lamar Street and/or a temporary bridge between the Liquefaction Plant and the Seaway DMPA. To the extent a temporary bridge would be required; Freeport LNG would need to file information showing the design and environmental impacts of the bridge for review and approval by the FERC. Parking would be restricted to construction equipment (bulldozers, backhoes, etc.) and vehicles for personnel utilizing the on-site temporary warehouse facilities. Buses or other commuter vehicles for construction workers would not be parked at the Seaway DMPA.

Construction and operation of the Phase II Modification Project facilities would involve both permanent and temporary land impacts at the Quintana Island terminal. A total of 38.5 acres of land would be required for the Phase II Modification Project, including 14.6 acres that would be temporarily disturbed during construction and 23.9 acres that would be affected on a permanent basis for operation as seen below in table 2.3-1. A breakdown of land requirements for the Projects is provided in table 2.3-1.

Table 2.3-1

Freeport LNG Liquefaction and Phase II Modification Projects
Summary of Land Requirements for Proposed Liquefaction Project (acres)

Facilities	Permanent Facility Footprint	Temporary Workspace	Total
FERC JURISDICTIONAL FACILITIES			
Liquefaction Plant and Associated Facilities	144.6	147.4	292.0
Pretreatment Plant and Associated Facilities	113.4	104.9	218.3
Pretreatment Plant – Off-site Access Road Segments	1.7	1.2	2.9
Pipeline/Utility Line System (FERC Jurisdictional Facilities and Nonjurisdictional Pipelines/Utility Lines) – South of PTP	0.0	44.6	44.6
LIQUEFACTION PROJECT TOTAL:	**259.7**	**298.1**	**557.8**
FERC NONJURISDICTIONAL FACILITIES			
Pipeline/Utility Line System (FERC Nonjurisdictional Facilities without Electric Line) – North of PTP	3.3	74.7	78.0
Electric Line at Pretreatment Plant	6.0	7.3	13.3
Appurtenant Facilities beyond Terminal Site and Pretreatment Plant site and not included in Pipeline/Utility Line System Footprint Totals	0.1	0.1	0.2
NONJURISDICTIONAL TOTAL:	**9.4**	**82.1**	**91.5**
LIQUEFACTION PROJECT TOTAL AFFECTED LAND AREA:	**269.1**	**380.2**	**649.3**
PHASE II MODIFICATION			
Phase II Dock and Berthing Area	17.4 a/	6.0 b/	23.4
LNG Transfer Pipelines	3.3	6.3	9.6
Access Road System	3.2	2.3	5.5
PHASE II MODIFICATION TOTAL:	**14.6**	**23.9**	**38.5**
TOTAL LAND REQUIREMENTS FOR LIQUEFACTION PROJECT AND PHASE II MODIFICATION PROJECT:	**283.7**	**404.1**	**687.8**

a/ Includes 12.6 acres of land and 4.8 acres of open water
b/ Includes 4.1 acres of land and 1.9 acres of open water



Figure 2.3-1: Seaway DMPA Workspace Layout

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DRAWN BY: JEBAKKEN

2.4 CONSTRUCTION, OPERATION, AND MAINTENANCE PROCEDURES

All Freeport LNG facilities would be designed, installed, tested, operated, and maintained in accordance with federal safety standards and regulations that are intended to ensure adequate protection for the public and to prevent facility accidents and failures. Additional information on these measures can be found in section 4.10.

2.4.1 Liquefaction Project

2.4.1.1 Construction of Liquefaction Plant

Grading, Site Preparation, and Site Fill Requirements

The proposed Liquefaction Plant footprint and adjacent laydown areas would require significant site improvements including clearing, grubbing, soil stabilization, backfilling, and grading activities, which must be performed prior to mobilization for construction of plant infrastructure. Prior to clearing of the construction workspace, appropriate temporary erosion controls would be installed. Typically, silt fences, check dams, fiber rolls, and sediment traps are positioned along the limits of disturbance. We are recommending Freeport LNG use at least one Environmental Inspector (EI) for the Liquefaction and Phase II Modification Projects, and at least one inspector for the Pretreatment Plant and Pipeline/Utility Line System. Each EI would monitor field conditions daily to ensure that appropriate erosion and sedimentation control measures are maintained until the construction workspace is fully stabilized. In addition, we are recommending that Freeport LNG develop and implement an environmental complaint resolution procedure which would provide affected landowners (typically within ½ mile of the aboveground facility) with clear and simple directions for identifying and solving their environmental concerns during construction and restoration.

The Liquefaction Plant would be located in the former DMPA west of the existing Phase I process facilities. The existing ground elevation in this area ranges from 25 feet to 31 feet amsl, except for a large stockpile of dredge material that rises to 40 feet amsl in the north central portion of the site. The final site grade for the Liquefaction Plant would be established at 28 feet amsl. Some cutting and filling would be required to smooth out topographic irregularities and an average two-foot depth or 528,000 yd^3 of additional fill material (clay top soil) would be needed which would require many truck or barge trips for fill material.

The section of the former DMPA outside of the existing terminal site would require considerable improvement and stabilization to provide a load bearing surface for crane access and construction. The techniques used to improve the soils would be similar to those adopted during Phase I facility construction. Various stabilizers may be added, including hydrated lime, Portland cement, fly ash, and other admixtures. Where needed, appropriate geotextiles and aggregate materials (*e.g.*, gravel and crushed stone) would be used to level and finish laydown and operational areas.

Prior to construction at any particular location, Freeport LNG would prepare such temporary workspaces (primarily laydown and support/satellite areas) as needed outside the proposed

operational footprints of the various process units. Temporary support facilities (*e.g.*, construction offices, warehouses, mess halls, parking lots, and portable toilets) would be installed. Site preparation for all construction workspace (both temporary and within operational footprints) would involve cutting and filling to rough grade and soil stabilization/improvement as described above, followed by erection of temporary fencing to isolate construction activities from operational areas where possible.

Permanent site grading would be directed towards perimeter outfalls and would be completed during initial site preparation to ensure proper drainage during construction and operation. Stormwater controls (including placement of gravel or other suitable material to provide a stable, well-drained surface) would be installed. The stormwater collection basin in the northwest corner of the former DMPA would be developed at this time and would receive stormwater channeled from perimeter outfalls in the western sector of the former DMPA; stormwater in the eastern sector would be conveyed to an existing drainage channel, which connects to a wetland mitigation pond and the ICW.

Much of the major equipment for the Liquefaction Plant would be delivered by barge, using the new aggregate barge and construction docks. Upgrading and extending existing plant roads would be performed as necessary to support the hauling of heavy equipment and supplies to the new construction areas.

To produce the large amounts of concrete required for the Liquefaction Project, a concrete batch plant would be brought to the site, as was the case during construction of the Phase I facilities. However, the infrastructure to support a concrete batch plant remains at the Quintana Island terminal site in the former batch plant and construction laydown area, which is now within the proposed permanent footprint of the Liquefaction Plant. This infrastructure would be removed during initial site preparation and new infrastructure to support the new concrete batch plant would be installed near the western end of the defined laydown area (See figure 1-2).

Liquefaction Trains and Ancillary Facilities

Following site grading and soil stabilization, foundation construction would initially involve the installation of pre-cast concrete piles to provide a firm base for the concrete pads on which buildings, pipe racks, and the heavy equipment components of the liquefaction trains would be set.

Dredging Requirements

The new aggregate barge dock slip would require dredging to a depth of -14 feet resulting in removal of approximately 28,000 yd^3 of material. The dredging activities would need authorization from the USACE.

The new construction dock would be recessed into the south shore of the ICW, a design that would require excavation of bank-side material to install the 176-foot-long by 128-foot-wide dock platform and off-shore dredging to create the dock slip. The extent to which dredging is required would depend primarily on the existing water depth and its ability to accommodate barges, which have a relatively shallow draft. Freeport LNG estimates that 85,000 yd^3 of

material would be removed over 6.7 acres. The existing construction dock at the terminal site would also have to be dredged of approximately 32,000 yd^3.

Dredging and Dredged Material Disposal

Vessel access to the Phase II dock would be provided from the FHC by deepening and widening the existing 30-acre berthing area on the east side of the terminal site to about 50 acres. Freeport LNG proposes to use conventional barge-mounted cutter/suction dredging or a combination of shore-based dragline and barge-mounted cutter/suction dredging during development of the dock and berthing area. The total amount of material to be removed for the Phase II dock work is estimated at 1,188,000 yd^3. Pre- and post-dredge surveys would be conducted to determine actual quantities. It is expected that dredging would be done prior to pile driving of the jetty structures.

As with the material dredged for the Liquefaction Project, material dredged for the Phase II dock and berthing area would be placed in Port Freeport's DMPA No. 1 and/or in one or more pre-approved DMPAs elsewhere. Adequate levee height would be maintained for proper containment and effluent quality.

Where it crosses an active shipping lane, such as the ICW, the pipeline used to convey the dredged material to the DMPA would be either floating or submerged. In the event that a floating pipeline is used, the pipeline would be equipped with quick connect joints and blank flanges that allow a section to be uncoupled quickly and moved out of the way to enable vessel passage. A small volume of sediment laden water would be released into the water channel during the uncoupling process, however, it is not anticipated that this amount would compromise water quality.

2.4.1.2 Construction of Pretreatment Plant

Grading, Site Preparation, and Site Fill Requirements

In general, Freeport LNG would adhere to the requirements set forth in the FERC's *2013 Upland Erosion Control, Revegetation, and Maintenance Plan (Plan)* and *Wetland and Waterbody Construction and Mitigation Procedures (Procedures).*[9] The Pretreatment Plant site is currently actively grazed coastal upland pasture, with some peripheral and interspersed emergent wetland and waterbody features. However, the location has an extensive excavation pit representing the site of commercial sand extraction that was undertaken by the previous landowner. The central excavation pit covers approximately 26.5 acres and is approximately 20 feet to 40 feet deep in the western sector and approximately 10 feet to 20 feet deep in the eastern sector. Freeport LNG intends to modify the western sector of the central pit to form a retention pond for receipt of stormwater discharges during facility construction and operation. Construction discharges would be channeled to the retention pond.

[9] For Upland Erosion Control, Revegetation and Maintenance Plan see: http://www.ferc.gov/industries/gas/enviro/plan.pdf and for Wetland and Waterbody Construction Mitigation procedures see: http://www.ferc.gov/industries/gas/enviro/procedures.pdf.

Approximately 9.8 acres of the central pit's eastern sector are located in the proposed operational footprint of the Pretreatment Plant and would require significant fill deposition during the initial stages of site preparation to provide a level, stable surface for foundation placement and subsequent infrastructure development. Freeport LNG estimates that 253,000 yd^3 of fill would be necessary to bring this previously excavated area up to the existing base elevation (average 3.0 feet amsl found elsewhere on the site and to provide a suitably sloped [4H:1V gradient] perimeter).

Preparatory tasks include soil stabilization, cutting and filling to rough grade beyond the extraction area and installation of stormwater controls. Two new access roads between the Pretreatment Plant site and CR 690 would be installed and the existing private access road from SH 332 would be upgraded and extended as necessary to provide site access from the west. The roads would be permanent and utilized during both construction and operation. After the necessary temporary workspaces, support facilities, and access roads have been installed, the Pretreatment Plant's main operational footprint would be elevated and graded.

As previously mentioned, the existing base elevation outside of the sand extraction area is relatively level, with an average and maximum height of approximately 3.0 feet and 5.0 feet amsl, respectively. To ensure flood protection, the ground elevation of the equipment area would be raised to 8.0 feet amsl; concrete foundation pads would add another 1.6 feet, bringing the base elevation of the equipment itself to 9.6 feet amsl.

Pretreatment Units and Ancillary Facilities

Following site preparation, foundation construction would involve the installation of concrete foundations for the pretreatment units and ancillary structures (buildings, electric substations, storage areas, etc.). The concrete foundations would be designed following recommendations received from the geotechnical engineering evaluation report.

The three pretreatment trains would be connected to Freeport LNG's existing natural gas pipeline system by underground pipeline interconnects between the existing sendout pipeline and the Pretreatment Plant, and by aboveground piping at the plant itself.

2.4.1.3 Construction of Pipeline/Utility Line System

As previously stated, Freeport LNG would use conventional construction techniques for buried pipelines and would follow the requirements set forth in the Freeport LNG's Procedures, but with the following two exceptions noted in table 2.4.1-1 to accommodate the installation of multiple pipelines/utility lines within the same right-of-way and HDDs across large waterbodies and wetland expanses. In table 2.4.1-1 the relevant section of the FERC's Plan and Procedures is paraphrased, followed by Freeport LNG's proposed modification and justification. Based on the justifications noted, we find Freeport's proposed modification acceptable. FERC's Plan and Procedures and Freeport LNG's two modifications to these are referred to collectively herein as Freeport LNG's Procedures.

Table 2.4.1-1

Requested Modifications to FERC's Upland Erosion Control, Revegetation, and Maintenance Plan and Waterbody Construction and Mitigation Procedures

FERC Procedure No.	FERC Requirement	Requested Modifications	Justification
VI.A.3	Item VI.A.3 of the FERC's Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures requires that the construction right-of-way width in wetlands be limited to 75 feet, unless prior written approval is obtained from the Director for a right-of-way width greater than 75 feet based on topographic conditions or soil limitations.	In wetlands and open water, Freeport LNG would require an 85-foot- to 100-foot-wide construction right-of-way for open-cut sections to accommodate multiple new pipelines. Between two and seven pipelines and/or utility lines would be installed in parallel at any given location. At the HDD crossing on the east side of the Velasco Levee in the vicinity of the Pretreatment Plant, a 200-foot-wide right-of-way lateral segment would be required to accommodate trench installation of the seven Pipeline/Utility Line System turnaround sections.	Right-of-way widths beyond 75 feet are required to ensure safe working conditions and to maintain safe separation distances between the individual lines in locations where there are multiple lines. For the most part multiple lines must be installed in separate trenches.
VI.B.1.a	Item VI.B.1.a of the FERC's Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures requires that all extra work areas (such as staging areas and additional spoil storage areas) be located at least 50 feet away from wetland boundaries, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land.	Several additional temporary workspaces (ATWSs) are necessarily located in wetlands due to their intended use. These include the HDD ATWSs on either side of the Freeport Harbor Channel (milepost [MP] 0.67 and 1.14, on the south side of the Intracoastal Waterway (MP 1.55), and on either side of the extensive wetland south of the County Road (CR) 891 Ditch (MP 2.70 and 3.62).	Based on ground reconnaissance and map review, Freeport LNG stated that there are no feasible location alternatives for these ATWSs that would cause less significant environmental impacts. Moreover, the ATWSs are required for HDD, a method that has been selected in part to minimize or avoid greater environmental impacts on wetlands as a whole.

Construction specifications would also require adherence to Freeport LNG's *Stormwater Pollution Prevention Plan* (SWPPP) for construction stormwater discharges, *Spill Prevention, Control and Countermeasure Plan*[10] (SPCC Plan), and Freeport LNG's *HDD Monitoring and Contingency Plan* (see appendix C).

As described in the following paragraphs, conventional pipeline construction typically involves the following sequential activities:

- right-of-way surveying;
- clearing and grading;
- trenching;
- stringing, welding, and installation;
- backfilling and grade restoration;
- hydrostatic testing and tie-ins; and
- cleanup and restoration.

[10] The SPCC Plan is included as appendix 2-C of Freeport LNG Liquefaction Project Resource Report 2 available at: http://elibrary.ferc.gov:0/idmws/file_list.asp?document_id=14048942.

The pipeline alignment would be identified and surveyed prior to construction. This would include staking the proposed pipeline centerlines, foreign line crossings, and workspace limits, along with wetland boundaries and other environmentally sensitive areas.

Prior to clearing of the construction workspace, appropriate temporary erosion controls would be installed. The EI would monitor field conditions daily to ensure that appropriate erosion and sedimentation control measures are maintained until the construction workspace is fully stabilized.

Prior to trench excavation in upland areas, vegetation would be cut and removed from the construction workspace. Chipped material would be spread across the work area during revegetation. No cleared material would be placed within wetlands unless approved by the appropriate agencies.

After clearing, the upland portions of the construction right-of-way would be graded to create a safe and level work surface. However, given the relatively uniform topography of the area landscape, the need for extensive grading is not expected. Generally, machinery would operate on one side of the trench and excavated materials would be stockpiled on the other. Grading activities would be scheduled to minimize the time between initial clearing operations and pipe installation.

Trenching

Trenching would involve excavating a pipeline ditch and would be accomplished with backhoes and/or similar excavation machinery. Spoil would be deposited within the construction workspace, adjacent to the trench on the opposite side from the excavation equipment. The trench would be excavated to a minimum depth that allows at least four feet of cover over the pipe. The bottom width of the trench would be cut to accommodate the specific diameter of pipe to be installed. The top width of the trench would vary depending on local soil conditions at the time of construction. The need for special bedding or blasting is not anticipated.

Based on concurrent construction of the multiple proposed pipelines and utility lines, and the generally narrow (nominally five feet) separation distance between the lines, Freeport LNG anticipates that the closely collocated lines would be laid together in one trench. The fiber optic cable would be installed directly adjacent to (within one foot of) the nearest pipeline. Typical cross-section drawings showing the arrangement of the pipelines and utility lines at specific milepost (MP) intervals along the route system are shown in figures 2.4.1-1, 2.4.1-2 and 2.4.1-3.

Crossing of foreign pipelines would generally require the new pipelines to be buried at a greater depth than the existing pipelines. These would be identified and flagged during the pre-construction phase. Trenching operations in the vicinity of an existing pipeline would proceed only after appropriate field testing has been undertaken to determine the existing pipeline's exact location. No temporary pipeyards or laydown areas are proposed outside of the temporary work area for the Liquefaction Plant and Pretreatment Plant sites and Phase II Modification work area.

In cropland, residential areas, or at the landowner's discretion, topsoil would be segregated from subsoil during trenching and remain segregated during storage to avoid loss though mixing with stockpiled subsoil.

Freeport LNG would use conventional measures to minimize erosion and sedimentation during trenching and would follow the requirements set forth in the Freeport LNG's Procedures. These would include measures to minimize the free flow of surface water into the trench and through the trench from upland areas into waterbodies. Erosion control measures would also be implemented as necessary for bank stabilization at waterbody crossing locations.

If trench dewatering is necessary, discharge to the ground generally is permitted where there is adequate vegetation along the right-of-way to function effectively as a filter medium. In areas adjacent to waterways, or where there is minimal vegetation, bale filters, filtration bags, or other appropriate measures would be used to limit sedimentation.

Stringing, Welding, and Installation

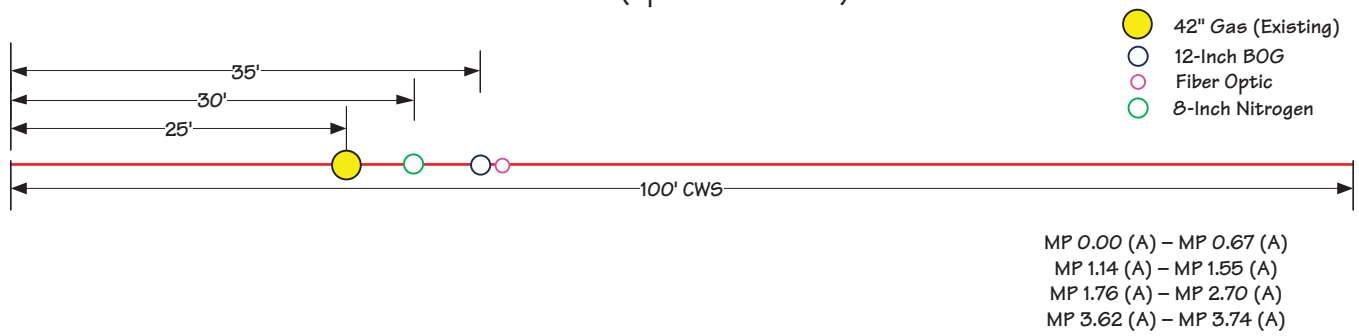
Stringing involves moving pipe joints into position along the prepared construction right-of-way. The joints would be moved by truck and loaders from the source areas and placed along the construction right-of-way, parallel to the trench line, for subsequent line-up and welding. Stringing activities would be coordinated with the trenching and pipe laying crews. Certain pipe joints may be bent to conform to changes in the direction of the pipeline alignment and natural ground contours. Individual pipe joints would be bent to the desired angle in the field and/or prefabricated fittings may be used.

Welding would be performed in accordance with 49 CFR, Part 192, Subpart E *Welding of Steel in Pipelines* and American Petroleum Institute Standard 1104. Completed welds would be inspected to determine integrity. If a weld does not meet defined requirements, it would be marked for repair or replacement. The weld joint areas would be coated and the entire pipe coating would be inspected for defects and repaired as needed. Following integrity inspections, the pipe would be lowered into the trench using sideboom tractors or similar equipment and bedded with padding material prior to backfilling.

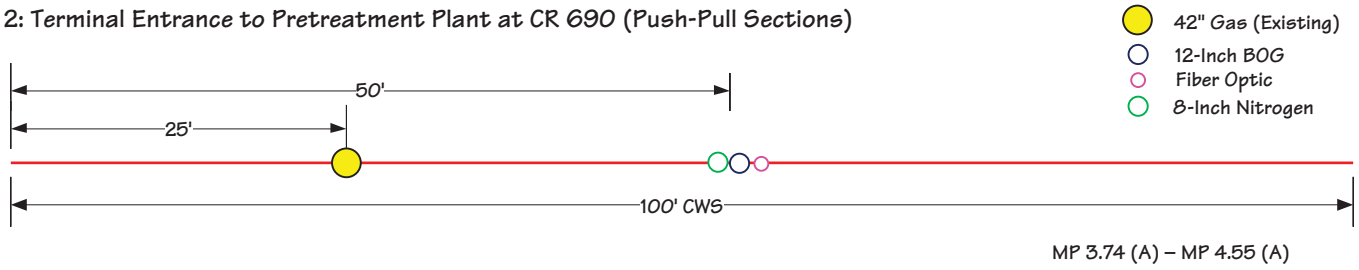
After the pipe is lowered into the trench and bedded with padding material, the trench would be backfilled with the previously excavated material using dozers, loaders, and compactors. Any excess excavated materials or materials unsuitable for backfill would be disposed of in accordance with applicable regulations.

In areas where topsoil has been segregated, the backfilling operation would involve the replacement of subsoil in the bottom of the trench, followed by the replacement of topsoil over the subsoil layer. In upland areas, a soil mound would be left over the trench to allow for soil settlement, unless the land owner requires otherwise. During backfilling, special care would be taken to minimize erosion, restore the natural ground contours, and restore surface drainage patterns as close to pre-construction conditions as practicable. Upon completion of trench backfilling, topsoil would be replaced as necessary and the pre-construction soil profile restored across the wider construction workspace.

1: Terminal Entrance to Pretreatment Plant at CR 690 (Open-cut Sections)



2: Terminal Entrance to Pretreatment Plant at CR 690 (Push-Pull Sections)



Acronyms for Figures 2.3.1-1 and 2.3.1-2

BOG = boil-off gas
CR = County Road
CWS = construction workspace
INEOS = INEOS Group Limited
MLV = mainline valve
MP = milepost
ROW = right-of-way

Figure 2.4.1-1

For environmental review purposes only.

Freeport LNG – Liquefaction Project
Construction Right-of-Way Cross-Sections for Jurisdictional Pipelines and Non-Jurisdictional Pipelines/Utility Lines MP 0.00(A) – MP 4.55(A)
South of Pretreatment Plant

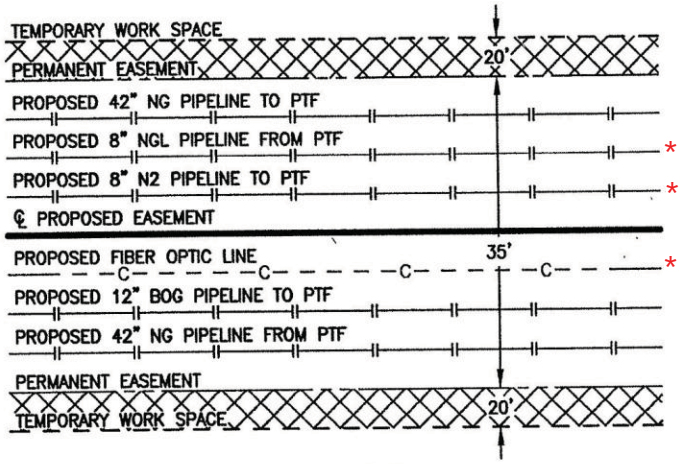
_FRE_RR_1_4_4A_CONSTRUCTION_ROW_CROSS_SECTIONS_SORRELL_1TO3.VSD	SCALE: NTS		REVISED: 6/28/2012	DRAWN BY: JPBOENTJE



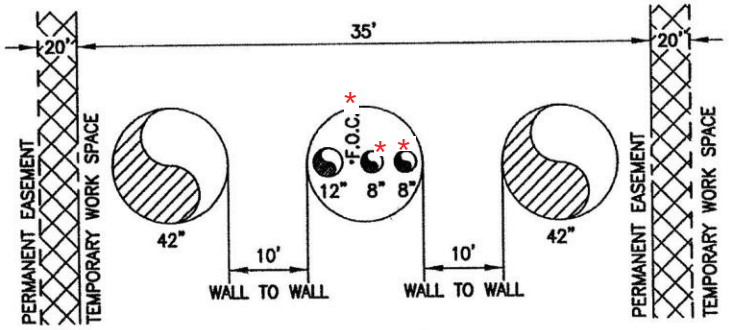
Figure 2.4.1-2
Freeport LNG – Liquefaction Project
Construction Right-of-Way Cross-Sections
for Non-Jurisdictional Pipelines/Utility Lines
North of Pretreatment Plant

For environmental review purposes only.

_2-4-1-2.VSD	SCALE: NTS		REVISED: 5/22/2014	DRAWN BY: JPBOENTJE



DETAIL "A"
N.T.S.



DETAIL "B"
N.T.S.

Acronyms for Figure 2.3.1-3

BOG = boil-off gas
F.O.C. = fiber optic cable
N2 = Nitrogen
NG = Natural Gas
NGL = Natural Gas Liquid
PTF = Pretreatment Facility

*Indicates nonjurisdictional pipeline/utility line

Note: Water line is not depicted on these plans pending final determination of drill arrangement

For environmental review purposes only.

Figure 2.4.1-3
Freeport LNG – Liquefaction Project
Construction Right-of-Way Cross-Sections for Lateral Jurisdictional Pipelines and Non-Jurisdictional Pipelines/Utility Lines MP 0.00(B) – MP 0.35(B)
At Pretreatment Plant

_FRE_RR_1_4_4C_CONSTRUCTION_ROW_CROSS_SECTIONS_LATERALS.VSD	SCALE: NTS		REVISED: 6/28/2012	DRAWN BY: JPBOENTJE

After the completion of backfilling and topsoil replacement across the construction workspace, all disturbed areas would be final graded and any remaining trash, debris, or unsuitable backfill would be properly disposed of. After construction is completed, the workspace area would be protected by the implementation of appropriate erosion control measures as necessary, including site-specific contouring and reseeding with an approved seed mix.

Table 2.4.1-2

Road/Railroad Crossing Locations and Methods for Pipeline/Utility Line System

Road Name	Milepost	Proposed Crossing Method	Pipelines/Utility Lines
FERC JURISDICTIONAL AND NONJURISDICTIONAL FACILITIES			
Entrance to ExxonMobil Facility	0.23(A)	Bore	BOG, Nitrogen, Fiber Optic
Entrance to Terminal Site	0.68(A)	HDD	BOG, Nitrogen, Fiber Optic
Thunder Road	1.18(A)	Bore	BOG, Nitrogen, Fiber Optic
Canal Drive	1.54(A)	Bore	BOG, Nitrogen, Fiber Optic
SH 332 (Ramp)	2.30(A)	Bore	BOG, Nitrogen, Fiber Optic
SH 332	2.33(A)	Bore	BOG, Nitrogen, Fiber Optic
SH 332 (Ramp)	2.35(A)	Bore	BOG, Nitrogen, Fiber Optic
CR 891 (Cone Island Road)	3.67(A)	Bore	BOG, Nitrogen, Fiber Optic
FERC NONJURISDICTIONAL FACILITIES			
Galleywax Way	5.41(A)	Bore	NGL, Nitrogen, Water, Fiber Optic
CR 792 (Suggs Road)	5.85(A)	HDD	NGL, Nitrogen, Water, Fiber Optic
Private Driveway	6.24(A)	Open Cut	NGL, Nitrogen, Water, Fiber Optic
Private Road	6.76(A)	Open Cut	NGL, Nitrogen, Water, Fiber Optic
Private Driveway	7.95(A)	Open Cut	NGL, Nitrogen, Water, Fiber Optic
Abandoned Railroad	9.46(A)	Bore	Fiber Optic
Abandoned Railroad	0.22(D)	Bore	NGL, Fiber Optic
CR 227	0.33(D)	Bore	NGL, Fiber Optic
CR 690 (Levee Road)	0.15(B)	HDD	Gas Inflow, Gas Outflow, BOG, NGL, Nitrogen, Water, Fiber Optic
FM Route 523	0.04(C)	Bore	Nitrogen, Water, Fiber Optic
FM Route 523	0.15(E)	Overhead	Electric Line
Private Road (West Access Road to Pretreatment Plant)	1.07(E)	Overhead	Electric Line

Notes
CR County Road
FM Farm-to-Market
HDD Horizontal Directional Drill
SH State Highway

Road/Railroad Crossing Construction Procedures

Table 2.4.1-2 lists the road and railroad crossings identified on the proposed pipeline and utility line routes. For most road and railroad crossings, conventional bores are anticipated. In all cases, applicable state and local regulations would be followed and traffic interruption would be minimized. The minimum pipeline clearance for both unsurfaced and paved public roads would

be five feet under the roadbed and four feet under any side borrow/drainage ditches. Pipeline warning signs/markers would be installed at each crossing location.

Waterbody and Wetland Crossing Construction Procedures

Open cut construction methods at waterbody crossings would vary according to the physical and environmental characteristics of the crossing. Minor waterways (water channel width less than or equal to 10 feet) and intermediate waterways (water channel width greater than 10 feet but less than or equal to 100 feet) would generally be crossed by open trench excavation with equipment operating from the banks as the width of the waterbody allows. During these operations, any existing water flow would be maintained. All open cut crossings would be "wet" crossings without the need for trench isolation techniques such as dam and pump or fluming.

Trench spoil would be placed bank-side above the high water mark for use as backfill. The pipeline would be installed below scour depth. Any federal and state backfill cover requirements would be met. The pipe would be weight coated, as needed, to provide negative buoyancy. Once the trench is backfilled, the banks would be stabilized through seeding, sodding, riprap deposition, or other techniques. Excavated material not required for backfill would be removed to an upland disposal site.

Other waterbody crossing methods that would be utilized for specific circumstances include conventional boring and HDD. Where a waterbody lies adjacent to a road, a bore is often used to avoid surface impacts on both the road and the waterbody. HDD crossings are generally over longer distances than bores and also avoid surface impacts, including in-stream and riparian disturbance.

A bore is implemented by excavating a bore pit to the proposed pipeline depth on both sides of the feature being crossed, boring a hole under the feature from one side to the other, and installing a prefabricated segment of pipeline through the borehole.

In the first stage of each HDD crossing, electric grid wire guides would be hand laid along the pipeline right-of-way between the proposed drill entry and exit locations. Only minimum ground and vegetation disturbance would result from this procedure. Following guide wire installation, a slant drill unit would be set up and a small diameter pilot hole would be drilled under the waterbody along a prescribed profile. Electromagnetic sensors would be used to guide the drill bit.

Once the pilot hole is completed, it would be enlarged using reaming tools to accept the pipeline. The reaming tools are attached to the drill string at the exit point of the pilot hole and are rotated and drawn back to the drilling rig, thus enlarging the pilot hole with each pass. During this process, drilling mud consisting of bentonite clay and water would be continuously pumped into the hole to remove cuttings and to maintain the integrity of the hole. Once the hole has been sufficiently enlarged, a prefabricated segment of pipe would be attached behind the reaming tool on the exit side of the crossing and pulled back through the drill hole toward the drill rig, completing the crossing.

As indicated in table 2.4.1-3 the FHC, ICW, and Oyster Creek, all of which are major waterbodies (water channel width greater than 100 feet), would be crossed by HDD for the underground Pipeline/Utility Line System. In addition, HDD would be used to cross an extensive emergent wetland, together with the Velasco Levee and its side ditches (eastern and western) in the vicinity of the Pretreatment Plant site. The three proposed lines (BOG, nitrogen, fiber optic) at three of the five HDD locations (FHC, ICW, emergent wetland) would be installed in one bore hole. At Oyster Creek, the four proposed lines (NGL, nitrogen, water, fiber optic) would likely require two bore holes, drilled in close proximity, but with sufficient separation (at least 10 feet) to ensure borehole integrity. At the Velasco Levee, four boreholes would be required, one for the gas inflow pipeline, one for the gas out flow pipeline, one for the BOG, NGL, nitrogen, and fiber optic lines together, and one for the water line.

Freeport LNG's *Draft HDD Monitoring and Contingency Plan* (see appendix C) outlines the procedures that would be followed to minimize the potential for an inadvertent release of drilling mud and to undertake effective cleanup should a release occur.

Table 2.4.1-3

HDD Waterbody Crossing Locations for Underground Pipeline/Utility Line System

Feature Name	Milepost		Crossing Length (Feet)	Pipelines/Utility Lines
	Start	End		
FERC JURISDICTIONAL AND NONJURISDICTIONAL FACILITIES				
FHC	0.67(A)	1.14(A)	2,448	BOG, Nitrogen, Fiber Optic
ICW	1.55(A)	1.76(A)	1,108	BOG, Nitrogen, Fiber Optic
Emergent Wetland	2.70(A)	3.62(A)	4,837	BOG, Nitrogen, Fiber Optic
Velasco Levee Eastern Velasco Ditch Western Velasco Ditch CR 690	0.00(B)	0.33(B)	1,725	Gas Inflow, Gas Outflow, BOG, NGL, Nitrogen, Water, Fiber Optic
FERC NONJURISDICTIONAL FACILITIES				
Galleywax Way Oyster Creek CR 792	5.34(A)	5.90(A)	2,990	NGL, Nitrogen, Water, Fiber Optic
Total:			**13,108**	

Notes
CR County Road
FHC Freeport Harbor Channel
ICW Intracoastal Waterway

The push-pull method would be used to install the BOG pipeline, nitrogen pipeline, and fiber optic cabling along approximately 8,507 feet of the eastern Velasco Ditch between MP 3.74(A) and MP 5.34(A). The trench would be excavated in the bed of the water channel with a barge-mounted backhoe working from the center of the channel.

Spoil from the trench would be placed adjacent to the excavation within the channel. Pipe joints would be welded, inspected, and coated one at a time and, as the pipelines are fabricated into continuous floating strings, they would be pushed or pulled through the channel, weighted as necessary, and lowered into the trench.

Hydrostatic Testing and Tie-ins

After construction and prior to placing the pipelines and associated appurtenances in service, the completed pipelines would be hydrostatically tested to ensure that the systems are leak proof and to provide the necessary safety margin for high pressure operation. Testing would be conducted in accordance with the requirements of 49 CFR Part 192, Freeport LNG testing specifications, and applicable permits.

The in-place pipeline would be filled with water and kept at the requisite operating pressure throughout the test. After the completion of a satisfactory test, the water would be discharged over land into containment structures. Valves and appropriate energy-dissipation devices, containment structures, or other measures would be used to regulate discharge rates and to minimize erosion and sedimentation. No chemical agents would be added to the test water. Hydrostatic testing impacts and water requirements are detailed in section 4.3.3.

Aboveground Appurtenant Facilities

At the sites for the meter stations, MLVs and ESD valves, and pig launchers/receivers, both within and beyond the fencelines of other facilities (Terminal, Pretreatment Plant, INEOS Plant), the principal sequential construction steps would be clearing and grading, placement of a concrete pad foundation, installation of equipment, erection of equipment housing, installation of perimeter fencing, and surface cleanup during which open areas would be covered with gravel, limestone or similar material. Where pigging equipment is installed, a concrete containment area sump would be constructed below the barrel of the pig launcher/receiver.

Temporary Construction Facilities

Temporary construction facilities required by the major contractors or subcontractors include shop, welding, storage, laydown, office facilities and construction of a temporary concrete batch plant. At this time, beyond the identification of workspace locations and configurations, a final layout plan for the temporary facilities is not available as it would depend on the preferences and needs of the contractors and subcontractors. The locations of proposed temporary construction workspaces for the Liquefaction Project are illustrated in figure 1-2.

Transportation

Construction workers at the Quintana Island terminal would leave their vehicles at off-site parking lots and would be transported by bus to and from Quintana Island. Construction access routes and traffic issues are discussed in section 4.8.5.

2.4.1.4 Construction Schedule

Freeport LNG has indicated a preferred construction start date of August 1, 2014. Construction and start-up of the initial liquefaction train (Train 1) and the first pretreatment train at the Pretreatment Plant is expected to be completed in approximately 48 months. Completion and start-up of each additional liquefaction and pretreatment train (Trains 2 and 3) is expected to

sequentially follow Train 1 at approximately 6-9 month intervals. Based on this schedule, construction at the Quintana Island terminal would take up to 4.5 years. Freeport LNG indicated that anticipated commercial operation of Train 1 would commence in December 2018, and that full commercial operation of all three trains may be reached as early as December 2019.

2.4.1.5 Operation and Maintenance

The Pretreatment Plant, Liquefaction Plant, and pipelines would be sited, designed, constructed, operated, and maintained in compliance with federal safety standards. Federal siting and design requirements for LNG and pipelines facilities are listed in Section 4.10, Reliability and Safety.

2.4.2 Phase II Modification Project

2.4.2.1 Construction of Berthing Dock

Construction would be initiated with the installation of piles for the dock platform, approach way, and pipe supports, after which pile-driving equipment and crews would be redeployed to install the piles for mooring and breasting structures while concrete placement is performed at the dock platform. Concrete placement for all other structures would follow the completion of the dock platform. Work on the dock superstructure would also involve the erection of pre-cast concrete elements and structural steel components. Completion of the dock platform, approach way, and pipe supports would allow subsequent installation of equipment and piping.

Heavy lifting equipment would be used to lift the piles into position, support pile-driving equipment and lift various formwork, concrete, and steel materials. Diesel powered pile-driving hammers would be used to install all piles for the dock facility structures. These hammers are internal combustion, open top hammers typically used in this type of construction. Other equipment would include smaller hydraulic lifting cranes, gas and diesel powered air compressors, gas powered welding machines, small hand tools, and gas powered generators.

Excavation and Dredging Operations for Dock Construction

Upland excavation would encompass all soils above -5.0 feet (NAVD 88) that can be handled by conventional, land-based construction equipment in the Phase II dock area.

Following upland excavation, the Phase II berthing area would be dredged roughly perpendicular to the FHC to a depth of -46.5 feet (NAVD 88) with a two-foot allowable overdepth, which would match the adjacent channel depth. Dredging specifications for the Phase II dock and berthing area would be similar to those for the Phase I dock. The width of the berthing area would be approximately 1,340 feet at the entrance to 830 feet at the west end. The easternmost mooring dolphin at the dock would be at least 250 feet from the near bottom edge of the ship channel that is maintained and periodically dredged by the USACE. Portions of the Phase II dock would be excavated from within an existing dredged slip, which has depths ranging from about -8 feet to -12 feet (NAVD 88). It is estimated that about 1,188,000 yd^3 of material would be hydraulically dredged and pumped to an existing DMPA in the vicinity of the terminal.

Construction of the LNG Transfer Pipelines

The Phase II dock would be connected to the storage tank area by the LNG transfer pipelines. These two pipelines would run aboveground and adjacent to each other on steel-framed support racks. The individual frame members for the support racks would arrive at the terminal prefabricated, after which the racks would be assembled on-site. At the dock site, the pipe racks would be installed after the dock superstructure has been erected. Pipe installation on the racks would be implemented from multiple directions.

Construction of Access Road

Land access for the Phase II Modification Project construction and operation work would require development of an approximately 7,000-foot-long plant access road. Approximately 3,820 feet of the plant road is currently operational but may require some improvement, and the remaining 3,180 feet would require new construction within the existing fenced facility. The road would be constructed using earth moving/grading equipment and the road would meet applicable USDOT requirements. Freeport LNG would use fill on-site for grading to the extent possible.

Transportation

Construction workers would leave their vehicles at off-site parking lots and would be transported by bus to and from Quintana Island. Construction access routes and traffic issues are discussed in section 4.8.5.

2.4.2.2 Construction Schedule

The construction schedule of the Phase II Modification Project is expected to commence at the same time as the Liquefaction Project, though may differ in length of time required because of the smaller scope of construction work.

2.4.2.3 Operation and Maintenance Procedures

The Phase II Modification Project would be operated and maintained in accordance with federal safety standards and regulations as identified in Section 4.10 Reliability and Safety.

2.5 FUTURE PLANS AND ABANDONMENT

Freeport LNG currently has no plans for abandonment of the Freeport LNG terminal, Pretreatment Plant or pipeline facilities. As noted in section 1.2, Freeport LNG had previously requested LNG non-FTA country export capacity in excess of that requested in the Application to FERC. This was not granted by the USDOE. Any Freeport expansion of non-FTA country export capacity would require an additional USDOE authorization as well as FERC authorization. In addition, an environmental analysis would be conducted. The expansion or abandonment would be subject to appropriate federal, state, and local regulations in effect at that time.

ALTERNATIVES

SECTION 3

3.0 ALTERNATIVES

We evaluated a number of alternatives to the Freeport LNG Liquefaction Project and Phase II Modification Project to determine whether an alternative would be reasonable or environmentally preferable to the proposed actions. These alternatives included the No Action Alternative, system alternatives, route alternatives, and aboveground facility site alternatives.

The evaluation criteria for selecting potentially reasonable and environmentally preferable alternatives include whether they:

- are technically and economically feasible and practical;
- offer significant environmental advantage over the proposed Project or segments of it; and
- meet the stated purpose and need for the proposed action: to allow Freeport LNG to export domestic natural gas to the world market.

3.1 NO ACTION ALTERNATIVE

If the Commission selects the No Action Alternative (*i.e.*, denies the applications), the objectives of the proposed Projects would not be met and Freeport LNG would not be able to provide U.S. natural gas producers with new access to global gas markets, however, the environmental impacts described in this EIS would not occur. It is speculative to predict the actions that would be taken by natural gas producers and end users as a result of the No Action Alternative. Similarly, the associated direct and indirect environmental impacts are also speculative. It is possible that natural gas infrastructure supplying natural gas to the global market area could be developed in other ways unforeseen at this point, depending on the market conditions, and the construction of other associated LNG export projects to serve global markets. These other LNG export projects would have their own environmental impacts, which could be less than, equal to, or greater than the Freeport LNG Projects.

3.2 SYSTEM ALTERNATIVES

System alternatives are alternatives to the proposed action that would make use of other existing, modified or proposed facilities that would meet the stated purpose of the proposed actions. A system alternative would make it unnecessary to construct part or all of the proposed actions, though additions or modifications to existing facilities may result in environmental impacts that are less than, equal to, or greater than the environmental impacts of the proposed facility.

On the East, West, and Gulf coasts of the United States, there are several proposed LNG export terminals that could be expanded or modified to export additional LNG. Any of these facilities would need additional liquefaction infrastructure plus the potential need for expanded docking facilities. Freeport LNG is an existing facility, and although the Pretreatment Plant would be built on a new site, the Liquefaction Plant, docks, tanks, etc. are existing. Any new LNG terminal would have large impacts from development of the facility. In addition, any of the system alternatives would not meet Freeport LNG's development goals or meet Freeport LNG's contractual obligations. As a result, any of the proposed export terminals do not offer significant

environmental advantage over the proposed Project which would partially utilize an existing facility.

3.3 SITE ALTERNATIVES

Site Alternatives include different locations for Freeport LNG's facilities that could reduce environmental impacts and still allow the Projects to meet the objectives. We evaluated site alternatives for the components of the Liquefaction Project (*i.e.,* the Liquefaction Plant, Pretreatment Plant, and Utility Line/Pipeline) and we considered site alternatives to the Phase II Modification Project. It should be noted that unlike a pipeline under Section 7 of the NGA, an authorization granted under Section 3 of the NGA does not grant the applicant eminent domain and thus we have limited ability to ensure that a recommended alternative site would be available unless the landowner would make it available for purchase or lease.

3.3.1 Liquefaction Plant

The site for the Liquefaction Plant adjacent to the existing Quintana Island terminal was selected on the basis of compatibility with the existing plant layout and yet-to-be constructed Phase II facilities, ease of functional integration, compliance with the siting and design requirements set forth in the CFR 49 Part 193 Subparts B and C and NFPA Standard 59, and availability of open space. The Liquefaction Plant also needs to be sited close to the existing offloading areas, LNG storage tanks, docking area, and other existing LNG infrastructure to avoid the construction of duplicative and significantly costly infrastructure at another location with added environmental impacts. The liquefaction trains and supporting equipment would be constructed within the existing terminal property and on adjacent Port Freeport property to the west, which was used previously as a DMPA.

The original Liquefaction Plant layout involved three trains located east of the Phase I process area and one train on the north edge of the Phase I process area (see figure 3.3.1-1). Freeport LNG revised the layout scenario for the current filing so that the three trains are on the former DMPA and located west of the Phase I process area (see figure 3.3.1-2). This location is expected to have relatively lower potential operational noise impacts as it is further away from a greater number of Quintana Island residents than the original location. As no other reasonable alternative site exists without significant increases in environmental impacts, constructing the Liquefaction Plant adjacent to the existing facility is the environmentally preferred location.



0 500 1,000 Feet

N

Figure 3.3.1-1
Freeport LNG - Liquefaction Project
Original Liquefaction Facility Configuration at Quintana Island Terminal
Brazoria County, Texas

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Figure 3.3.1-2

Freeport LNG - Liquefaction Project

Proposed Liquefaction Facilities at and Adjacent to Quintana Island Terminal

Brazoria County, Texas

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At the request of local landowners and FERC staff, Freeport LNG evaluated the feasibility of lowering the pad elevation of the Liquefaction Plant and examined the difference this would have on impacts on visibility, noise, safety, stormwater, and site engineering. Specifically, Freeport LNG evaluated lowering the ground elevation of the Liquefaction Plant by excavating 20 feet from the elevation currently proposed (*i.e.*, changing elevation from 28 feet amsl to 8 feet amsl). The results of the work showed that this alternative would not provide substantial improvements in visibility, and noise attenuation. The berm would need to be redesigned to ensure that it would be engineered for the additional height. If the berm was not redesigned, it would increase the risk to both workers and residents due to soil slumping/sliding. In addition construction of the berm and lowering the pad height would result in significantly increased vehicle and/or barge traffic associated with having to transport 5.7 million yd^3 of excavated material that would require disposal. Transport of the 5.7 million yd^3 would require an estimated 570,000 tandem dump truck round trips to transport the material or more than 2000 barge transports, much of it saturated with water. As a result of these impacts, this alternative would not provide a significant environmental advantage.

3.3.2 Pretreatment Plant

The proposed Pretreatment Plant site is located about 2.5 miles north of Quintana Island and would be situated primarily on grazing land. It would require an operational footprint of approximately 113.4 acres within a 276.3-acre property. The purpose of the Pretreatment Plant is to remove impurities in the natural gas prior to its liquefaction. The facility includes three natural gas pretreatment units (Units 1, 2, and 3) located in parallel in the northwest section and various support facilities. During Project planning and design, several site alternatives for the Pretreatment Plant were evaluated by Freeport.

The main criteria for site selection were:

- location between common source gas receipt point at Stratton Ridge meter station and the proposed Liquefaction Plant at the Quintana Island terminal;
- close proximity to the existing 42-inch-diameter sendout pipeline to minimize length of lateral pipeline interconnects;
- sufficient contiguous land acreage (approximately 40.0+ acres) to install Pretreatment Plant equipment with sufficient buffer to avoid disturbance (*i.e.*, noise and visual impacts) of neighboring property occupants;
- sufficient contiguous land acreage to provide topographic compensation (stormwater detention pond) for the loss of floodplain retention volume, as required;
- proposed industrial use compatible with existing surrounding land use(s);
- suitable road access; and
- land available for purchase or long-term lease.

To minimize impact, site alternatives were first assessed near or adjacent to the existing Quintana Island terminal. However there was a lack of a suitably configured (rectangle-based) area of sufficient size. The terminal site and the adjacent DMPA comprise an overall contiguous land area of 427 acres. Of this area, the operational footprints of the existing Phase I facilities (*i.e.*, unloading facilitates, two 160,000 m^3 LNG storage tanks, LNG vaporization systems, and associated utilities), proposed Phase II facilities, and proposed Liquefaction Plant collectively account for 221 acres. Much of the remaining 206 acres is peripheral fragmented land bordering the existing and proposed facilities, with 106 acres designated as construction workspace for the proposed Phase II and/or Liquefaction Plant.

The largest unfragmented block of land beyond the existing and proposed operational facility footprints is the 21-acre section located east of the ExxonMobil property and designated as "temporary workspace" for the Liquefaction Plant (see previously referenced figure 1-2). This area is insufficient to support the proposed Pretreatment Plant.

Since no suitable location was available at or adjacent to the terminal site, alternatives beyond the terminal were evaluated. The locations of 10 alternative sites are illustrated in figure 3.3.2-1 along with Freeport LNG's proposed location of the Pretreatment Plant (Site F). A comparison of these site alternatives is provided in table 3.3.2-1.

Site A is a 1,500-foot-long by 800-foot-wide (27.5-acre) rectangle located adjacent to Freeport LNG's existing compressor station at the Stratton Ridge underground storage site. As the Pretreatment Plant design evolved, a lack of sufficient space for the pretreatment equipment at Site A became evident (only 27.5 acres was available in comparison with the anticipated 40 acres required). The presence of peripheral industrial infrastructure and wetlands constrain the extent to which Site A could be expanded and would increase the area of affected wetlands over the proposed action. Freeport LNG's preliminary discussions with current land owners indicated that Site A is not likely to be available for purchase or long-term lease within a timeframe that meets the schedule or regulatory filing requirements.

Site B, which is located on the opposite side of Farm-to-Market (FM) Route 523 to Site A and the Stratton Ridge underground storage site, did not exhibit the same expansion constraints as Site A. Site B is a 2,000-foot-long by 1,000-foot-wide (45.9-acre) rectangle with sufficient additional peripheral space for a stormwater detention pond. Freeport LNG's preliminary discussions with current land owners indicated that Site B is not likely to be available for purchase or long-term lease within a timeframe that meets the schedule or regulatory filing requirements.

Site C is located on the same side of FM Route 523 as Site B, but is approximately one mile north of Site B. Site C consists of a parcel that is approximately 27.5 acres in size and exhibits the same expansion constraints as Site A. Freeport LNG's preliminary discussions with current land owners indicated that Site C is not likely to be available for purchase or long-term lease within a timeframe that meets the schedule or regulatory filing requirements.

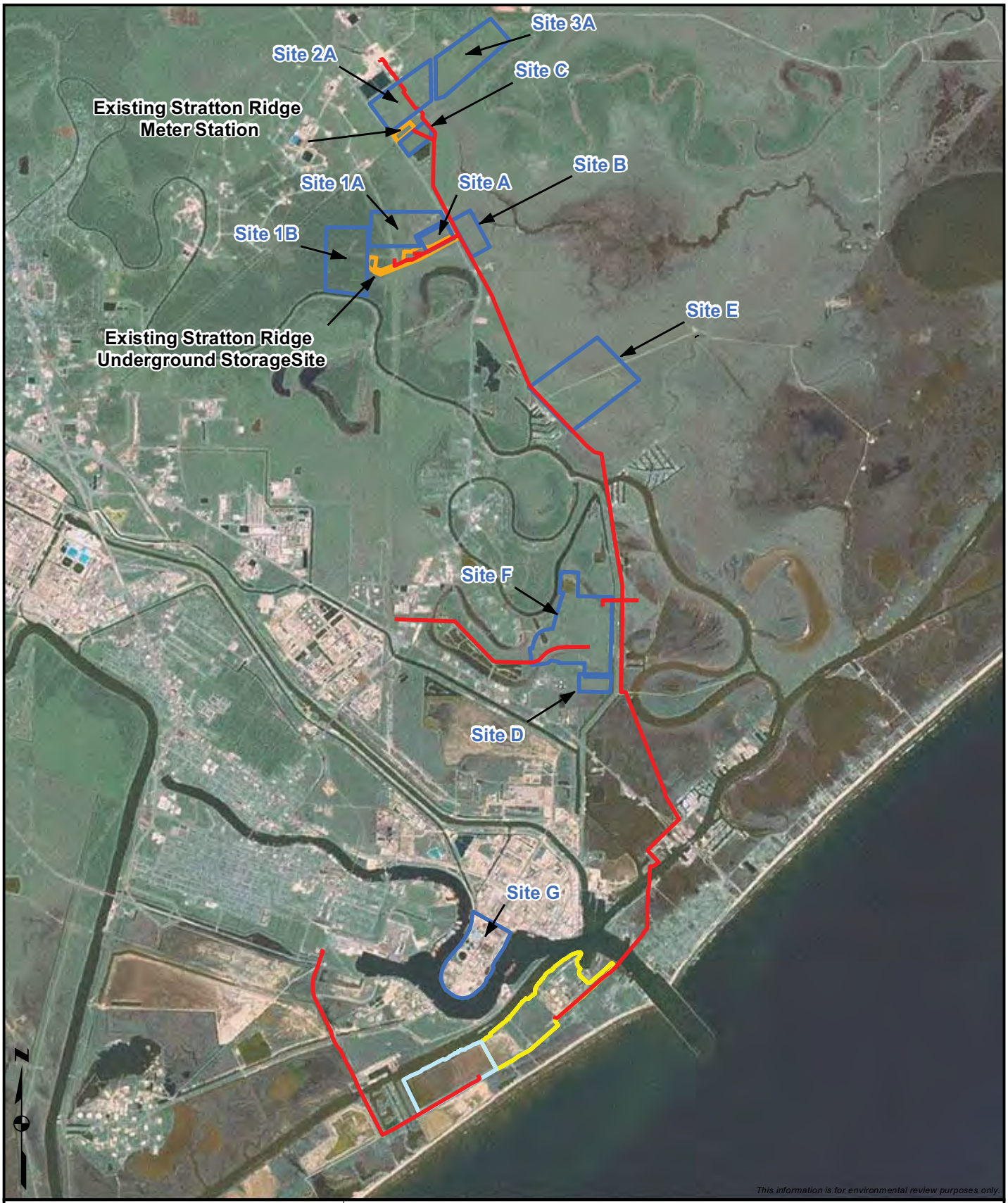


Figure 3.3.2-1

Freeport LNG - Liquefaction Project
Alternative Locations for the Pretreatment Plant Site
Brazoria County, Texas

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Table 3.3.2-1

Selection Criteria Summary for Pretreatment Plant Site Alternatives

Selection Criteria	Site										
	A	**B**	**C**	**D**	**E**	**F**	**G**	**1A**	**1B**	**2A**	**3A**
Location between Stratton Ridge meter station and Quintana Island terminal	yes	yes	yes	yes	yes	yes	yes	yes	Yes	yes	yes
Close proximity to existing 42-inch- diameter send-out pipeline	yes	yes	yes	yes	yes	yes	yes	yes	No	no	yes
Sufficient contiguous land acreage for pretreatment equipment, temporary workspace, and buffer	no	yes	no	no	yes	yes	yes	no	Yes	yes	yes
Sufficient contiguous land acreage for pond to offset loss of floodplain retention volume, as required	no	yes	no	no	yes	yes	unknown	no	Yes	yes	yes
Proposed industrial use compatible with existing surrounding land use(s)	yes	yes	yes	yes	yes	Yes	yes	no	No	yes	no
Suitable road access	yes	yes	yes	yes	yes	Yes	yes	yes	Yes	yes	yes
Land available for purchase or long-term lease within timeframe that meets Project schedule and regulatory filing requirements	no	no	no	no	yes	Yes	no	no	No	no	No

Note
Site F is the Proposed site

Site D is a small rectangular parcel, approximately 27.5 acres in size and is located adjacent to the southeast corner of Site F off FM Route 523. Like Site A, this Site turned out to be too small and Freeport LNG's preliminary discussions with current land owners indicated that Site D is not likely to be available for purchase or long-term lease within a timeframe that meets the schedule or regulatory filing requirements.

Site E is located on one part of a contiguous 500-acre property that Freeport LNG purchased in November 2011. Of the original five alternative sites considered, Site E was the only one that offered sufficient construction and operational space, while being readily available on the real estate market for purchase or lease. Site E was consequently originally chosen as Freeport LNG's "preferred site" for the Pretreatment Plant and was identified as such in draft Environmental Report (ER) materials filed with the FERC in Docket No. PF11-2 in December 2011.

The operational footprint for the Pretreatment Plant at Site E would occupy 100.1 acres and adjoining temporary workspace would occupy 85.6 acres, constituting an overall site footprint of 185.7 acres. This footprint was located in the western sector of the 500-acre property adjacent to CR 792 and the existing sendout pipeline, which runs along and within the site's western boundary.

The location and configuration of the construction footprint for Site E in the western sector of the overall 500-acre property minimized wetland and waterbody impacts to the extent possible. Of the 188.6 acres of planned site disturbance (which included 2.9 acres relating to the permanent relocation of an existing site access road north of the proposed Pretreatment Plant), only seven acres (based on delineation during July and August of 2011) involved either temporary or permanent impacts on wetlands or waterbodies.

Public review of the development plans for Site E, as filed with the FERC and as presented at several public meetings, raised significant concerns and opposition from residents in the nearby communities of Hide Away on the Gulf, Turtle Cove, and Oyster Creek Estates. In particular, residents of Hide Away on the Gulf and Oyster Creek Estates were concerned that Site E was located on CR 690, the single means of road access for the two communities, and an emergency or accident at the Pretreatment Plant could block that access. Concerns were also expressed in comment letters from residents in the area about noise levels, air emissions, water discharges, materials storage, flood protection, and other construction and operation-related issues with the potential to negatively impact local residents and natural resources.

As a result of public concerns with Site E, Freeport LNG evaluated and selected Site F as its proposed site. Site F consists of 400 acres of land that recently became available for purchase. The acreage consists of multiple contiguous land parcels with one property owner and is located about one mile southeast of the City of Oyster Creek, on the west side of CR 690 between Turtle Cove and SH 332. The Pretreatment Plant site (Site F) is evaluated in section 4.0 of this EIS.

Freeport LNG entered into an option agreement to purchase the above-described 400 acres of land, of which an approximately 276-acre area constitutes the newly proposed site for the Pretreatment Plant (see previous figure 3.3.2-1). Site F fulfills all the relevant site selection

criteria[11] identified in table 3.3.2-1; in addition, it can be accessed by multiple road routes and is located in a sparsely populated semi-rural area currently or historically supporting commercial operations such as sand extraction and oil/gas storage. The communities that are in closest proximity to Site E are at least 0.7 mile from Site F. This buffer minimizes noise and visual impacts. In addition Site F has a means of access that does not involve travel in close proximity to the proposed plant and thus addresses concerns about public safety and use of road in the event of an emergency. From an environmental impact perspective, development of Site F would involve approximately 15.1 acres of temporary and permanent wetland/waterbody impacts, in comparison with approximately 7.0 acres of temporary and permanent wetland/waterbody impacts for Site E.

We evaluated additional alternative sites as a result of concerns expressed by persons living in residential areas in proximity of the proposed Pretreatment Plant site to ensure the site chosen by Freeport LNG minimizes land use and environmental impacts on the greatest extent possible. These other sites included Sites 1A, 1B, 2A, and 3A (see figure 3.3.2-1). None of the sites proved to be viable due to land availability issues and site constraints as discussed below.

Alternative Sites 1A and 1B are located in undeveloped areas north and west, respectively, of the existing Stratton Ridge underground storage site. These properties rest atop the Stratton Ridge Salt Dome, an economically important salt diapir used by Dow and others for salt mining, gas, and petroleum products storage. The property owner of these sites is planning to use them for the development of future storage capacity and is not interested in selling or leasing the property for non-salt dome oriented activities. In addition, Site 1A is too small for the Pretreatment Plant, and Site 1B is too far from the existing 42-inch diameter send-out pipeline and would not be compatible with surrounding land uses.

Site 2A and 3A are located north and east, respectively, of the Stratton Ridge meter station. The property owner of Site 2A is not willing to sell or lease property for uses that are incompatible with salt dome oriented activities. Additionally, Site 2A lacks the required close proximity to the existing 42-inch-diameter sendout pipeline. Alternative Site 3A is not available for purchase at this time, and is not compatible with existing adjacent land uses.

During the draft EIS comment period we received comments from the public that Dow Texas currently has a cleared vacant area approximately 120 acres in size within the portion of its plant property known as “the thumb” and referred to herein as Site G (see figure 3.3.2-1). Site G is directly across the Intracoastal Waterway (ICW) from the Quintana Island terminal, and between the Brazosport Turning Basin and ICW Upper Turning Basin. We analyzed this as a possible alternative since it is located in an industrial area and further away from residential areas. Our review of the site indicated that it potentially contains contaminated soils. Further, Freeport LNG lacks development rights to the property. As previously indicated, eminent domain is not granted under Section 3 of the NGA. Accordingly, we determined that Site G is not technically and economically feasible and practical. The potential contamination issues could also mean that

[11] The criterion referring to an offset of stormwater retention volume is inapplicable because Site F is not located in a flood zone.

Site G would also not offer a significant environmental advantage. Therefore, Site G was dropped from further consideration.

In conclusion, Sites A, B, C, D, 1A, 1B, 2A, 3A, and G are not viable alternatives for siting of the Pretreatment Plant. The proposed site (Site F) provides a suitable location without the safety issues regarding access to homes during an emergency at the facility that were of concern with Site E. Site F minimizes environmental impacts associated with noise and other operational issues, and thus we conclude that no alternative site offers significant environmental advantages over the proposed site.

3.3.3 Pipeline/Utility Line System

In evaluating alternatives to the Pipeline/Utility Line System, the main criteria were the functional interdependency; and proximity to the proposed process facilities (Liquefaction Plant and Pretreatment Plant), Freeport LNG's existing natural gas sendout pipeline, and the existing sendout pipeline meter station at Stratton Ridge. The Liquefaction Plant, Pretreatment Plant, and Stratton Ridge meter station represent fixed receipt or delivery points for the natural gas transported by the sendout pipeline and utilized in the liquefaction process. The existing sendout pipeline route is the proposed route identified through Freeport LNG's routing analysis.

Freeport LNG would use existing pipeline corridor for its other pipelines and utility lines (nitrogen, NGL, BOG, water, and fiber optic) and would install utilities within a shared trench to the extent practicable. This would help to avoid segmentation of wooded areas, and minimize the impact on additional land owners.

For those new pipelines for which the contents are received from or delivered to locations other than the Terminal, Pretreatment Plant, or Stratton Ridge meter station, certain route sections deviate from the sendout pipeline and would be dependent on the geographic locations of the receipt and delivery points. Specifically, the nitrogen pipeline originates from an Air Liquide connection at the Stratton Ridge underground storage site, while the NGL pipeline would deliver to the INEOS Plant, about 0.4 mile north of the Stratton Ridge meter station (see figure 1-1).

At the Stratton Ridge underground storage site, the proposed routes for the nitrogen pipeline and water line are largely located on land owned or leased by Freeport LNG, and the two facilities are partially collocated along the right-of-way for the existing 24-inch-diameter gas pipeline that would be extended to connect the storage facility with the 42-inch-diameter sendout pipeline.[12] The section of the proposed NGL pipeline route that leaves the sendout pipeline south of the Stratton Ridge meter station and runs north to the INEOS Plant fence line, collocated along existing pipeline rights-of-way (approximately 60 percent of the proposed route section is collocated in this way). Alternatives to these direct and relatively short route sections (less than one mile in each case) would involve less collocation and thus would increase impacts on environmental resources. Therefore, the proposed routes are environmentally preferable.

[12] The proposed extension of the 24-inch-diameter gas pipeline is for Freeport LNG's Stratton Ridge underground storage operation and was identified as a nonjurisdictional facility under the previously authorized Phase II Project – it is not part of the Liquefaction Project.

3.4 PHASE II MODIFICATION PROJECT

3.4.1 No Action Alternative

Under the No Action Alternative, the objectives of the Phase II Modification Project would not be met and Freeport LNG would not be able to provide additional support for either import or export of LNG. If the Phase II Modification Project would not be built then the environmental impacts outlined in section 4 would not occur. In addition, any potential beneficial socioeconomic impacts identified in section 4.0 of this EIS would not occur**.**

3.4.2 System Alternatives

The purpose of Freeport LNG's Phase II Modification Project is to provide enhanced LNG storage and vessel handling options to allow Freeport LNG to respond to import, re-export, and export opportunities with optimum market positioning and service flexibility. Such enhanced options cannot be achieved through new or modified LNG terminal facilities elsewhere in the U.S., given that the location, design, and purpose of the Phase II Modification Project facilities are predicated on and inextricably linked to the existing plant facilities and operations at Freeport LNG's terminal. As such, no system alternatives exist that could achieve the same level of functional integration or optimize the terminal's operational flexibility and capabilities without causing greater environmental impacts.

3.4.3 Site and Facility Placement Alternatives

The location, design, and purpose of the Phase II Modification Project facilities are wholly dependent on the existing plant facilities and operations at the Quintana Island terminal; therefore, other geographically separate sites beyond the terminal were not evaluated.

The location and configuration of the proposed Phase II facilities (both for the Phase II Project and the Phase II Modification Project) at the terminal site are essentially dictated by technological considerations and the need for compatible design integration into the existing Phase I layout, and thus relocating these structures elsewhere onsite is not a viable alternative.

ENVIRONMENTAL ANALYSIS

SECTION 4

4.0 ENVIRONMENTAL ANALYSIS

The Projects would be located in Brazoria County Texas, along the Gulf Coast. The Liquefaction Plant and terminal is located on Quintana Island in the Town of Quintana, and the Pretreatment Plant would be located just outside the City of Freeport approximately 3.5 miles to the northeast.

The Town of Quintana is on the west side of the mouth of the Brazos River and on Farm Roads 1495 and 723, directly across the Brazos River Harbor channel from the Village of Surfside Beach. Quintana has long been a major seaport and varied industries have come and gone including a cattle hide and tallow operation, a pickled-beef factory, an elevator that loaded coal onto ships, a cottonseed oil and cake mill, a shipyard, and a cork plantation (Texas State Historical Association, 2013). In the Galveston hurricane of 1900, the coastline of Brazoria County was destroyed and most of the families then living at Quintana moved farther inland or left entirely. The current population of Quintana is approximately 58 persons (Texas State Data Center, 2012). Today Quintana is a popular destination for beachgoers, the site of a Brazoria County Park, and on the western end of Quintana Island, the location of Freeport LNG's existing LNG import terminal, which includes docking facilities, a storm levee, LNG storage tanks, LNG offloading equipment, vaporization facilities, and an approximately 10-mile-long 36–inch-diameter gas pipeline to deliver imported gas to the Stratton Ridge Meter Station.

The City of Freeport is approximately 16 miles south of Angleton in southern Brazoria County. The City itself was founded by the Freeport Sulphur Company in 1912 and was the site of the world's largest sulfur mines. In 1957 Velasco, one of the oldest towns in Texas, was incorporated into Freeport. Today Freeport is home to one of the Gulf's largest commercial shrimp trawler fleets, and has over 600 businesses and approximately 12,049 inhabitants (Texas State Historical Association, 2013). The location of the proposed Pretreatment Plant is just outside of Freeport on a 218-acre parcel. Cattle grazing is the predominant land use at and in the vicinity of the site, but the surrounding area also supports several residential communities, commercial developments concentrated along arterial roads (SH 332 and FM Route 523), and infrastructure associated with oil and gas production and storage. (See further details on land use in section 4.7).

The Freeport region has a predominantly maritime climate, characterized by periods of modified continental influence during the colder months when cold fronts from the northwest may reach the area. Because of its coastal location and latitude, cold fronts that reach the Freeport region seldom have severe temperatures. Below freezing temperatures are generally recorded only a few times per year. Normal monthly high temperatures range from about 63 degrees Fahrenheit (ºF) in January to 90 ºF in July and August; and lows range from 45 ºF in January to 77 ºF in July.

High humidity prevails throughout the year. The average annual precipitation is approximately 51 inches, varying from approximately 2.8 inches per month in February, March, and April, to 7.8 inches per month in September. Winter precipitation comes mainly as slow, steady rain. Excessive rainfall may occur in any season and on occasion there have been months with rainfall totals amounting to a trace, followed by months with totals in excess of 15 inches. Hail is rare

and summer rains can be strong due to local thunderstorms and storms originating in the Gulf. Tropical disturbances, such as hurricanes and tropical storms, are infrequent but can be major storm events when they occur.

Local air mass movements are strongly influenced by onshore-offshore flows. As the land surface heats up on a warm day, the air near the land surface warms and rises, causing atmospheric pressure to decrease relative to the cooler ocean water. The result is an onshore flow or "sea breeze". Onshore flows are common on spring, summer, and fall days, and typically penetrate less than 40 kilometers (km) inland from shore. When the land cools relative to the ocean, the pattern reverses and an offshore flow or "land breeze" results. Onshore flow is common on nights during the winter. The area is prone to fog, particularly in winter months when warm, humid ocean air is transported over cooler land surface and moisture in the air condenses.

Brazoria County has undergone significant subsidence since the early 1900s due mainly to groundwater extraction. Subsidence in the county ranged up to approximately 1.5 to 2 feet in northern portions of the county, closer to Houston.

The existing Freeport LNG import terminal was placed into service on July 1, 2008. The facility was authorized to operate with a vaporization capacity of 1.5 Bcf/d on Quintana Island. The Commission's NEPA analysis and impact determination for the Phase I facilities was contained in the final EIS issued on May 28, 2004 (FERC/EIS – 0164).

Freeport LNG's existing Quintana Island terminal is comprised of the following facilities: one marine berthing dock authorized for up to 200 LNG carrier visits annually, two 160,000 m^3 full containment LNG storage tanks, LNG vaporization systems, and associated utilities. The terminal is connected to the regional natural gas pipeline system by Freeport LNG's 9.6-mile-long 42-inch-diameter natural gas sendout pipeline.

Freeport LNG submitted an application to the Commission in Docket No. CP05-361-000 for authorization to site, construct, and operate the Phase II Project facilities, the construction and operation of which would expand the import capacity of the Quintana Island terminal. As originally proposed, the Phase II Project at the Quintana Island terminal included an additional marine berthing dock and associated transfer facilities for LNG vessels, new and expanded vaporization systems to increase the vaporization capacity to 4.0 Bcf/d, and an additional LNG storage tank.

The Commission's NEPA analysis and impact determination for the Phase II Project was contained in an Environmental Assessment (EA) issued on June 21, 2006 and on September 26, 2006, the Commission issued an Order approving the Phase II Project facilities. These facilities have not been constructed and a portion of this final EIS will review the application for modifications to this authorization called the Phase II Modification Project.

Freeport LNG submitted an application to the Commission for authorization to operate its Quintana Island terminal for the additional purpose of exporting foreign-sourced LNG. Subsequently, on December 9, 2008, Freeport LNG filed an application with the Commission for

authorization to construct and operate a BOG liquefaction system and an LNG truck delivery system to provide an alternative source of LNG at its Quintana Island terminal. The Commission's NEPA analysis and impact determination for the export, BOG liquefaction, and LNG truck delivery system facilities was contained in an EA issued on March 13, 2009. On March 25, 2010, the Commission authorized Freeport LNG to commence construction of the LNG truck delivery system, which was completed in November 2010.

4.1 GEOLOGY

4.1.1 Geology, Foundation Conditions and Natural Hazards

The Projects are located in the West Gulf Coast subdivision of the Coastal Plain geomorphic province. This region is characterized by seaward-dipping sedimentary rocks overlain by Quaternary deposits containing thick layers of clay, silt, sand, and gravel (United States Geological Survey [USGS], 2000). The area consists of Holocene barrier ridge/barrier flat deposits, alluvium, and fill and spoil deposits overlying the Pleistocene Beaumont Formation (USGS, 2005). The Beaumont and subsequent underlying formations represent unconsolidated deposits (sand, silt, clay, and gravel) up to several thousand feet thick. The proposed Liquefaction Plant would be located on beach-ridge and barrier-flat sand and shell sand deposits derived from coastal processes and fill and spoil material dredged for raising land along waterways. The proposed Pretreatment Plant and Pipeline/Utility Line System route are largely underlain by alluvium associated with historical deposition from the Brazos River and Oyster Creek. The Beaumont Formation underlies a small portion of the northern extent of the Pipeline/Utility Line System route.

The predominant structural feature under the northern portion of the pipeline route is the Stratton Ridge Salt Dome. The salt dome is oriented southwest to northeast with a caprock approximately 850 feet below ground. It is used as an underground gas storage facility with a capacity of 4.5 billion cubic feet (Bcf) in a cavern approximately 3,400 to 4,300 feet below ground (http://www.freeportlng.com/Underground_Cavern.asp).

The Old Brazos River, the Dow Barge Canal system, and the ICW come together at the FHC and the Gulf. The land and waterways in this area have been significantly altered by industrial development.

4.1.1.1 Mineral Resources

Underground mineral resources in proximity to the proposed Projects consist of salt (formerly exploited for brine production) and oil and gas resources. The Stratton Ridge Salt Dome was discovered in 1913 and has a salt ore body that extends from approximately 1,250 to 10,560 feet below ground. It is located approximately 2.8 miles northwest of the Pretreatment Plant. In the past, the salt dome was solution mined for brine production. The margins of the salt dome have been explored for oil and gas development (USGS, 2012). A small oil and gas field associated with the salt dome, the Stratton Ridge Oil Field, is now inactive. Another salt dome, the Bryan Mound, is located about 3.1 miles southwest of the Liquefaction Plant and serves as a storage site of the U.S. Strategic Petroleum Reserve. A commercial sand extraction operation existed at

the proposed Pretreatment Plant site up to 2005. This has since been closed and the associated equipment and structures removed. The Pretreatment Plant site footprint overlies the eastern section of the central abandoned borrow pit. Freeport LNG plans to backfill this borrow pit to planned final grade which is estimated to require a maximum of approximately 20 feet of fill. There are no identified active surface mining operations within one mile of the Projects.

The Railroad Commission of Texas (RRC) Public GIS Map Viewer shows several oil and gas wells within 0.1 miles of the Pipeline/Utility Line System route; however, these are identified as dry holes or bore holes that were drilled and plugged. There are storage wells near the northern portion of the Pipeline/Utility Line System route, including the storage well associated with this Project – the Stratton Ridge underground storage site.

Existing mineral resources near in the area are located significantly deeper than the depth of disturbance associated with facility and utility line construction. The salt dome is about 1,250 feet below ground surface (bgs) and the oil and gas reserves are about 1,300 feet bgs. These resources would not be affected by the generally shallow nature of Project construction. The natural gas storage well drilled into the Stratton Ridge Salt Dome is already complete. Therefore, none of the activities associated with the construction and operation of the proposed Project would be expected to affect mineral resources in the area.

4.1.1.2 Foundation Conditions

Freeport LNG has divided the proposed Liquefaction Plant into five project areas which have somewhat different subsurface soil conditions. Area 5 is defined as in the vicinity of the LNG tank location. Ground surface elevation is +5 feet. Areas 1 and 2 are located to the northeast of Area 5 with ground elevation at +5 feet. No structures are located in Area 1 in the current plot plan while shallow subsurface utilities are located in Area 2. Areas 3 and 4 are located to the west of Area 5 on the previous DMPA dredge spoils area. The three liquefaction trains and additional process structures would be located in Area 3. The elevation of the ground surface of Areas 3 and 4 is approximately +28 feet due the previous placement of dredge fill.

Freeport LNG has performed a geotechnical investigation of the Liquefaction Plant site areas. The soil investigations at Area 5 indicate that subsurface conditions comprise approximately 3 feet of clayey fill directly underlain by soft to firm plastic clays. A layer of loose to medium silty sand was encountered to depths of 35 feet and was underlain by layers of stiff to very stiff clays and sandy clays to depths of about 80 feet. These deposits overlie alternate layers of dense to very dense sands and stiff to very stiff hard clays to a depth of 225 feet where a very dense sand layer was encountered. The subsurface soil properties of Areas 1 and 2 are generally similar to those of Area 5 except for differences in the depths of layers in the top 80 feet. In Areas 3 and 4, dredged fill was placed and the ground surface elevation ranges between +25 and +30 feet. The soil investigations for Areas 3 and 4 indicate that the overall stratigraphic layers are very similar to those indicated in Areas 1, 2 and 5 with the exception of the shallowest fill stratum, which has an increased thickness of up to 30 feet.

The average shear wave velocity for the Liquefaction Plant site for the top 100 feet range between 520 and 705 feet per second for Areas 1, 2 and 5 while for Areas 3 and 4 the velocities

range between 525 and 800 feet per second. For all areas, the subsurface soils as characterized in accordance with Chapter 20 of ASCE 7-05 as Site Class D if the upper bound shear velocities are used and as Site Class E if the lower bound shear velocities are used. The foundations for all areas would be reinforced with concrete footings supported by deep driven piles.

The soil investigation at the Pretreatment Plant identified the surface conditions to consist of approximately 12 to 15 feet of firm to very stiff sandy to silty clay intermixed with sandy to clayey silt. This is underlain by about 15 feet of loose to medium dense sand and silty sand. Underlying this unit is approximately 70 feet of firm to stiff clay. Within this same 70-foot-thick zone, a dense to very dense silty sand layer was occasionally encountered.

The average shear wave velocity for the Pretreatment Plant site for the top 100 feet range is between 599 and 606 feet per second. Site classes as defined by ASCE 7-10, Chapter 20 refer to the soil and rock types in terms of shear wave velocity, standard penetration resistance, and undrained shear strength. The site classes are referred to by letter designations A through E. With A being hardest (hard rock) and E (soft clay soil) being the softest material type. Site Class D refers to stiff soil. The site class is important in seismic design because structures respond to ground shaking differently based on the soil or rock type that the building is founded upon. Structures founded upon softer soils experience more ground shaking than when on hard rock. The shear wave velocities for the Pretreatment Plant are in the upper range for Site Class E and the upper range for Site Class D site. Freeport LNG's geotechnical consultant Fugro has recommended that Site Class E be used for the Pretreatment Plant site. We concur.

The final grade proposed for the Pretreatment Plant is at an approximate elevation of +8 feet, which would be with two to five feet of the existing natural grade in areas outside of the borrow pits. Approximately 3 to 20 feet of fill is proposed across the Pretreatment Plant site which would require a large amount of deliveries. Because of anticipated on-site soil settlement, all settlement sensitive structures at the Pretreatment Plant site would be founded on deep pile foundations and lightly loaded structures would be supported on shallow foundations. However, shallow foundations are not recommended in the borrow pit areas that would be backfilled.

4.1.1.3 Natural and Geological Hazards

Geologic and other natural hazards that could potentially affect the proposed Liquefaction Plant, Pretreatment Plant, and pipelines consist of earthquake ground motions and faulting, soil liquefaction, subsidence, hurricane winds and flooding/storm/tsunami damage, and shoreline erosion.

Earthquake Ground Motions and Faulting

The Gulf Coastal Plain geomorphic province is characterized by a low seismic hazard potential. Freeport LNG conducted a site-specific hazard evaluation of the Liquefaction Plant site. The site specific evaluation determined that the peak ground acceleration including site effects is 0.021 g (where g is the acceleration due to gravity) with a 10 percent probability of exceedance in 50 years and 0.065 g with a 2 percent probability in 50 years. Significant earthquakes in the region are rare. Through 1989, only two earthquakes Modified Mercali Intensity VI had been recorded

for east Texas – 1891 and 1932 (USGS, 1999). The Advanced National Seismic System Comprehensive Catalog (USGS, 2014) has no record of significant seismic activity in the region of southeast Texas since the inception of the database in 1973. The sediments do not have the capacity to store large amounts of energy and rupture, so natural movements are more slow slides than sudden lurches. Most of the ground subsidence and earthquake activity that does exist in the region is thought to be the result of human activity (*e.g.,* oil and gas or groundwater extraction). As groundwater extraction was decreased in Brazoria County in the 1970s, subsidence also decreased (see subsidence below).

There are several faults near the Projects, including normal, listric, growth faults that generally dip Gulfward along the Texas gulf coast and faults around salt domes associated with diapirism. Slip rates along the normal growth faults is anticipated to be less than 0.2 millimeters per year. Faults associated with salt diapirism occur locally around the Stratton Ridge Salt Dome and the Bryan Mound Salt Dome. A site-specific fault study was conducted for the Liquefaction Plant. No faults were identified that could impact the areas east and west of the existing terminal in areas of the proposed expansion so no further fault investigation is required. However, a fault has been identified in the northwestern corner of a possible future expansion area. If additional plant expansion is planned along the northern side of the future expansion area, then additional investigation would be required.

The fault investigation identified a surface fault in the northern portion of the Pretreatment Plant property extending generally south-southwest.

Soil Liquefaction

Soil liquefaction is the transformation of loosely packed sediment, or cohesionless soil, from a solid to a liquid state as a result of increased pore pressure and reduced effective stress, such as intense and prolonged ground shaking from seismic events. Though there are sediments underlying the Liquefaction Plant that fit this category, the low risk of seismic activity in this area minimizes the potential hazard to the Liquefaction Plant from soil liquefaction. Freeport LNG identified a layer of loose to medium dense sand approximately 10 to 35 feet bgs at the proposed Liquefaction Plant that was potentially susceptible to liquefaction (Fugro, 2011). A similar loose sand/silty sand layer was also identified from approximately five to 20 feet bgs at the Pretreatment Plant (Fugro, 2012b). Freeport LNG evaluated the potential for liquefaction of this layer for the Liquefaction Project by performing soil borings and cone penetration tests. Based on the results of this investigation, Freeport LNG concluded that liquefaction of the identified continuous layers of silty sand and sand beneath the Liquefaction Project area is unlikely and that liquefaction of thin silt layers in the dredge fill would be sporadic, contained, and discontinuous (Fugro, 2011).

In addition, the clayey soils above the sand layer would damp out any vibration due to operation of machinery. Furthermore, the vibrations from the machinery are not of sufficient amplitude to cause liquefaction at the depth at which the sand layer is present. The structures are supported on pile foundations designed for downdrag and would not be affected by any localized liquefaction, should it occur at all.

Although Freeport LNG's geotechnical consultant Fugro recommended that a liquefaction study be performed for the Pretreatment Plant (Fugro, 2012c), and no such evaluation has yet been conducted, we deem that the extremely low risk of seismic activity, combined with the low liquefaction potential of the soils result in a low risk to the Pretreatment Plant from soil liquefaction. Therefore we conclude that additional liquefaction studies are unnecessary.

Subsidence

Subsidence is defined as sudden sinking or gradual downward settling of land with little or no horizontal motion, caused by surface faults and intensified or accelerated by the extraction of subsurface mineral resources, groundwater, or hydrocarbons. Large-scale subsidence has occurred in Brazoria County, starting around the turn of the last century. By the 1970s the area around Freeport had subsided approximately 1.5 feet and up to 2 feet in northern portions of the county, near Houston (Sandeen and Wesselman, 1973). The Brazoria County Groundwater Conservation District (BCGCD) was created in 2005 to, among other things, control and prevent subsidence. BCGCD has a map of projected subsidence through 2050 on their website (http://bcgroundwater.org/maps/feet2050.htm). The risk of subsidence in the Freeport area has been reduced greatly due to a reduction in groundwater pumping and the associated rise in the water levels in the Chilot aquifer. Estimated subsidence in the area of the Liquefaction Project is estimated up to one foot when projected through 2050 according to the BCGCD. The subsidence would not affect improved facilities such as the Liquefaction or Pretreatment Plants, although it may have minor effects on appurtenant structures attaching to the plants such as roads, stairs, etc. Mitigation for minor, ongoing settlement of these appurtenant facilities would require continued maintenance by Freeport LNG.

Hurricane Winds

The proposed Liquefaction Plant site would be subject to hurricane winds. As required in 49 CFR 193.2067, the LNG facility including both the LNG tanks and liquefaction process areas would be designed for a sustained wind speed of 150 miles per hour (mph), which converts to a 3-second gust wind speed of 183 mph. The Pretreatment Plant would also be designed for a 3-second gust wind speed of 150 mph.

Flooding/Storm Damage/Tsunami

The Liquefaction Project would be located along the Gulf shoreline and would be subject to coastal storms, hurricanes, flooding, and other coastal processes. According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), the Liquefaction Project would lie within Coastal Flood Zone VE and 100-year Flood Zone AE. VE indicates that the area is susceptible to coastal flooding with wave action. The base 100-year flood elevation for the Liquefaction Project is 13 feet (FEMA, 1993). Therefore, the Liquefaction Project must be designed to withstand severe weather and flooding events.

The Pretreatment Plant would be located in an area designated as Zone X, indicating that it is an area protected by levees from a 100-year flood (FEMA, 1992). The majority of the Pipeline/Utility Line System route is located within the 100-year flood plain, with coastal areas

also in Zone VE. The northern end of the Pipeline/Utility Line System route is outside of the 100-year floodplain.

The Liquefaction Project includes design elements to address potential flooding and storm damage. These elements include storm surge levees around the Liquefaction Project and elevated fill platforms or racks to raise operational facilities (28 feet amsl for the Liquefaction Plant, and 8 feet amsl for the Pretreatment Plant). The critical storm surge elevation used for the Liquefaction Project levee design criteria is elevation 13 feet amsl developed after Hurricane Carla in 1961. To dissipate the direct wave action of incoming waves and to prevent damage to inland installations, three levees are in place: the Velasco Drainage District's sacrificial levee extends around the ExxonMobil property to the east side of Quintana Island; the Freeport LNG levee surrounds the south and west sides of the LNG storage and vaporization area; and Port Freeport's levee around the former DMPA. The Liquefaction Project would be located within the Port Freeport DMPA levee. Both of non-sacrificial levees have crest elevations 21-feet amsl. The Freeport LNG levee was constructed of stabilized clay, but the levee around the DMPA is assumed to be constructed of the same dredged material found in the DMPA. Freeport LNG proposes to make structural improvements to the DMPA levee, as required.

As identified in section 4.12.4, Climate Change in the region would have two effects which may cause increased storm surges; increase temperatures of Gulf Waters which would increase storm intensity, and a rising sea level. Even with the increased sea levels due to climate change, and increased storm surge, the non-sacrificial levees elevations of 21-feet-amsl at the Liquefaction Plant would provide a significant barrier to even a 100-year climate-change-enhanced storm surge. The Pretreatment Plant, while inland, has a lower 8-feet-amsl pad that would be more vulnerable to storm surge, but would be afforded more protection due to its location 2.5 miles inland.

The Liquefaction Plant's shoreline location also makes it susceptible to potential inundation of tsunamis. The Pretreatment Plant is located approximately 2.5 miles from the coast and is not susceptible to inundation from tsunamis. Tsunamis are generated by submarine movements such as landslides and earthquakes. Freeport LNG conducted a tsunami hazard assessment as part of their seismic evaluation of the Liquefaction Plant (Freeport, 2011). It was concluded that a tsunami with a 500 year recurrence rate would reach less than 13 feet amsl. Horrillo *et al.*, (2010) identified three historical and potential future locations of submarine landslide occurrences and modeled the coastal impacts of the recurrence of similar slides. It was determined that the 21-feet-amsl levee elevation of the Liquefaction Plant would be sufficient for protection from storm surge and we agree.

Shoreline Erosion

Beach erosion along the seaward side of Quintana Island (south of the FHC mouth) has historically been rapid, but was reported to be stabilizing in recent years (Morton, 1997). However, according to the Texas Shoreline Change Project, a regional shoreline-monitoring and shoreline-change analysis program (Gibeaut *et al.*, 2000), the average annual rate of shoreline change in the Liquefaction Project vicinity is negative (*i.e.*, an erosional environment). Based on recent topographic profile mapping of the Quintana Island shoreline, and comparison to historic

shoreline locations, mapping for the Liquefaction Project area indicates that the annual rate of beach erosion is about 11 feet per year. In 2005, 72,000 tons of sand were dumped along the Gulf side of Quintana Island to replace beach lost to erosion. In recent years, Brazoria County has instituted a dune restoration planting project. Since beach erosion is occurring from the Gulf inward, toward the main land, the presence of the Liquefaction Project, which would be located on the backside of the island, should not have any effect on the rate of erosion on the island. The Pretreatment Plant is inland and would not be affected by shoreline erosion.

The slope stability analysis has not been properly identified for the north side of the Liquefaction Plant. This is necessary because the slope in question is 27 feet high with 25 feet below water. Freeport LNG has only analyzed the above water portion and states that the slope is stable. This is not adequate. The below water portion of the slope should to be analyzed to complete the analysis and ensure proper stability.

Mitigation Measures

The design of the Liquefaction and Pretreatment Plants are currently at the Front-End Engineering Design (FEED) level of completion. A feasible design has been proposed, and Freeport LNG would complete additional detailed design work if the Projects are authorized by the Commission. Information regarding the development of the final design would need to be reviewed by FERC staff in order to ensure that the final design addresses the requirements identified in the FEED.

As identified above, the fault investigation identified a surface fault in the northern portion of the Pretreatment Plant property extending generally south-southwest. Based on the findings of this report, **we recommend that:**

Prior to construction, Freeport LNG should file with the Secretary of the Commission (Secretary) the following information for the Pretreatment Plant site, stamped and sealed by the professional engineer-of-record:

- **a. an analysis of the suitability and sensitivity of proposed structures within the fault hazard zone offsets and either relocate those structures outside the fault hazard zone or provide structures that are designed to acceptably accommodate the potential fault offsets;**
- **b. an analysis of the potential need to redesign or re-orient utilities or other structures that cross the fault hazard zone and provide design details that demonstrate that the utilities and other structures acceptably accommodate potential fault offsets, including a plan to enable such structures to be periodically re-leveled;**
- **c. a review of vertical support structures (if any) within the fault hazard zone;**
- **d. threshold fault offset levels (total and differential) for movement-sensitive structures that cross the fault and action items for exceedance of those levels; and**

e. a fault monitoring program in accordance with section 4.6 of the April 25, 2014 Detailed Fault Study Report No. 04.10130160 prepared by Fugro Consultants, Inc.

In addition, Freeport LNG should file, in its Implementation Plan, the schedule for producing this information.

To ensure that Freeport LNG's Liquefaction Plant is designed to withstand potential geologic hazards, **we recommend that:**

Freeport LNG should file with the Secretary, the following information for the Liquefaction Plant, stamped and sealed by the professional engineer-of-record:

a. an updated slope stability analysis of the north side of Liquefaction Plant area including the slope below the water level. This analysis should include an updated bathymetry along the waterway channel that defines the underwater continuation of the slope included in the stability analysis;
b. site preparation drawings and specifications;
c. design drawings and calculations of structures and foundations of the Liquefaction Plant; and
d. seismic specifications used in conjunction with procuring Liquefaction Plant equipment prior to the issuing of requests for quotations.

In addition, Freeport LNG should file, in its Implementation Plan, the schedule for producing this information.

In conclusion, the Liquefaction Project is located in an area that presents several potential challenges, relative to geology, foundation conditions, and natural hazards; however, these conditions can be effectively managed through proper engineering design or shown to be minimal through additional evaluation. The recommendations included in this section ensure Freeport LNG would be required to mitigate and or manage associated geologic impacts on the proposed Projects, and thus geological impacts would be minor.

4.1.2 Phase II Modification Geology, Foundation Conditions and Natural Hazards

Geologic issues and impacts associated with the Phase II Modification Project are the same as those described above for the Liquefaction Plant due to the geographic overlap of the two projects. Refer to discussion above with respect to, seismicity and faulting, soil liquefaction, subsidence, hurricane winds, flooding/storm damage/tsunami, and shoreline erosion.

4.2 SOIL RESOURCES

4.2.1 Liquefaction Project

4.2.1.1 Liquefaction Plant

There are three mapped soils that are potentially affected by the work at the proposed Liquefaction Plant on Quintana Island: Galveston fine sand, undulating; Ijam clay; and Velasco clay. Galveston fine sand, undulating is a partially hydric soil that accounts for approximately 3.1 percent of the area. Ijam and Velasco clays are hydric soils that are approximately 3.7 percent and 29 percent of the area, respectively. The remaining 64 percent of the Quintana Island site is classified as "water"; however, this is the location of the DMPA, where dredge spoils have been used as fill. The soil in the DMPA is likely heterogeneous. Table 4.2.1-1 presents a descriptive profile, including construction limitations, of the three mapped soils.

Table 4.2.1-1

Characteristics of Soil Types at the Quintana Island Terminal Site

Map Unit Name	Drainage Class	Hydric	Prime Farmland	Erosion Concerns	Revegetation Potential	Compaction Prone
Galveston fine sand, undulating	Somewhat excessively drained	Partially	No	Very High	High	No
Ijam Clay	Very poorly drained	Yes	No	Moderate	Low	Yes
Velasco Clay	Very poorly drained	Yes	No	Moderate	Low	Yes

Impacts on Soils

Construction of the proposed Liquefaction Plant at and adjacent to the Quintana Island terminal would impact each of the three soil types (Ijam clay, Velasco clay, and Galveston fine sand, undulating) and the dredge spoil area, inclusive of the Seaway DMPA temporary laydown area and temporary warehouse facilities. In total, approximately 147.3 acres would be temporarily affected as construction workspace and approximately 132.5 acres would be permanently affected by aboveground facility placement and operation. Table 4.2.1-2 summarizes the acreage impacts for each soil type.

Permanent aboveground facilities associated with the Liquefaction Project would be designed to control and manage stormwater runoff, thus minimizing potential long-term erosive effects. The primary concern for erosive impacts of the Liquefaction Project would be the construction phase and temporary work areas during the post-construction phase.

Table 4.2.1-2

Soil Acreage Impacts at the Quintana Island Terminal Site

Soil Series	Temporary Workspace (acres)	Permanent Facility Footprint (acres)	Total
Galveston Fine Sand, Undulating	2.44	6.08	8.52
Ijam Clay	5.90	4.00	9.90
Velasco Clay	80.90	34.68	115.58
Water a/	58.10	87.72	145.82
Total	147.34	132.48	279.82

a/ Designation for former DMPA-impact acreages relate more appropriately to underlying dredge spoil material.

The three soil types mapped at the Liquefaction Plant on Quintana Island are at least moderately erosive, and Galveston fine sand, undulating has a high erosive potential. Factors that influence the degree of erosion include soil texture, structure, length and percent of slope, vegetative cover, and rainfall or wind intensity. Soils most susceptible to erosion by water are typified by bare or sparse vegetative cover, noncohesive soil particles with low infiltration rates, and moderate to steep slopes. Clearing, grading, and equipment movement could accelerate the erosion process and, without adequate protection, result in discharge of sediment to waterbodies and wetlands. Soil loss due to erosion could also reduce soil fertility and impair revegetation.

In order to minimize erosion during construction and immediately thereafter Freeport LNG's Procedures and SWPPP would be followed, which include measures such as minimizing the amount and length of soil exposure; slowing and/or diverting runoff; installing and maintaining erosion and sedimentation control measures; and reintroducing vegetative cover as early as possible. Proper application of these measures would be required to minimize erosive effects, as would immediate revegetation of the work areas, in particular areas of Galveston fine sand, undulating.

Two soil types are identified as having poor revegetation potential at the terminal site. Soils with poor revegetation potential include those that have a high clay content, low fertility, and are saturated for most of the year (*i.e.*, hydric soils). Much of the soils affected by construction of the aboveground facilities would be permanently developed and would not require revegetation (58 percent at the Liquefaction Plant area) and Freeport LNG would make efforts to revegetate where necessary in accordance with Freeport LNG's Procedures.

With the exception of Galveston fine sand, undulating all soils that would be disturbed for development of the Liquefaction Plant have the potential to experience some level of soil compaction. This includes the dredge spoils in the DMPA, which are likely compactible. Soil compaction modifies the structure and reduces the porosity and moisture-holding capacity of the soil. The degree of compaction is dependent on moisture content and soil texture. Fine-textured soils with poor internal drainage are the most susceptible to compaction. Construction equipment traveling over wet soils could disrupt soil structure, reduce pore space, increase runoff potential, and cause rutting. Compaction and rutting impacts would be more likely to occur

when soils are moist or saturated. To minimize soil compaction potential, the size of the construction work that requires the passage of heavy equipment would be limited to that required for construction and minimized to the extent practicable.

Freeport LNG plans to introduce an average 2 feet of clay soil fill beneath the operational footprint of the proposed Liquefaction Plant. This would also involve grading of piles and mounds, particularly material in the DMPA. This fill and grading would have little impact on the DMPA since this area already contains fill taken from nearby past dredging activities but would require large numbers of trucks or barge deliveries. Based on the plans to raise the grade on site, current plans for soil management during construction do not involve significant removals of soils for disposal off-site. If this is changed to include off-site disposal, reuse, or recycling, all soils would be tested in accordance with the requirements of the receiving facility as well as all appropriate federal and state laws.

Freeport LNG would additionally be amending soil on the property to make it more suitable for foundations. This would involve the addition of hydrated lime, Portland cement, fly ash, or other amendments. Geotextiles and/or aggregate material would be added to laydown and operational areas to mitigate potential soil erosion and compaction.

No prime farmland soils exist at the site of the Liquefaction Plant on the Quintana Island and investigations did not find any contaminated soils at the site.

Overall impacts on soils at the Liquefaction Plant would be minor given the vast majority of the area is a dredged disposal site and or contains disturbed soils. As noted above, work would be performed in accordance with Freeport LNG's Procedures and SWPPP to minimize impacts.

4.2.1.2 Pretreatment Plant Site

The soil types at the Pretreatment Plant are Brazoria clay; Clemville silty clay loam; Pledger clay; and Surfside clay. Approximately 76 percent of the 218-acre construction workspace is mapped as Surfside clay, which is a hydric soil. Pledger clay and Brazoria clay, are also hydric soils and account for 4 percent and 1 percent of the site acreage, respectively. Clemville silty clay loam is an upland soil confined to the upper northwest section of the site and accounts for 10 percent of areal coverage. The remaining 9 percent of the site is mapped as "water".

Table 4.2.1-3 presents a descriptive profile, including construction limitations, of the four mapped soils.

Table 4.2.1-3

Characteristics of Soil Types at the Pretreatment Plant Site

Map Unit Name	Drainage Class	Hydric	Prime Farmland	Erosion Concerns	Revegetation Potential	Compaction Prone
Brazoria clay 0 to 1 percent slopes	Somewhat poorly drained	Partially	Yes	Moderate	Moderate	Moderate
Clemville silty clay loam	Well drained	No	Yes	Moderate	Moderate	Moderate
Pledger clay	Somewhat poorly drained	Partially	Yes	Moderate	High	Moderate
Surfside clay	Poorly drained	Yes	No	Moderate	Low	Moderate

A portion of the Pretreatment Plant property was utilized for commercial clay and sand extraction from 2005 to 2012. Two pits remain – an approximate 29 acre pit in the west-central portion of the property and a smaller pit in the northwest corner of the property.

Impacts on Soils

Construction of the Pretreatment Plant would impact Brazoria clay, Clemville sand clay loam, Pledger clay, and Surfside clay. In total, approximately 104.9 acres would be temporarily affected as construction workspace and approximately 113.4 acres would be permanently affected by facility placement and operation. Table 4.2.1-4 summarizes the acreage impacts for each soil type.

Table 4.2.1-4

Freeport LNG Liquefaction Project Summary of Soil Acreage Impacts at the Pretreatment Plant Site

Soil Series	Temporary Workspace (acres)	Permanent Facility Footprint (acres)	Total
Brazoria clay, 0 to 1 percent slopes	0.14	2.68	2.82
Clemville silty clay loam	16.37	5.58	21.95
Pledger Clay	9.11	0	9.11
Surfside Clay	64.59	99.39	163.98
Water	14.65	5.75	20.40
Total	**104.86**	**113.4**	**218.26**

The proposed footprint of the Pretreatment Plant would extend over a portion of the existing 29 acre pit in the west-center portion of the site. Freeport LNG plans to fill in this portion of the pit with approximately 253,000 yd^3 of fill material that would be taken from the smaller pit in the northwest corner of the site. Soil stabilization additives including hydrated lime, Portland cement, and fly ash would also be added, as required. Geotextiles and/or aggregate material would be added to laydown and operational areas.

Permanent aboveground facilities associated with the Pretreatment Plant would be designed to control and manage stormwater runoff, thus minimizing potential long-term erosive effects. The primary concern for erosive impacts of the Pretreatment Plant would be the construction phase and temporary work areas during the post-construction phase.

The soil types mapped at the Pretreatment Plant are moderately erosive. In order to minimize erosion during construction and immediately thereafter, Freeport LNG would follow Freeport LNG's Procedures, and the SWPPP as outlined above for work at the Quintana Island terminal.

Freeport LNG would raise the grade of the operational footprint of the Pretreatment Plant by approximately 3 to 5 feet (to 8 feet amsl). Freeport LNG plans to source this material from the smaller pit in the northwest corner of the site. Based on the plans to raise the grade on site, current plans for soil management during construction do not involve significant removals of soils for disposal off-site.

Three of the four mapped soils at the Pretreatment Plant site are classified as prime farmland (Brazoria, Clemville, and Pledger). Approximately 8.26 acres of prime farmland would be lost due to filling and construction of the Pretreatment Plant. The remaining 25.62 acres of prime farmland would be temporarily disturbed during construction. Prime farmland is identified based on the ability of the soil to facilitate crop production. Potential impacts on prime farmland include interference with agricultural drainage, mixing of topsoil and subsoil, and compaction/rutting. Such impacts would result primarily from excavation, grading, backfilling, and vehicular traffic on the work site and along the construction right-of-way. Most impacts that could occur in temporary workspaces would be short-term and would not affect the potential use of prime farmland for agricultural purposes.

Freeport LNG proposes to minimize impacts on prime farmland by conforming to Freeport LNG's Procedures. These mitigation measures would include restoration of agricultural drainage systems, topsoil segregation, decompaction, and removal of rocks greater than 4 inches in diameter from surface soils.

Investigations did not find any contaminated soils at the site. Overall impacts on soils at the Pretreatment Plant site would be minor, limited to areas necessary for construction, and minimized through the use of the Freeport LNG's Procedures, and SWPPP.

4.2.1.3 Pipeline/Utility Line System

Thirteen soil types are represented in construction work space for the proposed pipelines and utility lines. Table 4.2.1-5 presents a descriptive profile of these soils, including construction limitations.

Table 4.2.1-5

Characteristics of Soil Types for the Pipeline/Utility Line System

Map Unit Name	Drainage Class	Hydric Soil	Prime Farmland	Erosion Potential	Revegetation Potential	Compaction Prone
Route Segment A						
Asa silty clay loam	Well drained	No	Yes	Moderate	High	Moderate
Edna fine sandy loam, 0-1 percent slopes	Poorly drained	Partially	No	High	High	Moderate
Francitas clay	Poorly drained	Partially	No	Moderate	Low	Yes
Galveston fine sand, undulating	Somewhat excessively drained	Partially	No	Very High	High	Moderate
Harris clay	Very poorly drained	Yes	No	Very Low	Low	Yes
Ijam clay	Very poorly drained	Yes	No	Moderate	Low	Moderate
Narta fine sandy loam	Somewhat poorly drained	Yes	No	High	Low	Yes
Norwood silt loam, 0-1 percent slopes	Well drained	Partially	Yes	Moderate	Moderate	Moderate
Pledger clay	Somewhat poorly drained	Partially	Yes	Moderate	High	Moderate
Surfside clay	Poorly drained	Yes	No	Moderate	Low	Moderate
Tracosa mucky clay	Very Poorly Drained	Yes	No	Very Low	Low	Yes
Velasco clay	Poorly Drained	Yes	No	Moderate	Low	Yes
Veston silty clay loam	Poorly Drained	Yes	No	Low	Low	Yes

Impacts on Soils

Table 4.2.1-6 shows the 13 soil types that would be affected by the construction of the pipelines and utility lines: Asa silty clay loam; Edna fine sandy loam with 0 to 1 percent slopes; Francitas clay; Galveston fine sand, undulating; Harris clay; Ijam clay; Narta fine sandy loam; Norwood silt loam with 0 to 1 percent slopes; Pledger clay; Surfside clay; Tracosa mucky clay; Velasco clay; and Veston silty clay loam. For each soil type, the aggregate system crossing length and temporary impact acreage is shown, the latter being divided between construction right-of-way and additional temporary workspace (ATWS).

Table 4.2.1-6

Freeport LNG Liquefaction Project
Summary of Soil Acreage Impacts for the Pipeline/Utility Line System

Soil Series	Crossing Length		Temporary Impact (acres)		
	Feet	Miles	Construction Right-of-Way	ATWS	Total
Asa silty clay loam	4,000	0.76	8.0	0	8.0
Edna fine sandy loam, 0 to 1 percent slopes	4,425	0.84	10.1	0	10.1
Francitas clay	2,120	0.40	5.0	0.1	5.1
Galveston fine sand, undulating	6,055	1.15	5.9	0	5.9
Harris clay	1,385	0.26	2.9	0	2.9
Ijam clay	7,255	1.38	3.8	0.2	4.0
Narta fine sandy loam	5,450	1.03	12.5	0	12.5
Norwood silt loam, 0 to 1 percent slopes	735	0.14	1.7	0	1.7
Pledger clay	9,030	1.71	6.1	0	6.1
Surfside clay	23,230	4.40	36.7	7.3	44.0
Tracosa mucky clay	45	0.01	0.1	0	0.1
Velasco clay	11,660	2.21	7.0	0	7.0
Veston silty clay loam	845	0.16	1.7	0	1.7
Water	10,515	1.98	9.6	0.6	10.2
TOTAL:	**86,750**	**16.43**	**111.1**	**8.2**	**119.3**

Construction of underground pipelines and utility lines would have no permanent impacts on soil types, in so much as soil types would remain unchanged and pre-construction soil conditions would be restored to the extent practicable following construction. In total, approximately 119.3 acres would be located within the construction workspace (nominal 100-foot-wide construction right-of-way and five ATWS') for the pipelines and non-electric utility lines. Tower placement for the new electric line between the Pretreatment Plant and an existing transmission corridor farther west would have minor temporary and permanent impacts. However, at this preliminary routing and design stage, the number and location of towers has not been determined; thus, the impact acreages with respect to soils have yet to be calculated. The electric line for the Liquefaction Project is not included in the acreage impact calculations presented in this section as the proposed line would utilize existing aerial infrastructure (poles) and would have no material effect on soils.

All of the soil types mapped for the Pipeline/Utility Line System route are at least moderately erosive, and the fine sandy soils (Galveston, Narta, and Edna) have a high erosive potential. In order to minimize erosion during construction and immediately thereafter, Freeport LNG would follow the Freeport LNG's Procedures and SWPPP for work at the Quintana Island Site. All of the soils that would be disturbed by pipeline construction activities have the potential to experience some level of soil compaction. Freeport LNG proposes to follow the Freeport LNG's Procedures during construction work to minimize the potential of this impact.

Approximately 84 percent of the soils that would be affected by construction of the Pipeline/Utility Line System have a poor revegetation potential. Freeport LNG has proposed to reseed disturbed areas using agency-approved seed mixes, consistent with the Freeport LNG's Procedures.

Three of the soil types crossed by the Pipeline/Utility Line System route are classified as prime farm land (Asa, Norwood, and Pledger). Freeport LNG proposes to minimize impacts on prime farmland by constructing the pipeline in accordance with the Freeport LNG's Procedures and following mitigation measures which include restoration of agricultural drainage systems, topsoil segregation, decompaction, and removal of rocks greater than 4 inches in diameter from surface soils.

About 93 percent of the proposed Pipeline/Utility Line System route and temporary construction area is underlain by hydric soils. Hydric soils are prone to compaction and rutting due to extended periods of saturation and high clay content. If construction of the Pipeline/Utility Line System occurs when these soils are saturated, heavy equipment operation would be impaired, and compaction and rutting could occur. Further, high groundwater levels that accompany hydric soils could create a buoyancy hazard for the Pipeline/Utility Line System. Special construction techniques such as concrete coating and other weighting methods would be used to overcome buoyancy hazards during operation of the Pipeline/Utility Line System. Construction of the proposed Projects would implement the Freeport LNG's Procedures, which include provisions for wetland crossings and special construction techniques in areas of saturated soils. Implementation of these measures would minimize impacts on hydric soils.

Freeport LNG does not anticipate encountering contaminated soils along the Pipeline/Utility Line System route because approximately 82 percent of the route is located in the same location as an existing pipeline for which no contaminated soils were identified during construction or during pre-planning. Overall soil impacts on the Pipeline/Utility Line System would be minor, take place at or adjacent to areas where soils have already been disturbed through previous work, and would be minimized through adherence to Freeport LNG's Procedures.

4.2.1.4 Summary of Impacts on Soils

In summary, the Liquefaction Project would result in a total of approximately 317.9 acres of temporary impact associated with construction of the Liquefaction Plant, the Pretreatment Plant, and the Pipeline/Utility Line System. Permanent impacts on soils would total 245.9 acres associated with construction of the Liquefaction Plant and the Pretreatment Plant, with no permanent impacts associated with the Pipeline/Utility Line System. Construction impacts on soils would be minor in the area of Quintana Island given the vast majority of the site is a dredge disposal area and or contains disturbed soils. The overall impacts on soils at the Pretreatment Plant site and for the Pipeline/Utility Line system would be minor, limited to areas necessary for construction, and minimized through the use of Freeport LNG's Procedures and SWPPP.

4.2.2 Phase II Modification Project

Soils potentially affected by the Phase II Modification Project are the same as those for the proposed Quintana Island Liquefaction Plant: Galveston fine sand, undulating; Ijam clay; and

Velasco clay, which account for 1.8 percent, 35.2 percent, and 52.2 percent, respectively. The characteristics of these soils are summarized in table 4.2.1-1.

Construction of the Phase II Modification Project facilities at the terminal would impact each of the three soil types (Ijam clay, Velasco clay, and Galveston fine sand, undulating) and the portion of the berthing area depicted as "water" on soil survey maps. In total, about 14.6 acres would be temporarily affected as construction workspace and approximately 23.9 acres would be permanently affected. Table 4.2.2-1 summarizes the acreage impacts for each soil type.

Table 4.2.2-1

Summary of Soil Acreage Impacts For the Phase II Modification Project

Soil Series	Temporary Workspace (acres)	Permanent Facility Footprint (acres)	Total
Galveston Fine Sand, Undulating	0.0	0.7	0.7
Ijam Clay	10.0	3.8	13.8
Velasco Clay	3.2	116.9	20.1
Water a/	1.4	2.5	3.9
Total	14.6	23.9	38.5

a/ Designation for part of the berthing area

Upland soils would be excavated at the outset of the Phase II Modification Project. Approximately 60,000 yd^3 would be removed to a level of -5 feet mean sea level (msl). This material would be used as fill to raise the level of the adjacent Liquefaction Plant. Therefore, a significant surplus of soils is unlikely, and off-site disposal is not proposed.

The soil types mapped for the Phase II Modification Project are at least moderately erosive, and Galveston fine sand, undulating has a high erosive potential. In order to minimize erosion during construction and immediately thereafter, Freeport LNG would follow the Freeport LNG's Procedures and SWPPP.

Overall impacts on soils as result of the Phase II Modification work would be similar to that described for the Liquefaction Plant work. Specifically, soil impacts at the Phase II Modification Project would be minor given the vast majority of the area is a dredged disposal site and or contains disturbed soils.

4.2.3 Sediments

Several construction areas would occur in the ICW on the northwest side of Quintana Island. Planned sediment dredging activities to facilitate construction include:

- approximately 85,000 yd^3 for the new construction dock and firewater intake structure;
- 28,000 yd^3 for the new aggregate dock;
- 32,000 yd^3 for the existing construction dock; and
- 1,188,000 yd^3 for the modified LNG berthing dock expanded berthing area.

The first three areas are associated with the Liquefaction Project, and the last is associated with the Phase II Modification Project. Sediment dredged from the ICW is anticipated to be Velasco Clay and Ijam Clay. This material would be removed and deposited in an existing DMPA.

4.2.3.1 Impacts and Mitigation

Freeport LNG proposes to use hydraulic cutterhead-suction to dredge areas for the new construction docks and firewater intake structure. Dredged material, which is predominantly stiff virgin clays with pockets of beach sand, would be placed in Port Freeport's DMPA No. 1, approximately 2.1 miles northwest of the terminal site and/or in one or more pre-approved DMPAs elsewhere. Freeport LNG states that adequate levee height would be maintained for proper containment.

In the case of sediments dredged for the Projects, the material is expected to be a stiff clay with little likelihood of re-suspension during dredging. The Velasco Clay was deposited naturally in the existing tidal environment, and, as such, is well suited to it. If sediments exposed by dredging of the Velasco clay are less cohesive, increased erosion or scour of these areas could occur, particularly during storms, floods, and large tides. Overall, dredging would result in minor, localized and short term impacts on water quality through increased turbidity during the time of dredging, which already occurs periodically during the USACE and other maintenance dredging of the FHC.

In summary, construction of the proposed Projects would affect soils, including hydric soils. Since the LNG terminal site is currently well vegetated and is nearly level, the potential for erosion of soils and discharge of sediments off the site would be relatively low during construction. Freeport LNG would minimize impacts by implementing the mitigative measures specified in the Freeport LNG's Procedures. Further, Freeport LNG would minimize potential soil contamination by implementing the preventative and mitigative measures specified in its SPCC Plan. Accordingly, soil impacts associated with erosion and soil contamination would be minor.

With the proposed construction schedule, as well as the compaction minimization measures contained in the Freeport LNG's Procedures and Freeport LNG's ECP&P, impacts due to soil compaction would be minimized to the extent possible and associated impacts would be minor.

Our analysis indicates that potential hazards associated with soft sediments, ground subsidence, and hydric soils underlying areas that would be developed by Freeport LNG for the Liquefaction Plant and Pretreatment Plant would be adequately addressed with its engineering design. Due to the relatively shallow construction depth of the pipeline, we conclude that the pipeline would not have an effect on deep sediment loading or stability, and impacts on ground subsidence would be minor.

4.3 WATER RESOURCES

4.3.1 Groundwater Resources

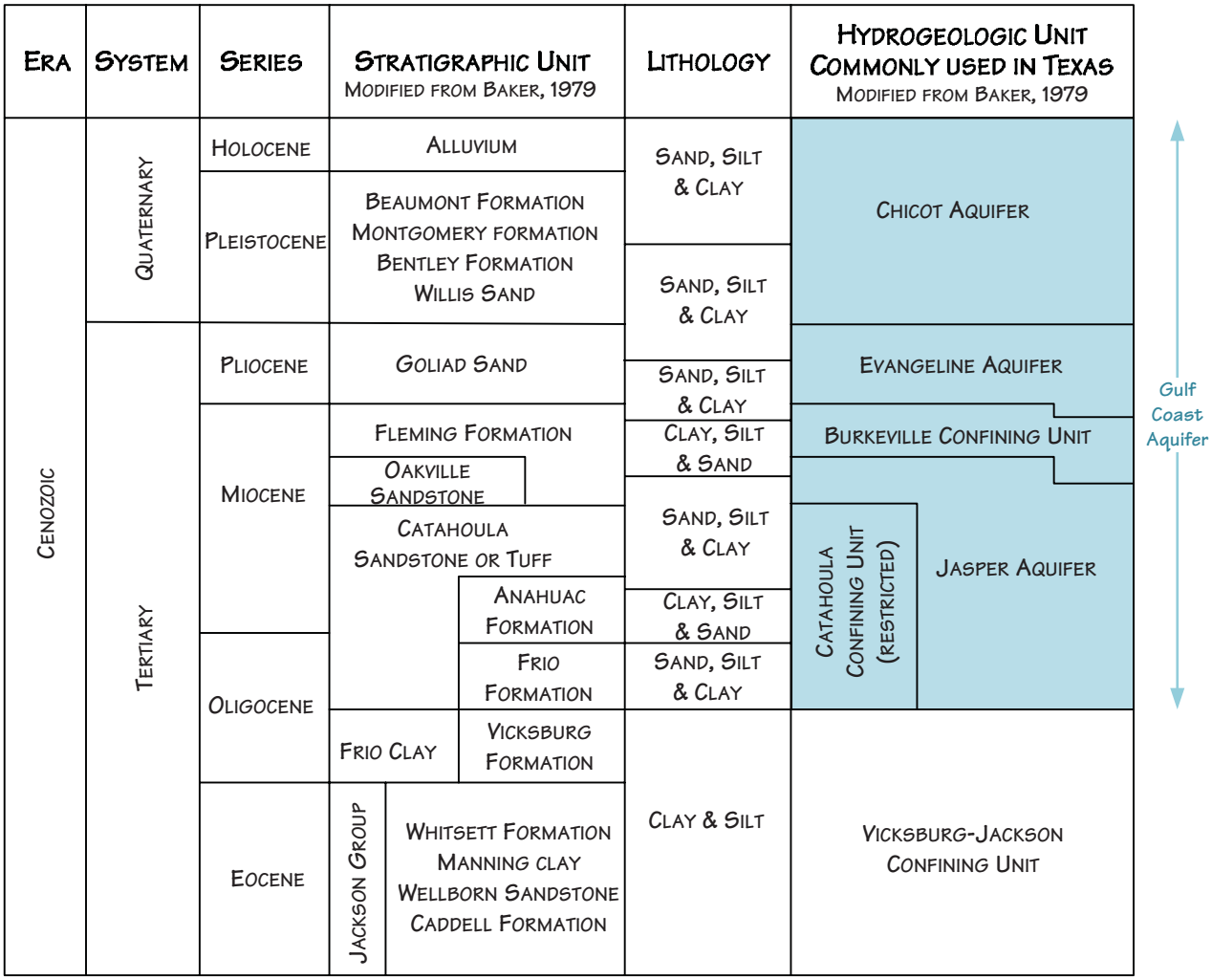
The coastal lowlands aquifer system in southeastern Texas is the principal source of groundwater in the Liquefaction Project and Phase II Modification Project areas and is used for public, agricultural and industrial needs. Within the coastal lowlands aquifer system, the Chicot Aquifer is the uppermost aquifer, and all public and private water supply wells in the Liquefaction Project and Phase II Modification Project areas are supplied by this aquifer (TWDB, 2012b). The Evangeline Aquifer underlies the Chicot Aquifer. The Chicot and Evangeline Aquifers are commonly used hydrogeologic-unit designations for subdivisions of the upper, mostly sandy part of the deposits; and the lower permeable zones make up the Jasper Aquifer. The geological profile of these three aquifers is illustrated in figure 4.3.1-1.

In the vicinity of the terminal, the Upper Chicot Aquifer extends from ground surface to about 300 feet bgs and the Lower Chicot Aquifer extends from 300 feet bgs to at least 1,200 feet bgs. In the Stratton Ridge area, about 3.2 miles north-northwest of the proposed Pretreatment Plant site, the top of the Upper Chicot Aquifer is at 10 feet bgs, the top of the Lower Chicot Aquifer is at 300 feet bgs, and the top of the Evangeline aquifer is at 1,100 feet bgs.

Previous studies at the Quintana Island terminal indicated that two metals (arsenic and manganese) and one volatile compound (benzene) exist in some areas on the centrally located property formerly owned by Freeport Oil Company (FOC) at groundwater concentrations above Texas Risk Reduction Program (TRRP) Tier I protective concentration levels (Entrix, 2004). However, the study concluded that constituent concentrations did not appear to be indicative of significant contamination and case closure was obtained through the TRRP in 2008.

Analysis of data from the Texas Groundwater Protection Committee (2010) indicates that, of the 77 listed agency cases involving industrial contamination of groundwater in Brazoria County since 1989 or earlier, eight have been in the Freeport area; however, none are in close proximity of the proposed Projects.

The Town of Quintana operates two municipal water wells located approximately 125 feet from the temporary workspace for the nitrogen pipeline, BOG pipeline, and fiber optic utility line at MP 0.20(A). Each well is drilled to 265 feet and the total sendout into the municipal system is 500 gpm. In addition, two on-site 8-inch-diameter water wells, each producing approximately 1,300 gpm, have been installed on the terminal site as part of the Phase I Project. No known active water wells are located within 150 feet of the construction workspace for the Pretreatment Plant or Pipeline/Utility Line System beyond Quintana Island. See figures 4.3.1-2 to 4.3.1-4 for well locations, type, (industrial, domestic, government, public), and operation status (active, unused, plugged or destroyed) within one mile of the Liquefaction Plant, Pretreatment Plant, or Pipeline/Utility Line System.



SOURCE: ADAPTED FROM FIGURE 55 (HYDROGEOLOGY-CORRELATION) IN GROUND WATER ATLAS OF THE UNITED STATES, OKLAHOMA-TEXAS, HA 730-E. (HTTP://PUBS.USGS.GOV/HA/HA730/CH_E/GIF/E055.GIF)

For environmental review purposes only.

Figure 4.3.1-1
Freeport LNG Liquefaction Project
Hydrogeological Units of Gulf Coast Aquifer

DATE: 5/6/2011
REVISED: 5/9/2011
SCALE: NTS
DRAWN BY: JPBOENTJE
K:_CLIENT_PROJECTS\D-F\FRE\FREEPORTLNG\LIQUEFACTION\FRE_HYDRO_UNITS_GULFCOAST_AQUIFER.VSD



Figure 4.3.1-2
Freeport LNG - Liquefaction Project
Water Wells within One Mile of the Liquefaction Project Area
Brazoria County, Texas

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Figure 4.3.1-3
Freeport LNG - Liquefaction Project
Water Wells Within One Mile of the Quintana Island Terminal Site
Brazoria County, Texas

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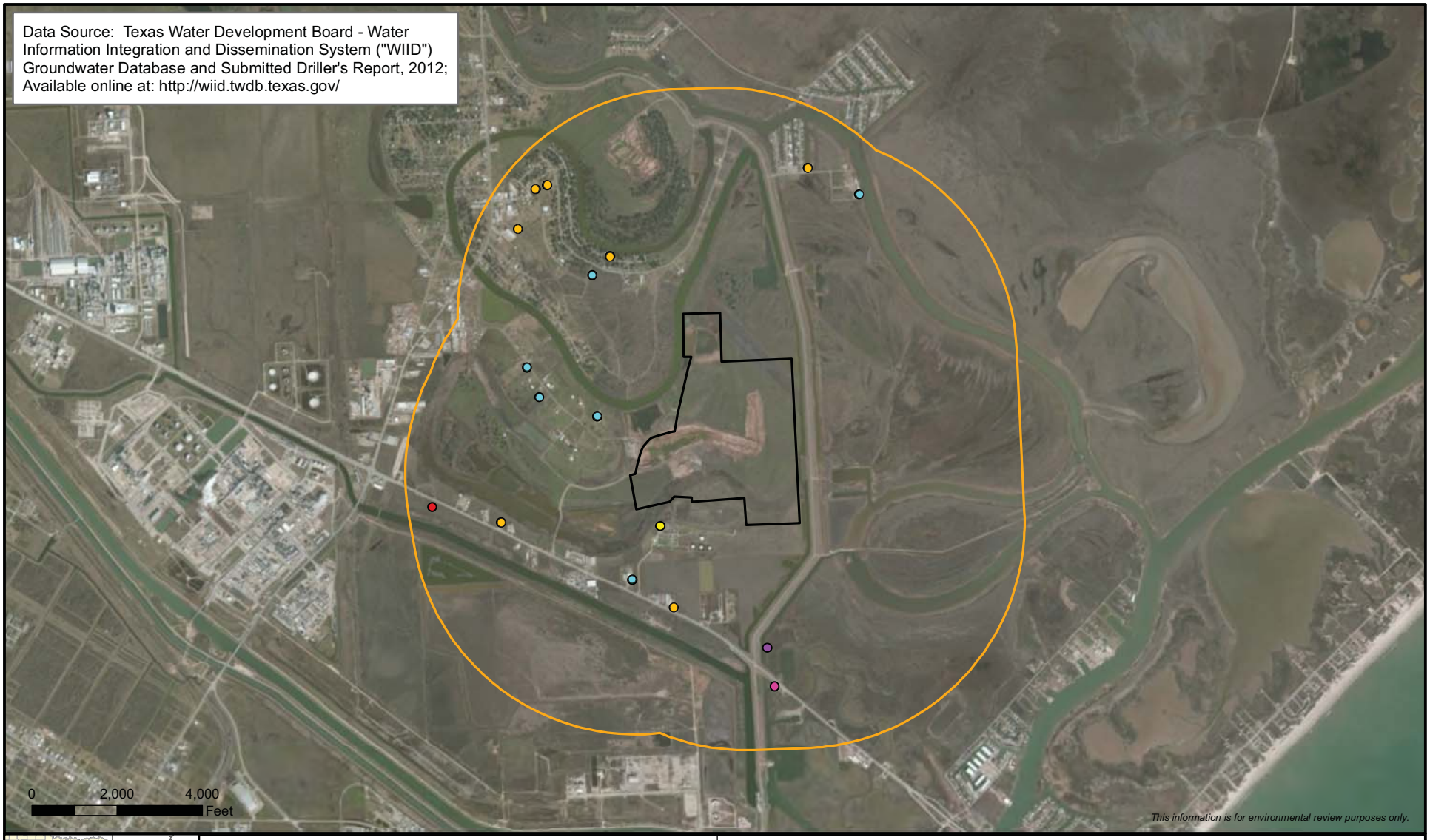


Figure 4.3.1-4
Freeport LNG - Liquefaction Project
Water Wells Within One Mile of theProposed Pretreatment Plant Site
Brazoria County, Texas

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The USEPA has not designated any sole source aquifers within the Liquefaction Project or Phase II Modification Project areas. In addition, no protected watersheds, specially designated aquifer withdrawal areas, wellhead protection areas, or springs occur within 150 feet of the construction workspace for the proposed Liquefaction Project and Phase II Modification Project facilities.

4.3.1.1 Impacts and Mitigation

Liquefaction Project

Existing conditions including a high groundwater table, structurally soft and weak sediments, and shallow ground faulting and subsidence associated with the sedimentary environment are potential concerns for construction at and adjacent to the Quintana Island terminal. However, no construction issues were encountered during the development of the Phase I Project due to these conditions. The Liquefaction Project would be constructed using similar foundation design, construction procedures, and mitigation measures. Therefore, no significant construction-related groundwater impacts are anticipated. Deep-driven, pre-cast, concrete pile foundations would be installed to support concrete pads for the buildings, pipe racks, and the heavy equipment components of the liquefaction trains and pretreatment units. The impact associated with the installation of these pilings could potentially cause contamination of aquifer layers through seepage from one layer to another. In addition, deep foundations may act as a transport mechanism for surficial contamination into deep, previously uncontaminated water bearing zones. However, when installed, the pilings would not extend beyond the Upper Chicot Aquifer. Because the pilings would be confined to this uppermost layer of the aquifer system, we conclude that the potential for cross-contamination is low.

In areas of shallow groundwater, it may be necessary to dewater pipeline trenches, resulting in a temporary lowering of the groundwater in the immediate vicinity of construction. Because of the relatively small volume of water removed, the short duration of the activity, and the local discharge of the water, the water levels would recover quickly. Effects on groundwater from trench dewatering would be localized and insignificant. Shallow groundwater is not expected to affect construction of aboveground facilities because the land elevation for the Liquefaction Project would be raised with fill material, as necessary, to avoid or minimize flood damage.

The greatest potential for impact on groundwater during construction would be through an accidental release of hazardous substances, such as lubricants or fuel. Freeport LNG would follow the SPCC Plan that was developed for Phase I Project construction and would modify the plan to address any Project-specific changes. The SPCC Plan addresses personnel training, secondary containment design, hazardous substance storage and disposal procedures, refueling areas, spill response procedures, mitigation measures, and other measures designed to reduce or eliminate potential adverse impacts on groundwater resources. We find the SPCC Plan adequate.

Potential impacts on the nearby Town of Quintana water supply wells would be minimized by restricting refueling and storage of hazardous substances within a 400-foot radius of community and public supply wells. Freeport LNG's erosion and sedimentation control measures set forth in its SPCC Plan and SWPPP would be implemented to avoid or minimize stormwater runoff from the Liquefaction Project. To the extent there are concerns over groundwater quality and

quantity, Freeport LNG would monitor groundwater quality and yield for public supply wells that could be affected before and after construction to determine whether these sources are being affected. Freeport LNG also proposes that in the event of damage to water supplies during construction, temporary water sources would be provided and the damage repaired.

Groundwater withdrawals from the two on-site wells may be required during construction as a source of concrete mixing water. These withdrawals would be made at a rate low enough to avoid short- and long-term groundwater depletion. Groundwater withdrawal could also be necessary for fire protection, but this would occur only during an emergency. Firewater tank capacity would be maintained with water from the Town of Quintana's two existing water supply wells, two existing on-site water wells, and/or condensate water from air tower operation.

Since natural gas would be cooled with air rather than water during the liquefaction process, only potable and service water would be required for the new Liquefaction Plant. The supply systems for these new facilities would be integrated with and would represent an expansion of the existing supply systems for the Phase I Project. Except for the fire water system, the same sources would be used for the Liquefaction Plant. During operation of the fire water system, water would be drawn from the ICW. Assuming 106 new full-time employees would work at the Liquefaction Plant. It is estimated that an additional 243.8 gallons per day (gpd) (0.17 gpm) of potable water would be required at the terminal. The proposed supply sources should have more than enough capacity to accommodate this increase.

Freeport LNG would require an estimated 38,400 gpd of process water at the Pretreatment Plant. Fire water and potable water would also be needed. To help conserve groundwater, Freeport LNG proposes to reduce a portion of the referenced water requirement via the use of mole sieve equipment which strips water from natural gas. The remainder of the water would be obtained from a municipal water supply that is being planned by the City of Freeport to support another development in the vicinity of the pretreatment facilities. The 4.7-mile-long water line from Dow Chemical that was described in the draft EIS is no longer proposed.

Based on the proposed construction methods and mitigation measures that Freeport LNG has identified, we conclude that Liquefaction Project would not have a significant impact on groundwater.

Phase II Modification Project

Potential impacts on existing groundwater resources as a result of construction and operation of the Phase II Modification Project and proposed mitigation measures are similar to those discussed above for the Liquefaction Project at the Quintana Island terminal site.

4.3.2 Surface Water Resources

The Freeport LNG Liquefaction Project and Phase II Modification Project lie within the Austin-Oyster Creek Watershed (USGS cataloging number 12040205). The major waterbodies in this watershed include Austin Bayou, Bastrop Bayou, Oyster Creek, the ICW, and the Old Brazos River Channel or FHC. All major waterways within the Liquefaction Project and Phase II

Modification Project areas are considered tidally influenced because of their close proximity to the Gulf. The relatively low relief of the watershed promotes slow water movement, which is typical of coastal zone areas. There are no protected or sensitive public watershed areas within the Liquefaction Project and Phase II Modification Project areas.

The Liquefaction Project and the Phase II Modification Project are located within the San Jacinto-Brazos Coastal Basin (Basin 11) and fall within the boundaries of two classified stream segments: Old Brazos River Channel Tidal (Segment 1111) and Oyster Creek Tidal (Segment 1109). The Old Brazos River Channel Tidal segment includes the eastern section of the terminal site together with the adjoining Pipeline/Utility Line System in the area of the LNG berthing docks and the FHC/ICW confluence; the Oyster Creek Tidal segment includes most of the Pretreatment Plant site and an approximately 4.3-mile-long section of the Pipeline/Utility Line System between MP 3.2(A) and MP 7.5(A). The 2010 Texas Integrated Report for CWA Sections 305(b) and 303(d), states that the Oyster Creek Tidal segment has no impairments or concerns (TCEQ, 2011), while the Old Brazos River Channel Tidal segment is listed as containing elevated levels of chlorophyll-a and iron. Neither of these two segments appears on the CWA Section 303(d) lists of impaired waters (TCEQ, 2008a, 2011). However, four waterbodies within the Austin-Oyster Creek Watershed appear on these lists, including the Gulf in the Freeport area for containing "mercury in edible tissue". The closest of the other three listed waterbodies is over 10 miles away from the Liquefaction Project and Phase II Modification Project.

The Quintana Island terminal site lies adjacent to the intersection of the FHC and the tidally influenced ICW (see figure D-1 in appendix D). The FHC provides access from Freeport LNG's berthing area to the Gulf. Both the FHC and ICW are major shipping routes through this highly industrialized area and are used for barge traffic as well as commercial/recreational fishing and boating. Five waterbodies are located on the terminal site: two perennial manmade ponds (1 and 2) and three intermittent drainage channels (A, B, and C). Stormwater runoff from the maintained areas around the existing facilities is directed through a system of shallowly sloped peripheral troughs, which is connected to the drainage channel system by a series of culverts.

Seven waterbodies (A through G) are wholly or partially located on the Pretreatment Plant site (see figure D-2 in appendix D). One named waterbody, Horseshoe Lake (Waterbody A), is located partially within the Pretreatment Plant site to the south and is characterized by open water areas and peripheral emergent wetland, and connects with the western Velasco Ditch (Waterbody G). The western Velasco Ditch represents a continuation of the oxbow feature constituting Waterbody B located in the northwest corner of the Pretreatment Plant site. Waterbodies C and D are associated with the two large pits that have been excavated since 2004-2005 for the commercial extraction of sand and clay. One pit is centrally located on the site; the other is located in the northwest corner. A narrow drainage ditch (Waterbody F) and a small pond (Waterbody E) are also associated with pit operation. Stormwater from the northwestern portion of the Pretreatment Plant site is carried in three man-made intermittent drainage ditches (MS-WL-002, MS-WL-004, and MS-WL-005) that are channeled south to the central pit. Two similar ditches (MS-WM-006 and MS-WM-008) carry stormwater from the eastern portion of the site into the western Velasco Ditch. Based on field delineations conducted in March and April, 2012, and a subsequent Preliminary Jurisdictional Determination (PJD) issued by the

USACE on August 9, 2012 (USACE, 2012), all five man-made intermittent drainage ditches are classified as wetlands and are discussed further in section 4.3.5.

The Pipeline/Utility Line System crosses twelve waterbodies, of which eight are perennial (the FHC, the ICW, Oyster Creek, Horseshoe Lake, the eastern Velasco Ditch, the western Velasco Ditch, the CR 891 Ditch, and an unnamed pond) and four are intermittent (two tributaries to Salt Bayou and two unnamed drainage channels) (see figure D-3 (a-h) in appendix D). Oyster Creek is a shallow, narrow, tidally influenced waterbody that is used by pleasure craft and recreational fishing boats. The eastern Velasco Ditch is a man-made, tidally influenced waterbody that was created during the construction of the adjacent levee. The western Velasco Ditch has a similar origin and physical profile, although it is not tidally influenced due to the fact that it lies inside the Velasco Levee and its drainage connection to tidally influenced waters involves a one way flow south through a box culvert under SH 332 that is maintained by five large capacity pumps at the Velasco Drainage District pumping station. The two tributaries to Salt Bayou are shallow, intermittent waterbodies that are not tidally influenced where they are crossed by the proposed Pipeline/Utility Line System. The two unnamed drainage channels are located further north and fringe the embankment of an abandoned railroad just east of Freeport LNG's Stratton Ridge Meter Station.

The FHC, the ICW, and Oyster Creek are designated as federally navigable waterbodies and federal navigation projects regulated by the USACE under the Section 10 of the RHA. Under Section 404 of the CWA, several waterbodies were confirmed as waters of the U.S. during previous Section 404/Section 10 permitting for the Phase I, Phase II, and NGL Extraction Projects and/or the PJD issued by the USACE on August 9, 2012 (USACE, 2012). These include: five other waterbodies, in addition to the FHC and ICW, at or adjacent to the Quintana Island terminal site (Pond 1, Pond 2, and Drainage Channels A, B, and C); the western Velasco Ditch, Horseshoe Lake, and unnamed drainage channel associated with WL-1 (Waterbody B) at the Pretreatment Plant site; and the twelve waterbodies crossed by the proposed Pipeline/Utility Line System. The remaining four waterbodies (C through F) at the Pretreatment Plant site are not regulated under Section 404 of the CWA, given their man-made origin in upland areas.

Under the TCEQ statewide water quality assessment program, the closest monitoring station to the terminal site is located in the Old Brazos River Channel approximately 3.5 miles upstream from the confluence of the FHC and the ICW. The most recent data sets for this station (TCEQ, 2008b, 2010) indicate that the only water quality or sediment concerns were an elevated level of nitrates in 2008 and elevated levels of chlorophyll-a and sediment-borne iron in 2010. The closest monitored waterbody to the proposed facilities beyond Quintana Island is the tidal portion of Oyster Creek, which runs within 0.2 mile east of the Pretreatment Plant site and is crossed by the proposed Pipeline/Utility Line System. The most recent data sets for this waterbody (TCEQ, 2008b, 2010) indicate that the only water quality or sediment concerns were elevated levels of bacteria and chlorophyll-a.

Of the use categories defined in the surface water quality standards in the state of Texas (aquatic life, contact recreation, fish consumption, general use, and public water supply), aquatic life, contact recreation, and general use apply to all waterbodies crossed by the proposed Liquefaction and Phase II Modification Project facilities. For those waterbodies within the Oyster Creek Tidal Segment (Segment 1109), including Oyster Creek, Horseshoe Lake, the western Velasco Ditch,

and the eastern Velasco Ditch, all three use categories are considered "fully supported". For those waterbodies within the Old Brazos River Channel Tidal segment (Segment 1111), namely the FHC and ICW, the recreation use is fully supported but the aquatic life and general uses are listed as water quality concerns in the 2010 Texas Integrated Report for CWA Sections 305(b) and 303(d) (TCEQ, 2011), based on elevated levels of chlorophyll-a and sediment-borne iron, as previously described.

4.3.2.1 Impacts and Mitigation

Liquefaction Project

To avoid or minimize adverse impacts on water quality from construction and operation of the Liquefaction Project, protective measures similar to those described and approved for the Phase I and Phase II Projects would be implemented. These include conformance with applicable federal, state, and local permit conditions, the Freeport LNG's Procedures, and the additional measures described below. The following sections discuss the potential impacts and mitigation measures.

Quintana Island Terminal

Table 4.3.2-1 lists the jurisdictional waterbodies at or adjacent to the terminal site and provides, for each waterbody, a quantitative and qualitative summary of anticipated impacts (if any) associated with construction and operation of the Liquefaction Plant. Impacts are considered direct if the waterbody is located within the proposed construction workspace, is temporarily or permanently disturbed, and consequent impact acreages can be calculated. Indirect impacts, such as potential changes in flow regime, which occur beyond the construction workspace, are secondary in nature, and do not involve actual temporary or permanent impact acreages.

The most significant direct impacts on surface waters are associated with new structures on the ICW, namely the proposed construction dock, the proposed aggregate barge dock, and the proposed fire water intake structure. Direct impacts on surface waters associated with onshore plant infrastructure are negligible and associated with construction of a driveway over Drainage Channel A.

Proposed Construction Dock and Proposed Aggregate Barge Dock

A construction dock would be installed on the south shore of the ICW north of the Terminal Maintenance Building, and an aggregate barge dock would be installed on the south shore of the ICW at the northwest corner of the proposed site for the Liquefaction Plant (see figure D-1 in appendix D). The construction dock platform would be 176 feet long by 128 feet wide and the aggregate dock platform would be 100 feet long by 30 feet wide, both extending over shoreline and open water. The construction dock platform would cover 0.52 acre; the aggregate dock platform would cover 0.07 acre.

Table 4.3.2-1

Freeport LNG Liquefaction Project
Waterbodies and Associated Impacts at the Quintana Island Terminal Site

Waterbody Name	Waterbody Type	Temporary Impact Acreage	Permanent Disturbance Acreage	Impact Profile
Pond 1	Perennial	0.00	0.00	Indirect- stormwater and hydrostatic test discharges during construction
Pond 2	Perennial	0.00	0.00	No direct or indirect impacts
Drainage Channel A	Intermittent	0.0	0.23	Plant road and walkway crossing requiring in-stream culvert (accounts for temporary impact and permanent disturbance acreages)
				Overhead crossing for LNG pipeline and trough- no in-stream impact Bore or drill crossing for natural gas pipeline, nitrogen pipeline, and fiber optic cable between Phase I process area and Liquefaction Plant- no in- stream impact
				Indirect - stormwater discharges during construction and operation
Drainage Channel B	Intermittent	0.00	0.00	Indirect - stormwater discharges during construction and operation
Drainage Channel C	Intermittent	0.00	0.00	Indirect - stormwater discharges during construction and operation
Freeport Harbor Channel (FHC) and Dow Barge Canal	Perennial	a/	0.00	Indirect impact due to turbidity plume
ICW	Perennial	a/	6.72	New Construction Dock and dredging
		a/	2.53	Aggregate Dock Dredging
		a/	0.01	Fire Water Intake Structure & Dredging
				Dredging at Existing Construction Dock
		a/	2.83	
	Total:	**0.0**	**12.32**	

a/ Impact area of estimated dredging plume within Freeport Harbor Channel, ICW, and Dow Barge Canal is approximately 428.1 acres, assuming 1000 meter plume.

Some shoreline disturbance and off-shore dredging would be necessary to install the platforms, which would be supported on piles. The amount of dredging required would depend on the water depth at the time of construction and its ability to accommodate barges, which have a relatively shallow draft. The fire water intake structure would be installed in the vicinity of a former boat ramp on the south shore of the ICW at the northwest corner of the Phase I process area. The structure would consist of a 40-foot-long by 20-foot-wide concrete platform mounted on piles and supporting two diesel-driven pumps to withdraw water at the 5,000 gpm flow rate required for fire suppression. Material removed for construction of the fire water intake structure would occur over 0.01 acre. Freeport LNG has estimated that the new construction dock and fire water intake structure would require 85,000 yd^3 of dredging and the aggregate barge dock would require 28,000 yd^3 of dredging. In addition, the existing construction dock would require 32,000 yd^3 of dredging. The docks would be permanent structures.

Dredging and Dredge Spoil Disposal

The USACE and several large petrochemical companies have performed periodic maintenance dredging of the FHC on a two to three year basis since the mid-1990s. This longstanding commercial activity coupled with typically high sediment flows into the ICW from the Brazos River have resulted in sustained high and variable turbidity levels over a long period of time. In addition, storms, floods, and large tides can result in high-energy or turbulent flow fields that increase suspended sediments over much larger areas and for longer periods than dredging operations, making it very difficult to distinguish between dredging-induced turbidity and the background levels generated by natural processes or normal navigation activities (Higgins *et al.*, 2004).

As outlined in Freeport LNG's Dredging Plan dated June 2013,[13] Freeport LNG proposes to use hydraulic cutterhead-suction dredging techniques during construction of the new construction docks and firewater intake structure. According to Reine *et al*., (2002), hydraulic cutterhead dredges generally produce small plumes that decay rapidly. Thus, turbidity effects from the use of a cutterhead-suction dredge are expected to be localized and of short duration, spreading less than a thousand meters from their sources and dissipating to ambient water quality within several hours after dredging is completed (Higgins *et al.*, 2004). In almost all cases, the vast majority of resuspended sediments resettle close to the dredge within an hour (Anchor Environmental CA L.P., 2003). The effects of sediment resuspension and increased turbidity would be limited to the period during and immediately following dredging. Figure 4.3.2-1 shows the worst-case scenario turbidity impacts up to 1000 meters from the dredging locations.

Dredged material, which is predominantly stiff virgin clays, would be placed in an approved DMPA that would be finalized with the USACE. Freeport LNG states that adequate levee height would be maintained for proper containment and both sediments and effluent would be tested to meet the requirements of the USACE permits and TCEQ water quality certification. Based on the relatively low volume of dredged material likely to be generated, the dredged material would be transported by a dredge pipeline to the disposal point. The dredge discharge pipe would cross the ICW to a booster pump. The booster pump would pump the dredged material slurry into a 704-acre DMPA. The sediment in the slurry would be allowed to settle before the decanted water exits the DMPA through a weir structure and is discharged into the Brazos River, far from the dredging site.

We received a comment from the USEPA regarding potential beneficial reuse of the dredged material. The USACE may evaluate beneficial reuse scenarios under its permit review.

[13] The June 2013 Dredging Plan can be acquired at: http://elibrary.ferc.gov:0/idmws/File_List.asp?document_id=14126940



Figure 4.3.2-1
Freeport LNG - Liquefaction Project
1000-Meter Extent of Turbidity Plume from Dredging
Brazoria County, Texas

FILE: R:\Projects\GIS_2013\181462 Freeport LNG liquefaction\mxd\Fig 4.3.2-1 Turbidity Plume 2014-02-19.mxd | REVISED: 2/20/2014 | SCALE: 1:45,000 DRAWN BY: GSTUDWELL

Onshore Plant Infrastructure

The only waterbody that would be directly affected by construction and operation of the onshore Liquefaction Plant at the terminal site is Drainage Channel A. Drainage Channel A would be crossed by a new LNG pipeline, LNG trough, natural gas pipeline, nitrogen pipeline, and fiber optic cable that would run between the Liquefaction Plant and the Phase I/Phase II LNG storage area to the east. The LNG pipeline and associated trough would span the channel via an overhead crossing at one location, while the natural gas pipeline, nitrogen pipeline, and fiber optic cable would be installed under the channel by bore or drill at a second location farther south. Therefore, in-stream impacts would be avoided at both crossing locations.

In addition, Freeport LNG would construct a narrow walkway across Drainage Channel A for pedestrian and cart access. Construction of the walkway would require installation of a permanent concrete culvert and some bank-side disturbance (see table 4.3.2-1). No redirection of drainage flow would occur to Drainage Channel A.

Indirect impacts may occur on drainage channels A, B, and C and Pond 1 at the terminal site due to minor variations in stormwater flow regimes, caused by construction-related changes in topography and surface permeability during construction and operation. None of these indirect impacts would have any significant environmental implications as all of the waterbodies were originally designed and built as drainage structures to convey stormwater to the ICW. Pond 2 would not be disturbed during facility construction or operation. Impacts and mitigation measures for stormwater runoff are discussed in more detail in section 4.3.4.

No process water discharges would be associated with the Liquefaction Plant; therefore, other than spilled or leaked material entering waterbodies directly or through stormwater runoff, the most likely potential pathway for process-related chemicals to enter local waterbodies is air deposition. As discussed above, the Gulf appears on the most recent Section 303(d) list of impaired waterbodies (TCEQ, 2011), due to the amount of mercury detected in edible fish tissue. Most of the mercury in fish in the Gulf is thought to originate from atmospheric deposition (Wallace and Swann, 2002) and is not attributable to surface runoff from adjacent industrial sites such as the terminal. Mercury in the feed gas for Freeport LNG's Liquefaction Plant at the Quintana Island terminal would be removed at the upstream Pretreatment Plant, resulting in natural gas containing very low levels of mercury (no more than one part per trillion) at the Liquefaction Plant. Therefore, the Liquefaction Project is not expected to have any measurable impact on mercury levels in the Gulf or adjacent surface waters.

Ballast Water

LNG exports through the Liquefaction Project would not result in any increase in the maximum number of vessel visits (400 per year) that corresponds with the LNG handling volume authorized in the Commission Order approving the Phase II Project. Ballast water carried by LNG vessels varies depending on size and type of vessel. The typical ships planned for loadings at LNG Dock 2 would carry between 175,000 m^3 and 165,000 m^3 of cargo. These ships would typically have a ballast capacity of between 65,000 m^3 to 70,000 m^3 depending on the vessel type. Assuming a mix of LNG vessel sizes calling on the Freeport LNG berth, this would result in an annual ballast discharge volume of approximately 7.1 billion gallons (21,890 acre feet) at a

rate of 400 vessels per year. When the terminal is operating in liquefaction mode, arriving vessels would be carrying ballast water instead of LNG, and these vessels would necessarily have to discharge ballast water at the terminal berthing docks to maintain a constant draft during the LNG loading operation.

Potentially, discharge of ballast water in the terminal's berthing area could provide a pathway for the introduction of exotic aquatic nuisance species into U.S. coastal waters. This concern was also addressed in Freeport LNG's Export Authorization Project Environmental Assessment (EAP-EA) (FERC, 2009) under which LNG carriers would visit the terminal about eight times per year to receive LNG for re-export and necessarily discharge ballast water in the berthing area.

These potential impacts are mitigated via USCG regulations that require all vessels equipped with ballast water tanks, which enter or operate in U.S. waters to maintain a ballast water management plan. The plan requires vessels to implement strategies to prevent the spread of exotic aquatic nuisance species in U.S. waters. Based on this requirement and other applicable federal laws and regulations over the discharge of ballast water, we conclude that ballast water discharges for the Liquefaction Project would not represent a significant effect on aquatic resources. Further information on regulations affecting the discharge of ballast water and requirements with respect to discharging ballast water are discussed in section 4.5.4.

Pretreatment Plant Site

Table 4.3.2-2 lists waterbodies at or adjacent to the Pretreatment Plant site and summarizes the anticipated impacts for each waterbody associated with construction and operation of the proposed facilities. Impacts on the two naturally occurring waterbodies, Horseshoe Lake (with drainage channel) and the unnamed drainage channel associated with Wetland WL-1 (see table 4.3.2-2) are collectively confined to 0.04 acre of permanent fill at the southern and northern extremities of the main Pretreatment Plant footprint. However, both the Horseshoe Lake drainage channel and the unnamed drainage channel would need to be redirected to maintain the current drainage flow into the western Velasco Ditch and through the Velasco Drainage District pump station.

With respect to the four unnamed, waterbodies (C through F) on the Pretreatment Plant site, the area in which the small pond (Waterbody E) and drainage ditch (Waterbody F) are located would be filled and utilized for temporary workspace. Given that they are both man-made features associated with the commercial excavation of sand and clay that was recently terminated, it is not anticipated that restoration would be necessary. Moreover, as indicated in table 4.3.2-2, the drainage ditch has been partially filled previously by the original property owner.

Freeport LNG would use the central excavation pit (Waterbody C) to develop a retention pond for stormwater runoff during construction and operation; a smaller detention pond may also be installed in this area. The existing pit topography and water retaining capacity would be modified considerably; however, these modifications would result in shallower, vegetated side slopes which decrease erosion and increase the ecological value of the waterbody.

Table 4.3.2-2

Waterbodies and Associated Impacts at the Pretreatment Plant Site

Waterbody Name	Waterbody Type/Jurisdictional Status a/	Temporary Impact Acreage	Permanent Disturbance Acreage	Impact Profile
Waterbodies on the Pretreatment Plant Site				
Horseshoe Lake and Drainage Channel (Waterbody A)	Perennial open water/wetland complex (WL-9) in relict oxbow of Oyster Creek with open channel to Western Velasco Ditch - USACE Jurisdictional	0.04	0.03	Wetland periphery extends across south edge of operational plant footprint; channel crosses footprint of plant at southeast corner and south access road – requires redirection
Unnamed Drainage Channel (Waterbody B)	Perennial open channel through Wetland WL-1 to Western Velasco Ditch - USACE Jurisdictional	0.23	0.01	Crosses northeast corner of plant footprint – requires redirection
Open Water in Central Excavation Pit (Waterbody C)	Intermittent pooled water in bottom of pit - USACE Non-jurisdictional	0.00	10.56	Existing pit would be modified to create stormwater detention pond for construction and operation
Open Water in Northwestern Excavation Pit (Waterbody D)	Intermittent pooled water in bottom of pit USACE Nonjurisdictional	3.21	0.00	Pit would be site of soil excavation for construction fill – capacity to retain water would not be diminished
Unnamed Pond (Waterbody E)	Intermittent pond created from upland construction USACE Nonjurisdictional	0.00	0.42	Affected by construction of new permanent access road
Unnamed Drainage Ditch (Waterbody F) b/	Intermittent ditch created for water pumped from central pit to Horseshoe Lake USACE Nonjurisdictional	0.00	0.37	Affected by fill and grading for temporary workspace
Waterbodies Adjacent to the Pretreatment Plant Site				
Western Velasco Ditch (Waterbody G)	Perennial borrow ditch along Velasco Levee USACE Jurisdictional	0.39	0.55	Affected by culvert installation for two new permanent access roads between Pretreatment Plant and CR 690
	Total (USACE Jurisdictional):	**0.66**	**0.59**	
	Total (USACE Nonjurisdictional):	**3.21**	**11.35**	
	Total:	**3.87**	**11.94**	

a/ Jurisdictional status is based on PJD issued on August 9, 2012 (USACE, 2012).
b/ Recent field observations have indicated that, subsequent to Freeport LNG's wetland/waterbody delineation in March/April 2012, a portion (0.32 acres) of this nonjurisdictional, man-made ditch was filled by the original site owner during wind-down of the on-site sand extraction operation. The permanent disturbance acreage (0.11) presented in this table represents the remaining portion of the ditch.

The northwestern pit (Waterbody D) is located in an area from which Freeport LNG is planning to remove clay-based soil for use as fill material on the main Pretreatment Plant footprint. Like the water in the central pit, the water in the northwestern pit is only present by virtue of recent material extraction and any environmental impacts, such as sedimentation and associated turbidity that may be caused by the proposed activities would be no different from those attributable to past excavation.

In addition to mercury, the Pretreatment Plant is designed to remove three other contaminants from the feed gas for the liquefaction process: CO_2, sulfur compounds, and water. Of the constituents listed above, none would result in significant waste generation and none would be disposed of in any stormwater effluent streams originating from the processing unit areas or other equipment areas at the Pretreatment Plant.

The waterbody impacts at the Pretreatment Plant primarily affect low quality man-made features. Freeport LNG's Procedures would be implemented during construction, which would minimize the impacts of erosion during construction of the Pretreatment Plant on the onsite surface waters as well as nearby surface waters. Therefore, we conclude that construction and operation of the Pretreatment Plant would have some permanent impact on waterbodies but not have a significant effect on these waterbodies.

Pipeline/Utility Line System

Table 4.3.2-3 lists the waterbodies that are crossed by the proposed Pipeline/Utility Line System and, for each waterbody and provides a quantitative summary of anticipated impacts associated with facility construction.

Freeport LNG is proposing to cross three of the four major waterbodies on the Pipeline/Utility Line System (FHC, ICW, and Oyster Creek) by the HDD method, thereby avoiding in-stream and riparian impacts, including disturbance of benthic substrate and shoreline vegetation. The fourth major waterbody, the eastern Velasco Ditch, would be crossed by the HDD method at the lateral crossings and the push-pull open cut method at the longitudinal crossings. The same HDD crossing location would include the Velasco Levee, CR 690, and the western Velasco Ditch. Approximately 8,840 feet of the longitudinal Pipeline/Utility Line System sections would be installed by the push-pull open cut method within the bed of the eastern Velasco Ditch.

Use of this method, in which the pipe joints are welded on shore and pushed or pulled as a floating string through the water channel, would cause less in-stream disturbance than that associated with the installation of individual pipe joints. The primary surface water impact resulting from the push-pull method would be a temporary increase in the concentration of suspended sediments and consequent turbidity during construction.

Freeport LNG is proposing to cross the CR 891 Ditch, the two tributaries to Salt Bayou, and the two unnamed drainage channels further north by the conventional open cut wet trench method with equipment operating from the banks. Assuming water is present during construction, the primary impact would be the similar to that associated with the push-pull method - a temporary increase in the concentration of suspended sediments and turbidity during construction.

Table 4.3-2-3

Waterbodies and Associated Impacts at the Pipeline/Utility Line System

Bank-to-Bank Milepost		Waterbody Name	Flow Regime	Approximate Width (Feet) a/	Crossing Method	Temporary Impact (acres)
From	To					
0.79(A)	0.98(A)	FHC	Perennial	970	HDD	0.00
1.63(A)	1.72(A)	ICW	Perennial	410	HDD	0.00
3.66(A)	3.67(A)	CR 891 Ditch	Perennial	49	Open Cut	0.10
3.73(A)	5.40(A)	Eastern Velasco Ditch	Perennial	N/A b/	Open Cut (Push-Pull)	19.60
5.41(A)	5.59(A)	Eastern Velasco Ditch	Perennial	N/A b/	HDD	0.00
5.59(A)	5.65(A)	Oyster Creek	Perennial	180	HDD	0.00
8.05(A)	8.05(A)	Unnamed Tributary to Salt Bayou	Intermittent	5	Open Cut	N/A c/
8.48(A)	8.49(A)	Unnamed Tributary to Salt Bayou	Intermittent	75	Open Cut	0.20
0.21(B)	0.22(B)	Western Velasco Ditch	Perennial	80	HDD	0.00
0.14(B)	0.16(B)	Eastern Velasco Ditch	Perennial	105	HDD	0.00
0.00(B)	N/Ad	Unnamed Pond d/	Perennial	377	N/A d/	0.70
0.21(D)	0.22(D)	Unnamed Drainage Channel	Intermittent	40	Open Cut	0.10
0.23(D)	0.23(D)	Unnamed Drainage Channel	Intermittent	19	Open Cut	0.10
0.31(E)	0.39(E)	Horseshoe Lake	Perennial	450	Overhead	0.00 e/
		Total:				**20.80**

Notes:
N/A Not Applicable

a/ Waterbody widths provided in this table is based on review of USGS 7.5 minute series topographic quadrangle maps (Scale 1:24,000) and aerial based maps of the area.
b/ The pipeline would be placed longitudinally in the borrow ditch using the push-pull method.
c/ Impacts associated with this waterbody are included in the wetland impact calculations in table 4.3.5-3.
d/ This feature occurs in the ATWS for the HDD pull-back at the lateral pipeline/utility line crossing of the Velasco Levee – there would be no permanent pipeline/utility line crossing.
e/ Overhead crossing by electric line serving Pretreatment Plant – no in-stream impacts.

As indicated above, Freeport LNG is proposing to use HDD at six of the 14 waterbody crossing locations on the Pipeline/Utility Line System, including all four major waterbodies (FHC, ICW, Oyster Creek, and eastern Velasco Ditch) crossed underground. The primary risk associated with directional drilling is the potential for inadvertent releases of drilling mud, commonly known as "frac-outs". In small quantities, drilling mud that enters a waterbody would not adversely affect overall water quality; in larger quantities, however, the release of drilling mud could adversely affect water quality and, consequently, resident aquatic life. Containment and disposal of the non-toxic mud (bentonite) used for HDD would be performed in accordance with

permit requirements. In the event the proposed HDD methods are not feasible, Freeport LNG would use the open-cut trenching method as described in the Freeport LNG's Procedures.

For the HDD crossings of the Velasco Levee, Freeport LNG would follow the engineering design requirements set forth in *Technical Specification – Horizontal Directional Drilling under the Freeport, Texas Hurricane Flood Protection System* (Velasco Drainage District, 2011). Freeport LNG has prepared a *Draft HDD Monitoring and Contingency Plan* (see appendix C) for the Liquefaction Project that describes the remedial steps that would be taken to address frac-outs and drill failures. Standard clean-up practices for frac-outs include the deployment of straw bales, silt fencing, or turbidity curtains, and the subsequent use of mechanical or natural means to remove the drilling mud. We have reviewed the Draft HDD Monitoring and Contingency Plan and find it to be adequate. However, because we do not have the site specific HDD Monitoring and Contingency Plan information for the HDDs, **we recommend that:**

> **Prior to the start of HDD operations, Freeport LNG file a final site-specific HDD Monitoring and Contingency Plan for review and written approval by the Director of OEP.**

Given the construction procedures, our recommendation, and mitigation measures proposed, construction impacts associated with the work area is expected to be localized and of short duration, and would result in minor impacts on water quality.

Operation of the Pipeline/Utility Line System is not expected to have any significant effect on waterbodies. No new impervious areas outside of existing facility fence lines would be developed that could increase stormwater runoff. Freeport LNG indicates all facilities would be operated and maintained in accordance with government safety standards and regulations that are intended to ensure adequate protection for the public and to prevent facility accidents and failures. For the Pipeline/Utility Line System, these standards and regulations include, but are not limited to, those set forth by the USDOT in Title 49 CFR Part 192 and the RRC pipeline safety regulations found in Texas Administrative Code (TAC) Title 16, Part 1, Chapter 8. These provisions are designed to ensure pipeline integrity and minimize the risk of structural failures that could cause leaks or spills of conveyed materials into waterbodies. Under USDOT requirements, isolation valves would be installed on the NGL pipeline at Oyster Creek to minimize the risk of in-stream contamination by NGLs in the unlikely event of a pipeline failure.

Accidental Spills or Leaks of Hazardous Materials

Construction of the Liquefaction Project facilities could potentially impact surface water quality due to accidental spills of fuel, lubricants, or other chemicals used during construction. Freeport LNG would utilize its SPCC Plan with Project-specific changes made as necessary. During Project operation, the potential for a chemical spill that could adversely impact surface waters or wetlands is low and would be similarly minimized by adherence to established spill control procedures. Accordingly, operational impacts on water quality are expected to be minor.

4.3.2.2 Phase II Modification Project

Table 4.3.2-4 provides a summary of the impacts associated with construction and operation of the Phase II Modification Project on each jurisdictional waterbody at and adjacent to the Quintana Island terminal. Impacts are considered direct if the waterbody is located within the proposed construction workspace, is temporarily or permanently disturbed, and consequent impact acreages can be calculated. Indirect impacts, such as potential changes in flow regime, occur beyond the construction workspace, are secondary in nature, and are not included in temporary or permanent impact acreages.

Table 4.3.2-4

Waterbody Impacts for the Phase II Modification Project

Waterbody Name	Waterbody Type	Temporary Impact Acreage	Permanent Disturbance Acreage	Impact Profile
Waterbodies on the Terminal Site				
Pond 1	Perennial	0.00	0.90	Direct – construction and operation of the Phase II dock and berthing area
Pond 2	Perennial	0.00	0.00	No direct or indirect impacts
Drainage Channel A	Intermittent	0.00	0.00	No direct or indirect impacts
Drainage Channel B	Intermittent	<0.10	0.00	Direct – construction and operation of the temporary plant road. The LNG transfer pipelines would cross Channel B using an overhead crossing, thus avoiding direct impacts Indirect – stormwater discharges during construction and operation.
Drainage Channel C	Intermittent	0.00	0.40	Direct – construction and operation of the Phase II dock and berthing area. Indirect – stormwater discharges during construction and operation.
Waterbodies Adjacent to the Terminal Site				
(FHC – Berthing Area	Perennial	1.90	3.50	Direct – construction and operation of the Phase II dock and berthing area. Indirect – stormwater discharges during construction and operation.
ICW	Perennial	0.00	0.00	Indirect – use of existing construction dock and increased barge traffic during construction.
Total:		**1.90**	**4.80**	

The following activities associated with construction and operation of the Phase II Modification Project at the Quintana Island terminal site may result in impacts on surface water resources: clearing and grading, waterbody crossings, dredging of the berthing area, construction of the Phase II dock, and an accidental spill or leak of hazardous materials. Potential impacts on

surface water resources due to these activities are discussed in the sections below and are similar to those discussed for the Liquefaction Project at the Quintana Island terminal site in the previous section.

As with the Liquefaction Project, Freeport LNG would implement protective measures similar to those approved and implemented for the Phase I Project to avoid or minimize adverse impacts on surface water resources. These include conformance with the Freeport LNG's Procedures, the SPCC Plan, and applicable permit conditions.

Clearing and Grading

As with construction of the Liquefaction Project, disturbed soils would be exposed to potential erosion during construction of Phase II Modification Project facilities. Land disturbing activities would be conducted in compliance with the National Pollutant Discharge Elimination System (NPDES) Construction General Permit for stormwater discharges and a project-specific SWPPP. As required under the NPDES regulations, Freeport LNG would modify, where necessary, its existing NPDES and SWPPP for the terminal site to accommodate Phase II activities. For the Phase I Project, Freeport LNG, in conjunction with the Velasco Drainage District, provided the FERC with a final design plan that identified the post-construction locations and grades of drainage features.

The plan indicated how the drainage properties of the preconstruction ditch system would be affected by levee relocation and facility construction. However, a revised drainage plan that includes the Projects has not been completed. Therefore, **we recommend that:**

Prior to construction of the Projects, Freeport LNG should file an updated Erosion and Sediment Control Plan to incorporate drainage modifications that meet the requirements of the Velasco Drainage District.

Waterbody Crossings

The two LNG transfer pipelines would be installed above Drainage Channel B. The aboveground crossing eliminates the need to excavate a trench through the channel, and would eliminate the impacts associated with sedimentation and turbidity from the standard wet open-cut construction technique. This waterbody crossing would be conducted in accordance with the Freeport LNG's Procedures, SPCC Plan, and applicable permit conditions.

In addition, a temporary plant road would be constructed between the existing Phase I process area and the northern end of the permanent plant road, which would require the installation of a temporary crossing over Drainage Channel B. This temporary crossing is included in the USACE's permit authorization for the Phase II Project (Permit No. SWG-2003-02110) which was issued on July 31, 2008. The temporary plant road would be constructed in accordance with the Freeport LNG's Procedures, SPCC Plan, and the requirements of the USACE permit.

Operational impacts on surface water quality would result from periodic maintenance dredging of the berthing area. Maintenance dredging of the LNG vessel berthing area would be required periodically to maintain the requisite water depth for LNG vessel maneuvering. Although

maintenance dredging would result in a temporary increase in suspended sediment and turbidity levels, these impacts would be temporary and limited to the immediate vicinity of dredge operations. Freeport LNG would conduct maintenance dredging in accordance with the requirements of the USACE permit and state water quality certification and associated water quality impacts would be minor.

Accidental Spills or Leaks of Hazardous Materials

Water quality could be adversely affected by a spill, leak, or other release of hazardous materials during construction and operational activities. Freeport LNG would implement spill prevention and response procedures specified in their Project-specific SPCC Plan to minimize potential impacts associated with spills or leaks of hazardous materials during construction.

4.3.3 Hydrostatic Testing

Prior to placement in service, pipe sections would be hydrostatically or pneumatically tested, depending on the type of pipe and its intended function, to ensure structural integrity. Table 4.3.3-1 shows hydrostatic testing requirements (uptake source(s)[14] rate, discharge location/rate, holding time, and volume) for the Liquefaction Project.

Depending on the volume required, water to hydrostatically test the piping would be obtained from the two existing on-site water wells or a combination of existing on-site wells and the Town of Quintana's existing municipal wells.

Hydrostatic testing would be performed to ensure that pipe sections are free from leaks and that the required margin of safety is provided for operation at anticipated pressures. Hydrostatic testing would be conducted in accordance with the requirements of USDOT pipeline safety regulations in Title 49 CFR Part 192 and Freeport LNG's own testing specifications. Approximately 67,000 gallons of water would be necessary for hydrostatic testing of the Liquefaction Plant. Upon test completion, the water would be discharged to a man-made pond that lies south of the Phase I Project LNG storage tanks. Freeport LNG would conduct all hydrostatic testing in accordance with applicable permit requirements.

Water quality in Pond 1 at the Quintana Island terminal site would not be affected by hydrostatic test discharges because only new pipe would be subject to testing and no chemicals would be added to the test water. New pipe is considered to be clean and contact with the metal surface would not introduce contamination into the test water. Freeport LNG would discharge hydrostatic test water through a hay bale dewatering structure or filter bag in an upland area, from which it would drain into Pond 1. In addition, Freeport LNG would use appropriate energy dissipation devices, containment structures, and other BMPs to minimize erosion and sedimentation at the point of discharge. The rate of flow would be controlled to prevent any temporary flooding of adjacent land. Hydrostatic testing is not required for construction of the Phase II Modification Project.

[14] The information presented in this section is provisional with respect to hydrostatic test water.

Table 4.3.3-1

Liquefaction Project Hydrostatic Testing Uptake and Discharge Requirements

Facility	Source	Uptake Rate (gpm)	Volume (x 1000 gallons)	Holding Time (hours)	Discharge Location	Discharge Rate (gpm)
Liquefaction Plant	On-site and/or Quintana Well(s)	150	67	8	terminal a/	100
Pretreatment Plant	PTP b/	150	48	8	PTP c/	50
Pipelines						
Nitrogen	UGS	150	105	8	terminal a/	100
NGL	PTP b/	150	67	8	PTP c/	100
BOG	PTP b/	150	115	8	terminal a/	100
NG Interconnect Inflow	PTP b/	150	45	8	PTP c/	50
NG Interconnect Outflow	PTP b/	150	45	8	PTP c/	50
	Total:		**492**			

Notes:
NG= natural gas
PTP = Pretreatment Plant

a/ Discharge location would be to Pond 1.
b/ Source at PTP may be composed of a combination of water from UGS (UGS waterline to PTP) and well(s) at PTP.
c/ Discharge location would be an upland area and in accordance with Freeport LNG's Procedures.

4.3.4 Stormwater Runoff

Land disturbing activities would be conducted in compliance with the NPDES Construction General Permit for stormwater discharges and Freeport LNG's Project–specific SWPPP, as required under the CWA, together with Freeport LNG's Project-specific Erosion and Sediment Control Plan. Freeport LNG would modify, where necessary, its existing plans to accommodate the increase in stormwater runoff due to the new Liquefaction and Phase II Modification Project facilities. LNG would not be considered a contaminant because it would evaporate upon release.

During construction, potential impacts involving stormwater discharges to surface waters at and adjacent to the Quintana Island terminal include erosion and sedimentation. There are no known existing soil- or sediment-borne chemical contaminants that could migrate into surrounding waterbodies from the terminal. The stormwater collection basin in the northwest corner of the former DMPA would be developed during initial site preparation and would receive construction stormwater channeled from perimeter outfalls in the western sector of the former DMPA; stormwater in the eastern sector would be conveyed to Drainage Channel A on the eastern perimeter. Stormwater in both the collection basin and Drainage Channel A would be discharged to the ICW through dedicated outfall structures and in accordance with applicable permit requirements. The collection basin and other sediment-retaining devices would help to minimize the sediment load of the discharges and any consequent environmental impacts on the

ICW. Given the proposed mitigation to control stormwater runoff, the construction work is expected to have minor impacts on stormwater and associated water quality.

During operation of the Liquefaction Plant, the amount of impervious surface area would be increased, resulting in an increased volume of stormwater runoff. To accommodate this increase and any topographic changes resulting from site development, new systems of catchment areas and drainage conduits would be designed. For operation of the Liquefaction Plant, the existing *Stormwater Management Plan* for the Quintana Island terminal would be revised to incorporate the new facilities. Stormwater discharges from the Liquefaction Plant would be via outfalls regulated under the NPDES program.

Following construction of the proposed Pretreatment Plant, a new area of impervious surface materials would exist at the site, resulting in a potential increase in stormwater runoff volumes. To accommodate this increase and any topographic changes resulting from site development, new systems of catchment areas and drainage conduits would be designed. A Project-specific *Stormwater Management Plan* would be developed for operation of the Pretreatment Plant.

In regards to the Pipeline/Utility Line System, no new impervious areas outside of existing facility fence lines would be developed that could increase stormwater runoff. In regard to the Phase II Modification Project, like the Liquefaction Project, land disturbing activities would be conducted in compliance with an NPDES Construction General Permit and Freeport LNG's Project Specific SWPPP and operation of the Phase II Modification Project would include a Stormwater Management Plan developed in consultation with the Velasco Water Management District.

Given the stormwater control measures, operation of the Liquefaction Project and Phase II Modification Project are expected to have minor impacts on runoff and water quality.

4.3.5 Wetlands

The proposed Liquefaction Project and Phase II Modification Project would be constructed in areas that support numerous wetlands. These wetlands have historically been, and presently is, disturbed by industrial, agricultural, and grazing activities. The Pipeline/Utility Line System would be constructed within the previously disturbed right-of-way. Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of wetland vegetation typically adapted for life in saturated soil conditions (USACE, 1987). Freeport LNG conducted field delineations in accordance with the methodology outlined in the USACE *1987 Wetland Delineation Manual* (USACE, 1987).

Field delineation surveys were conducted for Freeport LNG's Phase I Project, Phase II Project, NGL Extraction Project, and Liquefaction Project. Information that was originally collected for the Phase I and Phase II Projects between 2003 and 2005 was re-evaluated and corroborated through contemporary field investigations in 2010 and 2011. Information for the proposed Pretreatment Plant site is based on a field delineation survey that was completed by Freeport LNG in March through May, 2012. See figures D-1 through D-3 (a-h) in appendix D for field

determined waterbodies and wetlands for the Projects. Wetland vegetation species representative of the area are discussed in section 4.4 of this final EIS.

The most common wetlands in the vicinity are palustrine emergent and estuarine emergent wetlands. Some upland scrub-shrub communities and species are also present. Typical wetland species are discussed in section 4.4 of this final EIS.

4.3.5.1 Impacts and Mitigation

Liquefaction Project

The Liquefaction Project consists of three components which have potential effect on wetlands: the Liquefaction Plant/Quintana Island terminal site, the Pretreatment Plant, and the Pipeline/Utility Line System. These are discussed separately below.

Liquefaction Plant

There are nine wetlands within the vicinity of the Quintana Island terminal site. These consist of estuarine emergent and palustrine emergent wetlands, and are located mostly adjacent to the Liquefaction Plant or along the shoreline of the ICW. Many of these were created as compensatory mitigation for earlier phases of development of the facility. Table 4.3.5-1 lists the wetlands on the terminal site and indicates that there may be temporary impacts on wetlands adjacent to the area as a result of turbidity from the proposed dredging work (see table 4.3.2-1). Permanent impacts on wetlands would total 1.7 acres.

Table 4.3.5-1
Wetland Impacts at the Liquefaction Plant a/

Wetland No.	Wetland Type	Temporary Workspace (acres)	Permanent Footprint (acres)	Comment
WL-1	Estuarine Emergent	b	0.0	Impacts due to dredging turbidity. Adjacent to existing LNG berthing area
WL-2	Estuarine Emergent	b/	0.0	Impacts due to dredging turbidity. Adjacent to existing LNG berthing area
WL-3	Estuarine Emergent	b/	0.0	Impacts due to dredging turbidity. Adjacent to existing LNG berthing area
WL-5	Estuarine Emergent	b/	0.0	Impacts due to dredging turbidity. *Spartina alterniflora* bed on shoreline of ICW – compensatory mitigation wetland
WL-6	Estuarine Emergent	b/	0.0	Impacts due to dredging turbidity. *Spartina alterniflora* bed on shoreline of ICW – compensatory mitigation wetland
WL-7	Estuarine Emergent	0.00	1.1	*Spartina alterniflora* bed on shoreline of ICW – compensatory mitigation wetland
WL-10	Estuarine Emergent	b/	0.6	*Spartina alterniflora* bed on shoreline of ICW – compensatory mitigation wetland
	Total:	**0.00**	**1.7**	

a/ Wetland areas updated based upon USACE Permit application and associated data request responses
b/ Wetlands may be affected temporarily by turbidity from dredging plume

Freeport LNG's required adherence to permit conditions and implementation of the Freeport LNG's Procedures, SWPPP, and SPCC Plan would ensure the avoidance of indirect impacts (*e.g.,* from stormwater runoff) on the wetlands that lie beyond the proposed construction workspace.

The Quintana Island terminal site would permanently impact 7.8 acres of wetland (7.7 estuarine emergent and 0.10 palustrine scrub-shrub). Freeport LNG would mitigate the impacts on Quintana Island wetlands by creating 11 acres of estuarine emergent wetlands, of equal or greater functional value than those affected, in accordance with its Wetland Mitigation Plan filed with the FERC following issuance of the draft EIS. These compensatory wetlands would be located at the Quintana Island Terminal site.

We conclude that with the avoidance and minimization measures and mitigation plan described that wetland impacts at the Liquefaction Plant would not be significant.

Pretreatment Plant

As indicated in table 4.3.5-2, construction and operation of the Pretreatment Plant would have temporary and permanent impacts on wetlands within the associated construction workspace. Figure D-2 in appendix D shows the impacts on wetlands at the Pretreatment Plant site, based on the field delineation performed in March through May, 2012. Based on the USACE's field review undertaken on July 18, 2012 and subsequent written confirmation provided on August 9, 2012, all wetlands on the site are considered USACE jurisdictional.

Freeport LNG has avoided or minimized wetland impacts during its facility layout design. Of the 15 wetlands listed in table 4.3.5-2, two small wetlands (WL-19 and WL-20) are located wholly in the temporary construction workspace and would be temporarily disturbed during site preparation.

Upon completion of the Pretreatment Plant, the topography of the emergent wetlands within the temporary workspaces would be restored as site drainage plans allow and the areas would be allowed to revegetate naturally, in accordance with the Freeport LNG's Procedures and the *Wetland Restoration and Monitoring Plan*. The USACE Permit is not complete and the final mitigation measures are not finalized. Freeport LNG has prepared to offset the impacts at the Pretreatment Plant by providing a conservation easement with the USFWS that would ensure long-term protection for 70 acres of palustrine emergent wetlands of equal or greater functional value than those affected at the Pretreatment Plant site and as detailed in Freeport LNG's Wetland Mitigation Plan. The TPWD and USEPA have requested that the USACE require a greater amount of conservation easement. The final conservation easement would be finalized in the USACE permit.

The final approach to mitigation for the permanent fill of an estimated 11.8 acres of palustrine emergent wetland at the Pretreatment Plant site, may include a combination of purchase of credits in a wetland mitigation bank, placement of other wetlands (on or off-site) in a long term conservation agreement, creation, extension, or restoration of other wetlands. Freeport LNG would provide the USACE with a *Compensatory Wetland Mitigation Plan* offering specific details of the anticipated quantitative and qualitative wetland impacts resulting from

Pretreatment Plant development and the mitigation measures to be adopted. This mitigation would be separate from the compensatory wetland mitigation plan for Phase I and Phase II activities at the terminal. Given the overall siting requirements of the Pretreatment Plant and the prevalence of similar wetland habitat throughout the region, we conclude that Freeport LNG has minimized the impacts on wetlands as much as possible through the design of the facility.

Table 4.3.5-2

Wetland Impacts at the Pretreatment Plant Site a/

Wetland No. a/	Wetland Type	Temporary Workspace (acres)	Permanent Footprint (acres)
MS-WL-1	Palustrine Emergent	2.74	3.11
MS-WL-2	Palustrine Emergent	0.00	2.40
MS-WL-3	Palustrine Emergent	0.00	0.15
MS-WL-4	Palustrine Emergent	0.00	0.38
MS-WL-5	Palustrine Emergent	0.00	0.32
MS-WL-6	Palustrine Emergent	0.00	0.41
MS-WL-7	Palustrine Emergent	0.00	0.25
MS-WL-8	Palustrine Emergent	0.00	0.76
MS-WL-9	Palustrine Emergent	2.00	3.77
MS-WL-11	Palustrine Emergent	0.00	0.13
MS-WL-12	Palustrine Emergent	0.00	0.02
MS-WL-19	Palustrine Emergent/Scrub-Shrub	0.24	0.00
MS-WL-20	Palustrine Emergent	0.47	0.00
MS-WM-6	Palustrine Emergent/Upland Mosaic (20 percent wetland)	0.00	0.04
MS-WM-8	Palustrine Emergent/Upland Mosaic (50 percent wetland)	0.00	0.09
	Total:	**5.45**	**11.83**

a/ Wetland areas updated based upon USACE Permit application and associated data request responses
b/ WL-10 no longer exists and WL-13 through WL-18 are located beyond the Pretreatment Plant site, hence the associated gaps in the numbering sequence.

Pipeline/Utility Line System

In total, 36 emergent wetlands are crossed by the Pipeline/Utility Line System (see table 4.3.5-3). Construction and operation of the Pipeline/Utility Line System would have temporary impacts, but no permanent impacts, on wetlands within the associated construction workspace. Figure D-3 (a-h) in appendix D shows the type and extent of the wetlands within the proposed construction workspace, based on field delineations performed for the Phase I and Phase II Projects between 2002 and 2005, the NGL Extraction Project in August 2010, and the HDD workspace at MP 4.55(A)/0.15(B) in May 2012, along with corroboratory field reconnaissance of previous surveys in September 2010 and February 2011. The width of the construction right-of-way for the wetland crossings is 100 feet (refer to figures 2.4.1-1 and 2.4.1-2 which show right-of-way cross section configurations).

Table 4.3.5-3

Freeport LNG Liquefaction Project
Wetlands and Associated Impacts for the Pipeline/Utility Line System a/

Wetland No.	Location Along Pipeline and Utility Line Route		Crossing Length (feet) b/	Wetland Type	Temporary Impact (acres) c/	Permanent Impact (acres)
	From (Milepost)	To (Milepost)				
WL-1	0.01(A)	0.68(A)	262	Palustrine Emergent	0.5	0.0
WL-2	1.12(A)	1.16(A)	215	Palustrine Emergent	0.5	0.0
WL-3	1.17(A)	1.18(A)	60	Estuarine Emergent	0.1	0.0
WL-4	1.19(A)	1.51(A)	1710	Estuarine Emergent	3.9	0.0
WL-5	2.01(A)	2.29(A)	1507	Estuarine Emergent	2.6	0.0
WL-6	2.30(A)	2.35(A)	240	Estuarine Emergent	0.4	0.0
WL-7	2.36(A)	2.71(A)	1879	Estuarine Emergent	3.3	0.0
WL-8	3.59(A)	3.66(A)	375	Estuarine Emergent	0.9	0.0
WL-9	3.68(A)	3.69(A)	N/A b/	Estuarine Emergent	0.1	0.0
WL-10	3.73(A)	3.75(A)	N/A b/	Estuarine Emergent	0.1	0.0
WL-11	3.83(A)	3.86(A)	N/A b/	Estuarine Emergent	<0.1	0.0
WL-12	3.94(A)	3.95(A)	N/A b/	Estuarine Emergent	<0.1	0.0
WL-13	3.99(A)	4.01(A)	N/A	Estuarine Emergent	<0.1	0.0
WL-14	4.08(A)	4.12(A)	N/A b/	Estuarine Emergent	<0.1	0.0
WL-15	4.14(A)	4.14(A)	N/A b/	Estuarine Emergent	<0.1	0.0
WL-16	4.36(A)	4.38(A)	N/A b/	Estuarine Emergent	<0.1	0.0
WL-17	4.38(A)	4.55(A)	N/A b/	Estuarine Emergent	0.4	0.0
WL-18	4.56(A)	4.57(A)	N/A b/	Estuarine Emergent	<0.1	0.0
WL-19	4.62(A)	4.63(A)	N/A b/	Estuarine Emergent	<0.1	0.0
WL-20	4.62(A)	4.64(A)	N/A b/	Estuarine Emergent	<0.1	0.0
WL-21	4.96(A)	4.97(A)	7	Estuarine Emergent	<0.1	0.0
WL-22	5.25(A)	5.26(A)	N/A b/	Estuarine Emergent	<0.1	0.0
WL-23	5.32(A)	5.40(A)	N/A b/	Estuarine Emergent	0.1	0.0
WL-24	5.36(A)	5.39(A)	N/A a/	Estuarine Emergent	0.1	0.0
WL-35	7.23(A)	7.29(A)	205	Palustrine Emergent	0.3	0.0
WL-26	7.32(A)	7.35(A)	N/A b/	Palustrine Emergent	0.1	0.0
WL-27	7.33(A)	7.62(A)	731	Palustrine Emergent	1.6	0.0
WL-28	7.69(A)	7.72(A)	22	Palustrine Emergent	0.2	0.0
WL-29	8.03(A)	8.06(A)	40	Palustrine Emergent	0.1	0.0
WL-30	8.20(A)	8.26(A)	94	Palustrine Emergent	0.3	0.0
WL-31	8.43(A)	8.48(A)	250	Palustrine Emergent	0.6	0.0
WL-32	8.50(A)	8.60(A)	415	Palustrine Emergent	1.1	0.0
WL-33	8.72(A)	8.75(A)	N/A c/	Palustrine Emergent	0.1	0.0
WL-34	8.83(A)	8.84(A)	7	Palustrine Emergent	<0.1	0.0
WL-35	9.45(A)	9.45(A)	12	Palustrine Emergent	<0.1	0.0
WL-36	9.47(A)	9.47(A)	13	Palustrine Emergent	<0.1	0.0
WL-37	0.00(B)	N/A c/	745	Estuarine Emergent	1.3	0.0
WL-38	0.04(B)	0.04(B)	N/A b/	Palustrine Emergent/ Scrub-Shrub	<0.1	0.0
WL-39	0.09(B)	0.11(B)	N/A b/	Estuarine Emergent	0.1	0.0

Table 4.3.5-3

Freeport LNG Liquefaction Project
Wetlands and Associated Impacts for the Pipeline/Utility Line System a/

Wetland No.	Location Along Pipeline and Utility Line Route		Crossing Length (feet) b/	Wetland Type	Temporary Impact (acres) c/	Permanent Impact (acres)
	From (Milepost)	To (Milepost)				
WL-40	0.11(B)	0.12(B)	37	Palustrine Emergent/ Scrub-Shrub	<0.1	0.0
WL-41	0.13(B)	0.13(B)	24	Estuarine Emergent	<0.1	0.0
WL-42	0.14(D)	0.17(D)	45	Palustrine Emergent	0.2	0.0
WL-43	0.21(D)	0.21(D)	19	Palustrine Emergent	<0.1	0.0
WL-44	0.24(D)	0.32(D)	465	Palustrine Emergent	1.1	0.0
WL-45	0.34(D)	0.34(D)	25	Palustrine Emergent/ Scrub-Shrub	<0.1	0.0
WL-46	0.60(D)	0.62(D)	10	Palustrine Emergent	<0.1	0.0
WL-47	0.64(D)	0.65(D)	N/A b/	Palustrine Emergent	<0.1	0.0
				Total:	**20.2 e/**	**0.0**

Notes
N/A = Not Applicable

a/ Wetland areas updated based upon USACE Permit application and associated data request responses
b/ Wetland is within the temporary workspace area but not directly crossed by the proposed pipelines or utility lines.
c/ Construction impacts for the pipeline are based on a nominal 100-foot-wide construction right-of-way.
d/ Includes all temporary workspace east of MP 0.0(B).
e/ 0.1 of total reflects a collective rounding up of <0.1 values.

During and following construction, Freeport LNG would ensure that the temporary wetland impacts associated with the pipeline and utility line facilities are appropriately addressed through adherence to permit conditions and implementation of the protective measures in Freeport LNG's Procedures, *Wetland Restoration and Monitoring Plan*, SWPPP, and SPCC Plan. For wetlands, these protective measures include:

- minimizing vegetation clearing and soil disturbance;
- avoiding unnecessary vehicular traffic and equipment use;
- installing and maintaining erosion and sedimentation control devices such as hay bales and silt fences;
- restricting the duration of construction to the extent practicable;
- using timber construction mats or layers of timber to create a temporary work surface in wet conditions; and
- using low pressure ground equipment in wet conditions to minimize vegetation damage, soil compaction, and rutting.

Through the same combination of measures, Freeport LNG would strive to avoid indirect impacts (*e.g.*, from stormwater runoff) to those peripheral wetlands that lie beyond the proposed construction workspace. With the above mitigation, impacts from the Pipeline/Utility Line System on wetlands would be temporary and short term.

Summary of Wetland Impacts

The total temporary impact on wetlands from the Liquefaction Project is 25.7 acres and includes the wetland impacts associated with the Pretreatment Plant and Pipeline/Utility Lines. The total permanent impact on wetlands from the Liquefaction Project is 13.5 acres, which includes impacts associated with the Liquefaction Plant (1.7 acres) and the Pretreatment Plant (11.8 acres), with no permanent impacts from the Pipeline/Utility Line System.

In addition to the mitigation measures in the Freeport LNG's Procedures, Freeport LNG would be required to comply with the permit conditions contained in the USACE's Section 404 and TCEQ's Section 401 Permits. In Freeport LNG's application to the USACE, it must demonstrate that it has taken appropriate and practicable steps to minimize wetland impacts in compliance with the USEPA's Section 404(b)1 guidelines that restrict discharges of dredged or fill material where a less environmentally damaging alternative exists. Per USACE requirements, the permanent loss of wetlands would require that Freeport LNG provide compensatory mitigation. Freeport LNG is in consultation with the USACE to address the wetland impacts and ensure their *Compensatory Wetland Mitigation Plan* adequately satisfies all USACE requirements. Given the overall siting requirements of the Liquefaction Project, previously disturbed nature of the wetlands that would be affected, prevalence of similar wetland habitat throughout the region, and the mitigation to be developed through the USACE permitting process, we conclude that the Liquefaction Project would cause permanent but minor impacts on wetlands.

Phase II Modification Project

Construction and operation of the Phase II Modification Project would impact a total of approximately 6.1 acres of wetlands, all of which would be permanently affected. Wetland areas affected by the Phase II Modification Project are identified in figure D-1 in appendix D and described in table 4.3.5-4.

Following construction, temporarily disturbed wetlands would be restored and allowed to revegetate in accordance with the Freeport LNG's Procedures and Freeport LNG's *Wetland Restoration and Monitoring Plan*. The latter plan describes measures for reestablishing wetland species and for subsequent revegetation monitoring to ensure that all disturbed areas are successfully restored.

To address the Phase II Modification Project, Freeport LNG is working with the USACE to seek an amendment to the existing Section 404/10 permit authorization and to update its *Compensatory Wetland Mitigation Plan* as necessary. Therefore we conclude that the Phase II Modification Project would cause permanent but minor impacts on wetlands.

Table 4.3.5-4

Freeport LNG Phase II Modification Project
Jurisdictional Wetland Impacts a/

Wetland No.	Wetland Type	Temporary Workspace (acres)	Permanent Footprint (acres)	Comment
WL-1	Estuarine Emergent	0.00	3.9	Within Phase II dock/berthing area
WL-2	Estuarine Emergent	0.00	1.9	Within Phase II dock/berthing area
WL-3	Estuarine Emergent	0.00	0.2	Within Phase II dock/berthing area
WL-4	Palustrine Scrub-Shrub	0.0	0.1	Within construction workspace and easement for the new plant road
WL-5	Estuarine Emergent	0.01	0.00	Created/restored as compensatory mitigation for the Phase I Project
WL-6	Estuarine Emergent	0.00	0.00	Created/restored as compensatory mitigation for the Phase I Project
WL-7	Estuarine Emergent	0.00	0.00	Created/restored as compensatory mitigation for the Phase I Project
WL-8	Palustrine Emergent	0.00	0.00	Created/restored as compensatory mitigation for the Phase I Project
WL-9	Palustrine Emergent	0.00	0.00	Created/restored as compensatory mitigation for the Phase I Project
	Total:	**0.0**	**6.1**	

a/ Wetland areas updated based upon USACE Permit application and associated data request responses

4.4 VEGETATION

The Gulf Prairies and Marshes Region of East Texas, in which the Liquefaction Project is located, is a nearly level, slowly drained plain less than 150 feet in elevation, dissected by streams and rivers flowing into the Gulf. The region includes barrier islands that protect the coastline from ocean waves and highly productive estuaries and marshes that support a thriving fishing economy (Davis and Schmidly, 1994). Historically, post oak savanna and grassland have been the major climax vegetation types throughout most of the region. Neither the Liquefaction Project nor the Phase II Modification Project are located at or would affect any of the rare plant communities mapped on the Texas Natural Diversity Data Base (TPWD, 2012). The land on which the Liquefaction Project facilities would be sited has been subjected to and influenced by historic industrial, commercial, residential, and cattle grazing activities, some of which have significantly altered the natural vegetation profile.

4.4.1 Liquefaction Project

4.4.1.1 Quintana Island Terminal Site

The major vegetative cover types currently found at and adjacent to the Quintana Island terminal include upland herbaceous and scrub-shrub communities, as well as estuarine emergent wetland. The upland scrub-shrub community at the terminal site is heavily dominated by bigleaf marsh

elder (*Iva frutescens*) and eastern baccharis (*Baccharis halimifolia*), although various intermingled herbaceous species are also well represented.

The upland herbaceous community at and adjacent to the terminal site has been previously disturbed and contains species such as annual ragweed (*Ambrosia artemisiifolia*), bushy bluestem (*Andropogon glomeratus*), Canada goldenrod (*Solidago canadensis*), herbaceous mimosa (*Mimosa strigillosa*), and seaside goldenrod (*Solidago sempervirens*). This community also contains certain opportunistic species that tend to favor wetter conditions such as Gulf cordgrass (*Spartina spartinae*) and sea oxeye (*Borrichia frutescens*).

The presence of such species is indicative of recently disturbed soils. Land within the Seaway DMPA south of the site that would be used for temporary construction laydown and temporary warehouse facilities contains a mix of scrub-shrub and herbaceous species including bigleaf marsh, eastern baccharis, and sea oxeye. The predominant communities at the Seaway DMPA are upland, with wetland vegetation, including cattail (*Typha sp.*) and saltcedar (*Tamarix ramosissima*) concentrated in excavated pits.

Estuarine emergent wetlands occur along the low south shoreline of the ICW, where extensive beds of smooth cordgrass (*Spartina alternifolia*) have been planted as part of Freeport LNG's compensatory mitigation program, and on the east side of the terminal site between the LNG carrier berthing area and the east temporary workspace. Representative species include bulrush (*Scirpus* sp.), Carolina wolfberry (*Lycium carolinianum*), eastern baccharis, glasswort (*Salicornia* sp.), Gulf cordgrass, saltgrass (*Distichlis spicata*), saltmeadow cordgrass (*Spartina patens*), sand spikerush (*Eleocharis montevidensis*), sea oxeye, sea purslane (*Sesuvium maritimum*), and seaside goldenrod. Isolated clumps of scrub-shrub vegetation (mainly bigleaf marsh elder and eastern baccharis) punctuate the herbaceous cover. A detailed discussion of wetlands at the terminal site is included in section 4.3.5.

Impacts and Mitigation

The impacts on vegetation communities within the Quintana Island terminal's construction workspace are summarized in table 4.4.1-1. For the Liquefaction Project facilities at and adjacent to the terminal site, table 4.4.1-1 indicates those areas that are within the previously authorized Phase II Project footprint and other areas.

Approximately 35.0 acres of vegetation would be cleared during construction of the Liquefaction Project at and adjacent to the Quintana Island terminal, of which 20.8 acres would be temporary impacts. Approximately 14.2 acres of vegetation would be permanently cleared and lie outside the previously authorized construction footprint for the Phase II Project. Of the 20.8 acres temporarily affected, 18.3 acres lie inside the previously authorized construction footprint for the Phase II Project.

To minimize impacts on vegetation communities during and after construction, erosion control measures would be installed and temporary workspaces revegetated as applicable in accordance with Freeport LNG's Procedures and the SWPPP. With the implementation of these measures, impacts on vegetation are expected to be minor.

Operation and maintenance of the proposed facilities would have minimal impact on naturally occurring vegetation communities at the terminal site. Routine good housekeeping measures, such as mowing and weeding, would be used for tended areas among the Liquefaction Plant infrastructure; however, naturally vegetated areas peripheral to the permanent footprint of the facilities would not be included in Freeport LNG's maintenance program and would be allowed to grow without further disturbance.

4.4.1.2 Pretreatment Plant

The vegetation cover types at the Pretreatment Plant site are predominantly upland grassland, which has been actively grazed by cattle, and emergent wetland. Isolated trees and small patches of scrub-shrub cover punctuate the upland landscape.

Representative upland herbaceous species include annual ragweed, Bermuda grass (*Cynodon dactylon*), common dandelion (*Taraxacum officinale*), Johnson grass (*Sorghum halepense*), and wavy-leaf thistle (*Cirsium undulatum*). Upland scrub-shrub cover is dominated by Chinese tallow, goatbush (*Castela erecta*), and huisache (*Acacia smallii*). The isolated trees on the site are Chinese tallow.

The larger emergent wetlands on the site (*e.g.,* at Horseshoe Lake) are dominated by Gulf cordgrass, sea oxeye, and smooth cordgrass; smaller scrub-shrub sections within these wetlands are characterized by bigleaf marshelder. Wetland species in the small man-made drainage channels that cross the site include sand spikerush and prairie butter-cup (*Ranunculus platensis*).

Impacts and Mitigation

The impacts on vegetation communities within Pretreatment Plant's construction workspace are summarized in table 4.4.1-1. For the Liquefaction Project facilities at and adjacent to the terminal site, table 4.4.1-1 indicates those areas that are within the previously authorized Phase II Project footprint and other areas.

About 164.9 acres of vegetation would be cleared during construction at the Pretreatment Plant, of which 78 acres would be permanently affected and 86.9 acres would be temporarily affected. Impacts on vegetation from construction of the Pretreatment Plant would be minor because the facility would impact an area predominantly used for grazing where there are no special and rare vegetative communities. Impacts on wetland vegetation are minimized through wetland compensation areas as described in section 4.3.5.

Table 4.4.1-1

Freeport LNG Liquefaction Project
Vegetation Communities at Quintana Island Terminal Site Affected Within the Construction Workspace (in Acres) a/

Location	Upland Herbaceous		Upland Scrub-Shrub		Wetland Herbaceous e/		Scrub-Shrub Wetland		Total Vegetation	
	Temp	Perm	Temp	Perm	Temp	Perm	Temp	Perm	Temp	Perm
Within Previously Authorized Phase II Footprint										
Total:	18.3	<0.1	0.0	0.0	0.0	0.0	0.0	0.0	18.3	<0.1
Outside Previously Authorized Phase II Footprint										
Liquefaction Plant:										
Trains 1, 2, and 3	0.0	0.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	7.0
Ancillary Facilities	0.0	5.5	0.0	1.3	0.0	0.0	0.0	0.0	0.0	6.8
LNG Pipeline & Troughs in Phase I Process Area	0.0	<0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.1
Construction Dock	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Firewater Intake Structure	0.0	<0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.1
BOG Compressor at Phase I Berthing Dock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vapor Return Blowers at Phase 1/11 Berthing Docks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temporary Workspace (West)	1.1	0.0	0.8	0.0	0.0	0.0	0.0	0.0	1.9	0.0
Temporary Workspace (East Central)	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
Temporary Workspace (East)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Seaway DMPA	25.0	0.0	25.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0
Total:	26.7	5.7	25.8	1.3	0.0	7.0	0.0	0.0	52.5	14.0
Quintana Island Terminal Site Total:	45.0	5.8	25.8	1.4	0.0	7.0	0.0	0.0	70.8	14.1
Pretreatment Plant Site Total	81.1	66.1	<0.1	<0.1	5.5	11.8	0.2	0.0	86.9	78.0
Pipelines/Utility Lines (Jurisdictional & Nonjurisdictional) MP 0.00(A)- MP 4.55(A) MP 0.00(B) - MP 0.35(8)	6.8	0.0	0.2	0.0	14.3	0.0	0.0	0.0	21.3	0.0
Pipelines/Utility Lines (Nonjurisdictional)	34.5	0.0	18.9	0.0	5.9	0.0	0.0	0.0	59.3	0.0
Pipelines/Utility Lines Total:	41.3	0.0	19.1	0.0	20.2	0.0	0.0	0.0	80.6	0.0

Notes:
a/ Does not include the nonjurisdictional electric lines

4.4.1.3 Pipeline/Utility Line System

The major vegetative cover types currently found on the Pipeline/Utility Line System include grazed upland grassland (pasture land), scrub-shrub communities, and herbaceous wetlands. No significant tree cover is present. Both estuarine and palustrine wetlands are represented, although estuarine wetlands are more significant than palustrine wetlands and are represented by several extensive areas on the main artery of the Pipeline/Utility Line System.

Estuarine emergent wetlands occur along the southern portion of the main Pipeline/Utility Line System from Follett's Island to just south of Oyster Creek at MP 5.62(A). These wetlands are dominated by extensive beds of smooth cordgrass. Other representative species include bulrush, Carolina wolfberry, eastern baccharis, glasswort, Gulf cordgrass, saltgrass, saltmeadow cordgrass, sand spikerush, sea oxeye, sea purslane, and seaside goldenrod. Isolated clumps of scrub-shrub vegetation (mainly big-leaf marsh elder and eastern baccharis) punctuate the herbaceous cover.

Several small palustrine emergent wetlands occur south of Oyster Creek but most occur to the north, where scrub-shrub inclusions are also found. Characteristic species include bulrush, Gulf cordgrass, jointed flatsedge (*Cyperus articulatus*) narrow-leaf marshelder (*Iva angustifolia*), rattle-bush (*Sesbania drummondii*), saltgrass, saltmarsh fimbristylis (*Fimbristylis castanea*), and spikerush (*Elodea*). A detailed discussion of wetlands along the proposed Pipeline/Utility Line System is included in section 4.3.5.

Common upland herbaceous plants along the Pipeline/Utility Line System include annual ragweed, bahiagrass, barnyard grass (*Echinochloa crus-galli*), Bermuda grass, coreopsis (*Coreopsis*), false indigo (*Baptisia australis*) fine-leaved sneezeweed (*Helenium amarum*), frog-fruit (*Phyla nodiflora*), fox-tail bristle grass (*Setaria italica*), Mexican hat (*Chiranthodendron pentadactylon*), prickly pear cactus (*Opuntia*), spotted beebalm (*Monarda punctate*), St. Augustine grass (*Stenotaphrum secundatum*), Vasey's grass (*Paspalum urvillei*), and windmill grass (*Chloris*). Scrub-shrub vegetation along the Pipeline/Utility Line System includes bigleaf marshelder, eastern baccharis, rattlebush, and salt cedar (*Tamarix*).

Impacts and Mitigation

The impacts on vegetation communities within the Pipeline/Utility Line System's construction workspace are summarized in table 4.4.1-1. For the Liquefaction Project facilities at and adjacent to the terminal site, table 4.4.1-1 indicates those areas that are within the previously authorized Phase II Project footprint and other areas.

About 80.6 acres of vegetation would be cleared during construction of the Pipeline/Utility Line System. The proposed Pipeline/Utility Line System would be collocated with existing pipelines and utilities and are within previously disturbed and maintained corridors, which would help to minimize vegetation impacts. However, construction would necessitate the removal of surface vegetation and grading to facilitate pipeline installation and to allow safe operation of equipment. During grading, the root systems of herbs, shrubs, and small trees would be disturbed.

Following construction, all disturbed areas would be restored as near as practical to their original condition. Temporary and permanent erosion control measures would be installed as necessary and revegetation would be undertaken in accordance with Freeport LNG's Procedures, SWPPP. Reseeding and/or tree replanting programs, where required, would be developed in consultation with federal, state, and/or local permitting authorities. As a result of these mitigation measures, impacts on vegetation along the right-of-way associated with Pipeline/Utility Line System are expected to be minor and temporary.

To the extent practical, temporarily disturbed wetlands would be returned to their original grade, hydrology, and vegetative cover type. Woody shrubs and trees would be allowed to naturally revegetate within temporary workspaces. Most of the permanent pipeline corridor would be maintained with low vegetative cover to facilitate access for operations and maintenance, accommodate underground utilities in the shared right-of-way, and comply with the safety requirements of 49 CFR Part 192. Mechanical methods, such as brush hogging, would be used as necessary in upland areas to keep the permanent right-of-way clear of excessive woody vegetation.

Operation and maintenance of the Pipeline/Utility Line System would have a minimal impact on the naturally occurring vegetation communities. Active maintenance of vegetation within the operational right-of-way (*e.g.,* mowing and brush-hogging) may be required in select locations on an infrequent basis.

4.4.1.4 Summary of Impacts

In summary, the Liquefaction Project would temporarily impact 238.3 acres of vegetation, and permanently impact 92.1 acres of vegetation. Impacts on vegetation would generally be minor as a substantial portion of the Liquefaction Plant work would affect vegetation associated with the dredge disposal site that does not have a high value with respect to wildlife habitat, and impacts on vegetation from construction of the Pretreatment Plant would impact an area predominantly used for grazing where there are no special and rare vegetative communities.

4.4.2 Phase II Modification Project

The Phase II Modification Project would be constructed on Quintana Island, mainly within the existing terminal footprint. An access road would also be constructed on Quintana Island. The major vegetative cover types currently found at and adjacent to the Quintana Island terminal include upland herbaceous and scrub-shrub communities, as well as estuarine emergent wetland. Specific descriptions of vegetation existing on Quintana Island, in and adjacent to the terminal, are in section 4.4.1.

Impacts and Mitigation

The Phase II Modification Project's impact on vegetation communities is summarized in table 4.4.2-1. Construction of the Freeport LNG Phase II Modification Project would affect a total of approximately 23.4 acres of vegetation, of which 14.3 acres would be permanent. The remaining 9.1 acres would be restored in accordance with the Freeport LNG's Procedures and Freeport's

SWPPP. Excavation and construction of the new berthing dock would permanently impact estuarine emergent wetlands along the low south shore of the ICW and would require the removal of approximately 1,188,000 yd^3 of dredged material. See section 4.3.5 for a discussion of this construction activity as it affects wetlands and section 4.5.5 as it relates to EFH.

Freeport LNG proposes to utilize one or more of four existing DMPA sites in the Freeport area to dispose of the dredged material. The existing condition at each site varies according to the material placement history of each DMPA. Generally, DMPAs contain ruderal grasses, scrub/shrub vegetation, and unvegetated sand and clay areas. DMPAs where recent dredge material placement activities have occurred consist of open water and sparsely vegetated areas that are in the process of dewatering and decompression.

Table 4.4.2-1

Freeport LNG Phase II Modification Project
Vegetation Communities Affected
(Acres)

Project Component	Upland Vegetation				Wetland Vegetation			
	Herbaceous		Scrub-Shrub		Estuarine Herbaceous		Palustrine Scrub-Shrub	
	Temp	Perm	Temp	Perm	Temp	Perm	Temp	Perm
Phase II Dock and Berthing Area	3.0	5.4	0.4	0.4	0.1	6.0	0.0	0.0
LNG Transfer Pipelines	3.2	1.1	0.0	0.0	0.0	0.0	0.0	0.0
Access Road System	1.7	0.8	0.6	0.5	0.0	0.0	<0.1	<0.1
Total:	7.9	7.3	1.0	0.9	0.1	6.0	<0.1	<0.1
					Total Temp: 9.1		**Total Perm: 14.3**	

Notes
Temp = Temporary Impact
Perm = Permanent Impact

Within the site, all temporarily disturbed areas would be stabilized, and temporary and permanent erosion control measures would be installed as necessary. Areas not required for operation of the facility would be revegetated in accordance with the Freeport LNG's Procedures and Freeport LNG's SWPPP. Reseeding would be planned in consultation with federal, state, and/or local permitting agencies. Areas used for dredge disposal are expected to revegetate naturally to a similar state as the other existing DMPAs (*i.e.,* ruderal grasses and scrub/shrub vegetation). Impacts on vegetation as a result of the Phase II Modification Project would be temporary and minor.

Operation and maintenance of the Phase II Modification Project would have minimal impact on naturally occurring vegetation communities at the terminal site. Routine maintenance measures, such as mowing and weeding, would be used for tended areas among the Liquefaction Plant infrastructure; however, naturally vegetated areas peripheral to the permanent footprint of the Phase II Modification Project would not be included in Freeport LNG's maintenance.

4.5 WILDLIFE AND AQUATIC RESOURCES

4.5.1 Wildlife

The Liquefaction Project and the Phase II Modification Project are located within the Gulf Prairies and Marshes region of East Texas (Davis and Schmidly, 1997). Wildlife habitat within the region is diverse and includes highly productive estuaries and marshes, post oak savanna, and grassland habitats. Because of this habitat diversity, the region also contains a diverse range of wildlife species, including dozens of reptiles and amphibians (University of Texas, 2000). Davis and Schmidly (1997) lists 30 species of terrestrial mammals known to occur in the regional vicinity of the Liquefaction Project and Phase II Modification Project (Brazoria County) and an additional 15 species whose ranges include this area, although their presence has not been documented. As discussed further below, the upper and lower Texas coasts also provide habitat for over 300 migratory and non-migratory (resident) bird species.

Wildlife habitats at the Liquefaction Plant and Phase II Modification Project include previously disturbed herbaceous upland, scrub-shrub upland, barren or graveled upland, emergent wetland, scrub-shrub wetland, and open water (*i.e.*, berthing area, ICW, three drainage channels, and two man-made ponds). Over 150 regional species commonly occurring within these habitat types are known to occur in Project area. These include mammal species that have been observed recently on or adjacent to the terminal site listed in table 4.5.1-1. Birds common to the region include American crow (*Corvus brachyrhynchos*), turkey vulture (*Cathartes aura*), the indigo bunting (*Passerina cyanea*), hawks (*Accipiter* sp.), owls (*Aegolius* sp.), and orioles (*Icterus* sp.). Reptiles common to the region include the green anole (*Anolis caroliniensis*), skinks (*Eumeces* sp.), the six-lined racerunner snake (*Aspidoscelis sexlineatus*), the eastern mud turtle (*Kinosternon subrubrum*), and the snapping turtle (*Chelydra serpentine*). Amphibian species, only found in non-saline habitats, include the American bullfrog (*Lithobates catesbeianus*), cricket frog (*Acris crepitans*), and green frog (*Rana clamitans*).

Table 4.5.1-1

Observed Mammal Species

Common Name	Scientific Name
Bobcat	*Lynx rufus*
Coyote	*Canis latrans*
White-tailed deer	*Odocoileus virginianus*
Feral hog	*Sus scrofa*
Raccoon	*Procyon lotor*
Striped skunk	*Mephitis*
Eastern gray squirrel	*Sciurus carolinensis*

Most of the construction and operational footprint for the Liquefaction Plant and Phase II Modification Project at and adjacent to the terminal site is on land that was previously affected by the Phase I Projects or would be affected by the Phase II Project as originally proposed. The areas of new impact are the former DMPA within and adjacent to the existing property boundary on the west side of the terminal site, and the Seaway DMPA south of the site. Here, the available

habitat is mostly open and/or industrial land characterized by intermittent surface water pooling, with some peripheral herbaceous upland. The wildlife community in this location would be similar to that considered representative of the terminal site for the Phase I and Phase II Projects, although the uniformity of the landscape and the DMPA's historical function as a dredge spoil depository are unlikely to favor significant ecological diversity.

While the existing industrial infrastructure at the Quintana LNG terminal is not conducive to wildlife colonization, the two LNG storage tanks provide well-used aerial vantage points for raptors (owls and hawks) that hunt birds and other prey within the wetland and pond. The wetland and pond are situated just south of the storage tanks and were developed as part of the compensatory wetlands mitigation program for the Phase I Project. In addition to attracting various avian species, the pond supports a thriving population of red drum (*Sciaenops ocellatus*) when sufficient water is present.

Wildlife habitats at the Pretreatment Plant site and along the proposed Pipeline/Utility Line System include herbaceous upland, scrub-shrub upland, barren or graveled upland, emergent wetland, scrub-shrub wetland, and open water (*e.g.*, Horseshoe Lake and Oyster Creek). Much of the herbaceous upland and drier emergent wetland areas, including those that characterize the Pretreatment Plant site, support cattle grazing and can be categorized also as pasture land. As with the Liquefaction and Phase II Modification Project, over 150 regional species commonly occurring within these habitat types are known to occur in Project area. These include mammal species that have been observed recently on or adjacent to the terminal site listed in table 4.5.1-1. Birds common to the region include American crow, turkey vulture, the indigo bunting, hawks, owls, and orioles. Reptiles common to the region include the green anole, skinks, the six-lined racerunner snake, the eastern mud turtle, and the snapping turtle. Amphibian species, only found in non-saline habitats, include the American bullfrog, cricket frog, and green frog.

4.5.1.1 Wildlife Resource Impacts and Mitigation

Liquefaction Project Impacts

Construction activities and noise could temporarily drive some wildlife away from the construction area and could inhibit the movement of wildlife during work hours. Potentially, some smaller, less mobile fauna could become entrapped in excavations or could be inadvertently injured or killed by construction equipment, although no negative population-level effects are expected. It should be noted that, because the area supports currently operating industrial facilities within the larger Port Freeport, Oyster Creek, and Stratton Ridge areas, wildlife present are likely fairly tolerant of industrial activity and noise. Additionally, because the habitats affected by construction are widespread and common in the area, it is expected that the small numbers of wildlife displaced during construction would relocate, either temporarily or permanently, to other nearby suitable habitat. Wildlife activity in the area would likely resume soon after the completion of construction.

Animals permanently displaced by the new facilities may relocate to similar habitats nearby, where some animals could be forced into suboptimal habitats. In some undisturbed areas, the influx of individuals and increased population densities caused by these dislocations could

increase inter- and intra-specific competition and reduce the reproductive success of individuals. Corresponding population declines in the construction area could result in a decrease in the food stock available for predators. However, for the Liquefaction Project, the size of the permanently affected area relative to the expanse of available habitat elsewhere suggests that any such effects would be marginal. Also, due to their ability to move freely over large areas and demonstrated tolerance of ongoing activities at the terminal and beyond, larger mammals (*e.g.*, bobcat, coyote, and white-tailed deer) would likely experience only minimal direct adverse impacts.

To minimize wildlife impacts related to habitat loss, Freeport LNG's Procedures would be followed during construction and restoration activities. Other short-term impacts potentially occurring during construction include spills or leaks of hazardous materials and temporary water quality impacts resulting from stormwater runoff. Freeport LNG would implement an SPCC Plan and SWPPP to avoid or minimize such impacts. In addition, in wetland areas, the USACE would require compensatory mitigation where permanent impacts are proposed. Given the mitigation measures described above, effects on wildlife associated with the construction of the Liquefaction Project are expected to be minor.

Phase II Modification Project Impacts

Construction impacts associated with the Phase II Modification Project are expected to have similar impacts on wildlife as those described above for construction of the Liquefaction Plant that is also on Quintana Island (section 4.5.1). Specifically, construction activities and noise could temporarily drive some wildlife away from the construction area and could inhibit movement during construction hours. Smaller, less mobile fauna could become entrapped in excavations or could be inadvertently injured or killed by construction equipment, although no negative population-level effects are expected.

Due to the currently operating LNG terminal, wildlife in the immediate project area is accustomed to industrial activity and noise. Additionally, because the habitats affected by construction are widespread and common in the area, it is expected that the small numbers of wildlife displaced during construction would relocate, either temporarily or permanently, to suitable habitat nearby. Wildlife activity in area would likely resume soon after the completion of construction. To minimize impacts on wildlife habitat, Freeport LNG would implement the Freeport LNG's Procedures during construction and restoration activities.

Wildlife could also be affected if a spill or leak of hazardous materials were to occur; however, Freeport LNG would implement its SPCC Plan to avoid or minimize such impacts.

Vegetative clearing for construction of the Phase II Modification Project would impact a total of 23.2 acres of wildlife habitat, including 15.2 acres of upland herbaceous cover, 6.1 acres of wetland herbaceous cover, 1.9 acres of upland scrub-shrub cover, and less than 0.1 acre of scrub-shrub wetland. Of these, 9.0 acres (7.9 acres of upland herbaceous cover, 1.0 acres of scrub-shrub upland, and 0.1 acres of emergent wetland) would be temporarily affected; the remaining 14.2 acres would be permanently converted through replacement of vegetation with surfacing materials such as concrete or gravel, or through conversion to open water for the Phase II dock and berthing area.

4.5.2 Managed and Sensitive Wildlife Areas

Two National Wildlife Refuges (NWRs) - Brazoria and San Bernard - are located within 9.0 miles of the Quintana Island terminal. The closest of these is Brazoria NWR, located approximately 2.9 miles northeast of the terminal and 0.7 mile northeast of the Pretreatment Plant. Mottled ducks (*Anas fulvigula*), roseate spoonbills (*Platalea ajaja*), great blue herons (*Ardea herodias*), rails (Rallidae family), and sandhill cranes (*Grus canadensis*) have been known to frequent Brazoria NWR. This refuge is 40,000 acres in size and consists of saline and freshwater prairies, salt and mud flats, fresh and salt marshes, potholes, saltwater lakes, and a freshwater stream. It is located within the Freeport Christmas Bird Count circle, which attracts the highest number of migratory bird species seen in a 24-hour period in the nation.

San Bernard NWR is approximately 8.5 miles southwest of Quintana Island and approximately 10.6 miles southwest of the Pretreatment Plant site. The San Bernard NWR covers approximately 28,000 acres and consists of coastal prairies, salt and mud flats, saltwater and freshwater ponds, a stream, and a stand of trees such as hackberry (*Celtis* spp.), cedar elm (*Ulmus crassifolia*), Chinese tallow, and live oak (*Quercus virginiana*). Up to 30,000 snow geese (*Chen caerulescens*) and 25,000 ducks are found on the San Bernard refuge annually.

One Wildlife Management Area (WMA), the Justin Hurst WMA (previously Peach Point WMA), is located within the regional vicinity of the Liquefaction Project facilities. It contains two management units: the main unit, which is located approximately 3.5 miles northwest of the Liquefaction Plant site and about 4.8 miles west southwest of the Pretreatment Plant site; and the Bryan Beach unit, which is located approximately 2.6 miles southwest of the Liquefaction Plant site and approximately 6.5 miles southwest of the Pretreatment Plant site. Owned by the TPWD, habitats within the Justin Hurst WMA are managed for indigenous and migratory wildlife species with an emphasis on waterfowl.

The Quintana Neotropical Bird Sanctuary (NBS) is located less than 0.1 mile south of the Quintana Island terminal. This approximately 4-acre area is identified on the TPWD's Great Texas Coastal Birding Trail and Upper Texas Coast (UTC) Wildlife Trail as UTC Site No. 121. It is owned by the Town of Quintana and managed collectively by the Town of Quintana, the Gulf Coast Bird Observatory (GCBO), the Houston Audubon Society, and Partners in Flight (GCBO, 2005; Town of Quintana, 2011).

Before its origination in 1994, the Quintana NBS was an overgrown salt cedar lot, but it has since been improved by the addition of a nature trail, ponds, and benches, together with an observation tower funded by Freeport LNG. Since completion of the existing Phase I facilities at the terminal site in 2008, and despite significant tree damage caused by Hurricane Ike in the same year, the Quintana NBS has continued to attract a wide variety of neotropical birds (*e.g.*, warblers, vireos, buntings, thrushes, and hummingbirds) in high numbers, constituting an important stopover point as they migrate north over the Gulf. The small wooded area also attracts butterflies, small mammals, reptiles, and amphibians.

The Town of Quintana owns Xeriscape Park, which, in 2005, was relocated and expanded from 0.4 acre to 2.6 acres through the joint efforts of Freeport LNG, the Town of Quintana, and several local conservation groups. The new site is located close to the Quintana NBS. Xeriscape Park includes a hummingbird garden and pond. It attracts native birds and butterflies, and like Quintana NBS, serves as a stopover point for migratory birds. It is operated on land leased from Port Freeport and in part through a grant from the TPWD.

4.5.2.1 Impacts on Managed and Sensitive Wildlife Areas

Liquefaction Project

Due to the distances of the Brazoria NWR, San Bernard NWR, and Justin Hurst WMA from the proposed facilities, Project-related impacts on wildlife at these locations are not anticipated. Based on the results of Freeport LNG's study regarding construction impacts on avian species and the fact that wildlife in area are accustomed to industrial activities, we do not expect that construction of the Liquefaction Project would have a significant impact on managed and sensitive wildlife areas. In addition, the presence of the existing 21-foot-high storm levee between the proposed Project facilities and the sites would provide a buffer against noise during construction and operation.

Phase II Modification Project

As with the Liquefaction Project, due to the distance between the Phase II Modification Project facilities and the Brazoria NWR, San Bernard NWR, and Justin Hurst WMA, Project-related impacts on wildlife at these locations are not anticipated. Additionally, for the same reasons discussed above for the Liquefaction Project, the Phase II Modification Project is not expected to have a significant impact on managed and sensitive wildlife areas.

4.5.3 Migratory Birds

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA), originally passed in 1918. The MBTA states that it is unlawful to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg of any such bird, unless authorized under a permit issued by the Secretary of the Interior. "Take" is defined in the regulations as to "pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt any of the above" (50 CFR 10).

Executive Order 13186 (January 2001) was issued, in part, to ensure that environmental analyses of federal actions assess the impacts on migratory birds. It also states that emphasis should be placed on species of concern, priority habitats, and key risk factors and it prohibits the take of any migratory bird without authorization from the FWS. On March 30, 2011, the FWS and the Commission entered into a MOU that focuses on avoiding or minimizing the adverse impacts on migratory birds and strengthening migratory bird conservation through enhanced collaboration between the Commission and the FWS by identifying areas of cooperation. This voluntary MOU does not waive legal requirements under any other statutes and does not authorize the take of migratory birds.

As stated in Freeport LNG's Migratory Birds Conservation and Compliance Plan, the FWS Migratory Bird Office has developed lists of Birds of Conservation Concern (BCC), a subset of birds protected under the MBTA, to stimulate proactive conservation action by federal/state agencies and private parties (FWS, 2008a). Consistent with guidance provided during consultation with the FWS on January 12, 2012, Freeport LNG found a total of 43 BCC species on the BCC list for the Gulf Coastal Prairie portion of Bird Conservation Region (BCR) 37 (FWS, 2008a), which have been documented or are cited as probable to occur in the region (USGS, 2010; Texas Bird Breeding Atlas [TBBA], 2013).

Each species was analyzed for nesting habitat and breeding distribution based on data provided by the Cornell Lab of Ornithology (2013), the USGS (2010), and the TBBA (2013). However, of these 43 species, less than half (16) actually breed in the region; the remaining 27 are non-breeding inhabitants only. Most of the 43 species, both breeders and non-breeders, favor herbaceous upland and/or emergent wetland habitat. Both habitat types are found within the Projects' construction workspace, including wetland habitats along the ICW and to the south of the LNG storage tanks at the terminal created as part of the compensatory wetlands mitigation program for the Phase I Project. Table 4.5.3-1 provides a list of migratory bird species with breeding habitats in the area, their preferred nesting habitat, and the amount of habitat, by percentage, within the construction footprint.

Much of the vegetated land in and around the area is previously disturbed and/or currently maintained by mowing and other land management practices that reduce nesting habitat value. The undisturbed areas contain higher quality nesting habitat which would be more attractive to breeding bird species.

4.5.3.1 Impacts and Mitigation on Migratory Birds

Liquefaction Project

Many migratory bird species and nocturnal birds use natural light from the sun, moon, and stars for navigation. Artificial light sources can hide natural light sources, having unknown effects on population levels. Fatalities to avian species, due to artificial light, are well documented. Avian fatalities are associated with attraction to light sources, especially in low light, fog, and when there is a low cloud ceiling (Orr *et al.,* 2013), causing collision with facility components. To address this concern, Freeport LNG conducted a four-year bird strike study at the Quintana Island terminal, which occurred during both construction and operation of the Phase I terminal facilities, focusing on the two LNG storage tanks, air tower, LNG dock unloading arms, and installed power lines. The results of this four-year study indicate that seven bird strikes were due to the facility and appurtenant structures. None of birds struck were migratory BCCs. Based on the results of this study and the similar nature of the proposed Project components to those previously studied, bird strikes into Liquefaction Project components would likely be rare. The results of the study indicate that these structures do not pose a significant potential for bird strikes.

Table 4.5.3-1

Migratory Birds of Conservation Concern and Breeding Habits of Gulf Coast Prairie Portion of Bird Conservation Region (BCR) 37

Species*	FWS Status*	Comments	Percent of Construction Workspace
Ground Nesters that Breed in or Near the Area			44 a/
Least Bittern *(Ixobrychus exilis)*	-		
Black Rail *(Laterallus jamaicensis)*	-		
Wilson's Plover *(Charadrius wilsonia)*	-		
American Oystercatcher *(Haematopus palliatus)*	-		
Least Tern *(Sternula antillarum)*	^	Non-listed subspecies or population of threatened/endangered species	
Gull-billed Tern *(Gelochelidon nilotica)*	-		
Sandwich Tern *(Thalasseus sandvicensis)*	-		
Black Skimmer *(Rynchops niger)*	-		
Grasshopper Sparrow *(Ammodramus savannarum)*	-		
Shrub Nesters that Breed in or Near the Area			4 b/
Seaside Sparrow *(Ammodramus maritimus)*	^	Non-listed subspecies or population of threatened/endangered species	
Painted Bunting *(Passerina ciris)*	-	Observed in NBS	
Dickcissel *(Spiza americana)*	-		
Tree Nesters that Breed in or Near the Area			<1 c/
Reddish Egret *(Egretta rufescens)*	-		
Bald Eagle *(Haliaeetus leucocephalus)*	Delisted		
White-tailed Hawk *(Buteo albicaudatus)*	-		
Loggerhead Shrike *(Lanius ludovicianus)*	-	Observed in NBS	

Notes
* Species and Status list obtained from FWS (2008).
- Not presently or historically listed as Threatened or Endangered by the FWS.
^ Population in proximity to the Freeport LNG not-listed by FWS.

a/ Includes all areas with herbaceous upland and wetland vegetation regardless of ongoing land management practices.
b/ Includes all areas with shrub-shrub upland and wetland vegetation regardless of ongoing land management practices (mowing, cattle grazing, etc.).
c/ Although no forested areas are present, several isolated individual trees are located within the construction workspace at the Pretreatment Plant site.

As stated in Freeport LNG's Migratory Birds Conservation and Compliance Plan, to help address concerns about the potential for the Projects to impact migratory birds, Freeport LNG has proposed the following mitigation measures 1) crossing major waterbodies and an extensive emergent wetland using the HDD method; 2) avoiding vegetation clearing during the peak nesting season (March 1 through May 15) and summer/fall migration period (July 15 through

October 31); and 3) conducting construction and restoration activities in accordance with Freeport LNG's Procedures. We received a comment letter from the FWS that requested that Freeport LNG avoid vegetation clearing from April 1 through July 15. We note that FWS makes no reference to a summer/fall migration period and does not oppose clearing during the July 15 through October 31 time period.

Thus, based on our review of the FWS Suggested Priority of Migratory Bird Conservation Actions for Projects and comments from the TPWD, **we recommend that**:

> **Freeport LNG avoid vegetation clearing during the primary nesting season for migratory birds, April 1 through July 15. If Freeport LNG is unable to avoid this vegetation clearing restriction time-frame, it should consult with the FWS regarding Freeport LNG's vegetation clearing time-frame and file with the Secretary the results of the consultation prior to construction.**

In addition to the mitigation above, Freeport LNG has developed a draft Facility Lighting Design Plan (FLDP), which would be finalized upon further completion of facility design. The FLDP limits plant lighting to the illumination of paths, roadways, work surfaces, and process equipment while minimizing stray lighting onto surfaces beyond the plant boundary. Freeport LNG proposes to install and use only the minimum required light for safe and efficient operation of the facility; and employ the use of "Full cut-off" or "fully shielded" lighting to minimize direct glare, and prevent upward throw of light. In addition, the FLDP calls for the use of lighting timers and motion detectors to minimize light, and in all cases positioning lighting in a manner so as not to be obtrusive to the natural environment surrounding the facility.

The FWS had concerns over the potential of overhead power lines to create threats of avian collision and electrocution and requested that we look at an alternative of using underground power lines instead of overhead lines. Approximately 1/2 of the 4 miles of aboveground power lines are an upgrade of the existing line. As only 2 miles of new lines would be constructed, the potential to have a significant impact on avian species is minimal. Because the four-year bird strike study at the Quintana Island terminal indicated that power lines and other facilities at that location posed only a minor threat to birds, the power lines proposed for the Projects are not expected to cause any significant impact on birds. However, because of the value of the area to migratory birds, **we recommend that**:

> **Prior to construction, Freeport LNG should incorporate the FWS Avian Protection Plan Guidelines[15] into the design for the proposed 2.93-mile-long 138 kV electric transmission line to the Liquefaction Plant, and the 1.98-mile-long 138 kV electric transmission line to the Pretreatment Plant.**

[15] The Avian Power Plan Guidelines can be accessed at the link below. Additional references to this document in the draft EIS contain hyperlinks to allow access to this document.
: http://www.aplic.org/uploads/files/2634/APPguidelines_final-draft_Aprl2005.pdf.

Based on Freeport LNG's field surveys, agency input on concerns with avian impacts, our recommendations, and proposed mitigation to minimize impacts, the impacts of the Liquefaction Project on migratory and non-migratory birds are expected to be minor.

Phase II Modification Project

There would be no direct impacts (such as loss of habitat) to the NBS or Xeriscape Park that would affect migratory birds. Short-term impacts such as construction noise, increased traffic, and dust could potentially deter some birds from using the NBS or Xeriscape Park during construction. There would be no construction on the Gulf side of the levee in this area; therefore, no impacts on the Quintana NBS are anticipated from Project activities.

Freeport LNG conducted a study of avian species at the Quintana NBS and Xeriscape Park between May 2004 and June 2009. This study revealed that pre- and post-construction environments at the Quintana Island terminal did not affect species diversity or abundance. After construction, avian species continued to utilize the same habitats at both the Quintana NBS and Xeriscape Park. Based on these findings and the presence of the existing 21-foot-high storm levee located between the Liquefaction Plant site and the Quintana NBS and Xeriscape Park, noise associated with the Projects would not result in significant impacts on migratory birds.

Freeport LNG and ConocoPhillips designed a cooperative study with the GCBO conducted surveying a study of avian species at the Quintana NBS and Xeriscape Park, between May 2004 and June 2009. During the public comment period it was pointed out that this document was not publicly available. Freeport LNG did not provide the results of this study to us; therefore we do not rely on this study in our review.

4.5.4 Aquatic Resources

The Gulf of Mexico and its adjoining waters offer a wide range of habitats, including coastal marshes, mangrove swamps, sea-grass beds, coral reefs, offshore banks, and non-vegetated water bottoms. Approximately 38 percent of Gulf waters are in shallow intertidal areas, 42 percent are on the continental shelf (less than 650 feet deep) and continental slope (between 650 feet and 9,840 feet deep), and 20 percent are in abyssal areas (over 9,840 feet deep) (USEPA, 2011). This diversity of habitat types, over an area of approximately 600,000 square miles, promotes a similar diversity of fish species and fishery resources, each with its own patterns of spatiotemporal distribution and abundance.

Fisheries within the Gulf are some of the most productive in the world: In 2010, the commercial fish and shellfish harvest from the five Gulf States was approximately 1.3 billion pounds, representing almost 16 percent of the total annual domestic landings in the U.S. In Texas, the 2010 commercial fish and shellfish harvest was approximately 90 million pounds (National Marine Fisheries Service [NOAA Fisheries], 2011). In the same year, about 1,250,000 recreational fishing trips were made off the Texas Gulf coast (NOAA Fisheries, 2012).

Nearly all species significantly contributing to the Gulf's commercial and recreational catches are estuarine dependent. With the exception of such species as the eastern oyster (*Crassostrea virginica*) and speckled trout (*Cynoscion nebulosus*), most leave the estuaries as juveniles or sub-

adults and spawn at sea after becoming reproductive adults. The eggs of the majority of these species hatch in the waters of the open Gulf and the developing larvae become part of the offshore planktonic community. Under the influence of tides, currents, and winds, the young eventually arrive at the estuarine nursery grounds where they feed, grow, and mature prior to migrating out to sea to repeat the spawning process.

With respect to local fisheries and aquatic habitats, the area of the Liquefaction Project and Phase II Modification Project can be divided into marine (tidal), estuarine (tidal), and inland freshwater (non-tidal) areas. The Quintana Island terminal, which encompasses a portion of the Liquefaction Project and the entirety of the Phase II Modification Project, is situated close to the marine coastal waters of the Gulf, while two waterbodies (ICW and FHC) that fringe the site are part of the Brazos River Estuary system. The Brazos River Estuary includes the tidally influenced wetlands and waterbodies that predominate along the most southerly 6 miles of the proposed Pipeline/Utility Line System for the Liquefaction Project, closest to the terminal. Freshwater wetlands and waterbodies are more prevalent in the northern sector of the route system beyond Oyster Creek at MP 5.63(A); and they also characterize the Pretreatment Plant site of the Liquefaction Project on the west side of the Velasco Levee, where the levee itself provides a physical barrier from estuarine tidal influences to the east. An overview of the Liquefaction Project and Phase II Modification Project, in relation to the waterbodies noted above is shown in figures D-1 to D-3 in appendix D.

4.5.4.1 Liquefaction Project

Liquefaction Plant

Quintana Island is fringed by the open waters of the Gulf to the south, the ICW to the north, the Brazos River to the west, and the FHC to the east[16] (see figure D-1 in appendix D). The terminal site is located at the junction of the ICW and the FHC. The inland waters in the vicinity of the terminal are considered part of the Brazos River estuary which, based on mapping developed in 1998 by the NOAA /National Oceanic Survey (NOAA/NOS) and the Gulf of Mexico Fishery Management Council (GMFMC) (Center for Coastal Monitoring and Assessment [CCMA], 2011), encompasses the ICW and the tidal sections of various rivers, creeks, dredged waterways, wetlands, and associated lentic waterbodies along an approximately 24-mile-long section of coastline four miles east to 20 miles west of the FHC. The ICW separates Quintana Island and Follet's Island from the mainland of Brazoria County. The two islands are bisected by the FHC and fringed by the open waters of the Gulf to the south and the ICW to the north.

Due to the salinity shifts and high suspended sediment levels within estuarine ecosystems, relatively few species are permanent residents but a large number of species can migrate through estuaries to and from spawning habitat. Similarly, many species utilize estuaries for spawning or nursery habitat due to the abundant food supply and general absence of marine predators. However, the Brazos River estuary is atypical of most estuaries, including others along the Texas coastline (*e.g.*, Galveston Bay to the east and Matagorda Bay to the west), because it has no bay

[16] Compass directions provided for Quintana Island and the Terminal correspond with "Plant North", etc., where the Terminal site boundary along the ICW is considered the northern site boundary.

system; instead, it is composed solely of the rivers, creeks, dredged waterways, wetlands, and associated lentic waterbodies noted above. Estuarine bays would typically support much more diverse, extensive habitat and fishery resources.

In a study for the Estuarine Living Marine Resources Program, Pattillo *et al*., (1997) classifies the Brazos River estuary as "tidal fresh zone" and "mixing zone", indicating the varying salinity of the water in this area. Reflecting this salinity profile, local fisheries are classified as either estuarine or marine. Individual fisheries can have commercial and/or recreational significance as discussed below. Table 4.5.4-1 includes a description of representative commercial and recreational shellfish and finfish species potentially occurring in the regional vicinity of the Quintana Island terminal. Those species with a fishery classification of "estuarine" commonly occur in inshore waters close to the terminal site, whereas those species with a fishery classification of "coastal migratory pelagic, marine" or "reef, marine" are characteristically found further offshore in deeper water.

Commercial fisheries tend to be focused offshore; recreational fisheries involve both offshore and near-shore activities; the latter including land-based fishing from the FHC jetties. While no site-specific data are available for the Brazos River Estuary, the most important commercially harvested species in the nearest estuarine waters for which data are available typically include the species listed in table 4.5.4-1.

Other than species with significant commercial or recreational significance, the general fish assemblage in the vicinity of the terminal is likely to include species such as American eel (*Anguilla rostrata*), southern stingray (*Dasyatis americana*), Gulf killifish (*Fundulus grandis*), saltmarsh topminnow (*Fundulus jenkinsi*), sailfin molly (*Poecilia latipinna*), Gulf pipefish (*Syngnathus scovelli*), and inshore lizardfish (*Synodus foetens*) (Texas Gulf Coast Fishing, 2012).

Impacts and Mitigation

Potential fishery resources and habitat impacts that could occur during construction of the Liquefaction Project at the terminal site would include those associated with installation of a new aggregate barge dock, installation of a new construction dock, and installation of a new firewater intake structure. The new aggregate barge dock would be located on the south shore of the ICW near the northwest corner of the Liquefaction Plant site. The firewater intake structure would be located on the south shore of the ICW adjacent to the new construction dock. The locations of the docks and firewater intake structure are shown in figure 1-2.

Existing offshore conditions at the locations of the two docks and the firewater intake structure are characterized by soft benthic sediments, high turbidity, and a lack of submerged aquatic vegetation (SAV). The shoreline is narrow in the vicinity of the proposed new construction dock and the firewater intake structure. The narrow shoreline in the vicinity of the proposed new construction dock abuts the levee wall of the former DMPA on the west side of the terminal and the firewater intake structure is at the site of a former boat ramp. The *Spartina* beds that are found at other locations along the terminal shoreline are not present in the vicinity of the construction dock or firewater intake structure sites.

Table 4.5.4-1

Representative Commercial and Recreational Shellfish and Finfish Species Potentially Occurring in the Vicinity of the Quintana Island Terminal

Common Name	Scientific Name	Fishery Classification
Shellfish		
Blue crab	*Callinectes sapidus*	Estuarine
Brown shrimp	*Farfantepenaeus aztecus*	Estuarine
White shrimp	*Litopenaeus setiferus*	Estuarine
Stone crab	*Menippe adina*	Estuarine
Finfish		
Sheepshead	*Archosargus probatocephalus*	Estuarine
Gafftopsail catfish	*Bagre marinus*	Estuarine
Sand seatrout	*Cynoscion arenarius*	Estuarine
Speckled trout	*Cynoscion nebulosus*	Estuarine
Gray snapper	*Lutjanus griseus*	Estuarine
Striped mullet	*Mugil cephalus*	Estuarine
Southern flounder	*Paralichthys lethostigma*	Estuarine
Black drum	*Pogonias cromis*	Estuarine
Red drum	*Sciaenops ocellatus*	Estuarine
Dolphin	*Coryphaena hippurus*	coastal migratory pelagic, marine
Cobia	*Rachycentron canadum*	coastal migratory pelagic, marine
King mackerel	*Scomberomorus cavalla*	coastal migratory pelagic, marine
Spanish mackerel	*Scomberomorus maculatus*	coastal migratory pelagic, marine
Almaco jack	*Seriola rivoliana*	coastal migratory pelagic, marine
Red snapper	*Lutjanus campechanus*	reef, marine
Gag grouper	*Mycteroperca microlepis*	reef, marine
Scamp grouper	*Mycteroperca phenax*	reef, marine
Greater amberjack	*Seriola dumerili*	reef, marine
Lesser amberjack	*Seriola fasciata*	reef, marine

Source: Pattillo *et al*., 1997; Nelson *et al*., 1992; TPWD, 1975

The new construction dock would be 300-foot-long by 75-foot-wide and would extend over both shoreline and open water, covering an area of 0.5 acre. Some shoreline disturbance and off-shore dredging would be necessary to install the platform, which would be supported on piles. Likewise, installation of the 50-foot-long by 20-foot-wide pile-mounted concrete platform for the firewater intake structure would require both shoreline and off-shore material removal, as would the aggregate barge dock. The aggregate barge dock consists of four 48-inch-diameter steel monopoles, which would be installed in the water channel approximately 80 feet from the existing southern shoreline. The dock platform would be a 100-foot-long by 30-foot-wide crane barge, covering an area of 0.07 acre and held in position by steel cables affixed to the monopiles, which would be located shoreward of the barge. The new dock would be a permanent structure which would create additional hard substrate areas allowing for the growth of attached organisms, and would also provide a three-dimensional structure to be used by some species for refuge.

The impacts on biota from dredging and dredge material placement include interference with respiration, feeding, and alteration of habitat suitability. Suspended particles can physically clog breathing and feeding organs or can result in lowered oxygen levels through increases in chemical oxygen demand. As suspended sediments settle out of the water column, they can smother immobile fish larvae and eggs and benthic invertebrate. Other potential effects of construction include temporary interruption of fish and invertebrate movement in and out of the estuary either during development changes or during foraging. Construction may cause temporary emigration of fish populations from the immediate area in order to avoid areas of elevated suspended sediments. However, it is unlikely that relocation or disrupted migration would significantly affect fish populations because construction activities are expected to be short-term and localized. Freeport LNG's Procedures would be implemented to minimize migration of sediments, and Freeport LNG would follow the turbidity control measures specified in its Dredging Plan (see section 4.3.2).

In addition, the USACE performs periodic maintenance dredging of the ICW. During years when dredging is not performed, the ICW still has a high sediment load. However, high shoaling rates occur locally and sediments are expected to fall out rapidly after resuspension. The effects of resuspension, including increased turbidity, would be limited to the period during and immediately following dredging. Numerous studies indicate that dredge-induced turbidity plumes are generally localized, spreading less than a thousand meters from their sources and dissipating to ambient water quality within several hours after dredging is completed (Higgins *et al.,* 2004). Figure 4.3.2-1 shows the worst-case scenario turbidity impacts up to 1,000 meters from the dredging locations. The information shows the total size of the dredging plume based on this estimate would be 435 acres.

Concern was raised regarding impacts on oyster beds along the ICW during the comment period of the Pre-Filing Process. Potential impacts on oysters would be similar to those described above and are associated with sedimentation and alteration of habitat. As proposed, the Liquefaction Project would impact less than one acre of aquatic habitat along the shoreline of the ICW, although the turbidity plume may affect other areas of aquatic habitat. Shoreline impacts would be addressed in Freeport LNG's *Wetland Restoration and Monitoring Plan*, which would be developed in coordination with the FERC, USACE, and other federal and state resource agencies prior to construction. In addition, implementation of Freeport LNG's *Wetland Mitigation Plan* during construction of the Phase I Project (see FERC Docket No. CP03-75-000 and Department of the Army Permit SWG-2003-02110) resulted in an increase of the oyster population through the use of rock and wire gabions to contain soil and *Spartina* plantings along the ICW. Therefore, although construction activities would have some temporary impacts, we anticipate that the mitigation measures may have a positive impact on oyster populations along the ICW following construction.

Ballast Water Discharges

The EAP-EA discusses the effects of ballast water discharges on four ambient water quality parameters (temperature, pH, dissolved oxygen [DO], and salinity) and the consequent impacts on aquatic biota. It indicates that temperature and pH differentials between ballast water and ambient water would be insignificant, while the low DO and high salinity levels of ballast water

are also found in the deeper zones in the FHC and the berthing area, where relatively dense saltwater from the Gulf characteristically underlies freshwater from inland sources. The EAP-EA recognizes that the resident species at this location, which are all euryhaline (able to live in waters with a wide range of salinity), are well adapted to natural spatiotemporal variation in salinity and oxygen levels. The EAP-EA concludes that this osmotic adaptability and the ability to move over a short distance to more suitable conditions precludes these species from potentially deleterious impacts associated with ballast water discharges.

While the number of LNG carrier visits to the terminal as a result of the Liquefaction Project would likely be much higher than the eight visits estimated in the EAP-EA, the above-described scientific rationale for preclusion of deleterious impacts is equally valid. Moreover, during both export and re-export of LNG, Freeport LNG would discharge all ballast water under federal oversight and in accordance with federal regulations. With respect to the latter, the EAP-EA states that "Under these requirements, to the maximum extent practicable and as safety considerations allow, vessels must implement strategies to prevent the unintentional introduction and spread of exotic aquatic nuisance species in U.S. waters. These strategies include retaining ballast water on board, minimizing uptake or discharge at certain times or locations, and exchanging ballast water from coastal sources with mid-ocean seawater at least 200 nautical miles from any coast, prior to release at port."

USCG regulations require that all vessels equipped with ballast water tanks which enter or operate in U.S. waters maintain a ballast water management plan that is specific for that vessel and assigns responsibility to the master or appropriate official to understand and execute the ballast water management strategy for that vessel. Under these requirements, vessels must implement strategies to prevent the spread of exotic aquatic nuisance species in U.S. waters. Examples of these strategies include retaining ballast water on board, minimizing discharge or uptake at certain times and locations, and exchanging ballast water with mid-ocean seawater. Vessels that have operated outside of the U.S. Exclusive Economic Zone (EEZ) must either retain their ballast water on board or undergo a mid-ocean (greater than 200 nautical miles from shore/water depth greater than 2,000 meters) Ballast Water Exchange (BWE) in accordance with applicable regulations. Applicable U.S. laws, regulations, and policy documents related to ballast water include the following:

- Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA) that established a broad federal program "to prevent introduction of and to control the spread of introduced aquatic nuisance species…" FWS, USCG, USEPA, USACE, and NOAA all were assigned responsibilities.

- National Invasive Species Act of 1996 (NISA) that reauthorized and amended the NANPCA because "Nonindigenous invasive species have become established throughout the waters of the U.S. and are causing economic and ecological degradation to the affected near shore regions." The Secretary of Transportation was charged with developing national guidelines to prevent import of invasive species from ballast water of commercial vessels, primarily through mid-ocean BWE, unless the exchange threatens the safety or stability of the vessel, its crew, or its passengers.

- National Aquatic Invasive Species Act of 2003 (NAISA), amended in 2005 and again in 2007, established a mandatory National Ballast Water Management Program. The primary requirements established under NAISA are: 1) all ships operating in U.S. waters are required to have on board an Aquatic Invasive Species Management Plan; 2) the USCG was made responsible for the development of standards for mid-ocean BWE and ballast water treatment for vessels operating outside of the EEZ; and 3) implementing the control measures and available technology related to ballast water treatment.

- National Ballast Water Management Program originally established by NANPCA and further amended by NISA 1996 and NAISA 2003 that made the ballast water management program mandatory, including BWE with reporting to the USCG.

- Shipboard Technology Evaluation Program, a program authorized under the USCG Ballast Water Management Program and designed to facilitate the development of "effective ballast water treatment technologies, through experimental systems, thus creating more options for vessel owners seeking alternatives to BWE."

- Navigation and Vessel Inspection Circular 07-04, Change 1, a program developed by the USCG for the management and enforcement of ballast water discharge into U.S. ports and harbors.

- Vessels Carrying Oil, Noxious Liquid Substances. Garbage, Municipal or Commercial Waste, and Ballast Water, implementing regulations for the Act to Prevent of Pollution from Ships of 1980, which applies to all U.S.-flagged ships anywhere in the world and to all foreign-flagged vessels operating in navigable waters of the United States or while at port under U.S. jurisdiction.

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

Vessels can replace foreign ballast water using the following two methods:

- Sequential Exchange Method - the ballasted tank is emptied by pumps until the pumps lose suction and then refilled via gravitation and pumping of mid-ocean water. With this method, 100 percent of ballast water is emptied from the tank before refilling.

- Flow-Through Method - mid-ocean water is pumped into a full tank or hold from below while the existing coastal water is forced out of an opening at the top. The USCG requires that three times the ballast tank capacity must be pumped out using this method.

Correspondence from the NOAA Fisheries during development of the EAP-EA (NOAA Fisheries, 2008a; NOAA Fisheries, 2008b) indicated that the agency had no specific concerns

relating to ballast water discharges. In addition we did not receive any comments from NOAA Fisheries regarding ballast water.

Based on the above-described scientific rationale and adherence to applicable federal regulations, we determined that ballast water discharges for the Liquefaction Project would not present a significant impact on aquatic resources in the region.

Pretreatment Plant Site

Whereas the majority of waterbodies and wetlands within the Liquefaction Project area are within the region's estuarine zone, those adjacent to or within the Pretreatment Plant site are freshwater in nature. Construction of the Velasco Levee, which parallels the eastern border of the site, separated these latter wetland and waterbody features from the estuarine environment to the east, and localized drainage inflows from surface runoff and percolation have evidently promoted a transition to freshwater conditions through time.

Based on map review and field surveys, the waterbody/wetland complex consisting of Horseshoe Lake, the western Velasco Ditch, and two associated drainage channels through palustrine emergent wetlands, are the primary features supporting potential fisheries habitat on or in the vicinity of the Pretreatment Plant site (see figure D-2 in appendix D).

Public fishing access to Horseshoe Lake is available west of the Pretreatment Plant site. According to a local fishing guide website (Hookandbullet.com, 2012), fish commonly caught include bigmouth buffalo (*Ictiobus cypinellus*), bluegill (*Lepomis macrochirus*), blue catfish (*Ictalurus furcatus*), bowfin (*Amia calva*), and bullhead (*Ameiurus* sp.). All these species thrive in shallow backwater lakes and slow moving water channels with dense macrophytic vegetation, high levels of benthic detritus and turbidity, and relatively low DO. These conditions typify Horseshoe Lake, the western Velasco Ditch, and the interconnecting drainage channel. The fish species found in Horseshoe Lake are all warm water forage species found in freshwater conditions and none are considered ecologically sensitive.

Impacts and Mitigation

The waterbody/wetland complex consisting of Horseshoe Lake, the western Velasco Ditch, and two associated drainage channels through palustrine emergent wetlands are the primary features supporting potential fisheries habitat on or in the vicinity of the Pretreatment Plant site (see figure D-2 in appendix D). The small man-made drainage channels that cross the site and drain to the central excavation pit are unlikely to support sustainable fisheries due to their ephemeral nature and the steep drop to the pit below, which would prevent upstream access. Moreover, both the central and northwestern excavation pits are relatively recent features with no hydraulic connection to any downstream waterbody that could constitute a source of aquatic biota and ponded water in each pit has been periodically pumped out to allow excavation.

Construction impacts on fishery resources are most likely to occur where the operational footprint and/or peripheral temporary workspace directly overlap Horseshoe Lake, the western Velasco Ditch, and the two associated drainage channels through wetlands. In this regard, the

southern extremity of the Pretreatment Plant's main operational footprint extends across a small portion of Horseshoe Lake and the interconnecting drainage channel to the western Velasco Ditch, while the other drainage channel that feeds directly into the western Velasco Ditch is crossed by the northeast corner of the footprint. In addition, disturbance would occur in the western Velasco Ditch due to culvert installation for the two short access roads between the Pretreatment Plant and CR 690. While the proposed Pretreatment Plant have been sited where possible to avoid waterbody and wetland impacts, development at the locations described here would be associated with approximately 5.5 acres of temporary impacts and 7.5 acres of permanent impacts in potential freshwater fisheries habitat. This potential freshwater habitat includes 1.3 acres of open water and 11.6 acres of palustrine wetlands adjacent to open water. Of the 1.3 acres of potential open water habitat, 0.7 acre would be temporarily affected while 0.6 acre would be permanently affected. Of the 11.6 acres of potential freshwater wetland fisheries habitat, 4.7 acres would be temporarily affected and 6.9 acres would be permanently affected. Permanent impacts would result from placement of fill, redirection of drainage channel segments, and road culvert installation.

Temporary construction impacts within Horseshoe Lake, the western Velasco Ditch, and the two drainage channels described above would be associated with vegetation clearing and mechanical disturbance of benthic material during excavation and grading at the southern and northern edges of the Pretreatment Plant's operational footprint and, in the case of the western Velasco Ditch, during road culvert installation. Such in-stream activities, together with surface runoff and erosion from adjacent work areas, can temporarily increase sediment suspension and deposition with a resultant increase in turbidity and decrease in soluble oxygen levels. If banks are not stabilized and revegetated properly, soil erosion associated with surface runoff and bank sloughing can result in in-stream sediment deposition after construction is completed.

Physical disruption of vegetation, substrate, and the water column can cause stress, injury, mortality, or migration in benthic organisms and fish. A reduction in foraging success resulting from the loss of benthic species during construction can impact fisheries. Long-term community changes can be associated with vegetation removal, physical or chemical alteration of the substrate, or other permanent habitat modifications.

Increases in water turbidity associated with the generation of suspended sediments may adversely affect biological activity and processes, including photosynthesis, both in the water column and in benthic areas where the suspended sediments resettle. Before sediments resettle, they can be transported from the point of origin by currents, thereby increasing turbidity and sedimentation farther afield.

Although some sedimentation and turbidity would be experienced in Horseshoe Lake, the western Velasco Ditch, and the two associated drainage channels during construction, population-level impacts on fisheries and other aquatic life are expected to be minor, short-term, and localized, based on the expanse of each waterbody and the ready availability of similar habitat beyond the construction sites. These features would allow displaced fish and other fauna to relocate temporarily elsewhere and disturbed vegetation would be reestablished from peripheral stock. As discussed above, those species that make up the existing fish community are known to be tolerant of relatively high turbidity and low DO. Given the sheltered essentially

lentic nature of these waterbodies, sediment transportation by currents is not expected to be significant. Temporary impacts would be limited to the construction period and the reestablishment of vegetation is anticipated within one to two growing seasons. Impacts would be minimized by adherence to Freeport LNG's Procedures and would not be significant.

Pipeline/Utility Line System

The inland waters in the vicinity of the terminal and on most of the proposed Pipeline/Utility Line System are considered part of the Brazos River Estuary which, as previously mentioned, encompasses the ICW and the tidal sections of various rivers, creeks, dredged waterways, wetlands, and associated lentic waterbodies along an approximately 24-mile-long section of coastline 4 miles east to 20 miles west of the FHC.

The proposed Pipeline/Utility Line System is located in the Western Gulf Coastal Plain, which runs along the Texas coastline from the Louisiana border to the southernmost tip of Texas. This ecoregion is characterized by flat plains in which streams are typically sluggish and flow over sand and silt substrates. Turbidity is common and canopy cover is variable (Linam *et al*., 2002).

Bluegill, channel catfish (*Ictalurus punctatus*), green sunfish (*Lepomis cyanellus*), longear sunfish (*Lepomis megalotis*), red shiner (*Cyprinella lutrensis*), and western mosquito fish (*Gambusia affinis*) are common species found in this area. In the Brazos River drainage, other common species include bullhead minnow (*Pimephales vigilax*) and gizzard shad (*Dorosoma cepedianum*). The fish community at this location and further south consists primarily of common species (*e.g.*, Gulf killifish, sailfin molly, saltmarsh topminnow, sheepshead, silver perch (*Bairdiella chrysoura*), southern flounder, spotted seatrout, and striped mullet (*Mugil cephalus*) that are adapted to the higher salinities associated with estuarine conditions.

The crossing locations of the ICW and FHC are in relatively close proximity to the Gulf and are therefore likely to support fish communities that exhibit a combination of estuarine and marine characteristics.

Impacts and Mitigation

Impacts on open water, estuarine wetland, and unvegetated shallow water, all of which provide essential forage and refuge habitat for many coastal fishery species, may result from construction and operation of the proposed Pipeline/Utility Line System. Details regarding locations, characteristics, and potential impacts for waterbodies and wetlands are provided in sections 4.3.2, and 4.3.5, respectively.

In total, the proposed Pipeline/Utility Line System crosses five perennial waterbodies (FHC, ICW, Oyster Creek, and the eastern and western Velasco Levee ditches) and four intermittent waterbodies (two unnamed tributaries to Salt Bayou and two unnamed drainage channels). Additionally, the route also crosses several large estuarine wetland complexes and smaller palustrine wetlands. The route for the overhead electric line at the Pretreatment Plant crosses one perennial waterbody (Horseshoe Lake). The intermittent waterbodies are isolated from tidal flow and only provide potential fisheries habitat when flooded during wet times of the year, whereas the perennial waterbodies are tidally influenced and provide habitat for fisheries year-

round. Waterbody and wetland crossing locations are identified in figure D-3 (a-h) in appendix D.

Pipeline construction across waterbodies can result in similar environmental impacts on those discussed in the previous section for the Pretreatment Plant site. Impacts on fisheries and benthic invertebrates during underground pipeline construction would be limited primarily to the period of active construction and would be dependent on construction season, construction duration, and crossing methods within wetlands and waterbodies.

Increased sedimentation and turbidity resulting from construction of the pipeline would have the greatest potential to adversely affect fishery resources. Sedimentation can bury fish eggs, while turbidity affects juvenile and adult fish by reducing oxygen uptake by the gills. Because most of the fish species spawn offshore, increased sedimentation from pipeline construction should not affect nesting sites where eggs and young fry concentrate. Studies have indicated that in-stream turbidity levels increase during construction, but decrease rapidly after construction activities are completed (Vinkour and Shubert, 1987; Blais and Simpson, 1997).

Increases in water turbidity caused by the generation of suspended sediments through trench excavation and lateral placement of spoil may also adversely affect biological activity and processes, including photosynthesis, both in the water column and in benthic areas where the suspended sediments resettle. Before sediments resettle, they can be transported from the point of origin by currents, thereby increasing turbidity and sedimentation farther afield. Freeport LNG would follow the Freeport LNG's Procedures to minimize migration of sediments from the construction areas. In addition, trench spoils would be stored on or above the stream banks at least 10 feet from the water's edge and would have silt fence, hay bales, or other erosion control devices installed to minimize the potential for sediment-laden water to enter the stream. All staging and ATWS areas would be located at least 50 feet back from the water's edge where topographic conditions permit (unless otherwise permitted) with the exception of the ATWS identified in table 2.4.1-1. These setback distances minimize the potential for erosion and sedimentation along the stream banks.

In addition, trench excavation and the lateral placement of spoil can directly affect the benthic community in the immediate vicinity through physical disruption of the existing substrate and consequent stress, injury, mortality, or migration. Impacts on fisheries can be associated with a reduction in foraging success resulting from the loss of benthic species during construction. Indirect impacts can include long-term habitat modification and consequent community changes through physical or chemical alteration of the substrate.

Impacts on surface water quality can result from alteration of the stream banks and removal of riparian vegetation required at open-cut stream crossings. Stream bank and shoreline vegetation and undercut banks provide important cover for fish. Thus, fish that normally reside in these areas would be temporarily displaced. In addition, if stream banks are not stabilized and revegetated properly, soil erosion associated with surface runoff and bank sloughing can result in in-stream sediment deposition after construction is completed. However, these effects would be relatively minor because of the small area affected at each stream. The 50-foot setback for extra workspace areas required by the Freeport LNG's Procedures would reduce the loss of riparian

vegetation and provide a vegetated buffer between the workspace and the waterbody. In addition, Freeport LNG's Procedures limit vegetation maintenance on stream banks and allow for long-term revegetation of all shoreline areas within 25 feet of the normal high water mark with native herbaceous and woody plant species, except for a 10-foot-wide corridor over the pipelines that may be maintained in an herbaceous state.

Underground crossings of the FHC, the ICW, Oyster Creek, the eastern Velasco Ditch, and the western Velasco Ditch would be accomplished by the HDD method, which would cause no disturbance to substrate or shoreline vegetation as no excavation activities would take place within or along the banks of the waterbodies. Based on limited in-water construction activity with the HDD method and previous consultations with the NOAA Fisheries for the Phase I and Phase II Projects, Freeport LNG does not expect fishery resources would be adversely modified during construction or operation of the lines beneath the FHC, the ICW, and Oyster Creek.[17]

The HDD method would also be utilized to cross an approximately 0.9-mile-long section of estuarine wetland (*e.g.*, inundated and capable of containing fisheries habitat) along the pipeline route. Though impacts on a majority of the wetland area would be completely avoided with this method, temporary work spaces would be required within wetland areas to perform the drilling activities. These temporary work spaces would result in the temporary loss of fisheries habitat through wetland fill activities. Following construction, temporarily disturbed wetlands would be restored and allowed to revegetate in accordance with Freeport LNG's Procedures. These describe measures for reestablishing wetland species and for subsequent revegetation monitoring to ensure that all disturbed areas are successfully restored.

The open-cut wet trench method would be used to cross the two intermittent tributaries to Salt Bayou and the two unnamed drainage channels, whereas the push-pull method would be used to lay the pipelines and utility lines along approximately 8,507 feet of the eastern Velasco Ditch between MP 3.74(A) and MP 5.34(A). ATWS areas would be required at these crossing locations.

Prior to trenching in the eastern Velasco Ditch, one end of the water channel would be closed with a soil berm (at CR 891) and existing culverts at the other end (at Galleywax Way) would be boarded up, as was successfully done during installation of the 42-inch-diameter sendout pipeline. The trench would be excavated in the channel bed with a barge-mounted backhoe working mid-stream. Spoil from the trench would be placed in the channel adjacent to the excavated trench. Pipe joints would be welded on shore and as the pipelines are fabricated into continuous floating strings, they would be pushed or pulled through the channel, weighted as necessary, and lowered into the trench.

Although in-stream construction activities are required for the two tributaries to Salt Bayou, the two unnamed drainage channels, and the eastern Velasco Ditch, they would have only minor, temporary impacts on any local aquatic resources. As previously discussed, some related effects (*e.g.*, increased sedimentation, increased turbidity, and streambank disturbance) could have short-term, localized impacts on any fishery resources present at the time of construction. These

[17] The western Velasco Ditch is not designated as EFH.

impacts would be mitigated by adherence to Freeport LNG's Procedures, which require most in-stream work to be completed within 24 hours and stream bank stabilization to be completed within 24 hours of in-stream construction. Suspended sediment concentrations and turbidity would be expected to return to preconstruction levels soon after construction in each waterway is completed.

Overall, construction of the Pipeline/Utility Line System would result in approximately 20.8 acres of temporary in-stream impacts, associated with the eastern Velasco Ditch, the two tributaries to Salt Bayou, and the two unnamed drainage channels, as described above. In addition, this acreage includes minor temporary impacts on an unnamed pond that is within the HDD pull-back ATWS for the lateral pipelines associated with the Pretreatment Plant. Although some sedimentation and turbidity would be associated with construction disturbance in these waterbodies, population-level impacts on fisheries and other aquatic life are expected to be minor, short-term, and localized. Given the inshore, sheltered nature of the area, sediment transportation by tidal or non-tidal currents is not expected to be significant. Temporary impacts would be limited to the construction period and vegetation is anticipated to reestablish within one to two growing seasons. Thus impacts from the Pipeline/Utility Line System would only result in temporary impacts and would not be significant.

Accidental Spills or Leaks of Hazardous Materials

Fisheries present in the vicinity of the Terminal, Pretreatment Plant, and Pipeline/Utility Line System could be adversely affected by a spill, leak, or other release of hazardous materials during construction activities. Freeport LNG would minimize potential impacts associated with spills or leaks of hazardous materials during construction by implementing the spill prevention and response procedures in its existing SPCC Plan, with any Project-specific changes made as necessary. The SPCC Plan addresses personnel training, secondary containment design, hazardous substance storage and disposal procedures, refueling areas, spill response procedures, mitigation measures, and other measures designed to reduce or eliminate potential adverse impacts on water resources.

4.5.4.2 Summary of Impacts

Potential fishery resources and habitat impacts that could occur during construction of the Liquefaction Plant would include those associated with installation of a new aggregate barge dock, installation of a new construction dock, and installation of a new firewater intake structure. Impacts on freshwater fishery resources associated with the Pretreatment Plant include 1.3 acres of open water and 11.6 acres of palustrine wetlands adjacent to open water. Overall, construction of the Pipeline/Utility Line System would result in approximately 20.8 acres of temporary in-stream impacts. Although some sedimentation and turbidity would be associated with construction disturbance in these waterbodies, population-level impacts on fisheries and other aquatic life are expected to be minor, short-term, and localized. Impacts would be minimized through adherence to Freeport LNG's Procedure and the use of the HDD method to cross the FHC, the ICW, Oyster Creek, the eastern Velasco Ditch, and the western Velasco Ditch.

4.5.4.3 Phase II Modification Project

The existing aquatic resources at the Phase II Modification Project area, including environmental conditions and fishery types and profiles, are similar to those discussed in section 4.5.4 for the Liquefaction Project at the Quintana Island terminal site.

Impacts and Mitigation

The following activities associated with construction and operation of the Phase II Modification Project at the Quintana Island terminal site may result in impacts on fisheries: dredging of the berthing area, construction of the Phase II dock, and an accidental spill or leak of hazardous materials. Potential impacts on fisheries resources due to these activities are discussed in the sections below and are similar to those discussed for the Liquefaction Project at the Quintana Island terminal site in the previous section.

Dredging of the Berthing Area

Dredging for the Phase II dock and associated berthing area would involve the removal of approximately 1,188,000 yd^3 of material to be placed in an approved DMPA. Impacts on fisheries from dredging and dredge material placement are expected to have some minimal and short-term impacts on local fishery resources. Fine particulates would be temporarily resuspended throughout the immediate area as a result of the dredging process, which can interfere with respiration and feeding or could result in lowered oxygen levels through increases in chemical oxygen demand. Fish in the immediate vicinity of dredging activities would be expected to relocate temporarily until dredging operations have ceased. The effects of resuspension, including increased turbidity, would be limited to the period during and immediately following dredging.

Dredging activities would be conducted in accordance with both federal and state agency requirements to minimize impacts on fisheries. Freeport LNG has developed a Dredging Plan that outline details of dredging methods proposed and measures to control turbidity (see section 4.3.2).

Construction of the Phase II Dock

Construction of the Phase II dock could potentially displace individuals within the affected area and/or result in direct mortality of less mobile individuals. During construction activities, mobile species (*e.g.*, fish) would be expected to leave the vicinity. Animals displaced by construction activities are expected to relocate into similar habitats nearby. The influx and increased density of animals in some undisturbed areas caused by these dislocations could increase inter- and intra-species competition and reduce the reproductive success of animals that are not displaced by construction. However, these impacts are expected to be temporary, minor, and inconspicuous at the population level. In addition, construction of the Phase II dock would provide additional hard substrate areas on the submerged structures that would allow for the growth of attached organisms and create a three-dimensional structure which is used by some species as refuge. Freeport LNG has initiated introductory communication with the NOAA (NRG, 2011a-b) and would continue to consult with the agency as necessary during Project development.

Accidental Spills or Leaks of Hazardous Materials

Fisheries present in the vicinity of the terminal could be adversely affected by a spill, leak, or other release of hazardous materials during construction activities. Freeport LNG would minimize potential impacts associated with spills or leaks of hazardous materials during construction by implementing the spill prevention and response procedures in its existing SPCC Plan, with any Project-specific changes made as necessary.

4.5.5 Essential Fish Habitat

The MSA (Public Law 94-265 as amended through October 11, 1996) was established with several goals in mind, one of which was to promote the protection of EFH 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 in the MSA as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

Federal agencies that authorize, fund, or undertake activities that may adversely impact EFH must consult with the NOAA Fisheries. Although absolute criteria have not been established for conducting EFH consultations, NOAA Fisheries recommends consolidated EFH consultations with interagency coordination procedures required by other statutes, such as the NEPA and 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 or RHA permit).

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: 1) a description of the proposed action; 2) an analysis of the effects (including cumulative effects) of the proposed action on EFH, the managed fish species, and major prey species; 3) the federal agency's views regarding the effects of the action on EFH; and 4) proposed mitigation, if applicable.

3. **EFH Conservation Recommendations** – After reviewing the EFH Assessment, the NOAA Fisheries would provide 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 the NOAA Fisheries within 30 days of receiving NOAA Fisheries recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH.

4.5.5.1 Liquefaction Project

Between 1979 and 1987, the GMFMC prepared FMPs for seven marine groups within the Gulf: reef fish, migratory pelagic fish, red drum, shrimp, spiny lobster (*Panulirus argus*), stone crab (*Menippe adina* and *Menippe mercenaria*), and corals. Each FMP has been amended at least several times since then. One important amendment that applied to all seven FMPs occurred in 1998 and involved the identification of EFH for each group. All estuarine systems of the Gulf, including the Brazos River Estuary, are considered EFH, which is managed by the GMFMC (GMFMC, 2010).

The GMFMC (2005) designated the Brazos River Estuary as EFH for several groups of shellfish and finfish, namely red drum, reef fish and coastal migratory pelagics, shrimp, and stone crab. However, the FMP for the stone crab was repealed effective October 24, 2011 and the corresponding EFH designation no longer applies (Federal Register, 2011). The Brazos River Estuary includes those portions of the FHC, ICW, Oyster Creek, unvegetated shallow water estuarine areas, and estuarine wetlands crossed by the proposed Pipeline/Utility Line System. It does not include waterbodies on or adjoining the Pretreatment Plant site, which, as described in section 4.5.4, are freshwater in nature and by virtue of the Velasco Levee, are beyond the estuarine influences further east.

The current EFH designations described above are based in part on the previously referenced mapping developed in 1998 by the NOAA/NOS and the GMFMC, as currently accessible through CCMA. For the Brazos River Estuary, this mapping shows the presence of two species of shrimp (brown shrimp and pink shrimp [*Farfantepenaeus duorarum*]), one species in the reef fish/coastal migratory pelagics group (Spanish mackerel [*Scomberomorus maculatus*]), and red drum.

For each of the four species identified above for the Brazos River Estuary, the 1998 mapping provides relative abundance estimates by life stage (juvenile/adult) and season. According to the mapping, brown shrimp juveniles are abundant throughout the year, whereas adults are listed as not present; pink shrimp juveniles are common throughout the year, whereas adults are listed as not present; Spanish mackerel juveniles are listed as not present in winter (December to February) and rare throughout the remainder of the year, whereas adults are listed as common throughout the year; and red drum juveniles are listed as common throughout the year, whereas no data exist for adults.

Five EFH categories are considered important for various life stages of the above-listed species: mud substrates, shell reefs, estuarine water column, estuarine emergent wetlands, and SAV. All EFH categories, with the exception of shell reefs, are available within the Brazos River Estuary system, although SAV may be relatively sparsely represented. EFH used by each of the species are indicated in table 4.5.5-1 and life history descriptions are provided in the paragraphs that follow.

Table 4.5.5-1

Summary of Essential Fish Habitat Categories Potentially used by Specific Life Stages of Federally Managed Fish Species in the Liquefaction Project and Phase II Modification Project Areas

Species/Life Stage	Mud-Substrates	Shell Reefs	Estuarine Water Column	Estuarine Emergent Wetlands	Submerged Aquatic Vegetation
Brown Shrimp					
Postlarval	X	-	X	X	X
Juvenile	X	-	X	X	X
Subadult	X	-	X	X	-
Pink Shrimp					
Postlarval	X	X	X	X	X
Juvenile	X	X	X	X	X
Subadult	X	X	X	-	X
Red Drum					
Postlarval	X	-	X	X	X
Juvenile	X	-	X	X	X
Subadult	X	X	X	-	-
Adult	X	X	X	-	-
Spanish Mackerel					
Postlarval	X	-	X	X	X
Juvenile	X	-	X	X	X
Subadult	X	-	X	X	X
Adult	X	-	X	X	X

Source: GMFMC, 2010

Brown Shrimp

Brown shrimp spawn offshore in the spring and fall. Larvae tend to remain in deeper water but post-larval brown shrimp migrate to shallow vegetated estuarine habitats, reaching their destination between February and April (with another minor peak in the fall). Late post-larval and juvenile brown shrimp are most numerous in estuarine habitats in the spring and early summer, but typically are present through the fall. They prefer marsh edges and areas of submerged vegetation, habitat types that are both found in the area (GMFMC, 1981).

Pink Shrimp

Pink shrimp spawn offshore year round, with more intense spawning in the spring and fall. Larvae tend to remain in deeper water but post-larval pink shrimp migrate to shallow vegetated estuarine habitats, reaching their destination between May and December. Late post-larval and juvenile pink shrimp are most numerous in the bays and estuaries. They prefer marsh edges and areas of submerged vegetation, habitat types that are both found in the area (GMFMC, 1981).

Red Drum

Red drum is common in Gulf estuaries and can be found over various substrates including sand, mud, and oyster reefs. It can inhabit waterbodies with salinities ranging from freshwater to

highly saline. The red drum spawns in deep water habitats and eggs hatch in the Gulf, usually in late summer and early fall. Larvae are subsequently transported into estuarine waterbodies where the fish mature before returning to the deeper waters of the Gulf. Larvae are most common in estuarine waters between mid-August and late November (Pattillo *et al.*, 1997). Larval, post-larval, and juvenile stages prefer marshy nursery areas that are protected from currents, have muddy substrates, and support both submergent and emergent vegetation. These conditions are offered by the emergent marsh and open water habitat within the area. Larval and post larval red drum feed primarily on copepods, whereas juveniles feed on a wider variety of macroinvertebrates. Adult red drum tend to spend more time in deeper offshore waters as they age (Pattillo *et al.*, 1997).

Spanish Mackerel

Spanish mackerel is a fast-moving surface-feeding fish that forms immense schools of similar sized individuals. Adults frequent tidal estuaries, bays, and lagoons. Spawning occurs repeatedly during a prolonged spawning season from about April until September. The prolonged period of spawning allows for a wider distribution of larvae, with the greatest larval abundance of Spanish mackerel in the eastern Gulf. Spanish mackerel spawn close to shore and in shallow waters; larvae have been found in nearshore shallow water environments of the Gulf from Florida to south Texas (GMFMC and South Atlantic Management Fishery Council [SAFMC], 1983). Juveniles are found in the beach surf zone, occasionally in estuaries among clean sand substrates, and offshore, and prefer marine salinity and generally are not considered estuarine dependent.

Impacts and Mitigation

NOAA Fisheries consultation relating to aquatic resources, including EFH, was completed on January 13, 2004 (NOAA Fisheries, 2004) for the Phase I Project and on November 15, 2006 (FERC, 2006) for the Phase II Project. Species and habitat impacts reviewed by the NOAA Fisheries for both projects included those associated with LNG vessel dock construction, dredging within the berthing area, and construction dock operation during site development. NOAA Fisheries previously concluded that, with the implementation of appropriate and previously defined mitigation measures, the dredging involved in both the Phase I and Phase II Projects would have no adverse effects on the aquatic resources in question (see discussion of mitigation further below in this section). We forwarded the draft EIS to NOAA Fisheries as our EFH assessment for the Projects and we received no comments to date.

Offshore construction at the Quintana Island terminal site could result in impacts including resuspension of sediments and interruption of invertebrate and fish movement. Suspended particles would temporarily increase turbidity and decrease oxygen levels, and have the potential to physically clog breathing and feeding organs and smother immobile fish eggs and larvae and benthic invertebrates. However, these impacts would be limited to the period during and immediately following construction. Furthermore, the conversion of approximately 6.5 acres of land into water bottom through the dredging required for LNG ship dock would add a small amount of habitat for the use of local fish and macroinvertebrate populations. The new dock would also create a hard substrate for the growth of attached organisms and a three-dimensional

structure to be used by some species as refuge. In addition, no wetlands at the Quintana Island terminal site, considered part of the EFH designated for the Brazos River Estuary, would be affected by construction of the Liquefaction Plant except minor impacts due to dredging turbidity. Given the above information, this work is not expected to have a significant impact on EFH.

As described in section 4.5.4, waterbodies and wetlands on and adjoining the Pretreatment Plant site are freshwater in nature and by virtue of the Velasco Levee, are beyond the estuarine influences further east. Therefore, EFH designated in the Brazos River estuary does not include these areas, and any waterbody or wetland impacts caused by construction and operation of the Pretreatment Plant would not affect EFH.

Construction and restoration activities associated with the pipeline portion of the Liquefaction Project would not have any adverse impacts on EFH, since underground crossings of the FHC, the ICW, Oyster Creek, the eastern Velasco Ditch, and the western Velasco Ditch would be accomplished by the HDD method. HDD would cause no disturbance to substrate or shoreline vegetation as no excavation activities would take place within or along the banks of the waterbodies. In addition, other stream crossing areas trenched for pipeline construction through the open-cut wet trench and push-pull methods would be restored. In-stream trenching could result in increased turbidity and decreased oxygen levels, in addition to sediment deposition caused by soil erosion and bank sloughing upon alteration of stream banks and removal of riparian vegetation. Sedimentation could directly interfere with biotas ability to breathe and feed, and could bury immobile fish eggs, while turbidity could reduce oxygen uptake by the gills of juvenile and adult fish. Juvenile and adult fish are unlikely to be affected, however, as they have the ability and behavioral tendency to avoid disturbance. In addition, these impacts are expected to only occur during and immediately following construction. Therefore, based on limited in-water construction activity and previous consultations with the NOAA Fisheries for the Phase I and Phase II Projects, as discussed above, we do not expect that any designated EFH would be adversely modified during construction or operation of the Pipeline/Utility Line System beneath the FHC, the ICW, Oyster Creek, and the eastern Velasco Ditch.[18]

As described in section 4.3.5.1, wetland impacts would occur only on a temporary basis as a result of construction and operation of the Pipeline/Utility Line System. In addition, an approximately 0.9-mile long section of estuarine wetland along the pipeline route would be avoided using the HDD method. Table 4.3.5-3 reveals that no wetland impacts along the pipeline route, within EFH, are categorized as permanent. Impacts on wetland and stream resources would include temporary loss of vegetation, increased turbidity and suspended solids, temporary blockage of access to these areas by the placement of spoil, and some potential mortality of EFH species. However, these effects would only occur for a six to eight month duration as post-construction right-of-way maintenance would be in accordance with Freeport LNG's Procedures and once restored, the pipeline right-of-way should offer comparable EFH to pre-existing conditions.

[18] The western Velasco Ditch is not designated as EFH.

Consultation with NOAA Fisheries for the Phase I and Phase II Projects did not indicate that seasonal construction windows would be necessary for these projects. NOAA Fisheries also concluded that construction activities within the ICW and the FHC would not have a significant impact on marine resources. NOAA Fisheries' primary concern was the potential impacts on marine resources located in the shallow estuarine marshes traversed by the pipeline. Freeport LNG considered these concerns regarding potential impacts on EFH associated with the Phase I and Phase II Projects when developing the Liquefaction Project and Phase II Modification Project. As such, the Liquefaction Project avoids potential impacts on marine resources located in estuarine marshes through route selection and implementation of specialized construction techniques (*i.e.,* HDD). We find that these avoidance measures would assist in achieving successful restoration of wetlands and minimize impacts on EFH.

Conclusions of the Essential Fish Habitat Assessment

After a review of the four species with designated EFH in the Brazos River Estuary, one or more life stages of these species may be affected by construction activities associated with the Liquefaction Project and Phase II Modification Project. Because construction would not cause a net loss of benthic habitat that may serve as EFH for one or more life stages of the four EFH species, no permanent impacts on habitat are expected from either of the Projects. The primary impacts on EFH would be short-term and would affect the least mobile, most vulnerable life stages of species. These impacts include short-term stressors such as physical habitat disturbances and highly localized exposures to degraded surface water quality caused by increases in turbidity from silt-producing activities. Juvenile and adult finfish are less likely to be harmed by these impacts due to their mobility and behavioral tendency to move away from active work areas and areas with degraded water quality. Finally, temporary reductions in the abundance of benthic macroinvertebrate prey that may support local populations of bottom-feeding species would be minor and ecologically insignificant.

Project design and construction methods have incorporated items that should serve to minimize impacts on these species. Pro-active habitat restoration measures have been incorporated in Freeport LNG's Procedures and *Wetland Restoration and Monitoring Plan* to reduce the potential for long-term impacts. In addition, the area that would be affected is small relative to the available habitat in the area. Since the EFH areas of concern indicated by NOAA Fisheries during consultation for the Phase I and Phase II Projects were along the pipeline route in estuarine wetlands and streams, adherence to Freeport LNG's Procedures and *Wetland Restoration and Monitoring Plan* would help to minimize impacts on the tidal EFH caused by the Pipeline/Utility Line System portion of the Liquefaction Project.

While permanent impacts on EFH are not anticipated, we find that they would be adequately compensated for should they occur, and the minor and temporary impacts on EFH from construction of the Liquefaction Project would not have a substantial adverse effect on the four EFH species.

4.5.5.2 Phase II Modification Project

The impacts associated with construction of the Phase II Modification Project are similar to those described for construction of the Liquefaction Project at the Quintana Island terminal site. Based on limited in-water construction activity and consultations with NOAA Fisheries described above, no designated EFH would be adversely modified during construction or operation of the Phase II Modification Project.

4.6 THREATENED, ENDANGERED, AND OTHER SPECIAL STATUS SPECIES

Federal agencies are required by Section 7 of the ESA (Title 19 U.S.C. Part 1536[c]), as amended (1978, 1979, and 1982), to ensure that any actions authorized, funded, or carried out by the agency do not jeopardize the continued existence of a federally-listed threatened/endangered species, or result in the destruction or adverse modification of designated critical habitat of a federally-listed species. The FWS, which is responsible for terrestrial and freshwater species, and NOAA Fisheries, which is responsible for marine species, jointly administer the ESA. Additionally, FWS oversees implementation of the Bald and Golden Eagle Protection Act and NOAA Fisheries oversees the implementation of the MMPA. The action agency (*e.g.*, the FERC) is required to consult with the FWS and/or the NOAA Fisheries to determine whether federally-listed threatened/endangered species or designated critical habitat are found in the vicinity, and to determine the proposed action's potential effects on those species or critical habitats.

For actions with the potential to affect listed species or designated critical habitat, the federal agency must submit its BA to the FWS and/or NOAA Fisheries and, if it is determined that the action may adversely affect a listed species, the federal agency must submit a request for formal consultation to comply with Section 7 of the ESA. In response, the FWS and/or NOAA Fisheries would issue a Biological Opinion (BO) as to whether or not the federal action would likely jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of designated critical habitat.

As required by Section 7 of the ESA, we request that FWS and NOAA Fisheries accept the information provided in this final EIS as the BA for these Projects. Furthermore, based on our findings as described in this section, we also request the initiation of formal consultation for the Projects. The Projects may affect but would not likely adversely affect two bird species under FWS jurisdiction; two reptile species under the joint jurisdiction of FWS and NOAA Fisheries; and two marine mammals under NOAA Fisheries jurisdiction. Therefore, we request that FWS and NOAA Fisheries concur with our findings.

This review also includes Species of Concern, which are those species that federal agencies have concerns regarding status and threats, but where insufficient information is available to indicate a need to list the species under the ESA. Therefore, we are describing the potential impact on these species, but not making a formal determination of effect for Species of Concern.

4.6.1 Liquefaction Project

4.6.1.1 Federally-listed Threatened and Endangered Species

To obtain current information on federally-listed threatened/endangered species with potential to occur in the Liquefaction Project area, publicly available regional information on species and suitable habitat within or near the Liquefaction Project Sites were accessed along with relevant agency correspondence (NOAA Fisheries, 2011a and FWS, 2012a and 2012b). Table 4.6.1-1 summarizes potential impacts of the Liquefaction Project on federally-listed threatened/endangered species listed in Brazoria County, areas directly offshore, and in the Gulf of Mexico.

Table 4.6.1-1

Potential Impacts of the Liquefaction Project on Federally-listed Species and Species of Concern

Common Name	Scientific Name	Listing Status a/	Suitable Habitat within or near Project Site	Critical Habitat	Effect of Proposed Project b/
BIRDS					
Piping plover	*Charadrius melodious*	FT	Yes	0.5 miles to south	NLAA
Whooping crane	*Grus americana*	FE	Yes	100 miles to south	NLAA
REPTILES c/					
Green sea turtle	*Chelonian mynas*	FT	No	-	NE
Hawksbill sea turtle	*Eretmochelys imbricata*	FE	No	-	NE
Kemp's Ridley sea turtle	*Lepidochelys kempii*	FE	Yes	-	NLAA
Leatherback sea turtle	*Dermochelys coriacea*	FE	No	-	NE
loggerhead sea turtle	*Caretta*	FT	Yes	-	NLAA
MARINE MAMMALS					
Blue whale	*Balaenoptera musculus*	FE	Yes		NLAA
Fin (finback) whale	*Balaenoptera physalus*	FE	No		NE
Humpback whale	*Megaptera novaeangliae*	FE	Yes		NLAA
Sei whale	*Balaenoptera borealis*	FE	No		NE
Sperm whale	*Physeter macrocephalus*	FE	No		NE
FISHES					
Alabama shad	*Alosa alabamae*	SOC	No		
Dusky shark	*Carcharinus obscurus*	SOC	Yes		
Key silverside	*Mendia conchorum*	SOC	No		
Nassau Grouper	*Epinephelus striatus*	SOC	No		
Sand tiger shark	*Carcharias taurus*	SOC	Yes		
Speckled hind	*Epinephelus drummondhayi*	SOC	No		
Warsaw grouper	*Epinephelus nigritus*	SOC	No		
INVERTEBRATES					
Ivory tree coral	*Oculina varicosa*	SOC	No		

a/ Listing Key: FE: Federal Endangered; FT: Federal Threatened; SOC: Species of Concern (FWS, 2013a)
b/ Impact Key: NLAA = Not likely to adversely affect, NE = No effect
c/ Jointly protected by FWS and NOAA Fisheries.

For species that did not have suitable habitat within or near the Liquefaction Project site, a "no effect" determination was made. For species that had suitable habitat within or near the site, the effects determination was based on proximity of suitable habitat to the Liquefaction Project, species mobility, and species sensitivity to construction and operational impacts. "Near" was defined as one-mile from the Liquefaction Project site.

Of the FWS jurisdictional federally-listed species in Brazoria County, two bird species (piping plover [*Charadrius melodus*] and whooping crane [*Grus americana*]) and two marine reptiles (Kemp's Ridley sea turtle [*Lepidochelys kempii*] and loggerhead [*Caretta caretta*]) have suitable habitat within or near the Liquefaction Project site. Nesting activities conducted by sea turtles on land are under the jurisdiction of the FWS, while in water they are under the jurisdiction of the NOAA Fisheries. The Kemp's Ridley and loggerhead sea turtles have been known to nest in the vicinity of the Liquefaction Project (National Park Service [NPS], 2012).

Of the NOAA Fisheries jurisdictional federally-listed species in the Gulf of Mexico, two marine mammal species (blue whale [*Balaenoptera borealis*] and humpback whale [*Megaptera novaeangliae*]) have suitable habitat near the Liquefaction Project site (*e.g.*, within the general area frequented by LNG vessels navigating to and from the Quintana Island terminal). Of the eight potential Species of Concern recognized by NOAA Fisheries that may occur in the Gulf of Mexico, two fish species (dusky shark [*Carcharinus obscurus*] and sand tiger shark [*Carcharias taurus*]) have suitable habitat near the site (*e.g.*, within the general area frequented by LNG vessels navigating to and from the Quintana Island terminal).

The following provides further supporting documentation about the species with suitable habitat within or near the area, their characteristics, suitability of habitat at or near the site, potential for impacts, mitigation, and our effects determination.

Piping plover

Piping plovers nest along sandy beaches, gravel shorelines, and on river sandbars and alkali wetlands. They prefer to nest in sparsely vegetated areas that are slightly raised in elevation (like a beach berm). Piping plover breeding territories generally include a feeding area, such as a dune pond or slough, or near the lakeshore or ocean edge. This species does not breed in Texas. These birds are primarily coastal inhabitants of Texas only during the winter, preferring areas with expansive sand or mudflats (feeding) in close proximity to a sandy beach (for roosting). Primary threats to the piping plover are habitat modification and destruction, and human disturbance to nesting adults and flightless chicks (TPWD, 2013a).

Piping plovers migrate and overwinter along the Texas Gulf Coast, and thus, have the potential to rest and forage near the Liquefaction Plant area. The high mobility of the species suggests that they would look elsewhere to forage and roost if disturbed by sight, noise, or sound of the construction or operation. The species can be injured by striking man-made objects, particularly at night or during inclement weather, and the Liquefaction Project structures would create additional obstacles. To address this concern, Freeport LNG conducted a four-year bird strike study at the Quintana Island terminal, which occurred during both construction and operation of

the Phase I terminal facilities, focusing on the two LNG storage tanks, air tower, LNG dock unloading arms, and installed power lines. The study did not detect injuries or mortalities to this species and only found seven bird strikes due to the facility and appurtenant structures. In addition, Freeport LNG's FLDP helps to reduce the potential for bird strike hazards. As the piping plover is high mobile and wide ranging, and given the mitigation discussed above, the construction or operation of the Liquefaction Project *may affect, but is not likely to adversely affect* the piping plover.

The piping plover has FWS designated critical habitat ("Unit") approximately 0.5 miles from the Liquefaction Plant's construction footprint at the terminal site (further from appurtenant facilities) on Bryan Beach. The terrain between the Bryan Beach Unit and the Liquefaction Project facilities consists of vegetated land, residential land, open water, and roadways; thus, it does not offer suitable habitat and thus connectivity, for overwintering piping plovers (TPWD, 2013a; FWS, 2011; and FWS, 2012c). This separation area would also act as a buffer helping to prevent significant lighting impacts from the facility on this beach area. Based on the 0.5-mile separation, and the make-up of the land and the resulting lack of biological connectivity between the Gulf beach and the Liquefaction Project facilities, construction and operation of the Liquefaction Project would have *no effect on designated critical habitat* for the piping plover.

Whooping crane

Whooping cranes are the tallest bird in North America, reaching up to five feet in height. Their breeding grounds are in northern Canada, and they winter from October through May in the Aransas NWR northeast of Rockport, Texas (100 miles southwest of the Liquefaction Project area), as well as at Matagorda and St. Joseph's Islands in Aransas, Calhoun, and Matagorda Counties (FWS, 2013b; TPWD, 2013b).

This species could be an incidental visitor to the Liquefaction Project area during migration, as Brazoria County is located within the central whooping crane migration flyaway. Within the area there are marshes in which the whooping cranes could forage. During migration, species can be injured by striking man-made objects, particularly at night or during inclement weather. The Liquefaction Project structures would therefore create additional obstacles for the whooping crane. To address this concern, Freeport LNG conducted a four-year bird strike study (see above) which did not detect injuries or mortalities to this species. In addition, Freeport LNG's FLDP would help to reduce the potential for bird strike hazards. With the mitigation noted above, and the fact that whooping cranes are highly mobile and have the behavioral tendency to avoid areas of man-made disturbance, construction or operation of the Liquefaction Project *may affect, but is not likely to adversely affect* whooping cranes.

Critical habitat has been designated for the whooping crane on the coast, 100 miles south of the area in the Aransas NWR. Based on this separation, construction and operation of the Project would have *no effect on designated critical habitat* for the whooping crane.

Loggerhead sea turtle

Loggerhead sea turtles are distributed around the world and found on continental shelf, bays, estuaries, and lagoons in tropical to temperate waters. Mating takes place in late March to early June, and eggs are laid throughout the summer. Nesting sites are found on the U.S. Atlantic and Gulf Coasts. Hatchlings move towards the coastal waters and out to sea and reach maturity at 16 to 40 years (NOAA Fisheries, 2013d). It is assumed that hatchlings live out their "lost years" in rafts of sargassum and/or debris in open ocean drift lines. Hatchlings eat animals found in these seagrass mats along driftlines and eddies where they remain until large enough to migrate to the shallower coastal waters, which become their foraging habitat. Juveniles and adults prey on conch, clams, crabs, shrimp sponges, squid, and fish.

One loggerhead sea turtle nest was found on Quintana Beach (*e.g.*, on the Gulf side of Quintana Island), about 0.3 miles, at its closest point, from the Liquefaction Plant) in 2012 (NPS, 2012). As the loggerhead sea turtle is known to occur and nest within the general vicinity of the Liquefaction Plant, there is potential for it to occur near the terminal site in search of nesting habitat. However, suitable nesting habitat for this species is not available in the immediate vicinity of the Liquefaction Plant.

If a nesting attempt were to be made, it would most likely occur on the Gulf side of Quintana Island, about 0.3 mile at its closest point from the Liquefaction Plant. With respect to the potential for noise and lighting impacts, this is considered in general minor in comparison to other more serious threats including commercial fisheries and by-catch (NOAA Fisheries, 2011c). Mitigation to minimize potential impacts from noise and light to nesting areas 0.3 miles from the facility would include the facility berm itself, which in addition to its flood control purpose, would minimize potential for light and noise impacts from the facility to affect marine turtles on Quintana Beach. Additionally, Freeport LNG's FLDP would minimize light impacts on the facility site and sea turtle habitat. Regarding noise, Quintana Beach is already exposed to varying manmade noise sources via vehicle traffic at the beach, and background noise levels associated with operation of the import facility and shipping in the ICW.

Other potential impacts on this species could come from vessel strikes. However, the Project does not represent a change in number of LNG ships from that proposed in the previous EIS for the Freeport LNG Import Facility (CP03-75-000) and thus we do not anticipate further risk specific to vessel strikes to threatened/endangered species under the Liquefaction Project.

A final source of impacts could come from an oil spill associated with the Liquefaction Project. Freeport LNG's SPCC plan would provide measures to reduce the potential for any contaminants entering the waters in the vicinity of the Project in the event of an oil spill and thus minimize the potential for harm to the loggerhead sea turtle. The SPCC Plan would include discharge prevention measures (*e.g.*, requirements for secondary containment, inspections, testing, security, truck and tank loading procedures) and spill response and countermeasures (*e.g.*, documenting and reporting spills, remediation, and waste disposal).

Given the lack of suitable habitat within the immediate vicinity of the project, the distance to nesting habitat and mitigation to reduce light, and oil spills, the construction or operation of the Liquefaction Project *may affect, but is not likely to adversely affect* the Loggerhead sea turtle.

Kemp's Ridley sea turtle

Kemp's Ridley sea turtles are the smallest of the marine turtles, and found throughout the Gulf, inhabiting sandy and muddy areas that are rich in invertebrate fauna, particularly crustaceans (NOAA Fisheries, 2013c). The main food item of this species is reported to be blue crab (*Callinectes spp*.) (Ogren, 1992), but other benthic prey items such as mollusks, echinoderms, and other crustaceans have been found to contribute to its diet. According to Ogren (1992), adult Kemp's Ridley sea turtles are believed to be restricted to the Gulf, although juvenile and immature Kemp's Ridley turtles range along the temperate coastal areas of the northwest Atlantic Ocean (FWS, 1991). The major nesting beach for Kemp's Ridley, however, is on the northeastern coast of Mexico near Rancho Nuevo in southern Tamaulipas (NOAA Fisheries, 2013c).

The Kemp's Ridley sea turtle is known to occur and nest within the general vicinity of the Liquefaction Project and it could potentially occur near the terminal site searching for nesting habitat. Five Kemp's Ridley sea turtle nests were found on Surfside Beach (a beach eastward of Quintana Island and separated by the ICW channel) in Brazoria County in 2012, approximately 0.5 miles east of the Project (NPS, 2012). Suitable nesting habitat for this species, however, is not available in the immediate vicinity of the Liquefaction Project facilities. If a nesting attempt were to be made, it would most likely occur on Surfside Beach (0.5 miles from the Project) on the Gulf side of Quintana Island, or on Quintana Beach, approximately 0.3 miles (at its closest point) from construction and operation of the Project. These beaches are open for vehicle traffic and heavily used for recreation by the public. At a distance of 0.3 miles, at its closest point from the Project, and the abundance of recreational beach goers, it is unlikely that noise from construction or operation of the project would have an impact on nesting sea turtles should they occur.

Given the lack of suitable habitat within the immediate vicinity of the project, the distance to nesting habitat and mitigation to reduce light, vessel strikes, and oil spills, the construction or operation of the Liquefaction Project may *affect, but is not likely to adversely affect* the Kemp's Ridley sea turtle.

Blue whale

Blue whales, the largest living animals on earth, are found in oceans worldwide from sub-polar to sub-tropical latitudes. In spring, they migrate toward the poles to take advantage of high zooplankton production in the summer and migrate towards the subtropics in the fall to reduce their energy expenditure while fasting, avoid ice entrapment, and engage in reproductive activities. Although blue whales are often found in coastal waters, they are thought to occur more offshore than other whales (NOAA Fisheries, 2013). Several records of blue whale strandings in the Gulf (pre-1970) suggest that blue whales historically strayed into Gulf waters.

There are only two records of the blue whale occurring in the Gulf of Mexico; one stranded near Sabine Pass, Louisiana, in 1924 and one stranded on the Texas coast between Freeport and San Luis Pass in 1940. Both of these identifications have been questioned (Davis and Schmidly, 1994). Though there is little information about where in the Gulf of Mexico blue whales may occur, their common depth is 100 meters, which corresponds to a distance of more than 80 miles from shore. Potential for impacts would be limited to the possibility of a vessel strike or encountering an oil spill.

Given the blue whales' high mobility and no specifically attractive habitat for this species within the area, it is not likely to be present or affected. In addition, the mitigation proposed helps minimize impacts on the blue whale should it occur in this area. As a result, the proposed Liquefaction Project *may affect, but is not likely to adversely affect* the blue whale.

Humpback whale

Humpback whales are found worldwide, generally in waters over and adjacent to continental shelves and around oceanic islands. However, this species rarely occurs in the Gulf (Davis and Schmidly, 1997b). During migration, humpback whales stay near the surface of the ocean and prefer shallow waters while feeding and calving. Calving occurs in the warmest waters available at that latitude near offshore reef systems, islands, and continental shores, while feeding occurs in cold, productive coastal waters (NOAA Fisheries, 2013k). In the Gulf, humpback whales have been captured in the Florida Keys and northern Cuba and have been sighted off the west coast of Florida and Alabama. The only known occurrence of a humpback whale sighting off the coast of Texas was near Galveston in 1992 (TPWD, 1994).

Given the humpback whales high mobility and no specifically attractive habitat for this whale within the area, humpback whales are not likely to be present or affected. In addition, the mitigation proposed helps minimize impacts on the humpback whale should it occur in this area. As a result, the Liquefaction Project *may affect, but is not likely to adversely affect* the humpback whale.

Dusky shark

The dusky shark is a large slender shark that has a low ridge along its back between the dorsal fins (Castro, 1983). They grow to lengths near 12 feet and weigh around 400 pounds (NOAA Fisheries, 2011b). The dusky shark is found throughout the world's oceans where waters are warm (66-82^{0}F). One study in the northern Gulf of Mexico found that they spend most of their time at depths of 33-260 feet (*e.g.*, this depth range corresponds to two to 80 miles offshore), and while they have been known to come close to shore, they often avoid estuaries due to low salinity levels (Compagno, L.J.V., 1984).

As the species is highly migratory and has no specific habitat attracting them to the Liquefaction Project area, it is not expected that this species would occur near in the Project area. Moreover, as it spends most of its time in deep depths, this would reduce its chances of being hit by a vessel.

Given the dusky shark's high mobility and no specifically attractive habitat for sharks within the vicinity of the Liquefaction Project, the dusky shark is not likely to be present or affected. In addition, the mitigation proposed helps minimize impacts should this species occur in the area. As a result, the proposed action may impact individuals but would not lead toward a trend to federal listing of the dusky shark.

Sand tiger shark

The sand tiger shark is a medium sized shark with individuals reaching up to nine feet in length. Sand tiger sharks are gray in color with brownish red spots on their backs (NOAA Fisheries, 2013h). This species inhabits warm tropical and semitropical waters of the world. They are found from the surf zone seaward to depths of approximately 630 feet. They actively feed (sometimes in large groups) on fish, including other sharks, crustaceans, squid and any other prey that they can catch. As the species is highly migratory and has no specific habitat attracting them to the Liquefaction Project area, it is unlikely that this species would be present (Virginia Aquarium, 2013).

Given sand tiger shark's high mobility and that there is no specifically attractive habitat for it within the area, the sand tiger shark is not likely to be present or affected. In addition, the mitigation proposed helps minimize vessel strikes in the event this shark visits the area. As a result, the proposed action may impact individuals but would not lead toward a trend to federal listing of the sand tiger shark.

Deposition Impacts

At the request of public commentors and the USEPA, we analyzed potential impacts on federally-listed threatened/endangered species from air emissions. In general, pollutants that may affect plant or animal species enter the ecosystem through deposition. The species identified in table 4.6.1-1 have suitable habitat within the area.

Air emissions stemming from construction and operation of the Projects contain nitrogen and sulfur compounds that contribute to acidification and nitrogen enrichment in the environment that may adversely impact terrestrial and aquatic ecosystems. Compounds emitted by the Projects that contain nitrogen and sulfur include inorganic compounds such as various oxides of nitrogen, ammonia (NH_3), and inorganic forms of sulfur such as sulfur dioxide (SO_2).

Oxides of nitrogen (NO_x) and sulfur (SO_x) react with water and oxygen in the atmosphere to form nitric and sulfuric acids, respectively. Acid rain occurs when precipitation or fog captures nitric and sulfuric acids from the atmosphere and deposits them on the land or water. In the atmosphere, nitric and sulfuric acid may react with ammonium ions or other cations to form nitrate and sulfate particulate matter. Nitrate and sulfate particles may be deposited on the land or water as a result of precipitation, gravitational settling, or impaction. Acid gases and nitrate and sulfate particulate matter deposition can adversely impact terrestrial and aquatic ecosystems by two pathways: acidification and nutrient enrichment.

Acid rain falling on the ground may result in increased soil acidification over time, and the washing of nutrients for plant growth deeper into the soil or out of the soil, resulting in decreased plant growth. Acid rain can also influence surface water chemistry, which in turn can affect the surrounding terrestrial and aquatic ecosystems and biodiversity.

Cumulative high levels of nitrogen deposition may upset the ecological balance and cause shifts in population dynamics, species composition, community structure, and in extreme instances, an entire ecosystem. Nitrogen loading is an important factor in causing eutrophication, the addition of artificial or natural substances including nitrates to an aquatic system. The symptoms of eutrophication include blooms of algae, declines in the health of fish and shellfish, loss of sea grass beds and coral reefs, areas of low DO (hypoxic), and ecological changes in food web.

Emissions from the Projects would contribute to existing overburdened levels of NO_x and SO_x in the industrialized Freeport-Houston-Galveston area. Additionally, high levels of eutrophication in the northern Gulf of Mexico, have resulted in one of the largest hypoxic zones in the United States (Rabalais *et al.*, 2001; Bricker *et al.*, 2007), which effects the food sources of species that may be affected by the Projects.

The estimated peak emissions of NO_x and SO_x from the Projects are 650.8 and 54.2 tons per year (tpy), respectively, during construction and 24.6 and 2.3 tpy, respectively, during operation. The emissions of SO_x during construction of the Projects would be minimized by the use of ultralow sulfur diesel (ULSD) fuel in construction equipment. With the exception of emergency engines that would burn ULSD, the operational combustion equipment would use only natural gas, which contains very little sulfur. Emissions of NO_x would be minimized by the use of these low sulfur fuels and proper equipment maintenance and operation.

For each of the endangered species, air emissions could cumulatively contribute to the formation of acid rain. Nitrification of the waters can result in eutrophication and eventual hypoxic/anoxic conditions in the Northern Gulf, thus negatively impacting food sources for each of the species. It is unlikely that these conditions could have a significant effect on the blue and humpback whale due to the abundant food sources. Ocean acidification negatively impacts the growth and development of the food sources for the sea turtle and bird species.

Since the emissions would never reach a scale where a "take" of federally-listed species occurs, the effects are deemed *insignificant* (USFWS, 1998). Based on cumulative data of air emission deposition and impacts on the environment, we conclude that the construction and operation of the Project would not result in a "take" for the federally-listed endangered species. The proposed Project would, however, add to the already high concentration of nitrogen and sulfur compounds in the area that contribute to acidification and nitrogen loading of surrounding terrestrial and aquatic ecosystems which, in turn, directly and indirectly affects federally-listed endangered species. As the emissions of SO_x and NO_x are small proportionally, they are unlikely to result in any significant increases in ecological impacts on federally-listed threatened/endangered species. Thus depositional impacts do not change the previous determinations of *may affect, but is not likely to adversely affect* for each of the federally-listed threatened/endangered species.

4.6.1.2 State-Listed Threatened and Endangered Species

To obtain current information on state-listed threatened/endangered species with potential to occur in the area, Freeport LNG accessed publicly available regional information from the TPWD (2013e) website. Of the 27 state-listed species, seven are also recognized by the FWS and/or NOAA Fisheries as federally-listed species. Table 4.6.1-2 identifies the state-listed species listed in Brazoria County, which includes areas offshore that were not already discussed in section 4.6.1.1.

Table 4.6.1-2

Potential Impacts of the Liquefaction Project to TPWD State-listed Threatened and Endangered Species

Common Name	Scientific Name	Status a/	Suitable Habitat within or near Project Site
BIRDS			
Bald eagle	*Haliaeetus leucocephalus*	Threatened	Yes
Eskimo curlew	*Numenius borealis*	Endangered	No
Peregrine falcon	*Falco peregrinus*	Threatened	Yes
Reddish egret	*Egretta rufescens*	Threatened	Yes
Sooty tern	*Onychoprion fuscatus*	Threatened	No
White-faced ibis	*Plegadis chihi*	Threatened	Yes
White-tailed hawk	*Buteo albicaudatus*	Threatened	Yes
Wood stork	*Mycteria americana*	Threatened	Yes
FISH			
Smalltooth sawfish	*Pristis pectinata*	Endangered	No
MARINE MAMMALS			
West Indian Manatee	*Trichechus manatus*	Endangered	Yes
TERRESTRIAL MAMMALS			
Red wolf	*Canis rufus*	Endangered	No
Jaguarundi	*Herpailurus yaguarundi*	Endangered	No
Ocelot	*Leopardus pardalis*	Endangered	No
Louisiana black bear	*Ursus americanus luteolus*	Threatened	No
MOLLUSKS			
False spike mussel	*Quadrula mitchelli*	Threatened	No
Smooth pimpleback	*Quadrula houstonensis*	Threatened	No
Texas fawnsfoot	*Truncilla macrodon*	Threatened	No
AQUATIC REPTILES			
Alligator snapping turtle	*Macrochelys temminckii*	Threatened	No
TERRESTRIAL REPTILES			
Timber/canebrake rattlesnake	*Crotalus horridus*	Threatened	No
Texas horned lizard	*Phrynosoma cornutum*	Threatened	No

Source: a/ TPWD, 2013e.

The Texas Natural Diversity Data Base (TXNDD) provides geographic locations of species occurrences. Each occurrence is based on at least one observation but could include potentially hundreds of observations (TXNDD, 2013). In general, impacts on threatened/endangered species are not expected beyond one mile of the Liquefaction Project (see one mile designation line in figure 4.6.1-1) though occurrence data has been provided for up to five miles from the Project in the referenced figure. A total of seven species have recorded occurrences within a 5-mile radius of the Projects. The following provides additional documentation on the state-listed six birds and one marine mammal with suitable habitat present within or near the Liquefaction Project. With all of the bird species, the potential exists for birds to strike tall objects during periods of inclement weather. To address this concern, Freeport LNG conducted a four-year bird strike study which did not detect injuries or mortalities to rare, threatened, or endangered species. In addition, Freeport LNG's FLDP would help to reduce the potential for bird strike hazards.

Bald Eagle

Delisted under the ESA in 2007 due to population recovery, Bald eagles continue to be protected under the *Bald and Golden Eagle Protection* Act as well as state-listed as threatened in Texas. The bald eagle ranges over much of the U.S. and Canada. This eagle is primarily a fishing species that prefers habitats associated with large bodies of water (FWS, 1987). In Texas, wintering and nesting activity occurs mainly near large freshwater impoundments with standing timber located in or around the water (Mabie, 1990). The nesting period usually extends from October 1 to May 15. Breeding pairs, which generally bond for life, return to their same territory year after year (FWS, 1987). Nests are often situated on ecotonal boundaries of forest, marsh, and open water, typically in trees higher than 40 feet (Arroyo, 1992).

In 2005, the species was documented within 1-mile radius of the Liquefaction Project. However, this species is highly mobile and would likely avoid the area during construction and operation due to the lack of feeding habitat and the presence of humans. Due to the characteristics of this species and the mitigation for raptors as described in the FWS Avian Protection Plan Guidelines noted above, the construction and operation of the Liquefaction Project facilities is not expected to impact the bald eagle.

Peregrine falcon and arctic peregrine falcon

The peregrine falcon is a widely distributed and highly migratory species nesting in the western U.S., Canada, and Mexico. While two subspecies are present in Texas, *F. p. anatum* and the Arctic Peregrine Falcon (*F.p. tundrius),* the latter is no longer listed in Texas. However, because the subspecies are not easily distinguishable at a distance, reference is generally made only at the species level (TPWD, 2013m). Peregrine falcons are found primarily in the Trans-Pecos Ecoregion, but the Texas coastline plays an important role in the survival of migrant individuals. During each migration, falcons assemble on the Texas coast to feed on prey along the open coastline and tidal flats for up to one month in the spring or fall (TPWD, 2013m).

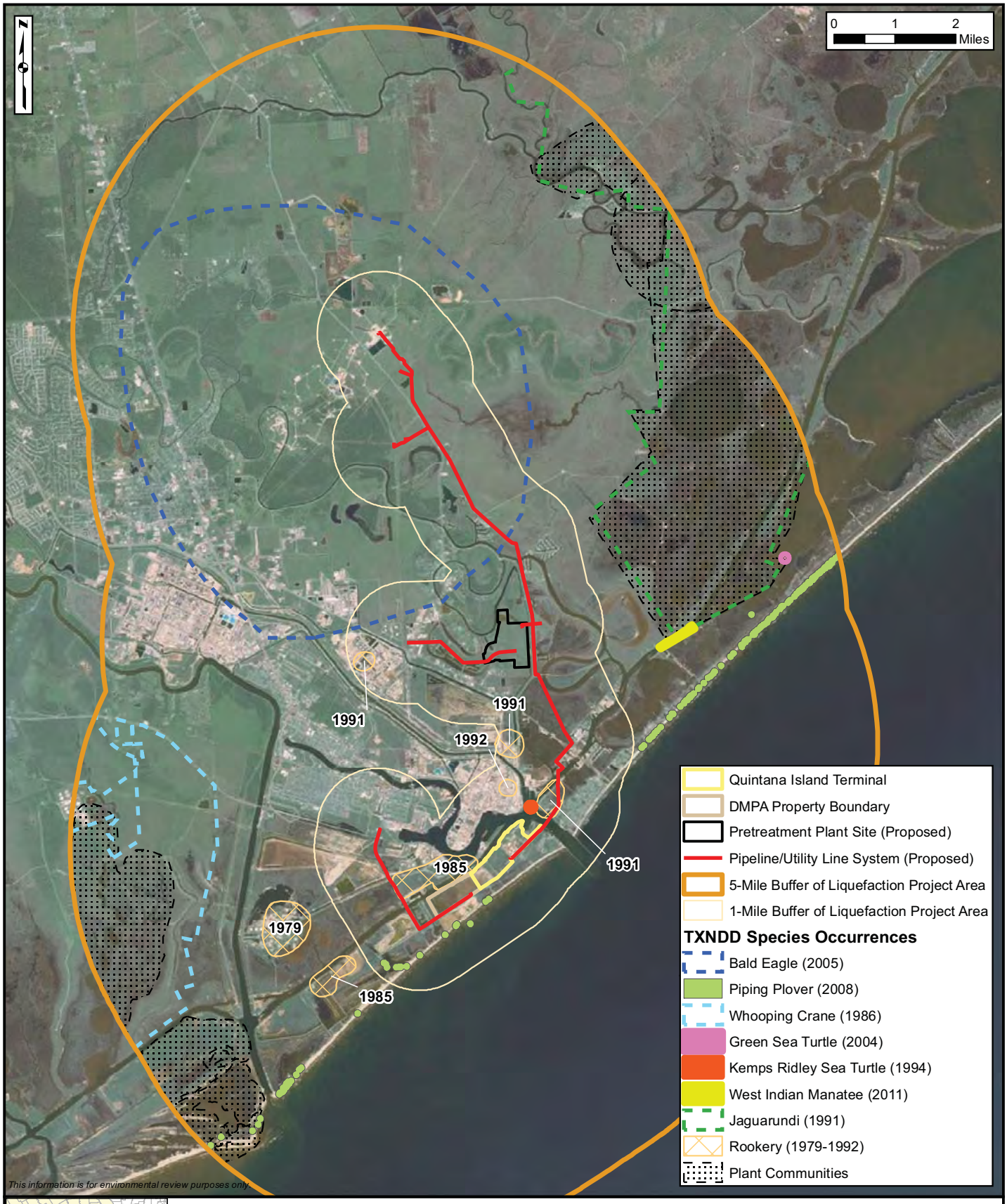


Figure 4.6.1-1
Freeport LNG - Liquefaction Project
TXNDD Species Occurrence Data within
Five Miles of the Liquefaction Project Area
Brazoria County, Texas

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Falcons could be incidental visitors to the Liquefaction Project area during migration. Due to the characteristics of this species and the mitigation for raptors as described in the FWS Avian Protection Plan Guidelines noted above, construction or operation of the Liquefaction Project is not expected to impact these species.

Reddish egret

Reddish egrets are coastal species with a limited range and breed along the Gulf Coast of Texas, Louisiana, Alabama, and both coasts of Florida. In Texas, they are permanent residents along the central and lower Texas Gulf coast, but are uncommon along the UTC (TPWD, 2013n). Reddish egrets are a medium-sized bird with a pinkish beige head, neck, and breast and a slate blue body. They forage in calm, shallow brackish marshes, shallow salt ponds, tidal flats, and lagoons, and nest on bare sand or amid cacti, willows, or other shrubs in Texas (National Audubon Society, 2013a).

There is potential for reddish egrets to use marsh like portions of proposed construction areas as foraging locations. Reddish egrets, if present, would likely avoid the area due the presence of humans and utilize suitable habitat adjacent to the Liquefaction Project. No permanent impacts on these areas are anticipated. Given their mobility, a reddish egret could temporarily avoid the area. Due to the characteristics of this species and rare presence in the area, construction or operation of the Liquefaction Project is not expected to impact the reddish egret.

White-faced ibis

White-faced ibis explore much of the western U.S. in search of breeding and foraging habitat in the spring and summer. They inhabit shallow freshwater marshes, swamps, ponds, and rivers, where islands of vegetation are available. In Texas, white-faced ibis breed in coastal marshes, but prefer freshwater locations. They nest between April and June on dead reeds or floating mats of dead plants and feed on insects, newts, leeches, earthworms, snails, and crayfish (National Audubon Society, 2013b).

There is potential for white-faced ibis to use the freshwater marsh like portions of the proposed construction areas as foraging locations. White-faced ibis, if present, would likely avoid the area due to the presence of humans and utilize suitable habitat adjacent to the Liquefaction Project. No permanent impacts on these areas are anticipated. Given their mobility, a white faced ibis could temporarily avoid the area. Due to the characteristics of this species, construction or operation of the Liquefaction Project is not expected to impact the white-faced ibis.

White-tailed hawk

White-tailed hawks occur from southeastern Texas south to Central and South America. In Texas, they are residents of coastal grasslands from the Rio Grande delta to the upper coast (Peterson, 1963) and farther inland in open-country with scattered mesquite, yucca, and large cacti. The white-tailed hawk perches on bushes, trees, utility wires, or on the ground. Breeding season extends from March to May and eggs are laid in nests found five to 15 feet above the ground in sizeable bushes and trees (Terres, 1996).

Coastal grasslands are present within construction work areas, thus this species could potentially perch or forage. White-tailed hawks, if present, would likely avoid the area due to the presence of humans and utilize suitable habitat adjacent to the Liquefaction Project. Impacts on the components of the area where the white-tailed hawk would forage are temporary. Additionally, given the mobility of the species, it could forage elsewhere during construction. Due to the characteristics of this species, construction or operation of the Liquefaction Project is not expected to impact the white-tailed hawk.

Wood stork

Wood storks are large white-bodied birds with a long heavy bill. They breed from Mexico to northern Argentina, and in the Caribbean islands of Cuba and Hispaniola. After nesting, some move into Texas, Louisiana, Mississippi, Alabama, and North Carolina, mainly along coastlines and large rivers (National Audubon Society, 2013c). Wood storks inhabit coastal marshes, bays, and prairie lakes, and forage in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water. In Texas, it is a common summer resident along the coastal plain in search of mudflats and other wetlands (National Audubon Society, 2013c).

Wood storks, if present, would likely avoid the area due to the presence of humans and utilize suitable habitat adjacent to the Liquefaction Project. Impacts on the components of the Liquefaction Project area where the wood stork would forage are temporary. Additionally, given the mobility of the species, during construction it could forage elsewhere. Due to the characteristics of this species, construction or operation of the Liquefaction Project is not expected to impact the wood stork.

West Indian manatee

West Indian manatees inhabit both salt and fresh water of sufficient depth (five feet to usually less than 20 feet) throughout their range. They may be encountered in canals, rivers, estuarine habitats, saltwater bays, and on occasion have been observed as much as 3.7 miles off the Florida Gulf coast. Manatees select habitat based on the following characteristics (listed in order of decreasing importance): water temperature (preferring warm waters); food supply (aquatic vegetation); water depth; and proximity to fresh water. Manatees may not need fresh water but they are frequently observed drinking fresh water from hoses, sewage outfalls, and culverts (Powell and Rathbun, 1984; FWS, 1989). Manatees are extremely rare in Texas, although near the turn of the century they apparently were not uncommon in the Laguna Madre. In 1986, the sighting of a manatee in Texas was recorded approximately one mile west of Caplen, on the Bolivar Peninsula (52 miles to the east of the Liquefaction Project) (Davis and Schmidly, 1997d). In addition, a single female manatee appeared in Texas (Galveston Bay, 45 miles to the east of the Projects) in mid-1990. This individual was removed from Texas' waters to join a population of manatees in Florida.

Due to the lack of SAV in waters of sufficient depth, the highly disturbed nature of the Liquefaction Project, and the rarity of manatees in Texas, the potential for occurrence of this species is extremely low. Thus, construction or operation of the Liquefaction Project is not expected to impact the West Indian manatee.

4.6.1.3 Phase II Modification Project

The federally- and state-listed species identified in tables 4.6.1-1 and 4.6.1-2, respectively, and described in section 4.6 for the Liquefaction Project, have similar potential to occur in the vicinity of the Phase II Modification Project due to both projects being located at the Quintana Island terminal. There is no habitat unique to the Phase II Modification Project that was not addressed in respect to the Liquefaction Project, and therefore all potential species impacts discussed in section 4.6.1.1 and section 4.6.1.2 are applicable.

Existing critical habitat for the overwintering population of the piping plover and migratory bird resources in the vicinity of the Phase II Modification Project are similar to that described in section 4.6.1.1 for the Liquefaction Project at the Quintana Island terminal site.

4.6.1.4 Conclusion

As described at the beginning of this section, and in compliance with Section 7 of the ESA, we have requested the initiation of formal consultation with FWS and NOAA Fisheries for the Projects. Therefore, **we recommend that:**

Freeport LNG should not begin construction activities until:

a. the staff completes formal consultation with the FWS and NOAA Fisheries; and

b. Freeport LNG has received written notification from the Director of OEP that construction or use of mitigation may begin.

4.7 LAND USE, RECREATION, AND VISUAL RESOURCES

4.7.1 Land Use

As depicted in figure 4.7.1-1, existing land uses at the Quintana Island terminal include industrial, open land, and open water. The work on Quintana Island including the Liquefaction Plant, and Phase II Modification Project, which encompasses land at Freeport LNG's existing terminal site and land directly adjacent to but west of the site, is within the Port Freeport Industrial District and therefore, the entire Quintana Island Project area is zoned for industrial development. The terminal site is bounded by open water to the north (ICW) and east (FHC), open land (a former DMPA) to the west, and residential land (Town of Quintana) and open land (coastal grass/scrub upland) to the south.



Figure 4.7.1-1
Freeport LNG - Liquefaction Project
Existing Land Use Types at and Adjacent to the Quintana Island Terminal Site
Brazoria County, Texas

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The existing land uses at or in the regional vicinity of the proposed Pretreatment Plant site include commercial, residential, open land, wetland, and open water. The 218-acre site is located in a semi-rural area, the native vegetation communities of which are characterized mostly by upland grassland and emergent wetland. Cattle grazing (within the open land use category) is the predominant land use, but the area also supports several residential communities, commercial developments concentrated along arterial roads (SH 332 and FM Route 523), and infrastructure associated with oil and gas production and storage. Figure 4.7.1-2 shows local features in the vicinity of the Pretreatment Plant site.

The Pretreatment Plant site is bounded to the east and north by a relict oxbow of Oyster Creek, which was partially channelized during construction of the adjacent Velasco Levee and CR 690 to form the existing canal ditch (western Velasco Ditch) that borders the west edge of the levee. Another relict open water oxbow of Oyster Creek fringes the site's northwest boundary. Open pasture land on the site continues beyond the north and southeast property boundaries. A cell tower is located approximately 260 feet (0.05 mile) south of the site. A prominent feature that occupies the west central portion of Freeport LNG's property is the excavation pit representing the site of commercial sand extraction (within the commercial land use category) that was undertaken by the previous landowner from 2005 until acquisition of the property purchase option by Freeport LNG in April 2012. The central excavation pit covers approximately 29.0 acres and is approximately 20 feet to 40 feet deep in the western sector and approximately 10 feet to 20 feet deep in the eastern sector. A second excavation pit, which was developed for commercial clay extraction, is located in the northwestern portion of the property.

The majority of the Pipeline/Utility Line System is classified as open land comprised of emergent marsh, scrub/shrub wetlands, grassland/herbaceous land, and open land. Approximately 20 percent of the land crossed by the route system is emergent wetland, mainly represented by the extensive estuarine wetland areas that are located between the ICW and Oyster Creek. The remaining 80 percent of land is predominantly grassland and is commonly used as pastureland for cattle grazing. The Pipeline/Utility Line System crosses barren land on the north shore of the ICW, along with industrial land at the Stratton Ridge underground storage site and the INEOS Plant. Residential land abuts the route at several locations, including the Town of Quintana (MP 0.25[A]), City of Surfside (MP 1.34[A]), Bridge Harbor Yacht Club (MP 2.40[A]), and Turtle Cove (MP 5.49[A]). The land use in the area can be seen on the aerial photos in figure D-3 (a-h) in appendix D. The Projects do not have residential areas within the construction or operational footprint.

4.7.1.1 Impacts from Liquefaction Project

Quintana Island Terminal Site

Table 4.7.1-1 shows the acreage impacts associated with construction and operation of the Liquefaction Plant for the three land uses (open land, industrial land, and open water) represented at and adjacent to the terminal site.

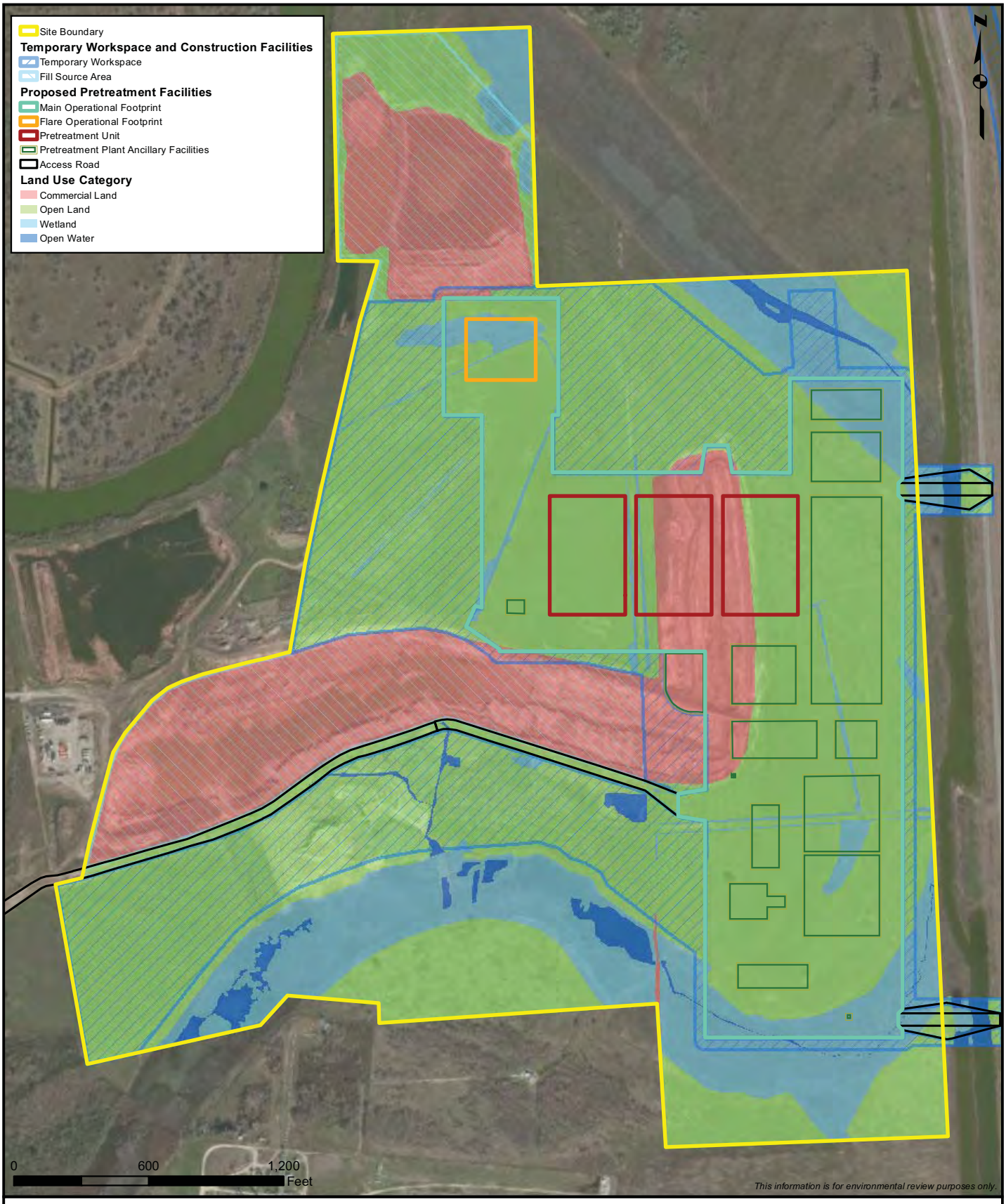


Figure 4.7.1-2
Freeport LNG - Liquefaction Project
Existing Land Use Types at the Pretreatment Plant Site
Brazoria County, Texas

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Table 4.7.1-1

Freeport LNG Liquefaction Project
Impact Acreages for Land Uses at Proposed Liquefaction Plant

Project Component	Open Land a/		Industrial Land b/		Open Water c/		Total	
	Temp	Perm	Temp	Perm	Temp	Perm	Temp	Perm
Trains 1, 2, 3	0.0	34.0	0.0	3.8	0.0	0.0	0.0	37.8
Ground Flare	0.0	2.6	0.0	0.0	0.0	0.0	0.0	2.6
Ancillary Facilities	0.0	46.4	0.0	20.9	0.0	0.0	0.0	67.3
Pipeline and Troughs in Phase I Process Area	0.0	<0.1	0.0	0.6	0.0	0.0	0.0	0.6
Pipelines (BOG, Nitrogen, Natural Gas) and Fiber Optic Line	0.0	N/A d/	0.0	0.0	0.0	0.0	0.0	0.0
New Construction Dock	0.0	0.1	0.0	0.0	e/	6.72		6.82
Aggregate Dock	0.0	0.0	0.0	0.0	e/	2.53		2.53
Firewater Intake Structure	0.0	0.0	0.0	0.0	e/	0.08	0.0	0.08
Dredging at Existing Construction Dock	0.0	0.0	0.0	0.0	e/	3.2	0.0	3.2
Drainage Channel A	0.0	0.0	0.0	0.0	0.1	0.07	0.0	0.07
BOG Compressors in Phase I Process Area (1 Regular, 3 Booster)	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5
Stormwater Collection Basin	N/A f/	23.0	0.0	0.0	0.0	0.0	0.0	23.0
Vapor Return Blowers at Phase I and Phase II LNG Berthing Docks	0.0	0.0	0.0	<0.1	0.0	0.0	0.0	<0.1
Temporary Workspace (West)	61.9	0.0	4.9	0.0	0.0	0.0	66.8	0.00
Temporary Workspace (West Central)	0.0	0.0	5.4	0.0	0.0	0.0	5.4	0.00
Temporary Workspace (East Central)	0.0	0.0	4.0	0.0	0.0	0.0	4.0	0.00
Temporary Workspace (East)	0.0	0.0	21.1	0.0	0.0	0.0	21.1	0.00
Seaway DMPA	50.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0
Subtotal:	111.9	106.7	35.4	25.3	0.1	12.6	147.4	144.6
Total:	218.6		60.7		12.7		292.0	

Notes
a/ *Open land* includes land at and adjacent to the terminal site that has not been developed or modified previously for the Phase I Project and land that lies beyond the former FOC property boundary; *open land* can include both vegetated and non-vegetated land.
b/ *Industrial land* includes property developed as part of Phase I by Freeport LNG and property within the Quintana Island terminal site that was formerly owned and developed for industrial purposes by FOC; *industrial land* can include both vegetated and non-vegetated land.
c/ *Open water* includes on-site ponds and the LNG berthing area.
d/ Within existing operational footprint of terminal.
e/ Impact area of estimated dredging plume within Freeport Harbor Channel, ICW, and Dow Barge Canal is approximately 428.1 acres, assuming 100 meter plume.
f/ Temporary workspace for stormwater collection basin included in West Temporary Workspace total for Liquefaction Plant.

At the terminal site, open land includes scrub-shrub wetland, scrub-shrub upland, herbaceous wetland cover, and herbaceous upland[19]; it also includes those unvegetated sections of the former DMPA that are located on and adjacent to the west side of the terminal site and lie beyond the area affected by the Phase I Project (this latter area being categorized as industrial land). Open land encompasses much of the undeveloped vegetated shoreline of the ICW and extends south into the northern sector of the proposed temporary workspace east of the Phase I process area. In this northern sector, herbaceous upland predominates, with one small pocket of scrub-shrub upland.

Of the 218.6 acres of open land that lie within the proposed construction workspace at and adjacent to the terminal site, 111.9 acres would be temporarily affected and 106.7 acres would be permanently affected by facility operation. Development of the Liquefaction Plant would result in the permanent conversion of these latter 106.7 acres of open land to industrial use. Pre-construction use and functionality of open land beyond the Liquefaction Plant site and Seaway DMPA laydown area would not be affected. Freeport LNG has purchased several residential properties close to the Liquefaction Plant to allow for adequate buffer zone with respect to noise impacts.

Industrial land includes property developed by Freeport LNG for the Phase I facilities, primarily the process area, the LNG berthing dock, and the temporary workspace that is now part of the proposed Liquefaction Plant footprint on the west side of the terminal site. Industrial land also includes the former FOC property that constitutes most of the proposed temporary workspace east of the Phase I process area.

Of the 60.7 acres of industrial land that lie within the Liquefaction Project's proposed construction workspace, 35.4 acres would be temporarily disturbed and 25.3 acres would be permanently affected by facility operation. This permanently affected area would continue to remain as industrial use.

Dredging would be necessary to accommodate barge visits to the existing construction dock on the south shoreline of the ICW in the vicinity of the Phase I process area. Dredging would also be associated with installation of the new construction dock, aggregate dock, and firewater intake structure on the same shoreline. In total, 12.09 acres of dredging would be required for these facilities.

The only onshore waterbody that would be directly affected by construction and operation of the Liquefaction Plant at the terminal site is Drainage Channel A. As indicated in figure D-1 in appendix D, Drainage Channel A would be crossed by aboveground facilities (LNG pipeline and trough) and underground Pipeline/Utility Line System, via a conventional bore or HDD. Discernible in-stream impacts would be avoided at both crossing locations. The work includes construction of a narrow walkway across Drainage Channel A, which would require installation of a concrete culvert and some bank-side disturbance. No permanent loss of waterbody acreage or redirection of drainage flow would occur.

[19] "Herbaceous upland" at the Terminal site can include isolated pockets of "scrub-shrub upland" and vice-versa.

Pretreatment Plant

For each of the three represented land uses (commercial land, open land, and open water), table 4.7.1-2 shows the acreage impacts associated with the temporary workspace and permanent facility footprint at the proposed Pretreatment Plant site. Commercial land (16.7 acres of temporary impact; 34.9 acres of permanent impact) consists of areas of previous sand/clay excavation in the west central and northwest portions of the site. Open Land is the largest land use, accounting for 164.6 acres of the 218.3 acres affected overall, either temporarily or permanently. This includes emergent wetlands and grassland. Grassland on the Pretreatment Plant site has historically been used as pasture land for cattle grazing. Open water is the least represented land use category, accounting for 1.5 acres of temporary impact and 0.6 acres of permanent impact, and consisting of natural and man-made ponds, channels, and ditches.

Table 4.7.1-2

Freeport LNG Liquefaction Project
Impact Acreages for Land Uses at Proposed Pretreatment Plant Site

Project Component	Commercial Land a/		Open Land b/		Open Water c/		Total Impact	
	Temp	Perm	Temp	Perm	Temp	Perm	Temp	Perm
Pretreatment Plant Site	16.7	34.9	86.7	77.9	1.5	0.6	104.9	113.4
Total:	51.6		164.6		2.1		218.3	

Notes
Temp Temporary Workspace
Perm Permanent Facility Footprint

a/ Commercial *land* includes land within the Pretreatment Plant property boundary that is currently used as an excavation source for construction materials; commercial *land* can include both vegetated and non-vegetated land. Note that the 13.8 acres of ponded water in the central and northwest excavation pits is included in the commercial *land* category in this land use classification.
b/ Open Land includes both wetlands (emergent herbaceous wetlands and scrub-shrub wetlands) and grasslands that are undeveloped or used as pasture land for cattle grazing.
c/ *Open Water* includes natural and man-made ponds, channels, and ditches; acreages are based on field survey data.

Pipeline/Utility Line System

Table 4.7.1-3 shows the acreage impacts associated with construction and operation of the proposed Pipeline/Utility Line System and the three land uses (industrial land, open land, and open water) represented along the Pipeline/Utility Line System route network. These acreages include the minor footprints of the ancillary aboveground facilities (Air Liquide meter station and MLV station). Land use impacts would be avoided by the use of HDD to cross several waterbodies (constituting open water) and a wetland.

Construction and operation of the Pipeline/Utility Line System would not change the existing land use profile, construction and operation of the linear underground facilities would involve only temporary impacts, and the footprints of the aboveground ancillary facilities (<0.1 acres total) would be within Freeport LNG's existing pipeline rights-of-way or industrial property. Similarly, following temporary construction disturbance, the new operational right-of-way

required for the NGL pipeline between the existing sendout pipeline route and the INEOS Plant would not change the land use classification there.

Of the four land use categories represented on the Pipeline/Utility Line System route, table 4.7.1-3 indicates that open land (82.8 acres) is the most affected land use category followed by open water (20.8 acres), and industrial land (15.7 acres). Open land is generally characterized by upland pasture used for cattle grazing and wetland areas, but also includes barren land, which has limited ability to support life and is less than one-third vegetative. Open water is primarily represented by a 1.7-mile length of the eastern Velasco Levee Ditch and accounts for 17 percent of the total construction workspace. The majority of industrial land is located at the terminal site, within the vicinity of the FHC and the ICW, and at the INEOS Plant; industrial land accounts for 13 percent of the total construction workspace.

Table 4.7.1-3

Freeport LNG Liquefaction Project
Impact Acreages for Land Uses on Proposed Pipeline/Utility Line System

Facility Type	Industrial Land a/		Open Land b/		Open Water c/		Total	
	CWS	OPF	CWS	OPF	CWS	OPF	CWS	OPF
Jurisdictional & Nonjurisdictional Pipelines - MP 0.00(A) – MP 4.55(A) & MP 0.00(B) – MP 0.35(B)								
	Construction Right-of-Way							
Gas Inflow Gas Outflow BOG NGL Nitrogen Water Fiber Optic	5.1	0.0	23.3	3.3d/	8.8	0.0	37.2	3.3
	Additional Temporary Workspace							
	0.0	0.0	6.2	0.0	1.2	0.0	7.4	0.0
Total:	5.1	0.0	29.5	3.3d/	10.0	0.0	44.6	3.3
Nonjurisdictional Pipelines/Utility Lines - MP 4.55(A) – 9.47(A) & MP 0.00(C) – MP 0.72(C) & MP 0.00(D) – MP 0.98(D)								
	Construction Right-of-Way							
NGL Nitrogen Water Fiber Optic	10.6	0.0	52.5	0.0	10.8	0.0	73.9	0.0
	Additional Temporary Workspace							
	0.0	0.0	0.8	0.0	0.0	0.0	0.8	0.0
Total:	10.6	0.0	53.3	0.0	10.8	0.0	74.7	0.0
Overall Total:	15.7		82.8		20.8		119.3	

Notes
CWS Construction workspace
OPF New operational footprint beyond existing sendout pipeline route
a/ *Industrial land* includes property (*high, medium, low intensity* and *open space*) developed for industrial and/or commercial purposes; *industrial land* can include both vegetated and non-vegetated land; acreages based on Land Use/Land Cover LULC data (USGS, 2010).
b/ Open Land includes both wetlands (emergent herbaceous wetlands and scrub-shrub wetlands), g*rasslands, which are undeveloped or used as pasture land for cattle grazing*; acreages based on LULC data (USGS, 2010), and barren lands.
c/ *Open water* includes ponds, lakes, and waterways; acreages based on map analysis and field survey data.
d/ Acreage for new operational footprint included in construction workspace total.
Land use category definitions based on Anderson *et al*., (1976 [revised 2001]).

4.7.1.2 Summary of Impacts

The Liquefaction Project would temporarily affect effect 371.7 acres of land and permanently affect 258.9 acres of land. Work on Quintana Island generally would take place adjacent or close to existing industrial uses of the Freeport LNG terminal and does not represent a substantial change in land use. The Pretreatment Plant work chiefly represents a change in land use from agricultural (associated with cattle grazing) to an industrial land use. Construction and operation of the Pipeline\Utility Line System would not change the existing land use profile. The visual impacts are shown to vary with distance from the facility, and generally are minor given the already existing LNG terminal and associated industrial views in the area. As a result, the Liquefaction Project would have a minor impact on land use in the area.

4.7.1.3 Impacts from the Phase II Modification Project

Construction and operation of the Phase II Modification Project facilities would involve both permanent and temporary land impacts at the Quintana Island terminal. A total of 38.5 acres of land would be required, including 14.6 acres that would be temporarily disturbed during construction and 23.9 acres that would be affected on a permanent basis for operation.

Table 4.7.1-4 shows the acreage impacts associated with construction and operation for the three land uses (open land, industrial land, and open water) represented within the Phase II Modification Project footprint.

Table 4.7.1-4

Freeport LNG Phase II Modification Project
Impact Acreages for Land Uses

Project Component	Open Land a/		Industrial Land b/		Open Water c/		Total	
	Temp	Perm d	Temp	Perm d/	Temp	Perm d/	Temp	Perm d/
Phase II Dock and Berthing Area	3.6	10.5 e/	0.5	2.1	1.9	4.8 f	6.0	17.4
LNG Transfer Pipelines	2.9	1.1	3.4	2.2	0.0	0.0	6.3	3.3
Access Road System	2.2	1.2	0.1	2.0	0.0	0.0	2.3	3.2
TOTAL:	9.1	12.5	4.0	6.3	1.9	4.8	14.6	23.9

Notes
Temp Temporary impacts during construction (not included in permanent impact totals)
Perm Permanent impacts during operation (not included in temporary impact totals)

a/ O*pen land* includes upland grassland, upland scrubland, emergent wetland, scrub/shrub wetland, pasture land, and maintained rights-of-way.
b/ *Industrial land* includes property developed as part of Phase I by Freeport LNG and the plant road on the berm adjacent to the east side of the ExxonMobil property that currently provides access to the northern portion of the leased area; *industrial land* can include both vegetated and non-vegetated land.
c/ *Open water* includes on-site ponds, drainage channels, and dredging for the berthing area.
d/ Unless otherwise indicated, project operations would result in a conversion of the existing land use to industrial land.
e/ Includes the conversion of 8.2 acres of open land to open water and 2.3 acres of open land to industrial land.
f/ Includes 4.8 acres of open water within the berthing area. Land use within this area would not change.

Open lands within the Phase II dock and berthing area are composed of herbaceous uplands, emergent wetlands, and two small areas of scrub-shrub uplands. Of the 21.6 acres of open land affected, 9.1 acres would be temporarily affected and 12.5 acres would be permanently affected

by operation. Development of the Phase II dock and berthing area would result in the permanent conversion of 8.2 acres of open land to open water and 2.3 acres of open land to industrial land. The plant road system and right-of-way for the elevated transfer pipelines would convert 1.2 acres and 1.1 acres, respectively, of open land to industrial land.

Industrial land includes property developed by Freeport LNG for the Phase I facilities, primarily the process area and the Phase I dock. Industrial land also includes the former FOC property that is located approximately 575 feet west of the existing berthing area. Of the 10.3 acres of industrial land affected, 4.0 acres would be temporarily disturbed and 6.3 acres would be permanently affected by facility operation. Development of the Phase II dock and berthing area would result in the permanent conversion of 1.2 acres of industrial land to open water.

Impacts on open water would occur as a result of construction and operation of the proposed Phase II dock and berthing area. The 4.8 permanently affected acres of open water represent an area along the north shore of the existing berthing area (3.5 acres), Drainage Channel C (0.4 acres), and Pond 2 (0.9 acres), all of which would be dredged specifically for the Phase II Modification Project. In addition, open water would be created for the berthing area as a result of shoreline excavation, which would convert 8.2 acres of open land and 1.2 acres of industrial land to open water. Open water impacts are expected to be minor, as Phase II Modification Project construction and operational activities would be consistent with current uses.

4.7.2 Recreation and Special Interest Areas

Recreational resources and activities in the vicinity of the Quintana Island terminal and along the existing sendout pipeline route have been described and evaluated previously for the Phase I Project (FERC, 2004) and/or the Phase II Project (FERC, 2006). Since these evaluations were completed, no significant changes in the recreation profile of the area have been evident. The most popular activities continue to include boating and fishing in the Gulf and adjoining waterbodies as well as camping, hunting, bird watching, and beach use.

Designated recreational areas on Quintana Island close to the terminal site include Quintana Beach County Park, the NBS, and Xeriscape Park (expanded in 2005), all of which are located 0.1 mile or less to the south, in or near the Town of Quintana. Quintana Beach County Park is a 50-acre park with amenities such as recreational vehicle sites, restrooms, and showers. It also includes elevated wooden boardwalks for beach and dune access, hiking trails, boating facilities, grassy areas for sports, two historic homes, several pavilions, and a fishing pier.

In addition to Quintana Beach County Park, two other parks are located on Quintana Island: Morrison Park and the Bryan Beach unit of the Justin Hurst WMA. Morrison Park is located on CR 723 (Lamar Street), approximately 0.2 mile southwest of the proposed Liquefaction Project site at the terminal. The park occupies a square 0.2-acre plot of land adjacent to a shoreline lagoon and includes cabanas, a barbecue pit, a picnic table, and a swing set. It also provides opportunities for fishing and crabbing in the lagoon. The Bryan Beach unit of the Justin Hurst WMA is located on the south end of Quintana Island, south of CR 1495 and approximately 2.6 miles southwest of the proposed Liquefaction Plant. In addition, many residents in the

community to the southwest of the Quintana Island terminal have boat docks adjacent to their homes and would use the ICW and FHC for transit or for other recreational purposes.

The Pretreatment Plant site is located in a semi-rural area that is predominantly used for cattle grazing but also supports several residential communities, commercial developments concentrated along arterial roads (SH 332 and FM 523), and infrastructure associated with oil and gas production and storage.

The closest recreational area to the Pretreatment Plant site is the Brazoria NWR, which lies about 0.7 miles northeast of the site at its closest point, beyond the Velasco Levee. The Brazoria NWR is characterized by extensive coastal wetlands. The only public road access is through the main entrance on CR 227, about 5.4 miles north of the Pretreatment Plant site. A gravel road runs for 7.5 miles through the Big Slough Recreation Area at the heart of the Brazoria NWR and a network of pathways allows pedestrian access to various woodland, wetlands, and open water habitats. Waterfowl hunting for duck, geese, and coots is permitted on the Christmas Point hunting area, which can only be reached by boat, and on Middle Bayou, which has both pedestrian and boat access. The hunting season is from late October to mid-January. Fishing is allowed year around and pedestrian and/or boat access is available in select areas.

The evaluation of the Pipeline/Utility Line System route did not identify any significant recreational or special interest areas beyond those discussed already with respect to the Quintana Island terminal site and the Pretreatment Plant site.

4.7.2.1 Impacts and Mitigation

Liquefaction Project

Neither Morrison Park nor the Bryan Beach unit of the Justin Hurst WMA would be directly affected by construction or operation of the Liquefaction Project. Visitor traffic for both areas would be addressed as necessary in Freeport LNG's *Transportation Management Plan*.

It is not anticipated at this time that any safety or security exclusion zones implemented around the terminal would affect recreational uses, including boating and fishing but boating and fishing would be affected during the time dredging activities would be conducted. In addition, the additional barge traffic may lead to minor delays or inconvenience for boating and fishing.

While the nearest section of the Brazoria NWR is in reasonably close proximity to the Pretreatment Plant site, the two locations are separated by the Velasco Levee and an extensive emergent wetland/upland complex. Given the separation distance between the NWR and the Pretreatment Plant site, and the fact that the only public road entrance to the NWR is far removed geographically from the site, it is not anticipated that Freeport LNG's proposed development would have any significant impact on the NWR or its visitors.

Phase II Modification Project

Impacts on Recreation and Special interest areas resulting from the Phase II Modification Project would be similar to those described for the Liquefaction Project since the Phase II Modification Project location overlaps that of the proposed Liquefaction Plant.

4.7.3 Visual Resources

Visual impacts may occur during construction when large equipment, excavation activities, spoil piles, and construction materials are visible to local residents and visitors and during operation to the extent facilities or portion of facilities and their lighting are visible to residents and visitors. The degree of visual impact resulting from a project is typically determined by the general character of the existing landscape and the visually prominent features of the proposed facilities.

4.7.3.1 Liquefaction Project

Liquefaction Plant

The primary/critical views to be protected on Quintana Island are those views towards the ocean. Currently, at all locations on the island views inland are of industrial facilities. During construction of the proposed Liquefaction Plant at the terminal site, there would likely be temporary visual impacts on residences on Beach Lake Drive, located directly south of the Liquefaction Plant construction footprint, and to other residences in the Town of Quintana, located directly south of the eastern temporary workspace. The closest of these residences, on Beach Lake Drive, is situated approximately 180 feet from the Liquefaction Plant construction footprint. However, all these residences, and those in the community of Bryan Beach located approximately 0.10 mile west of the Liquefaction Plant, would be visually shielded from portions of the construction activity by the 21-foot-high levee that runs along the southern perimeter of the terminal site and the 30-foot-high levee that runs along the southern and western perimeter of the adjacent former DMPA. Views of the Liquefaction Plant from other directions would be more distant, primarily from industrial locations across open land and waterways (ICW and FHC).

During operation, the most prominent visual feature of the Liquefaction Plant at the terminal site would be the multiple air cooling fans associated with the Liquefaction Plant. Each of the liquefaction trains (Trains 1, 2, and 3), would include 50 fan units arranged contiguously in two adjacent rows, one row containing 26 fan units, one row containing 24 units, and each fan unit containing 3 fans. For each train, both rows would be located centrally on the foundation pad, between other equipment assemblies. The two fan rows for each train would collectively form a structure approximately 660 feet long, 120 feet wide, and 27 feet high (see figure 1-2).

Six residences (including both temporary rental properties and permanently occupied homes) are located on Cortez Street, south of the proposed Liquefaction Plant. The view from this location would be from a distance of at least 660 feet (the distance of the nearest residence to the new structures). We requested visual simulations to assess the visual impacts on residences in the vicinity of the Liquefaction Project. A visual simulation created nearby (to the north on an

unnamed beach road) shows the Liquefaction Plant and the new LNG tank constructed under Phase II would result in changes to the view shed, although the viewshed in this direction is already industrial in nature, and thus the adverse visual impacts would be lessened somewhat by the existing industrial context of the landscape (see figures E-1 and E-2 in appendix E, which show existing conditions and proposed conditions).

Several residences in the community of Bryan Beach would have views of the Liquefaction Plant. The closest residence to the Liquefaction Plant from this location is 0.58 mile. Figures E-3 through E-6 in appendix E show a visual simulation study of the three liquefaction trains in their new location from a nearby residence on CR 806c west/southwest of the site. The simulations were taken at ground level and also from a height of 25 to 27 feet above the ground elevation in order to present views from the upper floors of residences. The existing view where the facility would be constructed was previously used as a DMPA. This view would also encompass existing industrial facilities across the ICW. The simulation shows the Liquefaction Project creates a new industrial feature in the viewshed, though adverse visual impacts would be lessened somewhat by the views of the existing industrial facilities. The facility would have no impact on the views toward the ocean, although some people would be sensitive to the change.

Nighttime visual impacts were assessed via the development of simulations that show the impacts of facility lighting on night time views. Three views were evaluated: Viewpoint 01 provides the view looking southeast from the north side of the Quintana Island bridge on FM Route 1495; Viewpoint 03 provides the view looking northeast from the south end of Bryan Beach Road, near Quintana Beach; and Viewpoint 05 provides the view from the south end of an unnamed beach road, near Quintana Beach northeast of the Viewpoint 03 location (Refer to figures E-7 through E-9 in appendix E, respectively). As would be expected, lighting impacts become more visually pronounced with decreasing distance between the viewpoint and the terminal site, though it should be noted that all viewpoints already have a substantial amount of industrial lighting via the lighting from the existing Freeport LNG terminal, and via lighting from other industrial facilities in the area. In addition, Freeport LNG has mitigated lighting impacts to the extent possible via its FLDP. Given the industrial lighting already existing in the area, and Freeport LNG's mitigation efforts that help minimize glare and extension of lighting offsite, the additional lighting impacts are expected to be minor.

Pretreatment Plant

During construction and operation of the Pretreatment Plant, the most significant potential visual impacts would likely involve residences along CR 230 and Elm Street, located west of the Pretreatment Plant site. The closest of these residences is situated about 0.17 mile from the construction footprint and about 0.47 mile from the operational footprint. Views of the site from other directions would be much more distant and from unpopulated areas across open land. Figures E-10 and E-11 in appendix E provide a simulated view east from CR 230 (Stringfellow Road) across the Pretreatment Plant site. This represents the closest residential view of the proposed facilities. The visual simulation shows the Pretreatment Plant adds an industrial dimension to the otherwise open landscape, though the distance of separation between the plant and the closest residence helps to minimize visual impacts. Since issuance of the draft EIS, we revisited the Pretreatment Plant site and met with the landowners in the communities of Turtle

Cove and Hide-Away on the Gulf. These communities would have the greatest visual impacts from the Pretreatment Plant. The Pretreatment Plant would be obvious from many parts of the community and as indicated above, would show an obvious industrial component to the view above the levee on which Levee Road lies. Many landowners have commented and indicated in person that this would be a visual impact. While we agree that some portion of the local population would be affected, given the limited number of people affected, and the fact that only a portion of the facility would be visible above the levee, we do not deem this significant.

To minimize the effects of Pretreatment Plant lighting on local residents, Freeport LNG has developed a FLDP. The general concepts addressed in the plan include compliance with the regulatory requirements for lighting described in 49 CFR Part 192, Federal Aviation Administration Advisory Circulars, NFPA 59A, and the American Petroleum Institute's Recommended Practice 540 *Recommended Practice for Electrical Installations in Petroleum Processing Plants*.

The FLDP provides an overview of the different categories of lighting utilized throughout the facility for plant operations, perimeter security, roadways, aircraft obstructions, and emergency lighting. Various attachments to the plan, including a lighting fixture schedule, would describe the different lighting fixtures that would be installed (*e.g.*, pendant, wall, stanchion with pole supports or angled fixtures, flood lights, and street lights). Specific luminaires that would be used for reducing light pollution would be reviewed along with shielding and or direction of lighting to minimize glare to residential.

The FLDP addresses the mitigation actions that Freeport LNG proposes to use to minimize the amount of required light for the safe and efficient operation of the Pretreatment Plant.

Pipeline/Utility Line System

For the Pipeline/Utility Line System, visual impacts during construction would be relatively short term at any given location, due to the geographically sequential nature of pipeline installation. Beyond the minor ancillary aboveground facilities (Air Liquide meter station, NGL pipeline shut-off valves at Oyster Creek) and pipeline markers, no permanent visual impacts would be associated with operation of the Pipeline/Utility Line System alone.

4.7.3.2 Phase II Modification Project

The Phase II modification Project would consist only of a LNG vessel berthing dock; LNG transfer pipelines; the LNG unloading arms; and the access road system that was analyzed in the previous Phase II Project EA, and as such, would not have any significant additional visual impact.

4.7.4 Coastal Zone Management

The CZMA gives states with federally approved coastal management programs the responsibility of reviewing federal agency actions and activities to ensure that they are consistent with the state program's goals and policies. Any project that is in or may affect land and water resources in the

Texas coastal zone and that requires a federal license or permit must be reviewed for consistency with the Texas Coastal Management Program (TCMP). Applicants for federal permits in coastal areas must provide the federal agency with a "consistency certification" stating that the proposed Project is consistent with the state's coastal management program. Because the Projects are located within a designated coastal zone management area, Freeport LNG is responsible for documenting that its Project is consistent with the TCMP.

Brazoria County is one of several counties included in the TCMP. The Coastal Coordination Council (CCC) was established by the TCMP to serve as the forum to coordinate state, federal, and local programs and activities on the coast. In order to obtain a federal permit in Texas, an applicant must document consistency with the Texas CMP. In order to obtain a consistency determination in Texas for a federal action (*e.g.,* a FERC project), applicants must submit a section 404 permit application to the COE, along with a consistency statement. The COE will forward the Public Notice to the CCC and the RRC. The CCC will post the Public Notice on its website and in the Texas Register. The RRC is responsible for reviewing federal agency actions and activities to confirm they are consistent with the TCMP.

There are no Coastal Management Program (CMP) areas of special concern within the Liquefaction Project area; the nearest coastal area coordinated by the CMP is Christmas Bay Coastal Preserve, located about 10 miles east of the Liquefaction and Phase II Modification Project area.

Proposed actions subject to the CMP must be deemed consistent with the program to be authorized. Freeport LNG would seek confirmation to this effect through consultation with the CCC and the RRC as part of the USACE Section 404/10 permitting effort for the Liquefaction Project. A determination from the CCC that the Projects are consistent with the laws and rules of the CMP must be received before a notice to proceed could be issued. Therefore, **we recommend that:**

> **Freeport LNG should not begin construction of the Projects until it files a copy of the determination of consistency with the Texas Coastal Management Program issued by the CCC.**

We note that Brazoria County is one of the counties involved in the Galveston Bay Estuary Program. Administered by the TCEQ, the program is part of the USEPA's National Estuary Program, which was created to guide the conservation and restoration of estuaries of national significance. However, because the Galveston Bay Estuary is located about 40 miles northeast of Quintana Island, the Projects are not expected to have any impacts on this program. No other National Estuary Program special management areas are located in Brazoria County.

4.7.5 Hazardous Waste Sites

Freeport LNG has conducted multiple field investigations and data base searches and has not identified the presence of hazardous, potentially hazardous, and solid waste management sites within the area of the Liquefaction or Phase II Modification Projects.

4.7.6 Planned Developments

In addition to the Liquefaction Project, and Phase II Modification Project on Quintana Island, Port Freeport is continuing a program of facility expansion and enhancement, which, in recent years, has included development of a 65-acre cargo storage area for wind turbine blades and the LNG terminal itself. Other initiatives within the county, in addition to Freeport LNG's Liquefaction Project, include: nine industrial developments; the Port Freeport Channel Widening Project; the Velasco Terminal Development Project; five pipeline development projects; oil and gas well field developments (74 new wells proposed); roadway improvement projects including construction of an overpass at FM Route 1495 and SH 36 (construction to be completed in 2014); three commercial development projects, and three other residential developments (in the Lake Jackson area) (refer to detailed descriptions of proposed residential, commercial, and industrial developments in the assessment of cumulative impacts in section 4.12).

Of the above-referenced projects, the Velasco Terminal Project and Port Freeport Channel Widening Project would be closest to the Liquefaction Project area: the Velasco Terminal Project is located approximately one mile to the north of the terminal site and the Port Freeport Channel Widening Project involves dredging activities in the FHC, adjacent to and east of the terminal's berthing area. The Liquefaction Project is actively supported by Port Freeport and it would not impact any of the developments, with the possible exception of the FM Route 1495/SH 36 overpass. If respective construction timeframes coincide, development of the overpass would need to be factored into the *Transportation Management Plan* for the Liquefaction Project. Construction associated with the Channel Widening Project was scheduled to commence in the first quarter of 2012, although no activity has taken place to date.

4.7.7 Land Ownership

The Liquefaction Project facilities at the Quintana Island terminal would be located on property within a designated Industrial District and available to Freeport LNG through existing and pending lease agreements with Port Freeport. The properties on which the Pretreatment Plant and Air Liquide meter station would be sited are owned or leased by Freeport LNG or one of its component companies, whereas the NGL meter station would be located on industrial property owned by INEOS. For the proposed pipelines and non-electric utility lines, most of the route system is collocated with Freeport LNG's 42-inch-diameter sendout pipeline and easement agreements with private landowners are in effect for this existing pipeline. Freeport LNG would work with property owners to ensure that multi-line rights-of-way are reflected in any new or modified easement agreements that are necessary.

4.8 SOCIOECONOMICS

This section evaluates the effect of the Liquefaction Project, and the Phase II Modification Project on socioeconomics in the area. The assessment includes an evaluation of the proposed Projects' effect on local population, employment, the economy, housing, public services, traffic, property values, tax revenue, and environmental justice. The socioeconomic data presented is derived via the Bureau of Labor Statistics (2011a and 2011b) and the U.S. Census Bureau (2010) unless otherwise noted.

4.8.1 Population

As indicated in table 4.8.1-1, the populations of the State of Texas, Houston-Sugar Land-Baytown Metropolitan Statistical Area ("Houston MSA" or "Greater Houston"),[20] and Brazoria County increased by over 20 percent between 2000 and 2010. In contrast, the populations of the cities of Freeport and Oyster Creek decreased slightly, while the much smaller population of the Town of Quintana increased by 47 percent (from 38 to 56 persons). Greater Houston is one of the fastest growing urban areas in the country.

Table 4.8.1-1

Freeport LNG Liquefaction Project
Existing Population Characteristics

Geographic Area	Population			Population Density b/ (square mile)	Population 2012 Estimates	Unemployment Rate 2011 (percent)	Unemployment Rate 2012 (Percent) Estimates
	2000 a/	2010 b/	Percent Change				
Texas	20,851,818	25,145,561	20.6	96.0	26,059,203	8.1 c/	5.1 h/
Greater Houston	4,715,417	5,946,800	26.1	666.0	6,204,161	7.3 d/	5.6 h/
Brazoria County	241,767	313,166	29.5	225.9	324,769	8.4 d/	4.3 h/
City of Freeport	12,708	12,049	-5.2	1,069.6	12,079	8.9 e/	g/
City of Oyster Creek	1,192	1,111	-6.8	584.7	1,121	8.9 f/	g/
Town of Quintana	38	56	47.4	93.3	62	g/	g/

a/ U.S. Census Bureau, 2000
b/ U.S. Census Bureau, 2010a
c/ U.S. Department of Labor, Bureau of Labor Statistics, 2011a
d/ U.S. Department of Labor, Bureau of Labor Statistics, 2011b
e/ Sperling's Best Places, 2011a
f/ Sperling's Best Places, 2011b
g/ Recent employment data not available.
h/ US Census American Community Survey 1 year estimates

4.8.2 Economy and Employment

The top employment sectors for Brazoria County in terms of employee numbers are: educational services, health care, and social assistance (30,355 persons); manufacturing (18,619 persons); and professional, scientific, management, administrative and waste management services (14,457 persons). The largest employers within the county include Dow, Independent School Districts (ISDs), Infinity Group, Texas Department of Criminal Justice (TDCJ), and Wal-Mart Stores, Inc. (Economic Development Alliance for Brazoria County, 2010).

[20] Houston-Sugar Land-Baytown Metropolitan Statistical Area is a 10-county area defined by the U.S. Office of Management and Budget for collecting, tabulating, and publishing Federal statistics.

Consistent with Brazoria County as a whole, the top employment industries within the City of Freeport include: construction (1,259 persons); educational services, health care, and social assistance (753 persons); and manufacturing (671 persons). Top employers include Brazosport ISD, Dow, Phillips 66 Company, TDCJ, and U.S. Contractors (City of Freeport, 2012). Freeport LNG's existing terminal provides the major source of employment on Quintana Island – currently about 50 full-time operations personnel work at the facility. The adjacent Town of Quintana provides limited employment (15 persons) in the areas of manufacturing, arts/entertainment/recreation, and public administration.

Table 4.8.1-1 provides the unemployment rates for Greater Houston and Brazoria County in November 2011 were 7.3 percent and 8.4 percent, respectively and the corresponding unemployment rates for the City of Freeport and City of Oyster Creek were both at 8.9 percent. Estimated unemployment rates for Greater Houston and Brazoria County decreased in 2012 to 5.6 percent and 4.3 percent, respectively, showing an improved economic trend in the area. Currently, the City of Freeport's annual rate of job growth is 1.6 percent; job growth over the next 10 years is predicted to be 34.4 percent. The Brazoria County economy has added about 500 jobs a month in the past year, many of which are attributable directly or indirectly to industrial sector production growth resulting from the low price of shale gas used for fuel and as a chemical feedstock (The Facts, 2012).

4.8.2.1 Impacts and Mitigation

Liquefaction Project

Employment

Construction of the Liquefaction Plant at the terminal site would require a monthly average of 850 on-site temporary workers over the course of construction; however, the number of workers present during construction would vary through time (see table 4.8.2-1). Initially, 100 to 200 workers would mobilize to the site. As construction activity progresses, the construction workforce would increase to a monthly average of 800 temporary construction workers. During peak construction, the workforce would number 1,400 to 1,650 workers. Note that the construction schedule for the three pretreatment units would be staggered to coincide with the construction schedule for the three liquefaction trains: each liquefaction train and its corresponding pretreatment unit would be constructed concurrently within the approximate 48- to 54-month timeframe. The Pipeline/Utility Line System is expected to take 12 to 18 months and would be performed concurrently with the Pretreatment Plant work.

Table 4.8.2-1

Number of Workers Duration Construction

Phase	No. of workers during early construction period (~ one – six months)	Monthly Average no. of workers after initial startup work	No. of workers at peak	Total Duration (months)
Liquefaction Plant	100 to 200	800	1,400 to 1,700	48 to 54
Pretreatment Plant and Pipeline/Utility Line System	20 to 70	850	1,200 to 1,350	48
Total	120 to 270	1650	2,600 to 3,050	48 to 54

As the Liquefaction Plant nears completion and commissioning, workforce numbers would decrease. During the peak construction period for the Pretreatment Plant approximately 1,200 – 1,350 workers would be required. This amount includes approximately 50 to 60 construction workers needed to construct the Pipeline/Utility Line System during the peak construction period. These workers are in addition to those required for construction of the facilities at the Liquefaction Plant site. However, like the workforce at Quintana Island terminal, the number of workers present during construction Pretreatment Plant would vary through time. Initially, 20 to 70 workers would mobilize at the Pretreatment Plant site. As construction activity progresses, the workforce would increase to a monthly average of 850.

Based on the numbers presented above, the Liquefaction Project as a whole would require, during the peak construction period, up to 3,000 temporary construction workers. Assuming 50 percent of the workers, at peak construction period, are non-local, and that they all would temporarily reside in Brazosport (*i.e.,* 1,500 personnel) during Project construction, the associated influx represents about 2.4 percent of the total population of this area. Should non-local workers be accompanied by family members, and based on an average family size of 3.4 persons in the State of Texas, up to 5,100 persons could temporarily relocate to the area. It is likely that the actual number of in-migrants could be smaller because individual workers could relocate at different times, for different durations, and may not bring families with them. As well, a significant portion of non-local workers are likely to commute from outside the area if possible to avoid added housing costs.

The type of general contractor awarded the construction contract (*i.e.,* local versus non-local and union versus non-union) would have a direct impact on the percentage of the workforce that would be hired locally, the number of workers that would commute daily from outside the area, and the number that would temporarily relocate to the area. Predominantly local workers from southern Brazoria County would be utilized; however, as much as half the workforce may originate from Greater Houston area. In summary, the population impacts would be temporary, minor, and offset by employment and economic benefits.

Operation of the Liquefaction Project facilities would require the addition of approximately 163 permanent workers to Freeport LNG's existing staff: 22 terminal administration staff, 84 operations and maintenance staff for the Liquefaction Plant, and 57 operations and maintenance staff for the Pretreatment Plant and Pipeline/Utility Line System.

Freeport LNG intends to hire and train local residents where possible for operational positions; and therefore, it is anticipated that many of the approximately 163 additional full-time employees would come from the Brazosport area and impacts on local population from the facility's operation would be negligible.

Displacement of Businesses or Residences

Construction and operation of the Liquefaction Project would not result in direct competition with any local businesses and would not require the relocation or involuntary displacement of any residences or businesses. The Liquefaction Plant at the terminal site would be on industrial-zoned land leased from Port Freeport and wholly occupied by Freeport LNG. The Pretreatment Plant would be sited on land purchased by Freeport LNG under a voluntary transaction and the

Pipeline/Utility Line System would, for the most part, follow existing operational rights-of-way. New operational rights-of-way would not cause any changes to existing land use.

We are aware that Freeport LNG has offered to purchase all existing properties on Quintana Island. Some landowners on Quintana Island have elected to accept the offer to purchase their homes. For those homeowners on Quintana Island who elect to stay, Freeport LNG has offered $5,000 as compensation for each year of construction.

Property Values

The main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence on land previously in industrial use and we do not anticipate any impact on the value of adjacent properties or homes. One study on this issue showed that the construction of industrial facilities (e.g. fossil fuel generation plants) in the vicinity of residential areas may have a minor negative effect on property values in those residential areas (Davis, 2010). However, there are many issues that affect property values and given the number of projects and other development in the southern Brazoria County area, increased property values are more likely. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities, and while there would be visual and other environmental impacts, it is unknown if any impacts on the value of property on Quintana Island would occur.

Payroll and Material Purchases

The Liquefaction Project would have an estimated total construction payroll of approximately $650 million over the 48- to 54-month construction timeframe and an annual operational payroll of $2 million. Because southeast Texas supports an extensive manufacturing and processing infrastructure for the chemical and petro-chemical industries, many construction materials and equipment supplies are readily available locally and Freeport LNG anticipates that most construction-related purchases would be made in Brazoria County. Although the specific amount that Freeport LNG would spend on construction material purchases within Brazoria County cannot be readily calculated, Freeport LNG estimates that the Liquefaction Project's spending profile would be similar to that for the Phase I Project, which would result in approximately 18 percent ($490 million) of the total Project construction outlay ($2.7 billion) being spent within Brazoria County.

Tax Revenues

Construction of the Liquefaction Project would result in increased sales tax revenues for local communities, Brazoria County, and the State of Texas. Freeport LNG paid approximately $5,740,000 in taxes or other payments to city, county, and state agencies that support local communities, schools, and transportation infrastructure in 2010. This included $1,211,000 for the Town of Quintana, $2,770,000 for various Brazoria County entities (including Brazosport ISD), and $1,759,000 for the State of Texas. Should Freeport LNG purchase a significant number of homes on Quintana Island, the Town of Quintana may lose annual real estate taxes from those homes. Although specific tax revenues for the Liquefaction Project cannot be readily

calculated at this time, increases would likely be significant and are estimated at $36 million per year after construction. New revenues would provide direct and indirect benefits to residents throughout the life of the Projects.

Removal of Agricultural, Pasture, or Timberland from Production

There would be no loss of cropland or timberland resulting from construction or operation of the Liquefaction Project.

Phase II Modification Project

Employment

Construction of the Phase II Modification Project would require about 300 on-site workers; however, the number of workers present during construction would vary through time. Initially, 200 to 250 workers would mobilize to the site. As construction activity progresses, the construction workforce would ramp up to an average of 300 workers. During peak construction, the workforce would number 500 to 600 workers. The number workers associated with construction of the LNG storage tank authorized as part of the Phase II Project, which would be constructed in conjunction with the Phase II facilities as modified. As the facilities near completion and commissioning, workforce numbers would decrease. It is anticipated that that three to five full-time operational employees would be hired at the terminal as a consequence of the Phase II Modification Project.

It is expected that Freeport LNG would utilize predominantly local workers from the southern Brazoria County area; however, as much as half the workforce may originate from the Greater Houston area.

Assuming all non-local workers (150 personnel or 50 percent of the estimated average construction workforce) temporarily reside in Brazosport during Project construction, the associated influx represents 0.2 percent of the total population of this area (estimated as 57,288 in 2010 [U.S. Census Bureau, 2010b]). Should non-local workers be accompanied by family members, up to 510 persons could temporarily relocate to the area.

This estimate is based on an average family size of 3.4 persons in the State of Texas. For purposes of estimating impacts on the local population, the 510 persons estimated to relocate to the area assumes that each non-local construction worker would be accompanied by 2.4 family members. It is likely that actual number would be much smaller because individual workers would relocate at different times, for different durations, and may not be accompanied by family members, and a significant portion of the non-local workers are expected to commute to the area daily from the Greater Houston area from 45 to 100 miles away.

Based on the above-described estimates for construction personnel, any temporary increase in local population size resulting from the Phase II Modification Project would be minor.

Displacement of Businesses or Residences

The Phase II facilities at the terminal site would be on industrial-zoned land leased from Port Freeport and wholly occupied by Freeport LNG. The Phase II Modification Project would not result in direct competition with any local businesses and would not require the relocation or involuntary displacement of any residences or businesses.

Property Values

The Phase II facilities at the terminal site would be on industrial-zoned land leased from Port Freeport and wholly occupied by Freeport LNG and similar in visual impacts on the existing facilities. As such, no consequential impact on the value of this property or other nearby property on Quintana Island is anticipated.

Payroll and Material Purchases

Freeport has estimated that construction of the Phase II facilities would have a total construction payroll of approximately $150 million over the 36-month construction timeframe. Given Brazoria County's well-developed petroleum and chemical industrial infrastructure, many construction materials and equipment supplies are readily available locally. Therefore, Freeport LNG anticipates that a large portion of construction-related purchases would be made in Brazoria County. Freeport LNG estimates that the Phase II facilities' spending profile would result in approximately 18 percent ($117 million) of the total construction outlay ($650 million) being spent within Brazoria County.

Tax Revenue

Similarly to the Liquefaction Project, the Phase II facilities would result in increased tax revenues for the State of Texas, Brazoria County, and local communities.

Removal of Agricultural, Pasture, or Timberland from Production

Construction and operation of Phase II facilities at the Quintana Island terminal would not require the removal of agricultural land, pasture, or timberland from production.

4.8.3 Public Services

4.8.3.1 Emergency Response

The Freeport LNG Liquefaction Project resides in an area of longstanding petrochemical, port, and urban activity which has a well-developed ability to handle large-scale emergencies.

The Brazosport Industrial Community Awareness & Emergency Response (CAER) coordinates emergency preparedness and response procedures between its 18 member companies and promotes emergency planning with the community. CAER operates several sirens for public awareness of incidents occurring within their area, a website providing up-to-date information on

emergencies and evacuation notices, emergency training, emergency drills, and support (manpower, equipment, expertise) in emergency situations within the Brazosport industrial area.

In addition, the Brazoria County Emergency Planning Committee meets monthly at the Brazoria County Sheriff's office to review any drills/exercises that have been conducted by various entities and also upcoming ones. In attendance at this meeting are the 18 CAER participating companies, Brazoria County Emergency Manager and his deputy, Freeport Fire and Police Department, Oyster Creek Police Department, Alvin Police Department, Emergency Managers from Quintana, Freeport, Alvin, Oyster Creek, TCEQ Emergency Response, Lake Jackson, Port Freeport, Dow ER both pipeline and facilities, Kinder Morgan pipeline, and usually NOAA weather service.

Freeport LNG annually updates its Emergency Response Plan (ERP) to incorporate the latest in emergency response information as well as for each of the implemented projects. Each year Freeport LNG hosts a review of the ERP with area emergency responders, law enforcement, local and area governmental officials, and USCG. The Texas Department of Public Safety maintains an office in downtown Freeport with statewide access to personnel in the event of a large-scale emergency.

The Brazoria County Sheriff's Department is located in Angleton, 21 road miles from the Quintana Island terminal site and 17 road miles from the Pretreatment Plant site. In addition, many of the local municipalities, including the cities of Freeport and Oyster Creek, maintain their own police departments.

The Freeport Fire Department and the Oyster Creek Volunteer Fire Department provide fire protection services in the area. Eight other fire departments and volunteer fire departments are within 30 – 40 minutes from Quintana Island some of which have industrial firefighting capabilities. Freeport LNG annually provides for several terminal personnel and local firefighters to attend the LNG fire school at Texas A&M University.

The USCG's Freeport Station, which is located in Surfside across the FHC from the terminal, serves the Gulf Coast in search and rescue, law enforcement, and other missions. Emergency services, including medical, fire, and law enforcement, are available through the "911" service. USCG also has assets and personnel at the Galveston Station and the Marine Safety Unit (MSU) Texas City.

These groups work closely together to plan, drill, and integrate response plans for small and large-scale emergency response events for the petrochemical and industrial complexes, private business, port facilities as well as Freeport LNG's terminal.

Medical facilities in or near Brazosport include three hospitals (Brazosport Regional Health System, Sweeny Community Hospital, and Angleton Danbury Medical Center). The closest of these, Brazosport Regional Health System, is an acute care, not-for-profit hospital with 175 beds and the only Level III Trauma Center in Brazoria County. The hospital is located in Lake Jackson, 15 road miles from the Quintana Island terminal site and 11 road miles from the Pretreatment Plant site. Sweeny Community Hospital, located in Sweeny, is 30.3 miles from the

terminal site and 31.7 miles from the Pretreatment Plant site. Sweeny Community Hospital has 20 beds. Angleton Danbury Medical Center, located in Angleton, is 25.4 miles from the terminal site and 18.6 miles from the Pretreatment Plant site. Angleton Danbury Medical Center has 64 beds. The above hospitals, along with Mategorda Regional Medical Center in Mategorda County (within 20 miles of the Projects) all have trauma centers and together serve over 100,000 emergency patients annually.

The Brazoria County Sheriff's Department is located in Angleton, 21 road miles from the Quintana Island terminal site and 17 road miles from the Pretreatment Plant site. In addition, many of the local municipalities, including the cities of Freeport and Oyster Creek, maintain their own police departments. The Freeport Fire Department and the Oyster Creek Volunteer Fire Department provide fire protection services in the Project area.

We received numerous comments from the public complaining that there are no identified evacuation points that were acceptable for residents, campers, or visitors at the public beach to evacuate in the event of an incident at either the Liquefaction Plant or the existing terminal. Residents identified a point along the beach on the south side of Quintana Island that was a pick-up point for evacuation. After issuance of the draft EIS, we visited the site and found that there was limited to no ability for residents or visitors to reach the location. Typically, the Emergency Response Plan is required prior to construction and includes evacuation procedures. We are recommending in section 4.10.7 that Freeport LNG submit an updated Emergency Response Plan prior to construction for the Town of Quintana in the event of an emergency.

We also spoke to residents near the Pretreatment Plant who feared that evacuation routes would be cut-off in the event of an incident at the Pretreatment Plant. We analyzed the evacuation routes for Turtle Cove and Hide-Away on the Gulf, Oyster Creek, and Bridgepoint and concluded that all residents and visitors had acceptable evacuation routes should Levee Road be closed. In addition, should Route 332 be closed due to an incident at the Pretreatment Plant, visitors and residents of surfside would be able to leave via Bluewater Highway/Route 257.

Freeport LNG filed an Evacuation Plan with the FERC on May 14, 2014 as a result of FERC's data request (see appendix J). This initial Evacuation Plan describes Freeport LNG's public notification procedures, public evacuation procedures, potential available evacuation routes, including assembly areas, marine pickup points, land evacuation routes and marine evacuation routes as well as vessel transit routes. Additional information on the Evacuation Plan, and Emergency Response Plan are discussed in Section 4.10.7 Emergency Response.

4.8.3.2 School System

The City of Freeport and its surrounding communities (including the City of Oyster Creek and Town of Quintana) are part of the Brazosport ISD. For the 2011-2012 school year, the Brazosport ISD was rated as an "Academically Acceptable" district by the Texas Education Agency (potential ratings include Academically Unacceptable, Academically Acceptable, Recognized, and Exemplary).

The district has 19 schools (11 elementary, two middle, three intermediate, two high, one alternative) and 12,498 students for the 2011 - 2012 school year (TEA, 2013). Current capacity

within the Brazosport ISD is 13,586 students (Ritchie, 2011). Based on current enrollment, the school district has capacity for an eight percent increase in the student population. Within the district, the student-to-teacher ratio is 19:1.

4.8.3.3 Public Service Impacts and Mitigation

Liquefaction Project

Brazoria County has a well-developed infrastructure to provide health, police, fire, emergency, and social services. Because the non-local workforce would be small relative to the current population of the area and its available services, construction of the Liquefaction Project would result in minor temporary, or no impact on local community facilities and services such as police, fire, medical, and waste disposal services. Local communities have adequate infrastructure and community services to meet the needs of the non-local workers that would be required for the Liquefaction Project. Other construction-related demands on local agencies could include increased enforcement activities associated with issuing permits for vehicle load and width limits, local police assistance during construction to facilitate traffic flow, and emergency medical services to treat injuries resulting from construction accidents. Freeport LNG would not have a significant impact with respect to its electric, water, gas, and sewage disposal requirements. The Brazosport ISD has the capacity for an 8 percent increase in its student population (more than 1,000 additional students) and should be able to address any small increase in student population resulting from a percentage of construction workers bringing their families to the area.

Phase II Modification Project

The Phase II Modification Project would not adversely impact the availability of local community facilities, and necessary public services (*e.g.*, medical care, police, and fire protection) are generally in adequate supply (see section 4.8.3.1). It is unlikely that many non-local construction workers would relocate to the area, either with or without their families. Therefore, there should be no impacts on the Brazosport ISD resulting from increased student enrollment. Even if all non-local workers were to relocate their families to the Liquefaction Project area, about 210 new students might be enrolled in the Brazosport ISD, which would constitute a 1.6 percent numerical increase in the 2010-2011 student population of 13,000. Impacts on public services and infrastructure associated with operation of the Phase II Modification Project would be negligible given the small number of operational employees involved.

4.8.4 Housing

In Brazoria County there are more than 4,200 vacant housing units for rent, and another more than 5,100 vacant units defined by the census as seasonal, recreational, occasional, migrant use, (U.S. Census Bureau, 2010a) and the county offers more than 2,800 motel/hotel rooms with an estimated 52 percent occupancy rate (Source Strategies, 2011). In addition there are 27 recreational vehicle/trailer parks within 20 miles of the site offering an additional option for temporary housing. Although this information would appear to show substantial housing

availability, comments from individuals at the public hearing on the draft EIS stated that the above data does not reflect the current housing situation in terms of occupancy rates, which are very high. In May 2014, we contacted randomly chosen apartment complexes, representing approximately 450 units, in the Brazosport area and found only about 4 percent of the existing apartments at the complexes, were available for rent. Representatives of the apartment complexes noted an increasing difficulty in finding temporary (rental) accommodations.

As of May 30, 2014, there were about 310 homes/condos for sale in southern Brazoria County[21] and another 600 in northern Brazoria County. Freeport LNG provided data on new housing projects proposed indicating a substantial number of homes are or would be built in Brazoria County. However, the time of when these homes would be available, their affordability for construction workers, and whether construction workers would be willing to relocate to the area is uncertain. Table 4.8.4-1 shows additional information on housing characteristics.

Table 4.8.4-1

2010 Housing Characteristics in Brazoria County (2012 Estimates)

State/County	Owner Occupied (percent)	Renter Occupied (percent)	Median Value, Owner Occupied Units ($)	Median Contract Monthly Rent ($)	Vacancy Rate (percent)
Texas	62.3	37.7	$129,200	$831	11.7
Brazoria County	70.6	29.4	$146,900	$866	9.9

Source: U.S. Department of Commerce, Bureau of the Census, 2010 Census of Population and Housing and American Community Survey 1-year Estimates, (www.census.gov).

4.8.4.1 Housing Impacts and Mitigation

Liquefaction Project

As a result of the large increase in workers in the area and already high occupancy rates of existing housing, we conclude that existing housing and apartment availability near the Project may not be adequate and it would be likely that a large number of the construction workers would need to commute to the work site from outside the area. In addition, the proposed construction schedule for the Liquefaction Project could coincide with other demands for housing and temporary accommodations from tourism and other unrelated construction projects. As a result the increased demand may continue to cause very low motel/hotel room availability and/or price increases, along with increases in traffic associated with workers commuting from outside the area.

Phase II Modification Project

Despite the large workforce associated with construction of the Phase II Modification Project, the use of local labor to the extent practicable would minimize potential impacts on housing availability. In addition, there is adequate temporary housing in the form of motels, hotels and

[21] Redfin Search www.redfin.com. May 30, 2014. Studio and 1+ bedroom homes only.

rental properties to address the conservative estimate of 150 workers who might require housing. Independently, no appreciable impacts on housing are expected from the Phase II work as a result of Project operation, given the small number of operational employees involved.

4.8.5 Traffic

The Projects would generate roadway traffic related to deliveries of construction supplies, and traffic generated by construction workers along roadways to the Quintana Island terminal site, the Pretreatment Plant site, and along the Pipeline/Utility Line System.

Quintana Island is reached from the mainland and the City of Freeport by FM Route 1495, also known as Navigation Boulevard. Major roads connecting to FM Route 1495 in the Freeport area are SH 36 and FM Route 523. The Quintana Island terminal site is approached by turning left (east) from FM Route 1495 onto CR 723, which becomes Lamar Street parallel to, and just south of the ICW.

The Pretreatment Plant site is located on the west side of CR 690 (Levee Road), approximately 0.7 mile north of the intersection of CR 690 and SH 332. The site is regionally situated about 0.5 mile east of the nearest development in the City of Oyster Creek and about 3.5 miles northeast of downtown Freeport. Current road access to the site property is provided by two roads: 1) a private haulage road that runs for approximately 0.6 mile between an entrance on SH 332 (located about 0.9 mile southeast of the SH 332/FM Route 523 intersection) and the west side of Freeport LNG's property (located to the northeast of the intersection); and 2) CR 230, which runs for approximately 1.3 miles between an intersection with FM Route 523 to an intersection with the above-referenced haulage road adjacent to and west of Freeport LNG's property.

Access to the Pipeline/Utility Line System construction areas beyond Quintana Island would be via the existing local roadway network in Surfside Beach, CR 690 (Levee Road) and CR 792 (Suggs Road) in the Oyster Creek area, and FM Route 523 in the Stratton Ridge area.

4.8.5.1 Traffic Impacts and Mitigation

Liquefaction Project

Quintana Island Terminal Deliveries

Delivery of materials and equipment to the Quintana Island terminal site during construction would be accomplished by two primary methods:

- most major pieces of equipment (*e.g.*, compressors, vessels) and large volume bulk materials (*e.g.*, aggregate, structural steel) would be barged to the Liquefaction Plant site and off-loaded at the aggregate barge dock and new construction dock; and

- local supplies of construction consumables and smaller volume freighted materials would be transported to the site by truck.

The new aggregate barge dock would be located on the south shore of the ICW near the northwest corner of the Liquefaction Plant site; the new construction dock would also be located on the south shore of the ICW, approximately 1.1 miles east in the vicinity of existing Terminal Maintenance Building. At the aggregate barge dock, barges would be tied up to the spud breasting barge (unloading barge). At the construction dock, barges would be tied up to breasting dolphins and to the unloading platform. If loaded barges arrive ahead of schedule, they would be moored in the existing berthing area on the east side of the terminal site until they can be moved into position for unloading. Freeport LNG estimates that 300 to 450 barge visits would occur during facility construction.

Road transportation of materials, earthen fill, and equipment to the terminal site would generate at least 10 to 12 deliveries via tandem truck per day during construction, with a peak of at least 60 to 80 trips per day during the most active period. A similar number of trips by small, two-axle trucks would be anticipated. The large amount of fill material needed for the Liquefaction Plant, if trucked to the Quintana Island terminal, would generate adverse traffic impacts and inconvenience the residents of the Town of Quintana. It would also potentially cause increased roadway dust and debris. Freeport LNG has indicated its intent to limit truck deliveries to the extent practicable due to the potential for adverse impacts that a high trucking volume would have on Town of Quintana residents and to accommodate local weight restrictions on the FM 1495 Bridge and CR 723, Lamar Street.

Quintana Island Terminal Construction Worker Traffic

Construction workers would leave their vehicles at a dedicated parking lot on the mainland and would be bused to and from the construction site on Quintana Island. Coordination with Port Freeport has identified an area along FM Route 1495 that is within the Port secure area and was used for off-site parking during the Phase I Project. This area would be similarly used for off-site parking for the Liquefaction Project, having the advantage of safe and easy entry and exit from both SH 36 and FM Route 1495. This would limit the amount of traffic on CR 723, the single means of road access for the terminal and the Town of Quintana on Quintana Island. Parking would not be permitted on Quintana Island, with the exception of a limited number of contractor staff. Each bus journey from the parking lots to the construction site would take approximately 8 minutes. Each bus driver would make multiple trips. For an estimated average construction workforce of 1,000 persons, 12 buses would be needed (based on two trips per bus).

Freeport LNG has indicated that traffic control, particularly at the end of the work day when employees are leaving the mainland parking areas, would be handled through the use of contracted off-duty City of Freeport police and/or Brazoria County sheriff's deputies, or temporary traffic signals. During these times, traffic impacts would be at its most severe. As with construction traffic control for the Phase I Project, the cost of police assistance and traffic signals with traffic control for the Liquefaction Project would be borne by Freeport LNG.

Pretreatment Plant Site Deliveries

Direct deliveries of materials and equipment to the Pretreatment Plant site and Pipeline/Utility Line System construction areas would be by truck. Road transportation of materials and equipment to the Pretreatment Plant site would generate at least 10 to 12 deliveries via tandem

truck per day during construction, with a peak of 60 to 80 trips per day during the most active period. During construction, the substantial amount of fill required for the Pretreatment Plant would necessitate the delivery of large amounts of fill by truck. These trips, along with other deliveries could potentially have an adverse impact on local roadway traffic and inconvenience nearby residents, as well as issues with road dust and debris.

Pretreatment Construction Worker Traffic

During construction, use of CR 230 would be avoided or restricted to small trucks and cars because the road runs through a small residential area near the site. Construction worker parking would be provided at the Pretreatment Plant construction site, in a dedicated 14- to 18-acre portion of the temporary workspace. Until the two access roads between the Pretreatment Plant site and CR 690 are built, all commuter traffic would enter and leave via the existing haulage road that connects the property with SH 332. Overflow parking, if required, would be located at Freeport LNG's existing underground storage facility, located approximately 5.4 miles from the construction site. In this case, workers would be bused to and from the site. Freeport LNG has indicated that off-duty City of Freeport police and/or Brazoria County sheriff's deputies would be contracted to provide traffic control, as necessary.

Pipeline/Utility Line System Deliveries

Road transportation of materials and equipment for the Pipeline/Utility Line System would be transitory and would revolve predominantly around pipe deliveries and deliveries associated with HDD. This would result in approximately 130 to 150 tandem truck deliveries to various points along the system. As with construction of the Phase I sendout pipeline, a large percentage of pipeline welding would occur adjacent to CR 891 and the eastern Velasco Ditch. This would be the main area for truck deliveries of pipe joints and HDD-associated deliveries.

Pipeline/Utility Line System Construction Worker Traffic

Access to the Pipeline/Utility Line System construction areas beyond Quintana Island would be via the existing local roadway network in Surfside Beach, CR 690 (Levee Road) and CR 792 (Suggs Road) in the Oyster Creek area, and FM Route 523 in the Stratton Ridge area. Access is also available at several of the road crossing locations. However, area roads generally do not provide sufficient room and/or suitable traffic flow conditions for the temporary parking of personal vehicles during construction. As such, construction workers would leave their vehicles at ATWSs and/or off-site parking lots at existing Freeport LNG facilities, including the Stratton Ridge underground storage site. Where needed, the workers would be bused between the parking areas and the work sites.

Modeled Traffic Impacts

Quintana Island and the area of Freeport close to the terminal site, as well as the Brazosport region generally, are accustomed to notable fluctuations in road traffic flows due to their socioeconomic profile. Brazosport is characterized by a mix of traffic associated with industrial, construction, shipping, and recreational/tourism activities. Some local petrochemical and industrial complexes experience large daily inflows and outflows of vehicles during work shift

turnarounds and construction projects. Port Freeport experiences large increases in road traffic when vessels are being unloaded and commodities transported out of the area. Recreational and tourist traffic patterns vary seasonally, with most activity taking place at weekends and during special events.

Characteristic traffic conditions on any given roadway system are typically measured and categorized according to Level of Service (LOS), which is a rating system used in traffic engineering to measure the effectiveness of the operating conditions of roadways and intersections. Each level is used to describe traffic flow in terms of delay experienced by motorists. Several variables impact the quality of traffic flow, including speed, travel time, vehicular delays, traffic interruptions, and the freedom to maneuver.

There are six LOS levels ranging from "A" to "F". Level A is defined as being ideal flow conditions with little or no delay, whereas Level F is defined as conditions where extreme delays may be encountered.

Based on LOS standards, Freeport LNG modeled existing traffic flow patterns in the Liquefaction Project area and any changes in these patterns that might be anticipated during facility construction and operation. Modeling was performed for two construction years - 2015 and 2018 - and incorporated known planned and on-going construction projects (*e.g.,* Dow ethylene plant) in the Brazosport area.

Modeling of traffic volumes during peak construction activities associated with the Liquefaction Project and Phase II Modification Project combined would result in a LOS of F for SH 288/SH 36, FM Route 1495/Gulf Boulevard, SH 36/FM Route 1495, FM523/SH 332, and SH332/CR690 during certain times of the construction work. However, the use of traffic mitigation strategies can reduce all of these intersections to a worst case of level D or better. These mitigation strategies include use of flagmen and uniformed traffic control during construction and in some cases improvements to the intersections to allow for better traffic flow as outlined in Freeport LNG's Traffic Impact Study but would result in reduced traffic flow and on local traffic arteries in Brazoria County and near the Town of Quintana.

Transportation Management Plan

Since issuance of the draft EIS, Freeport LNG submitted a Transportation Management Plan (see appendix I) outlining traffic and transportation mitigation measures. The Transportation Management Plan addresses routes and intersections that would be heavily impacted by the transportation of Project construction workers and materials to the Projects. Traffic control measures including busing of construction workers, uniformed traffic control, temporary traffic signals, creation of access roads, and improvements at intersections, would reduce impacts on traffic flow on these routes and at intersections to the extent possible. However, the Projects would still result in a significant and unavoidable impacts on the residents of the Town of Quintana during construction of the Liquefaction and Phase II Modification Projects. For the wider Brazoria County, Freeport LNG's Traffic Management Plan would mitigate these impacts and traffic would not be significant.

Phase II Modification Project

Phase II Modification Project Deliveries

Delivery of materials and equipment to the terminal site would be accomplished as follows:

- large commodities and bulk materials associated with construction of the Phase II dock would be delivered to the site via 10 to 12 barge visits over the construction period. Because construction would generally occur from within the berthing area, off-loading of the materials onto a construction dock would not occur. In those relatively infrequent cases where Freeport LNG's existing construction dock on the ICW is utilized for receipt of barged commodities and materials, the barges would be tied up to the spud breasting barge (unloading barge).
- Local supplies of construction consumables and smaller volume freighted materials would be transported by truck.

The existing construction dock is located on the south shore of the ICW adjacent to the terminal (see figure 1-2). Barge cargo can be stored at Port Freeport until needed at the site. Alternatively, if loaded barges arrive ahead of schedule, they would be moored in the berthing area on the east side of the terminal site until they can be moved into position for unloading.

Road transportation of materials and equipment to the site would generate, on average, 10 to 12 deliveries via tandem truck per day during construction, with a peak of 15 to 20 trips per day during peak construction in addition to those required for the Liquefaction Plant. A similar number of trips by small, two-axle trucks can be expected. We are recommending that Freeport LNG prepare and utilize a Transportation Management Plan for the Projects that would mitigate transportation impacts as much as practicable.

Phase II Modification Project Construction Worker Traffic

As with the Phase I Project, construction workers would park their vehicles at dedicated parking lots on the mainland and would be bused to and from the Quintana Island terminal similar to that for the Liquefaction Project. For an estimated construction workforce of 300 persons, seven buses would be needed (based on two trips per bus) in addition to that required for the Liquefaction Project.

The same traffic controls would be implemented as with the Liquefaction Project. Impacts on traffic flows on Quintana Island or elsewhere as a result of operation of the Phase II Modification Project, when combined with the operational traffic for the Liquefaction Project, would be minor given the small number of permanent employees involved.

4.8.6 Vessel Traffic

4.8.6.1 Vessel Traffic Impacts and Mitigation

Liquefaction Project

The proposed facilities are designed such that the addition of liquefaction capability would not preclude the terminal from operating in vaporization or sendout mode as business conditions dictate. Having dual liquefaction and regasification capabilities does not result in the terminal requiring any increase in the number of vessel transits and would not exceed thresholds authorized under the Commission's 2006 Order approving the Phase II Project.

We did receive comments regarding the security procedures and security zone around an LNG tanker as it come into or leaves port. These procedures were approved under the original Freeport LNG Project as described in Section 4.12.5.1, 4.12.5.2, 4.12.5.3 and 4.12.5.6 of the final EIS issued in May 2004. While 200 vessels were authorized in the original project and 200 more were authorized in the Phase II Project, few vessels have visited the existing Freeport LNG Quintana Island terminal. Thus, local residents would see a large rise in LNG vessel visits in comparison to what they are actually seeing right now. These short closures of the ICW and Brazos River for security reasons would happen while the vessel is maneuvering to enter or leave the berth. This could be an inconvenience for other users of the waterways.

It is unlikely that LNG import and export activities would occur concurrently: over any given period and as dictated by market conditions, vessels visiting the terminal would either be delivering LNG for regasification or taking LNG on board for export. The Liquefaction Project would not result in any additional vessel transits to/from the terminal beyond the level accommodated by current authorizations, and thus no vessel traffic impacts are anticipated.

Phase II Modification Project

Both the Phase I and Phase II docks have been designed with the capability to off-load LNG from, or load LNG onto, visiting vessels. The Phase II dock would have the capability of up to 200 vessels per year. Simultaneous transferring at both docks would accommodate up to 400 total vessels per year. The Phase II Modification Project would not result in any additional vessel transits to/from the terminal beyond the level accommodated by current authorizations.

In an effort to identify and minimize potential impacts on other waterway users and the public, Freeport LNG has consulted with elected officials, marine facility operators, local residents, and representatives of the USCG, Port Freeport, and Brazos Pilots regarding LNG vessel safety and movements associated with the approved Phase II dock. On November 11, 2011, after reviewing the possible navigational safety and security concerns associated with the Phase II Modification Project, the USCG informed Freeport LNG that neither submission of a Letter of Intent (LOI) nor a revision to the existing Waterway Suitability Assessment (WSA) was required since the Phase II Modification Project would not result in an increase in vessel size and/or the frequency of marine traffic.

Under current Port Freeport operating rules, LNG carriers would enter and leave the berth during daylight hours only, under one-way traffic conditions, and with the necessary tugs in attendance. Port entry, docking, cargo operations, undocking, and departure would typically take less than 24 hours. The potential impacts of LNG operations on other port traffic have been discussed in detail with Port Freeport officials and vessel pilots in the Brazos Pilots. Both groups maintain that LNG traffic would not create substantial delays for other deep draft traffic due to the short distances involved in port entry and departure transits, along with the planned availability of dedicated tugs. The Pilots estimate that the worst possible delay would be less than 30 minutes.

Berth placement and design take into consideration the establishment of USCG- mandated safety zones around the LNG carriers while they are moored. The docks would be set back far enough from the edge of the navigation channel such that safety zone entry restrictions would not hamper other traffic. Recent coordination between Freeport LNG and the USCG regarding the Phase II Modification Project indicates that, because the proposed Project would not result in an increase in the size and/or frequency of LNG marine traffic, the currently proposed Phase II Modification Project would require neither submission of a LOI nor revision of the existing WSA (USCG, 2011).

4.8.7 Environmental Justice

Executive Order 12898 on Environmental Justice requires that each federal agency address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. Federal agencies' responsibilities under this Order apply equally to Native American programs. Based on data from the U.S. Census Bureau (2010a), racial/ethnic population and income statistics for the Liquefaction Project are presented at state, county, and local levels in table 4.8.7-1.

As shown in table 4.8.7-1, in terms of minority representation, some of the communities in the immediate vicinity of the Projects have a higher percentage of minority population and higher poverty rates than the county or State of Texas and others have a lower percentage of minority population and lower poverty rates than the county or State of Texas. While a relatively high percentage of the City of Freeport's population lives below the poverty level, Freeport LNG's continued payment of significant local taxes would help to support this area economically.

To evaluate information more specific to the area affected by the Liquefaction Project, the FERC assessed environmental justice statistics at the U.S. Census block group level, which is the smallest available geographic census unit. The information is presented below with respect to the Liquefaction Plant, the Pretreatment Plant, and the Pipeline/Utility Line System work.

Liquefaction Plant

The estimated percentage of the population living below the poverty limit and percentage of the population that is a minority was determined for each census block group within a study area that extends 0.5 mile from the Liquefaction Plant work area. Table 4.8.7-2 shows the poverty and minority data for the Liquefaction Plant area. This area covers three census block groups with the percent living below poverty ranging from 5.8 to 16.2 percent. Within these three census

block groups, minorities constitute 10.8 to 63.4 percent of the population. The location of the block groups are shown in Figure 4.8.7-1.

Table 4.8.7-1

Freeport LNG Liquefaction Project
Existing Ethnic and Economic Conditions

State/County	Race/Ethnicity (percent)						Total Minorities b/	Annual Per Capita Income c/	Percent Below Poverty Level c/
	White	Black	Native American	Asian	Hispanic or Latino a/	Other			
Texas	70.4	11.8	0.7	3.4	37.6	13.3	54.7	$24,870	16.8
Brazoria County	70.1	12.1	0.6	5.5	27.7	11.7	46.8	$27,529	10.6
City of Freeport	65.0	12.2	0.8	0.5	59.9	21.5	73.5	$16,866	19.4
City of Oyster Creek	83.5	3.8	1.6	0.4	23.5	7.6	31.4	$18,108 b/	14.6
Town of Quintana	80.4	1.8	0.0	1.8.0	26.8	4.0	33.9	$27,864	8.3

Notes
Source: U.S. Census Bureau, 2010a, unless otherwise indicated
a/ The Census Bureau treats ethnicity and race separately. Hispanics may be of any race, so also are included in applicable race categories; thus, the Hispanic/Latino percentages should not be added to percentages for other racial categories.
b/ Total minorities is equal to total population minus white non-Hispanic population
c/ U.S. Census Bureau, 2010b

Table 4.8.7-2

Poverty and Minority Populations in Census Block Groups within ½-mile of Liquefaction Plant

Census Tract	Block Group	Percent Below Poverty a/	Percent Minority b/
Census Tract 6644	Block Group 2	5.8	63.4
Census Tract 6642	Block Group 3	10.2	10.8
Census Tract 6642	Block Group 2	16.2	32.9

a/ U.S. Census America Community Survey 2008 – 20012
b/ U.S. Decennial Census, 2010

Pretreatment Plant

The study area for the Pretreatment Plant extends 0.5 mile from the Pretreatment Plant site and includes a single census block group (Census Tract 6642, Block Group 2). In that group, 16.2 percent of population lives below the poverty level and minorities represent 32.9 percent of the population (U.S. Census, 2010a).

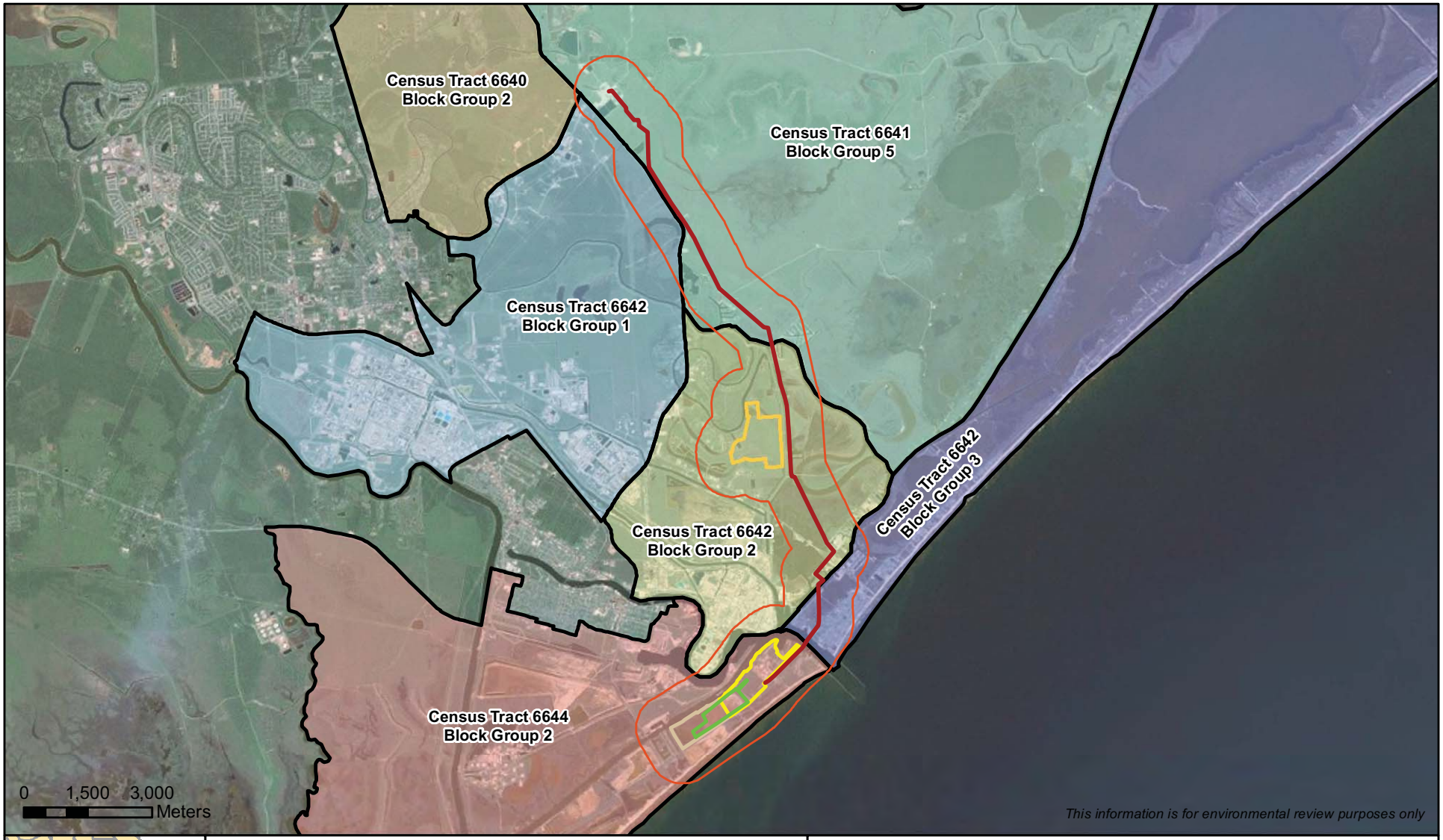


Figure 4.8.7-1
Freeport LNG - Liquefaction Project
Environmental Justice Areas
Brazoria County, Texas

FILE: R:\Projects\GIS_2013\181462 Freeport LNG liquefaction\mxd\Fig 4.8.7-1 EJ 2014-05-29.mxd | REVISED: 5/30/2014 | SCALE: 1:132,000 DRAWN BY: GSTUDWELL

Pipeline/Utility Line System

The study area for the Pipeline/Utility Line System extends 0.5 mile from the pipeline centerline and includes six census block groups (see table 4.8.7-3). The percent of the population that lives below the poverty line here ranges from 3.5 to 16.2 percent and the percentage of the population represented by minority's ranges from 10.8 to 63.4 percent.

Table 4.8.7-3

Poverty and Minority Populations in Census Block Groups within ½-mile of Pipeline/Utility lines

Census Tract	Block Group	Percent Below Poverty a/	Percent Minority b/
Census Tract 6644	Block Group 2	5.8	63.4
Census Tract 6642	Block Group 3	10.2	10.8
Census Tract 6641	Block Group 5	3.5	27.5
Census Tract 6642	Block Group 1	20.8	23.7
Census Tract 6642	Block Group 2	16.2	32.9
Census Tract 6640	Block Group 2	9.1	41.4

a/ U.S. Census America Community Survey 2008 – 20012
b/ U.S. Decennial Census, 2010

The analysis shows that some block groups have a higher percentage of minority population than Brazoria County and other block groups have a lower percentage of minority population than Brazoria County (*e.g.*, 10.8 percent to 63.4 percent minorities in the block groups affected versus 48.4 percent minorities in Brazoria County). The block group with a 63.4 percent minorities (Census Tract 6644, Block Group 2) could be considered an Environmental Justice area as it has approximately 26 percent higher percentage of minorities than the county. However, other block groups affected by the Projects have a much lower percentage of minorities affected than the county. Impacts from the facility are not differentiated across minority and non-minority areas as both of these areas are affected. The same is true for percent of persons living below the poverty line: this percentage ranged from 3.5 to 16.2 percent in the block groups affected versus a poverty rate in Brazoria County of 10.6 percent. Accordingly, we find the Liquefaction Project does not disproportionately affect minority populations or low income populations. In addition, Freeport LNG has minimized impacts during construction and operation to the extent possible to reduce effects on people living in the area. The Phase II Modification Project is located in the same area as the Liquefaction Plant, and the above results apply to this work as well.

Under Executive Order 12898, each federal agency must ensure that public documents, notices, and hearings are readily available to the public. The mailing list for the Projects was initiated when the FERC's NOI was issued, and has been continually updated during the EIS process. All property owners affected by the Projects, as identified by Freeport LNG, received the notices about the Projects without any distinction based on minority or income status. The distribution list for the final EIS included local newspapers and libraries; and all landowners, miscellaneous individuals, and environmental groups who provided scoping comments or asked to remain on the mailing list.

The FERC held two public scoping meetings in Brazoria County to provide residents, municipalities, special interest groups and federal and state regulatory agencies an opportunity to comment. The date and location of the meetings were included in both NOIs. Throughout this document we identify impacts on environmental resources that potentially may have a direct or indirect effect on the local population. We have not identified any disproportionately high and adverse human health or environmental effects on minority and low-income communities or Native American groups.

With our Traffic Management Plan recommendation we conclude that the traffic impacts would be mitigated and would not have a significant adverse impact on Brazoria County. In general, construction and operation of the Projects would not have a significant adverse socioeconomic impact on the local population, including public services, property values, or disadvantages communities.

4.9 CULTURAL RESOURCES

Section 106 of the NHPA of 1966, as amended, requires that federal agencies consider the effect that their undertakings would have on historic properties, and afford the ACHP and opportunity to comment. An undertaking includes any activity for which a federal agency has jurisdiction, including licensing or certification. Historic properties are prehistoric or historic districts, sites, buildings, structures, objects, landscapes, or properties of traditional, religious, or cultural importance, which are listed or eligible for listing on the NRHP. Freeport LNG, as a non-federal party, is assisting the FERC in meeting our obligations under Section 106, by providing data, analyses, and recommendations in accordance with the ACHP's implementing regulations at 36 CFR 800.2(a)(3). While we have delegated the gathering of cultural resources information to Freeport LNG, the Commission retains its authority to make final findings and determinations. This section discusses the status of the Projects' compliance with Section 106. The steps in the process to comply with Section 106 include consultations, identification of historic properties, assessment of effects, and resolution of any adverse effects.

4.9.1 Consultations

We sent copies of our NOIs for the Projects to a wide range of stakeholders, including the ACHP, U.S. Department of the Interior (USDOI), NPS, USDOI Bureau of Indian Affairs (BIA), the Texas State Historic Preservation Office (SHPO), and Indian tribes which may have an interest in the area. The NOIs contained a paragraph about Section 106 of the NHPA, and stated that we use the notice to initiate consultations with the SHPO, and to solicit their views, and those of other government agencies, interested Indian tribes, and the public on the potential effects on historic properties.

The USEPA responded to our NOIs in a letter dated August 15, 2012. The USEPA requested that our EIS for the Liquefaction Project describe the process and outcome of government-to-government consultations between the FERC and interested Indian tribes. This is described below. The USEPA also requested that the FERC consult with the SHPO, discuss impacts on historic properties, and address compliance with Section 106 of the NHPA. This is also

described below. No other comments on cultural resources issues were received in response to our NOIs.

Through a review of Freeport LNG's application, and independent research, we identified Indian tribes that may have historically used or occupied the area, and may attach religious or cultural significance to historic properties in the Area of Potential Effect (APE), in accordance with Section 101(d)(6)(B) of the NHPA. In addition to sending our NOIs to potentially interested Indian tribes, on September 26, 2011 we wrote letters to the Alabama-Coushatta Tribe, Caddo Nation, Tonkawa Tribe, and Wichita and Affiliated Tribes, describing the Liquefaction Project and requesting comments. No Indian tribes responded to our letters.

In addition to the FERC's consultation program, Freeport LNG, through its environmental consultant (NRG), also communicated with Indian tribes it thought may have an interest in the Projects. On December 3, 2010, NRG sent letters by certified mail to the Tonkawa Tribe of Oklahoma, the Caddo Nation of Oklahoma, and the Alabama-Coushatta Tribe of Texas. The letters contained a project description and requested comments. On April 20, 2012, a second set of letters were sent to the three tribes, as well as the Wichita and Affiliated Tribes of Oklahoma, providing an update on Freeport LNG's current activities (Liquefaction Project, and Phase II Modification Project). To date, no comments have been filed by any of the tribes in response to the Freeport LNG letters.

Freeport LNG also communicated with the Texas SHPO. On November 19, 2010, NRG requested that the SHPO participate in the FERC pre-filing environmental review process for the proposed Liquefaction Project. On April 20, 2012, NRG sent another letter to the SHPO providing an update about the Liquefaction Project. Freeport LNG provided the SHPO with copies of its cultural resources reports, and the SHPO reviews of those reports are discussed below.

4.9.2 Overview and Survey Results

4.9.2.1 Area of Potential Effect

Since the Liquefaction Project contains three distinct components (i.e., the Liquefaction Plant, a Pretreatment Plant, and a Pipeline/Utility Line System) the APE and cultural resources survey results for each is discussed separately below. Portions of the APE for the Phase II Modification Project and components of the Liquefaction Project were previously investigated for cultural resources during the prior Freeport LNG Phase I Project and Phase II Project overviews and surveys, and a summary of that work is discussed below.

4.9.2.2 Liquefaction Project Facilities

Liquefaction Plant at the Quintana Island Terminal

The Liquefaction Plant facilities would be located within the western portion of the existing Quintana Island terminal and on adjacent industrial-zoned land that was formerly a DMPA. The

Liquefaction Plant facilities, and the associated laydown area at the Seaway DMPA, cover a total of about 305 acres. The Phase II Modification Project is also located at Quintana Island terminal.

The first overview report covering the Phase I Project was produced by Panamerican Consultants, Inc. (Panamerican) in 2002 (Cinquino *et al*., 2002). This report addressed 181 acres at the Quintana Island terminal, and was basically a literature review and site file search. Four previously recorded archaeological sites (41BO116, 41BO123, 41BO135, and 41BO175) were identified on Quintana Island.

In October 2004, Freeport LNG's contractor SWCA produced a cultural resources survey report for the Quintana Island terminal (Lawrence *et al.,* 2004). The survey of the "tank site" concentrated on 89 acres, excluding dredged materials and a marsh. No cultural materials were found in this area. Investigations of 48 acres at the "marine terminal" found 20 features related to the historic Quintana town site (previously recorded site 41BO135). SWCA evaluated those remains as not qualifying for nomination to the NRHP. In addition, previously recorded site 41BO123 was confirmed as the extant remains of the Quintana Cemetery.

In a letter dated October 20, 2004, the SHPO stated that the portion of the historic Quintana townsite (41BO135) located within the proposed Project construction area is not eligible for the NRHP. Further, the SHPO agreed with the recommendation that the Quintana Cemetery should be avoided. We concur.

In April 2005, Freeport LNG's contractor HRA Gray & Pape conducted a cultural resources survey of 48 acres at Quintana Island for the Phase II Project. No new cultural resources were found during that investigation (Pickering and Hughley, 2005). On June 2, 2005, the SHPO accepted the HRA Gray & Pape report, and stamped the cover letter "No Historic Properties Affected." We concur.

There are portions of Quintana Island where the Liquefaction Project facilities would be located that have not been covered by cultural resources surveys. This includes portions of the liquefaction trains area, the stormwater collection basin, and the temporary construction laydown area on the Seaway DMPA at the western end of the proposed terminal. Freeport LNG estimated that there are about 146 acres of proposed construction workspace for the Liquefaction Plant outside of the area previously investigated for the Phase I and Phase II Projects. Freeport LNG characterized this unsurveyed tract as DMPA land. In its April 20, 2012 letter to the SHPO, NRG requested concurrence with its recommendation that no further cultural resources surveys be conducted for the Liquefaction Project at or adjacent to the Quintana Island terminal, or along the route of the Pipeline/Utility Line System route, except for the electric power line. We believe the SHPO concurred with that recommendation, when it stamped the NRG letter on May 8, 2012, with its "No Historic Properties Affected" finding. The SHPO that no additional archaeological investigations should be necessary within the unsurveyed portions of the Liquefaction Plant at the Quintana Island terminal and on DMPA land, because those areas have a low potential to contain historic properties.

We received comments from the public regarding the purchase of many homes by Freeport LNG on Quintana Island and how this would affect the future viability of the historic Town of

Quintana. Freeport LNG has not indicated what they intend to do with these homes. The removal of homes and any associated impact to historic resources must comply with Section 106 requirements including consultation with the SHPO as applicable.

Pretreatment Plant

The proposed Pretreatment Plant would be located about 2.5 miles north of the Quintana Island terminal and about 3.5 miles southeast of Freeport LNG's Stratton Ridge gas storage facilities, along the route of the Pipeline/Utility Line System corridor. The Pretreatment Plant would occupy about 104.2 acres within a larger tract of 276 acres for which Freeport LNG has an option to purchase. Formerly, there was a sand extraction operation at this location.

In July 2012, HRA Gray & Pape produced a report that documented a cultural resources inventory of the proposed Pretreatment Plant (Nash *et al.*, 2012). A total of 309 acres were surveyed at this location. One group of structures, consisting of a corral and barn, were noted adjacent to the tract. These structures are still in use and were recommended as not qualifying for the NRHP.

HRA Gray & Pape provided the SHPO with a copy if its survey report for the Pretreatment Plant on June 18, 2012. On July 3, 2012, the SHPO stamped the cover letter with its finding of "No Historic Properties Affected." We concur.

Pipeline/Utility Line System

We consider the APE for the Pipeline/Utility Line System to be about 11.3-miles-long between Quintana Island and the INEOS Plant, covering about 127 acres combined. Most of the route for the Pipeline/Utility Line System would be collocated adjacent to Freeport LNG's existing 9.6-mile-long sendout pipeline between the Quintana Island terminal and the Stratton Ridge Meter Station. The exceptions, outside of the existing pipeline route, include:

- 2.9-mile-long electric line to the Liquefaction Plant;
- 0.4-mile-long Pipeline/Utility Line System route between the existing sendout pipeline right-of-way and the newly proposed Pretreatment Plant;
- 2.0-mile-long electric line to the Pretreatment Plant;
- 0.7-mile-long Pipeline/Utility Line System route between Stratton Ridge gas storage facilities and the existing sendout pipeline right-of-way; and
- 1.0-mile-long Pipeline/Utility Line System route between the end of the existing sendout pipeline near the existing Stratton Ridge Meter Station and the INEOS Plant.

Cultural resource investigations along the route of the sendout pipeline date back to the 2002 Panamerican overview report. That report identified four previously recorded sites (41BO4, 41BO70, 41BO114, and 41BO115) within 150 feet of the pipeline route (Cinquino, M., *et al.*, 2002).

In 2004, SWCA inspected a 120-to-150-foot-wide corridor along the proposed route of the 9.6-mile-long sendout pipeline, covering about 107 acres. Trenching at the previously recorded location of site 41BO125 (historic fort and townsite of Velasco) found scattered shells but no cultural artifacts or features. Previously recorded site 41BO114 was found to be outside of the extra workspace, and previously recorded site 41BO115 could not be relocated. SWCA concluded that no historic properties would be affected along the pipeline route, and the SHPO agreed on October 20, 2004. We concur.

In 2005, HRA Gray & Pape documented a survey covering about 249 acres at the Stratton Ridge gas storage facilities area. No cultural resources were found during that survey. On June 2, 2005, the SHPO agreed that no historic properties would be affected in the surveyed area. We concur. This surveyed area would contain the proposed location of the 0.7-mile-long Pipeline/Utility Line System route within the Stratton Ridge gas storage facility, including an 8-inch-diameter nitrogen line and an 8-inch-diameter water line. No other cultural resources investigations are necessary for those facilities.

In a letter to the SHPO dated August 23, 2010, HRA Gray & Pape discussed a 1.0-mile-long pipeline route for Freeport LNG's proposed NGL Extraction Project (Nash, 2010). That letter recommended that no field surveys be required, and the SHPO agreed on September 13, 2010. We cannot concur, because the copy of the report filed in LNG's application to the FERC did not contain any project maps, as required in the OEP's *Guidelines for Reporting on Cultural Resources Investigations for Pipeline Projects* (December 2002 version). It is possible that this report covers the proposed 1.0-mile-long Pipeline/Utility Line System route between the Stratton Ridge Meter Station and the INEOS Plant, outside of the existing sendout pipeline right-of-way. However, we cannot make this finding based on the data filed with the FERC, nor are we convinced by the report that historic properties could not exist along the unsurveyed Pipeline/Utility Line System route, and request this information per the recommendation in section 4.9.4.

The 2.9-mile-long 137-kV electric line from the CenterPoint substation in City of Freeport to the Quintana Island Liquefaction Plant does not require a cultural resources survey. Freeport LNG stated that the line would be placed on existing aerial infrastructure (poles), and therefore, installation of the new line would cause no ground disturbance or new visual impacts that may adversely affect historic properties. According to Freeport LNG, cultural resources information for the existing infrastructure was provided during the Phase I Project.

In a November 14, 2012 response to the FERC staff's October 25, 2012 data request, Freeport LNG stated that it had not yet conducted a survey of the proposed electric line to the Pretreatment Plant, due to routing issues and lack of landowner access. In Freeport LNG's data response of July 1, 2013, Freeport LNG stated it still did not have land owner permission to conduct such a survey, that a different company (CenterPoint) was in charge of the electrical line, and therefore that Freeport LNG does not have access to the cultural resource reports for the electric line.

4.9.3 Unanticipated Discoveries Plan and Cemetery Avoidance Plan

Freeport LNG originally prepared a *Plan Addressing Unanticipated Discoveries of Cultural Resources and Human Remains* for the Phase II Project that was accepted by the SHPO on June 2, 2005. However, to address FERC staff comments on that plan, for the Liquefaction Project Freeport LNG filed a modified *Unanticipated Discoveries Plan* as appendix 4D of Resource Report 4 in Freeport LNG's application. In its April 20, 2012 letter to the SHPO, NRG requested review of the revised plan. We determined that the SHPO accepted that plan when it accepted the April 20, 2012 letter using a stamp dated May 8, 2012. We also find Freeport LNG's revised *Unanticipated Discoveries Plan* to be acceptable.

The October 2004, SWCA survey report contained a protection plan for the Quintana Cemetery (Lawrence *et al.,* 2004). SWCA recommended that a three-foot-high earthen levee be built around the cemetery, secured with a chain-link fence on the outside of the berm, with controlled fenced access to the cemetery across the Velasco Drainage District levee. We believe that the SHPO accepted the recommendation to protect the historic Quintana Cemetery (site 41BO123) when it accepted the SWCA report on October 20, 2004.

Freeport LNG attached a copy of its *Cemetery Avoidance Plan* as appendix 4-C of its application to the FERC for the Liquefaction Project. The Quintana Cemetery is currently located within the existing Freeport LNG terminal, and is surrounded by a chain-link fence. An existing 21-foot-high storm protection levee should separate construction activities associated with the Liquefaction Project, including the Pipeline/Utility Line System route, from the cemetery. In addition, the terminal's secure area fence would be relocated higher up on the levee slope, and an infrared detection system would be installed. Also, Freeport LNG would hire a qualified professional archaeologist to monitor construction along the Pipeline/Utility Line System route across Quintana Island and through the community of Surfside. We find this plan acceptable.

4.9.4 Status of Compliance with the NHPA

No traditional cultural properties, burials, or sites of religious significance to Indian tribes were identified in the APE by the NPS, BIA, SHPO, Freeport LNG and its consultants, or the Indian tribes contacted by the FERC. We agree with the SHPO that no historic properties would be adversely affected in areas that have been inventoried.

We have not yet completed the process of compliance with Section 106, because not all Project facilities have been inventoried. Freeport LNG has not documented that the all elements of its Pipeline/Utility Line System and electric line for the Pretreatment Plant have been covered by cultural resources surveyed, outside of the existing 9.6-mile-long sendout pipeline route between Quintana Island and the Stratton Ridge gas storage facility. In addition, we note that with respect to the use of the Seaway DMPA for construction laydown, Freeport LNG did not consult with the Texas SHPO or perform a cultural resource survey based on the premise that the area is composed of highly disturbed dredge material and therefore would not contain cultural resources. The FERC must ensure that our responsibilities under the NHPA and the ACHP's implementing regulations for Section 106 at 36 CFR 800 are met. Therefore, **we recommend that:**

Freeport LNG should not begin construction of the Pretreatment Plant electric transmission line, and Pipelines/Utilities Line System and use of ancillary areas for staging, storage, and temporary work areas (including the Seaway DMPA) and new or to-be-improved access roads, until:

a. **Freeport LNG files with the Secretary:**

   (1) remaining cultural resources survey report(s) and their attachments for work proposed by Freeport LNG;
   (2) site evaluation report(s) and avoidance/treatment plan(s), as required; and
   (3) comments on the cultural resources reports and plans from the SHPO;

b. **the ACHP is afforded an opportunity to comment if historic properties would be adversely affected; and**

c. **the FERC staff reviews and the Director of OEP approves the cultural resources reports and plans, and notifies Freeport LNG in writing that treatment plans/mitigation measures (including archaeological data recovery) may be implemented and/or construction may proceed.**

All materials filed with the Commission containing location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: "CONTAINS PRIVILEGED INFORMATION - DO NOT RELEASE."

4.9.5 Phase II Modification Project

The Phase II Modification Project is located at the existing Quintana Island terminal. Freeport LNG has prepared a cultural resources overview report for the area of the Phase II Modification work and concluded that no impacts on cultural resources would occur. The Texas SHPO has concurred with this recommendation.

4.10 RELIABILITY AND SAFETY

The transportation of natural gas by pipeline involves some risk to the public in the event of an accident and subsequent release of gas. The pipeline facilities as part of Liquefaction Project are identified in table 2.1.3-1 and include the BOG pipeline and interconnects. In addition to the natural gas pipelines, there would be a water pipeline, nitrogen pipeline, and a nonjurisdictional NGL pipeline.

In regards to natural gas pipelines, the greatest hazard is a fire or explosion following a major pipeline rupture. Methane (CH_4), the primary component of natural gas, is colorless, odorless, and tasteless. It is not toxic, but is classified as a simple asphyxiate, possessing a slight

inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death.

As identified in section 1, the proposed facilities must be designed, constructed, operated, and maintained in accordance with the DOT Minimum Federal Safety Standards in 49 CFR 192. The regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures.

The DOT pipeline standards are published in Parts 190-199 of Title 49 of the CFR. For example, Part 192 specifically addresses natural gas pipeline safety issues, prescribes the minimum standards for operating and maintaining pipeline facilities, and incorporates compressor station design, including ESDs and safety equipment (sections 192.163-192.173). Part 192 also requires a pipeline operator to establish a written emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency.

We received a comment from the public questioning whether the gas coming into the treatment plant was impure and whether this would have an effect on the pipeline. The impurities in the pipeline quality natural gas that would be removed by the Pretreatment Plant are common in natural gas. They are being removed purely to facilitate the liquefaction of natural gas. The USDOT pipeline safety standards are the same for re-gasified LNG as for typical pipeline quality natural gas.

These standards, along with advances in pipeline minimize the potential for accidental gas leakage or other system failure. The operator must also establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a gas pipeline emergency and report it to appropriate public officials.

4.10.1 LNG Regulatory Agencies

Three federal agencies share regulatory authority over the siting, design, construction and operation of LNG terminals: the USCG, the USDOT, and the FERC. The USCG has authority over the safety of an LNG facility's marine transfer area and LNG marine traffic, as well as over security plans for the entire LNG terminal facility and LNG marine traffic. The USDOT establishes federal safety standards for siting, construction, operation, and maintenance of onshore LNG facilities, as well as for the siting of marine cargo transfer systems at waterfront LNG plants. Those standards are codified in Title 49, CFR, Part 193 (Part 193 or 49 CFR 193). Under the NGA and delegated authority USDOE, the FERC authorizes the siting and construction of LNG import and export facilities.

In 1985, the FERC and USDOT entered into a MOU regarding the execution of each agency's respective statutory responsibilities to ensure the safe siting and operation of LNG facilities. In addition to FERC's existing ability to impose requirements to ensure or enhance the operational reliability of LNG facilities, the MOU specified that FERC may, with appropriate consultation with USDOT, impose more stringent safety requirements than those in Part 193.

In February 2004, the USCG, USDOT, and FERC entered into an Interagency Agreement to ensure greater coordination among these three agencies in addressing the full range of safety and security issues at LNG terminals, including terminal facilities and tanker operations, and maximizing the exchange of information related to the safety and security aspects of the LNG facilities and related marine operations. Under the Interagency Agreement, the FERC is the lead federal agency responsible for the preparation of the analysis required under NEPA for impacts associated with terminal construction and operation. The USDOT, and USCG when necessary, participate as cooperating agencies.

As part of the review required for a FERC authorization, FERC staff must ensure that all proposed facilities would operate safely and securely. The design information that must be filed in the application to the FERC is specified by Title 18 CFR, Part 380.12 (m) and (o). The level of detail necessary for this submittal requires the sponsor to perform substantial front-end engineering of the complete facility. The design information is required to be site-specific and developed to the extent that further detailed design would not result in changes to the basis of design, operating conditions, major equipment selections, equipment design conditions, or safety system designs which we considered during our review process. FERC's filing regulations also require Freeport LNG to identify how its proposed design would comply with USDOT's siting requirements of 49 CFR 193, Subpart B. As part of our NEPA review, we use the Freeport LNG's information, developed to comply with USDOT's regulations, to assess whether or not the facility would have a public safety impact. As a cooperating agency, USDOT assists the FERC in evaluating whether Freeport LNG's proposed siting meets those requirements.

The following sections contain the conclusions of our reliability and safety analysis and incorporate comments of the USDOT as a cooperating agency. In accordance with the working arrangements allowed by the 1985 MOU, the USDOT has reviewed our analysis of the Freeport LNG's compliance with the requirements in Part 193 for the Phase II Modification Project and for the Liquefaction Plant, as well as our recommended mitigation measures, and has no objections at this time. In accordance with 33 CFR 127, the USCG previously provided FERC with a Letter of Recommendation regarding the suitability of the waterway for the type and frequency of the planned LNG carrier traffic and has noted that the proposed Projects would not result in an increase in the size and/or frequency of the LNG marine traffic.

The remotely located Pretreatment Plant for the Liquefaction Project would fall under FERC jurisdiction due to the type of facilities proposed and their necessity for the Liquefaction Project. However, unlike the terminal facilities, the USCG would not be involved in the regulation of these inland pretreatment facilities. In addition, USDOT indicated that the Pretreatment Plant would be subject to the USDOT regulations in 49 CFR Part 192, rather than Part 193, because natural gas would not be liquefied and LNG would not be transferred, stored, or vaporized in any of those facilities. As Part 192 does not have applicable siting regulations for process facilities, we assessed public impacts from the siting of the Pretreatment Plant using an approach consistent to that in Part 193.

For both the Liquefaction and Phase II Modification Projects, section 4.10.2 discusses the principal hazards associated with LNG, liquid nitrogen, NGLs, aqueous ammonia, acid gas, and refrigerants; section 4.10.3 discusses our technical review of the preliminary designs; section

4.10.4 discusses siting requirements; section 4.10.5 includes a siting analysis of hazards resulting from an LNG or refrigerant spill at the terminal; section 4.10.6 includes a siting analysis of hazards resulting from a release of NGLs, aqueous ammonia or acid gas at the Pretreatment Plant; section 4.10.7 discusses facility security and the results of the USCG's review on waterway suitability; and section 4.10.8 discusses emergency response and evacuation planning.

4.10.2 Hazards

The principal hazards associated with the substances involved in the liquefaction, storage and vaporization of LNG result from loss of containment, vapor dispersion characteristics, flammability, and the ability to produce damaging overpressures. A loss of the containment provided by storage tanks or process piping would result in the formation of flammable vapor near the release location, as well as the potential for nearby pooled liquid. Releases occurring in the presence of an ignition source would most likely result in a fire located at the vapor source. A spill without ignition would form a vapor cloud that would travel with the prevailing wind until it either dispersed below the flammable limits or encountered an ignition source. In some instances, ignition of a vapor cloud may produce damaging overpressures. The dispersion of toxic components would also be a hazard associated with substances at the Pretreatment Plant. These hazards are described in more detail below.

4.10.2.1 Cryogenic and Flashing Liquid Releases

The Phase II Modification Project and the Liquefaction Plant would handle LNG at a cryogenic temperature of -260°F. The Liquefaction Plant would also store liquid nitrogen at -320°F and would handle mixed refrigerant liquid (including propane and ethylene) at near-cryogenic temperatures.

The Pretreatment Plant would also store liquid nitrogen at -320°F and would handle NGLs at near-cryogenic temperatures.

Loss of containment of these cryogenic or near-cryogenic liquids could release both liquid and vapor into the immediate area. Exposure to either cold liquid or vapor could cause freeze burns and, depending on the length of exposure, more serious injury or death. However, any spills would be kept on-site by impoundments, and the extent of the cold state of these releases would be greatly limited due to the continuous mixing with the warmer air. The cold temperatures from the release should not present a hazard to the public, which would not have access to on-site areas.

These cryogenic and near-cryogenic liquids would quickly cool any materials contacted by the liquid upon release, causing extreme thermal stress in materials not specifically designed for such conditions. The thermal stresses could subsequently subject the material to brittleness, fracture, or other loss of tensile strength. These temperatures, however, would be accounted for in the design of equipment and structural supports, and would not be substantially different from the hazards associated with the storage and transportation of liquid oxygen at -296ºF or several other cryogenic liquids that have been routinely produced and transported in the United States.

A significant amount of these liquids may flash evaporate to vapor upon release. Methane (the primary component of LNG), ethylene, propane, nitrogen, and the components of NGLs are asphyxiants and may pose extreme health hazards, including death, if inhaled in significant quantities within a limited time. However, the locations of concentrations where oxygen-deprivation effects could occur are greatly limited due to the continuous mixing with the air surrounding the spill site. The potential for asphyxiation normally represents a negligible risk to the public, who would not have access to on-site areas.

4.10.2.2 Flammable Vapor Dispersion

In the event of a loss of containment, LNG, refrigerants (including ethylene and propane) and NGLs would create vapor when released from storage or process facilities. Depending on the size of the release, a liquid pool may also form and vaporize. Additional vaporization would result from exposure to ambient heat sources, such as water or soil. When released from a containment vessel or transfer system, LNG would produce about 620 standard cubic feet of natural gas for each cubic foot of liquid. Each cubic foot of refrigerants or NGLs would generally produce a similar or smaller volume of vapor upon release than would be generated by LNG.

If the loss of containment does not result in immediate ignition of the LNG, refrigerant, or NGL vapors, the vapor cloud would travel with the prevailing wind until it either encountered an ignition source or dispersed below its flammable limits.

An LNG vapor cloud would initially sink to the ground due to the cold temperature of the vapor. As an LNG vapor cloud disperses downwind and mixes with the warm surrounding air, the LNG vapor cloud may become buoyant. The LNG vapor cloud would not typically be warm, or buoyant, enough to lift off from the ground before the LNG vapor cloud becomes too diluted to be flammable. As an ethylene vapor cloud disperses downwind and mixes with the warm surrounding air, the ethylene vapor would become neutrally buoyant. However, a dispersing propane vapor cloud would remain denser than the surrounding air, even after warming to ambient temperatures. The buoyancy of a NGLs vapor cloud would depend on its composition, which would vary, and this vapor could be either positively or negatively buoyant. As a result, estimating the dispersion of the vapor cloud is an important step in addressing potential hazards and is discussed in section 4.10.5 for the facilities at the terminal and in section 4.10.6 for the Pretreatment Plant.

4.10.2.3 Vapor Cloud Ignition

The flammability of a vapor cloud is dependent on the concentration of the vapor when mixed with the surrounding air. In general, higher concentrations within the vapor cloud would exist near the spill, and lower concentrations would exist near the edge of the cloud as it disperses downwind. Mixtures occurring between the lower flammability limit (LFL) and the upper flammability limit (UFL) could be ignited. Concentrations above the UFL or below the LFL would not ignite.

The LFL and UFL for methane are between 5 -percent-volume and 15 percent-volume in air, respectively. Propane has a narrower flammability range, but has a lower LFL of approximately 2.1 percent-volume and a UFL of 9.5 percent-volume in air, respectively. Ethylene has a much wider flammability range and a lower LFL of approximately 2.7 percent-volume and a UFL of 36 percent-volume in air. Mixed refrigerant would have a UFL and LFL based on the amount of LNG, ethylene, and propane it contains, which would vary throughout the process. NGLs would have similar UFLs and LFLs based on the amounts of heavier hydrocarbons it contains, which would also vary.

If the flammable portion of a vapor cloud encounters an ignition source, a flame would propagate through the flammable portions of the cloud. In most circumstances, the flame would be driven by the heat it generates, a process known as a deflagration. A methane vapor cloud deflagration in an uncongested and unconfined area travels at slower speeds and does not produce significant pressure waves. Confined and congested methane vapor clouds may produce higher flame speeds and overpressures, and are discussed later in section 4.10.5.5.

Once the flammable portion of a vapor cloud has encountered an ignition source, a deflagration may propagate back to the spill site if the vapor concentration along this path is sufficiently high to support the combustion process. When the flame reaches vapor concentrations above the UFL, the deflagration could transition to a fireball and result in a pool or jet fire back at the spill source. A fireball would occur near the source of the release and would be of a relatively short duration compared to an ensuing jet or pool fire. Radiant heat modeling for pool fires at the terminal site is discussed in section 4.10.5.3. Radiant heat modeling for pool fires at the Pretreatment Plant is discussed in section 4.10.6.3.

The extent of the affected area and the severity of the impacts on objects either within an ignited cloud or in the vicinity of a pool fire would primarily be dependent on the quantity and duration of the initial release, the surrounding terrain, and the environmental conditions present during the dispersion of the cloud. A vapor cloud fire can ignite combustible materials within the cloud and can also cause severe burns and death. Fires may also cause failures of nearby storage vessels, piping, and equipment. The failure of a pressurized vessel could cause fragments of material to fly through the air at high velocities, posing damage to surrounding structures and a hazard for operating staff, emergency personnel, or other individuals in proximity to the event. In addition, failure of a pressurized vessel when the liquid is at a temperature significantly above its normal boiling point could result in a boiling-liquid-expanding-vapor explosion (BLEVE). BLEVEs of flammable liquids can produce overpressures and a subsequent fireball when the superheated liquid rapidly changes from a liquid to a vapor upon the release from the vessel. This concern is addressed in section 4.10.5.6 for the pressurized propane and ethylene storage tanks for the Liquefaction Plant. The NGLs at the Pretreatment Plant would not be stored in pressurized tanks. Atmospheric storage tanks, such as those existing and approved for LNG storage at the terminal, are unlikely to BLEVE due to the smaller difference between their design pressure and ambient pressure.

4.10.2.4 Overpressures

If the deflagration in a flammable vapor cloud accelerates to a sufficiently high rate of speed, pressure waves that can cause damage would be generated. As a deflagration accelerates to super-sonic speeds, larger pressure waves are produced, and a shock wave is created. This shock wave, rather than the heat, would begin to drive the flame, resulting in a detonation. Deflagrations or detonations are generally characterized as "explosions" as the rapid movement of the flame and pressure waves associated with them cause additional damage beyond that from heat. The amount of damage an explosion causes is dependent on the amount that the produced pressure wave is above atmospheric pressure (*i.e.,* an overpressure) and its duration (*i.e.,* pulse). For example, a 1 pound per square inch (psi) overpressure, often cited as a safety limit in U.S. regulations, is associated with shattering glass with glass fragments traveling with velocities high enough to lacerate skin.

Flame speeds and overpressures are primarily dependent on the reactivity of the fuel, the ignition strength and location, the degree of congestion and confinement of the area occupied by the vapor cloud, and the flame travel distance.

The potential for unconfined LNG vapor cloud detonations was investigated by the USCG in the late 1970s at the Naval Weapons Center in China Lake, California. Using methane, the primary component of natural gas, several experiments were conducted to determine whether unconfined LNG vapor clouds would detonate. Unconfined methane vapor clouds ignited with low-energy ignition sources (13.5 joules), produced flame speeds ranging from 12 to 20 mph. These flame speeds are much lower than the flame speeds associated with a deflagration with damaging overpressures or a detonation.

To examine the potential for detonation of an unconfined natural gas cloud containing heavier hydrocarbons that are more reactive, such as ethane and propane, the USCG conducted further tests on ambient-temperature fuel mixtures of methane-ethane and methane-propane. The tests indicated that the addition of heavier hydrocarbons influenced the tendency of an unconfined natural gas vapor cloud to detonate. Natural gas with greater amounts of heavier hydrocarbons would be more sensitive to detonation.

Although it has been possible to produce damaging overpressures and detonations of unconfined LNG vapor clouds, the LNG proposed for liquefaction by this project would have lower ethane and propane concentrations than those that resulted in damaging overpressures and detonations.

The substantial amount of explosives needed to create the shock initiation during the limited range of necessary vapor-air concentrations also renders the possibility of detonation of unconfined LNG vapors as unrealistic. Ignition of a confined LNG vapor cloud could result in higher overpressures. In order to prevent such an occurrence, measures are taken to mitigate LNG vapor dispersion into confined areas, such as buildings, and also the potential for ignition inside them. In general, the primary hazards to the public from an LNG spill that disperses to an unconfined area, either on land or water, would be from dispersion of the flammable vapors or from radiant heat generated by a pool fire, as discussed in the previous sections.

In comparison with LNG vapor clouds, there is a higher potential for unconfined propane to produce damaging overpressures, and an even higher potential for unconfined ethylene vapor clouds to produce damaging overpressures. Unconfined ethylene vapor clouds also have the potential to transition to a detonation much more readily than propane. This has been shown in multiple experiments conducted by the Explosion Research Cooperative to develop predictive blast wave models for low, medium, and high reactivity fuels and varying degrees of congestion and confinement (Pierorazio, 2005). The experiments used methane, propane, and ethylene, as the respective low, medium, and high reactivity fuels. In addition, the tests showed that if methane, propane, or ethylene is ignited within a confined space, such as in a building, they all have the potential to produce damaging overpressures. The NGLs process streams at the Pretreatment Plant would contain similar or heavier hydrocarbon components. Therefore, a potential exists for these process streams to produce unconfined vapor clouds that could produce damaging overpressures in the event of a release.

These overpressure hazards are discussed in section 4.10.5.5 for the facilities at the terminal and in section 4.10.6.5 for the Pretreatment Plant.

4.10.2.5 Toxic Vapor Dispersion

A toxicity hazard would be associated with the pretreatment of natural gas at the Pretreatment Plant, due to the mercury in the feed gas, hydrogen sulfide (H_2S) in the acid gas stream, and benzene and toluene in NGLs stream. Aqueous ammonia would also be stored and handled at the Pretreatment Plant.

Mercury would be removed from the feed gas and accumulated in sulfur-impregnated activated carbon beds, forming mercuric sulfide, which is stable, insoluble, and not classified as hazardous waste. However, the H_2S, benzene, toluene, and aqueous ammonia would have potential for dispersion upon release. These hazards are discussed in section 4.10.6.6.

4.10.2.6 Past Incidents at LNG Plants

With the exception of the October 20, 1944, failure at an LNG facility in Cleveland, Ohio, the operating history of the U.S. LNG industry has been free of safety-related incidents resulting in adverse effects on the public or the environment. The 1944 incident in Cleveland led to a fire that killed 128 people and injured 200 to 400 people.[22] The failure of the LNG storage tank was due to the use of materials inadequately suited for cryogenic temperatures. LNG migrating through streets and into underground sewers due to the lack of adequate spill impoundments at the site was also a contributing factor. Current regulatory requirements ensure that proper materials suited for cryogenic temperatures are used and that spill impoundments are designed and constructed properly to contain a spill at the site.

Another operational accident occurred in 1979 at the Cove Point LNG facility in Lusby, Maryland. A pump seal failure resulted in gas vapors entering an electrical conduit and settling

[22] For a description of the incident and the findings of the investigation, see "U.S. Bureau of Mines, Report on the Investigation of the Fire at the Liquefaction, Storage, and Regasification Plant of the East Ohio Gas Co., Cleveland, Ohio, October 20, 1944," dated February 1946.

in a confined space. When a worker switched off a circuit breaker, the gas ignited, causing heavy damage to the building and a worker fatality. With the participation of the FERC, lessons learned from the 1979 Cove Point accident resulted in changing the national fire codes to ensure that the situation would not occur again.

On January 19, 2004, a blast occurred at Sonatrach's Skikda, Algeria, LNG liquefaction facility, which killed 27 and injured 56 workers. No members of the public were injured. Findings of the accident investigation suggested that a cold hydrocarbon leak occurred at Liquefaction Train 40 and was introduced to the high-pressure steam boiler by the combustion air fan. An explosion developed inside the boiler firebox, which subsequently triggered a larger explosion of the hydrocarbon vapors in the immediate vicinity. The resulting fire damaged the adjacent liquefaction process and liquid petroleum gas separation equipment of Train 40, and spread to Trains 20 and 30. Although Trains 10, 20, and 30 had been modernized in 1998 and 1999, Train 40 had been operating with its original equipment since start-up in 1981.

To ensure that this potential hazard would be addressed for the proposed Projects, all combustion and ventilation air intake equipment would be provided with hazard detection devices that would alarm and enable isolation and deactivation of any combustion equipment whose continued operation could add to or sustain an emergency. We would review the final design to confirm the location and shutdown capabilities of these devices.

On March 31, 2014, an explosion and fire occurred at Northwest Pipeline Corporation's LNG peak-shaving facility in Plymouth, Washington. The facility was immediately shut down, and emergency procedures were activated, which included notifying local authorities and evacuating all plant personnel. No members of the public were injured. The accident investigation is still in progress. Once measures to address any causal factors which led to this incident are developed, they would be applied to all facilities under the Commission's jurisdiction.

4.10.3 Technical Review of the Preliminary Engineering Designs

Operation of the proposed facilities poses a potential hazard that could affect the public safety if strict design and operational measures to control potential accidents are not applied. The primary concerns are those events that could lead to an LNG spill of sufficient magnitude to create an off-site hazard, as discussed in section 4.10.2. However, it is important to recognize the stringent requirements in place for the design, construction, operation, and maintenance of the facility, as well as the extensive safety systems proposed to detect and control potential hazards.

As part of the preliminary safety reviews for the Projects, Freeport LNG's design development team conducted a hazard identification (HAZID) analysis of the Front-End Engineering Design (FEED) design to identify the major hazards that may be encountered during the operation of facilities. In addition, a hazard and operability (HAZOP) study of the completed design would also be performed by Freeport LNG's design development team during the detailed design phase. The HAZOP study addresses hazards of the process, engineering, and administrative controls, and provides a qualitative evaluation of a range of possible safety and environmental effects which may result from the design or operation of the facility. Recommendations to prevent or

minimize these hazards are generated from the results of the HAZOP review. These studies help establish the required safety control levels and identify whether additional process and safety instrumentation, mitigation, and/or administrative controls would be needed.

Once the design has been subjected to a HAZOP review, the design development team tracks changes to the facility design, operations, documentation, and personnel. These changes would be evaluated to ensure that the safety and environmental risks arising from these changes are addressed. Resolution of the recommendations generated by the HAZOP review are also monitored.

Based on these analyses, various layers of safeguards would be included in the facility designs to reduce the risk of a potentially hazardous scenario from developing into an event that could impact the off-site public. These layers of protection are independent of one another so that anyone would perform its function regardless of the action or failure of any other protection layer or initiating event. These layers of protection typically include:

1) A facility design that prevents hazardous events through the use of suitable materials of construction; operating and design limits for process piping, process vessels, and storage tanks; adequate design for wind, flood, seismic, and other outside hazards;

2) Control systems, including monitoring systems and process alarms, remotely-operated control and isolation valves, and operating procedures to ensure the facility stays within the established operating and design limits;

3) Safety-instrumented prevention systems, such as safety control valves and ESD systems, to prevent a release if operating and design limits are exceeded;

4) Physical protection systems, such as appropriate electrical area classification, proper equipment and building spacing, pressure relief valves, spill containment, and structural fire protection, to prevent escalation to a more severe event;

5) Site security measures for controlling access to the facility, including security inspections and patrols; response procedures to any breach of security; and liaison with local law enforcement officials; and

6) On-site and off-site emergency response, including hazard detection and control equipment, firewater systems, and coordination with local first responders to mitigate the consequences of a release and prevent it from escalating to an event that could impact the public.

The use of these protection layers would mitigate the potential for an initiating event to develop into an incident that could damage the facility, injure operating staff, or impact the safety of the off-site public.

As part of the applications, Freeport LNG provided FEEDs for the Projects. The FEEDs and specifications submitted for the proposed facilities to date are preliminary, but would serve as the basis for any detailed design to follow. During the FERC review process, we analyzed the

information filed by Freeport LNG to determine the extent that layers of protection or safeguards to enhance the safety, operability, and reliability of the facilities were included in the FEEDs.

As a result of the technical review of the information provided by Freeport LNG in the submittal documents, we identified a number of concerns relating to the reliability, operability, and safety of the proposed design. In response to staff's questions, Freeport LNG provided written responses. However, some of these responses indicated that corrections or modifications would be made in order to address issues raised in the information request. As a result, **we recommend that**:

> **Prior to construction of the final design, Freeport LNG should file with the Secretary, for review and written approval by the Director of OEP, information/revisions pertaining to Freeport LNG's responses, as listed in Table 4.10.3-1 of the EIS, which indicated features to be included in the final design and documentation.**

Table 4.10.3-1

Freeport LNG Responses Indicating Features to be Included in the Final Design of the Projects

Project	Filing Date	Response Numbers
Liquefaction	December 10, 2012	55, 56, 64, 66, 67, 75, 77, 81, 90, 98, 99, 100, 119, 122, and 127
Liquefaction	June 6, 2013	17, 23, 24, 30, 32, 33, 35, 36, and 37
Phase II Modification	December 10, 2012	134
Phase II Modification	June 6, 2013	2 and 3

The objectives of our FEED reviews focused on the engineering design and safety concepts of the various protection layers, as well as the projected operational reliability of the proposed facilities.

The designs would use materials of construction suited to the pressure and temperature conditions of the process design. Valves and other equipment would be designed to recommended and generally accepted good engineering practices. Freeport LNG indicated that the terminal facilities would be designed in accordance with the regulations in 49 CFR 193, which includes requirements for piping to be designed in accordance with ASME B31.3 and pressure vessels to be designed in accordance with ASME Section VIII.

The process equipment containing LNG and refrigerants would be designed to withstand the effects of hurricane force winds based on the requirements of ASCE 7-05, Minimum Design Loads for Buildings and Other Structures. The design wind velocity would be 150 mph, which is equivalent to a 3-second gust of 183 mph wind. Freeport LNG stated that this design wind velocity corresponds to a Category 4 hurricane on the Saffir-Simpson hurricane scale. The same design wind velocity would be used for facilities at the Pretreatment Plant.

The existing terminal facilities were constructed at an elevation of 14 feet amsl. The pipe supports for the piping associated with the Liquefaction Plant would be elevated to approximately 26 feet above sea level (NAVD 88), and liquefaction process equipment would be

elevated to 28 feet above sea level, which would minimize the risk of flooding. The jetty platform for the proposed Phase II Modification Project would have a maximum elevation of 25 feet above sea level. The Pretreatment Plant lies outside the 100-year and 500-year flood zones. To ensure flood protection, the ground elevation of the pretreatment equipment areas would be raised to 8 feet amsl.

Process control valves and instrumentation would be installed to safely operate and monitor the facility. Alarms would have visual and audible notification in the control room to warn operators that process conditions may be approaching design limits. Operators would have the capability to take action from the control room to mitigate an upset.

Freeport LNG would update the existing facility operations procedures to include the facilities proposed for the Projects and would provide these updates for review after completion of the final design. This timing is fully consistent with accepted industry practice. We have made recommendations for Freeport LNG to provide updates to the operating and maintenance procedures as they are developed. In addition, we have recommended measures, such as the labeling of all instrumentation and valves, to address human factor considerations and improve facility safety.

Safety valves and instrumentation would be installed to monitor, alarm, shutdown, and isolate equipment and piping during process upsets or emergency conditions. Safety instrumented systems would comply with International Society for Automation (ISA) Standard 84.01 and other recommended and generally accepted good engineering practices. We also made recommendations on the design, installation, and commissioning of instrumentation and ESD equipment to ensure appropriate cause and effect alarm or shutdown logic.

Safety relief valves, vent stacks, and flares would be installed to protect the process equipment and piping. The safety relief valves would be designed to handle process upsets and thermal expansion within piping. Freeport LNG also had an analysis prepared in accordance with NFPA 59A (2001), which determined that the vacuum relief valves on the existing LNG storage tanks and the approved Phase II LNG storage tank would continue to adequately protect the storage tanks during the proposed future operations, which would include the use of in-tank pumps with larger capacities.

Storage and process facilities would be provided with spill containment systems designed to direct any spills away from equipment and occupied areas. This design would minimize the potential for heat from a fire to impact adjacent equipment and occupied areas if ignition occurs and would also minimize the potential for flammable vapors from dispersing to confined or occupied areas. Impoundment systems are further discussed in sections 4.10.5.1 and 4.10.6.1.

None of the facilities proposed for the Projects would exceed the threshold heights in 14 CFR Part 77.9 and the USDOT advisory circular AC 70/7460-1K. Therefore, FAA notification due to tall structures would not be required for any project facilities.

Freeport LNG provided a preliminary fire protection plan to demonstrate that adequate hazard detection, hazard control, and firewater coverage would be installed to detect and address any

upset conditions. The hazard detection systems would detect, alarm, and alert personnel in the area and control room to initiate an ESD and/or initiate appropriate procedures. These systems would meet NFPA 72 and other recommended and generally accepted good engineering practices. Hazard control devices would be installed to extinguish or control incipient fires and releases and would meet NFPA 10 and 17 and other recommended and generally accepted good engineering practices. Automatic firewater systems and monitors would be provided for use during an emergency to cool the surface of storage vessels, piping, and equipment exposed to heat from a fire and would meet NFPA 22 and 24 requirements. We also made a recommendation for Freeport LNG to provide a finalized fire protection evaluation. In addition, we made a recommendation for Freeport LNG to provide more information on the design, installation, and commissioning of the hazard detection, hazard control, and firewater systems as this information would be developed during the final design phase.

In order to minimize the risk of an intentional event, Freeport LNG would install security fencing, lighting, camera systems, and intrusion detection to deter, monitor, and detect intruders into the Liquefaction Project areas. In addition, as discussed in section 4.10.8, Freeport LNG must update its Operations Manual, Emergency Manual, and the Facility Security Plan in accordance with the USCG's regulations, which can be found in 33 CFR 127 and 33 CFR 105. We also made recommendations to provide incident reporting during operation.

Freeport LNG would also be required to update its Emergency Response Plan to include the Projects in accordance with the Energy Policy Act of 2005, as discussed further in section 4.10.7. In addition, Freeport LNG would update its emergency procedures in accordance with 49 CFR 193 for the terminal facilities. In accordance with 49 CFR Part 193.2509, the emergency procedures for the terminal facilities would provide for protection of personnel and the public as well as the prevention of property damage that may occur as a result of incidents at the facility.

If authorization is granted by the Commission, the next phase of the Projects would include development of the final design, including final selection of equipment manufacturers, process conditions, and resolution of some safety-related issues. To ensure the final design would be consistent with the safety and operability characteristics identified in the FEED, information regarding the development of the final design, as detailed below, would need to be filed with the Secretary for review and written approval by the Director of the OEP before equipment construction at the site would be authorized.

In addition to the final design review, we would conduct inspections during construction and would review additional materials, including quality assurance and quality control plans, non-conformance reports, and cooldown and commissioning plans to ensure that the installed design would be consistent with the safety and operability characteristics of the FEED. We would also conduct inspections during operation to ensure that the facility would be operated and maintained in accordance with the filed design throughout the life of the facility.

To ensure that the concerns we've identified relating to the reliability, operability, and safety of the proposed designs are addressed by Freeport LNG, and to ensure that the facilities would be subject to the Commission's construction and operational inspection program, **we recommend that the following measures should apply to the Projects, including the Pretreatment Plant. Information pertaining to these specific recommendations should be filed with the**

Secretary for review and written approval by the Director of OEP either: prior to initial site preparation; prior to construction of final design; prior to commissioning; prior to introduction of hazardous fluids; or prior to commencement of service, as indicated by each specific condition. Specific engineering, vulnerability, or detailed design information meeting the criteria specified in Order No. 683 (Docket No. RM06-24-000), including security information, should be submitted as critical energy infrastructure information pursuant to 18 CFR 388.112. See Critical Energy Infrastructure Information, Order No. 683, 71 Fed. Reg. 58,273 (October 3, 2006), FERC Stats. & Regs. ¶31,228 (2006). Information pertaining to items such as: offsite emergency response; procedures for public notification and evacuation; and construction and operating reporting requirements would be subject to public disclosure. All information should be filed a minimum of 30 days before approval to proceed is requested.

- **Prior to initial site preparation, Freeport LNG should provide procedures for controlling access during construction.**
- **Prior to initial site preparation, Freeport LNG should file the quality assurance and quality control procedures for construction activities.**
- **Prior to initial site preparation, Freeport LNG should file a plot plan of the final design showing all major equipment, structures, buildings, and impoundment systems.**
- **Prior to initial site preparation, Freeport LNG should file an overall project schedule, which includes the proposed stages of the commissioning plan.**
- **The final design should include change logs that list and explain any changes made from the FEED provided in Freeport LNG's application and filings. A list of all changes with an explanation for the design alteration should be provided and all changes should be clearly indicated on all diagrams and drawings.**
- **The final design should provide up-to-date Process Flow Diagrams with heat and material balances and Piping and Instrument Diagrams (P&IDs), which include the following information:**
    a. **equipment tag number, name, size, duty, capacity, and design conditions;**
    b. **equipment insulation type and thickness;**
    c. **storage tank pipe penetration size and nozzle schedule;**
    d. **valve high pressure side and internal and external vent locations;**
    e. **piping with line number, piping class specification, size, and insulation type and thickness;**
    f. **piping specification breaks and insulation limits;**

g. all control and manual valves numbered;

h. relief valves with set points; and

i. drawing revision number and date.

- **The final design should provide P&IDs, specifications, and procedures that clearly show and specify the tie-in details required to safely connect to the existing facilities.**

- **The final design should provide an up-to-date complete equipment list, process and mechanical data sheets, and specifications.**

- **The final design should provide complete drawings and a list of the hazard detection equipment. The drawings should clearly show the location and elevation of all detection equipment. The list should include the instrument tag number, type and location, alarm indication locations, and shutdown functions of the hazard detection equipment.**

- **The final design should provide complete plan drawings and a list of the fixed and wheeled dry-chemical, hand-held fire extinguishers, and other hazard control equipment. Drawings should clearly show the location by tag number of all fixed, wheeled, and hand-held extinguishers. The list should include the equipment tag number, type, capacity, equipment covered, discharge rate, and automatic and manual remote signals initiating discharge of the units.**

- **The final design should provide facility plans and drawings that show the location of the firewater and foam systems. Drawings should clearly show: firewater and foam piping; post indicator valves; and the location, and area covered by, each monitor, hydrant, deluge system, foam system, water-mist system, and sprinkler. The drawings should also include P&IDs of the firewater and foam system.**

- **The final design should provide an updated fire protection evaluation of the proposed facilities carried out in accordance with the requirements of NFPA 59A 2001, chapter 9.1.2 as required by 49 CFR 193. A copy of the evaluation, a list of recommendations and supporting justifications, and actions taken on the recommendations should be filed.**

- **The final design should specify that for hazardous fluids, the piping and piping nipples 2 inches or less are to be no less than Schedule 160.**

- **The final design should provide an air gap or vent installed downstream of process seals or isolations installed at the interface between a flammable fluid system and an electrical conduit or wiring system. Each air gap should vent to a safe location and be equipped with a leak detection device that: should continuously monitor for the presence of a flammable fluid; should alarm the hazardous condition; and should shutdown the appropriate systems.**

- **The final design should provide electrical area classification drawings.**

- **The final design should provide spill containment system drawings with dimensions and slopes of curbing, trenches, and impoundments.**

- **The final design of the hazard detectors should account for the calibration gas when determining the LFL set points for methane, propane, ethylene, and NGLs.**

- **The final design should include a hazard and operability (HAZOP) review of the completed design prior to issuing the P&IDs for construction. A copy of the review, a list of recommendations, and actions taken on the recommendations should be filed.**

- **The final design should include the cause-and-effect matrices for the process instrumentation, fire and gas detection system, and ESD system. The cause-and-effect matrices should include alarms and shutdown functions, details of the voting and shutdown logic, and setpoints.**

- **The final design should include a plan for clean-out, dry-out, purging, and tightness testing. This plan should address the requirements of the American Gas Association's Purging Principles and Practice required by 49 CFR 193 and should provide justification if not using an inert or non-flammable gas for cleanout, dry-out, purging, and tightness testing.**

- **The final design should provide the sizing basis and capacity for the final design of pressure and vacuum relief valves for major process equipment, vessels, storage tanks, and vent stacks.**

- **The final design should provide the procedures for pressure/leak tests which address the requirements of ASME VIII and ASME B31.3, as required by 49 CFR 193.**

- **The final design should include a drawing showing the location of the ESD buttons. ESD buttons should be easily accessible, conspicuously labeled and located in an area which would be accessible during an emergency.**

- **The final design should include a delayed automatic start for the ICW firewater pumps.**

- **The final design should provide a hydraulic study for the LNG storage tank piping with the larger in-tank pumps, and confirm the final size of the discharge nozzle and header pipe.**

- **The final design should ensure that the LNG storage tank piping supports are adequately designed for the higher rated in-tank pump flow rates.**

- **The final design should provide a list of the UPS locations, sizes with load capacities, and services.**

- **The final design should include detection of a leak through the pump primary electrical seals, in addition to monitoring and alarming the nitrogen gas pressure to the seal purge, in order to account for small leaks that pressure indicators may not be able to detect. Low temperature or flammable gas detection should be provided downstream of primary seal. The junction box should be equipped with flammable gas detection.**

- **The final design should include the addition of high pressure alarm and shutdown on the LNG Transfer Drums.**

- **The final design should include double isolation valves on the propane vaporizer drains.**

- **The final design should specify that the refrigeration system vent lines be equipped with double isolation valves.**

- **The final design should specify a pipe class of T39 for the LNG cooldown lines (4"-LNG-111032, 4"-LNG-121032, and 4"-LNG-131032) to downstream of isolation valves (V10448, V20448, and V30448), respectively.**

- **The final design should specify that relief valves should not vent back into a system that has a design pressure equal to or above the relief valve set pressure. The calculated operating pressure of all relief valves should not exceed the allowable operating pressure of that particular relief valve under any condition.**

- **The final design should include a list of the recommendations not considered or included in the final design that are listed in the hazard identification (HAZID) review of December 8, 2011 and the justification for the omission.**

- **Prior to commissioning, Freeport LNG should file plans and detailed procedures for: testing the integrity of onsite mechanical installation; functional tests; introduction of hazardous fluids; operational tests; and placing the equipment into service.**

- **Prior to commissioning, Freeport LNG should provide a detailed schedule for commissioning through equipment startup. The schedule should include milestones for all procedures and tests to be completed: prior to introduction of hazardous fluids and during commissioning and startup. Freeport LNG should file documentation certifying that each of these milestones has been completed before authorization to commence the next phase of commissioning and startup will be issued.**

- **Prior to commissioning, Freeport LNG should provide tag numbers on equipment and flow direction on piping.**

- **Prior to commissioning, Freeport LNG should tag all instrumentation and valves in the field, including drain valves, vent valves, main valves, and car-sealed or locked valves.**

- **Prior to commissioning, Freeport LNG should file updates addressing the Projects in the operation and maintenance procedures and manuals, as well as safety procedures.**

- **Prior to commissioning, Freeport LNG should maintain a detailed training log to demonstrate that operating staff has completed the required training.**

- **Prior to introduction of hazardous fluids, Freeport LNG should complete a firewater pump acceptance test and a firewater monitor and hydrant coverage test. The actual coverage area from each monitor and hydrant should be shown on the facility plot plan(s).**

- **Prior to introduction of hazardous fluids, Freeport LNG should complete all pertinent tests (Factory Acceptance Tests, Site Acceptance Tests, Site Integration Tests) associated with the Distributed Control System and Safety Instrumented System that demonstrates full functionality and operability of the system.**

- **Prior to commencement of service, progress on the construction of the proposed systems should be reported in monthly reports filed with the Secretary. Details should include a summary of activities, problems encountered, contractor non-conformance/deficiency logs, remedial actions taken, and current project schedule. Problems of significant magnitude should be reported to the Commission within 24 hours.**

In addition, we recommend that the following measures should apply throughout the life of the Freeport LNG facilities:

- **The facility should be subject to regular FERC staff technical reviews and site inspections on at least an annual basis or more frequently as circumstances indicate. Prior to each FERC staff technical review and site inspection, Freeport LNG should respond to a specific data request, including information relating to possible design and operating conditions that may have been imposed by other agencies or organizations. Up-to-date detailed P&IDs reflecting facility modifications and provision of other pertinent information not included in the semi-annual reports described below, including facility events that have taken place since the previously submitted semi-annual report, should be submitted.**

- **Semi-annual operational reports should be filed to identify changes in facility design and operating conditions, abnormal operating experiences, activities (including ship arrivals, quantity and composition of imported and exported LNG, liquefied and vaporized quantities, boil-off/flash gas, etc.), plant modifications, including future plans and progress thereof. Abnormalities should include, but not be limited to: unloading/loading/shipping problems, potential hazardous conditions from off-site vessels, storage tank stratification or rollover, geysering, storage tank**

pressure excursions, cold spots on the storage tanks, storage tank vibrations and/or vibrations in associated cryogenic piping, storage tank settlement, significant equipment or instrumentation malfunctions or failures, non- scheduled maintenance or repair (and reasons therefore), relative movement of storage tank inner vessels, hazardous fluids releases, fires involving hazardous fluids and/or from other sources, negative pressure (vacuum) within a storage tank and higher than predicted boil-off rates. Adverse weather conditions and the effect on the facility also should be reported. Reports should be submitted within 45 days after each period ending June 30 and December 31. In addition to the above items, a section entitled "Significant Plant Modifications Proposed for the Next 12 Months (dates)" also should be included in the semi-annual operational reports. Such information would provide the FERC staff with early notice of anticipated future construction/maintenance projects at the LNG facility.

- **Significant non-scheduled events, including safety-related incidents (e.g., LNG, NGL, refrigerant, or natural gas releases, fires, explosions, mechanical failures, unusual over pressurization, and major injuries) and security-related incidents (e.g., attempts to enter site, suspicious activities) should be reported to the FERC staff. In the event an abnormality is of significant magnitude to threaten public or employee safety, cause significant property damage, or interrupt service, notification should be made immediately, without unduly interfering with any necessary or appropriate emergency repair, alarm, or other emergency procedure. In all instances, notification should be made to the FERC staff within 24 hours. This notification practice should be incorporated into the LNG facility's emergency plan. Examples of reportable hazardous fluids related incidents include:**

  a. fire;

  b. explosion;

  c. estimated property damage of $50,000 or more;

  d. death or personal injury necessitating in-patient hospitalization;

  e. release of hazardous fluids for five minutes or more;

  f. unintended movement or abnormal loading by environmental causes, such as an earthquake, landslide, or flood, that impairs the serviceability, structural integrity, or reliability of an LNG facility that contains, controls, or processes hazardous fluids;

  g. any crack or other material defect that impairs the structural integrity or reliability of an LNG facility that contains, controls, or processes hazardous fluids;

  h. any malfunction or operating error that causes the pressure of a pipeline or

LNG facility that contains or processes hazardous fluids to rise above its maximum allowable operating pressure (or working pressure for LNG facilities) plus the build-up allowed for operation of pressure limiting or control devices;

i. a leak in an LNG facility that contains or processes hazardous fluids that constitutes an emergency;

j. inner tank leakage, ineffective insulation, or frost heave that impairs the structural integrity of an LNG storage tank;

k. any safety-related condition that could lead to an imminent hazard and cause (either directly or indirectly by remedial action of the operator), for purposes other than abandonment, a 20 percent reduction in operating pressure or shutdown of operation of a pipeline or an LNG facility that contains or processes hazardous fluids;

l. safety-related incidents to hazardous fluids vessels occurring at or en route to and from the LNG facility; or

m. an event that is significant in the judgment of the operator and/or management even though it did not meet the above criteria or the guidelines set forth in an LNG facility's incident management plan.

In the event of an incident, the Director of OEP has delegated authority to take whatever steps are necessary to ensure operational reliability and to protect human life, health, property or the environment, including authority to direct the LNG facility to cease operations. Following the initial company notification, the FERC staff would determine the need for a separate follow-up report or follow-up in the upcoming semi-annual operational report. All company follow-up reports should include investigation results and recommendations to minimize a reoccurrence of the incident.

4.10.4 Siting Requirements

The principal hazards associated with the substances involved in the liquefaction, storage and vaporization of LNG result from cryogenic and flashing liquid releases; flammable and toxic vapor dispersion; vapor cloud ignition; pool fires; jet fires; BLEVEs; and overpressures. As part of our review, we assess the potential for these hazards to impact the safety of the off-site public by analyzing the design's compliance with the federal siting requirements. The Commission's regulations under 18 CFR 380.12(o)(14) require Freeport LNG to identify how the proposed design would comply with the siting requirements of 49 CFR 193, Subpart B. As part of our review, we use this information, developed by Freeport LNG to comply with USDOT's regulations, to assess whether or not the facility would have a public safety impact. Although the facilities at both the terminal site and the Pretreatment Plant would be subject to USDOT regulation, only the terminal site facilities would be subject to USDOT's siting requirements in

49 CFR 193. However, in order to provide a consistent assessment of potential public impacts which could result from the construction of the facilities at both sites, we applied the Part 193 siting standards to the Pretreatment Plant. The siting analysis is divided into two discussions. The first, section 4.10.5, covers the Liquefaction Plant and Phase II Modification Project, which would both be located at the terminal site and are subject to the siting requirements of 49 CFR 193. The second, section 4.10.6, covers the Pretreatment Plant.

The standards in 49 CFR 193 require that an operator or governmental authority exercise control over the activities that can occur within an "exclusion zone," defined as the area around an LNG facility that could be exposed to specified levels of thermal radiation or flammable vapor in the event of a release of LNG or ignition of natural gas. Certain mathematical models must be used to calculate the dimensions of these exclusion zones. The siting requirements in the 2001 edition of NFPA 59A, an industry consensus standard for the production, storage, and handling of LNG facilities, are incorporated into 49 CFR 193, Subpart B by reference, with regulatory preemption in the event of conflict. These standards also require hazard zone analyses for the release or ignition of other flammable liquids.

The following sections of Part 193 specifically address siting requirements for each LNG container and LNG transfer system:

- Part 193.2051, Scope, states that each LNG facility designed, replaced, relocated or significantly altered after March 31, 2000, must be provided with siting requirements in accordance with subpart B and NFPA 59A. In the event of a conflict with NFPA 59A, the regulatory requirements in Part 193 prevail.

- Part 193.2057, Thermal Radiation Protection, requires that each LNG transfer system have thermal exclusion zones in accordance with section 2.2.3.2 of NFPA 59A.

- Part 193.2059, Flammable Vapor-Gas Dispersion Protection, requires that each LNG container and LNG transfer system have a dispersion exclusion zone in accordance with sections 2.2.3.3 and 2.2.3.4 of NFPA 59A.

The above LNG siting requirements would be applicable to the following facilities that are proposed for the Liquefaction Plant:

- Two 6,788-gpm LNG transfer pumps per liquefaction train and associated piping;

- Six 11,007-gpm LNG in-tank pumps, which would replace the six existing 5,065-gpm in-tank pumps in the existing LNG storage tanks, and associated piping; and

- Three 11,007-gpm LNG in-tank pumps, which would replace the three approved 5,065-gpm pumps for the Phase II LNG storage tank, and associated piping.

On October 10, 2010, after consultation with the USDOT, FERC issued a letter to Freeport LNG requiring a revised siting analysis for the original Phase II project (Docket No. CP05-361-000) for the facilities "that are not yet in existence or under construction" due to the July 7 and 16,

2010 USDOT interpretations.[23] In response, Freeport LNG provided revised modeling in their application and filings as part of their siting analysis for the Phase II Modification Project. For the LNG facilities proposed for the Phase II project, these Part 193 requirements would be applicable to the following equipment:

- One 40,629,700 gallon (net) full containment LNG storage tank and associated piping and appurtenances - Parts 193.2057 and 2959 require the establishment of thermal and flammable vapor exclusion zones for LNG tanks;

- Three 5,065-gpm in-tank pumps in the proposed Phase II LNG Storage Tank T-3 and associated piping; and

- A marine LNG unloading dock consisting of three 16-inch-diameter liquid transfer arms and one 16-inch-diameter vapor return arm, two 26-inch-diameter vacuum insulated transfer pipes, and other associated process vessels, piping and appurtenances.[24]

Previous FERC EAs and impact statements for past projects have identified inconsistencies and areas of potential conflict between the requirements in Part 193 and NFPA 59A (2001). Sections 193.2057 and 193.2059 require exclusion zones for each LNG container and LNG transfer system, and an LNG transfer system is defined in Section 193.2007 to include cargo transfer system and transfer piping (whether permanent or temporary). However, NFPA 59A (2001) requires exclusion zones only for "transfer areas," which is defined as the part of the plant where the facility introduces or removes the liquids, such as truck loading or ship-unloading areas. The NFPA 59A (2001) definition does not include permanent plant piping, such as cargo transfer lines. Section 2.2.3.1 of NFPA 59A (2001) also states that transfer areas at the water edge of marine terminals are not subject to the siting requirements in that standard.

The USDOT has addressed some of these issues in a March 2010 letter of interpretation.[25] In that letter, USDOT stated that: (1) the requirements in the NFPA 59A (2001) for transfer areas for LNG apply to the marine cargo transfer system at a proposed waterfront LNG facility, except where preempted by the regulations in Part 193; (2) the regulations in Part 193 for LNG transfer systems conflict with NFPA 59A (2001) on whether an exclusion zone analysis is required for transfer piping or permanent plant piping; and (3) the regulations in Part 193 prevailed as a result of that conflict. The USDOT has determined that an exclusion zone analysis of the marine cargo transfer system is required.

In FERC EAs and impact statements for past projects, we have also noted that when the USDOT incorporated NFPA 59A into its regulations, it removed the regulation that required impounding

[23] Accession No. 20101008-3043

[24] The proposed Phase II Modification Project (Docket No. CP12-29-000) involves (1) reorientation of the marine LNG unloading dock; (2) decreasing the diameter of the two LNG transfer pipelines from 32-inch to 26-inch; and (3) reducing the number of LNG unloading arms from four to three.

[25] U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) Interpretation "Re: Application of the Siting Requirements in Subpart B of 49 CFR Part 193 to the Mount Hope Bay Liquefied Natural Gas Transfer System" (March 25, 2010).

systems around transfer piping. As a result of that change, it is unclear whether Part 193 or the adopted sections of NFPA 59A (2001) require impoundments for LNG transfer systems. We note that Part 193 requires exclusion zones for LNG transfer systems, and that those zones were historically calculated based on impoundment systems. We also note that the omission of containment for transfer piping is not a sound engineering practice. For these reasons, we generally recommend containment for all LNG transfer piping within the plant's property lines.

Federal regulations issued by OSHA under 29 CFR 1910.119 (Process Safety Management of Highly Hazardous Chemicals; Explosives and Blasting Agents [PSM]), and the USEPA under 40 CFR 68 (Risk Management Plans) cover flammable liquids, such as propane and ethylene at many facilities in the U.S. However, on October 30, 1992, shortly after the promulgation of the OSHA Process Safety Management regulations, OSHA issued a letter of interpretation that precluded the enforcement of PSM regulations over gas transmission and distribution facilities. In a subsequent letter on December 9, 1998, OSHA further clarified that this letter of interpretation applies to LNG distribution and transmission facilities.

In addition, USEPA's preamble to its final rule in the Federal Register, Volume 63, Number 3, 639-645, clarified that exemption from the requirements in 40 CFR 68 for regulated substances in transportation, including storage incident to transportation, is not limited to pipelines. The preamble further clarified that the transportation exemption applies to LNG facilities subject to oversight or regulation under 49 CFR 193, including facilities used to liquefy natural gas or used to transfer, store, or vaporize LNG in conjunction with pipeline transportation. Therefore, the above OSHA and USEPA regulations are not applicable to facilities regulated under 49 CFR 193. As stated in Part 193.2051, LNG facilities must be provided with the siting requirements of NFPA 59A (2001 edition). The siting requirements for flammable liquids within an LNG facility are contained in NFPA 59A, Chapter 2:

- NFPA 59A section 2.1.1 requires consideration of clearances between flammable refrigerant storage tanks, flammable liquid storage tanks, structures and plant equipment, both with respect to plant property lines and each other. This section also requires that other factors applicable to the specific site that have a bearing on the safety of plant personnel and surrounding public be considered, including an evaluation of potential incidents and safety measures incorporated in the design or operation of the facility.

- NFPA 59A section 2.2.2.2 requires impoundments serving flammable refrigerants or flammable liquids to contain a 10-minute spill of a single accidental leakage source or during a shorter time period based upon demonstrable surveillance and shutdown provisions acceptable to the USDOT. In addition, NFPA section 2.2.2.5 requires impoundments and drainage channels for flammable liquid containment to conform to NFPA 30, Flammable and Combustible Liquids Code.

- NFPA 59A section 2.2.3.2 requires provisions to minimize the damaging effects of fire from reaching beyond a property line, and requires provisions to prevent a radiant heat flux level of 1,600 BTU/ft^2-hr from reaching beyond a property line that can be built upon. The distance to this flux level is to be calculated with LNGFIRE or using models

that have been validated by experimental test data appropriate for the hazard to be evaluated and that are acceptable to USDOT.

- NFPA 59A section 2.2.3.4 requires provisions to minimize the possibility of any flammable mixture of vapors from a design spill from reaching a property line that can be built upon and that would result in a distinct hazard. Determination of the distance that the flammable vapors extend is to be determined with DEGADIS or alternative models that take into account physical factors influencing LNG vapor dispersion. Alternative models must have been validated by experimental test data appropriate for the hazard to be evaluated and must be acceptable to USDOT. Section 2.2.3.5 requires the design spill for impounding areas serving vaporization and process areas to be based on the flow from any single accidental leakage source.

For the Liquefaction Plant, FERC staff identified that these siting requirements would be applicable to the following facilities:

- Two 15,000-gallon ethylene storage tanks and associated process piping;
- Two 15,000-gallon propane storage tanks and associated pumps and process piping;
- Piping and equipment in the three liquefaction process trains;
- Liquefaction Area LNG Containment Sump and associated impoundment system;
- Propane and Ethylene Storage Containment Sump and associated impoundment system; and
- Propane Collection Area A and B impoundment systems.

The Pretreatment Plant would be subject to the regulations in 49 CFR Part 192, rather than Part 193. However, since Part 192 does not have applicable siting regulations for process facilities, the siting of the Pretreatment Plant facilities, including the impoundment systems, was evaluated using criteria consistent with the requirements of Part 193. The siting requirements for flammable liquids within an LNG facility, which are contained in NFPA 59A, Chapter 2, would not apply to but would relate to the following Pretreatment Plant facilities:

- Piping and equipment in the three pretreatment process trains;
- Aqueous ammonia system;
- Pretreatment Collection Area A and B impoundment systems; and
- NGL Surge Drum impoundment system.

4.10.5 Siting Analysis for Facilities at the Terminal

4.10.5.1 Impoundment Sizing at the Terminal

Suitable sizing of impoundment systems and selection of spills on which to base hazard analyses are critical for establishing an appropriate siting analysis. Although impoundment capacity and spill scenarios for LNG storage tank impoundments are well described by Part 193, a clear definition for other impoundments is not provided either directly by the regulations or by the adopted sections of NFPA 59A (2001). Under NFPA 59A (2001) Section 2.2.2.2, the capacity of impounding areas for vaporization, process, or LNG transfer areas must equal the greatest volume that can be discharged from any single accidental leakage source during a 10-minute period or during a shorter time period based upon demonstrable surveillance and shutdown provisions acceptable to the USDOT. However, no definition of single accidental leakage source is provided in the regulations.

We recommend impoundments to be sized based on the greatest flow capacity from a single transfer pipe for 10 minutes, while recognizing that different spill scenarios may be used for the single accidental leakage sources for the hazard calculations required by Part 193. A similar approach is used with impoundments for process vessels. We recommend these impoundments to also be able to contain the contents of the largest process vessel served, while recognizing that smaller design spills may be appropriate for Part 193 calculations.

Liquefaction Plant

Freeport LNG proposes to construct a Liquefaction Area LNG Containment Sump that would be 60 feet long by 60 feet wide by 26.25 feet deep, of which 8.25 feet would be below the bottom of the trench, to serve the liquefaction process area. This sump would be constructed of concrete and its interior surfaces would be lined with insulated concrete. Any spills in the liquefaction area would flow along insulated concrete troughs to this sump.

The Liquefaction Area LNG Containment Sump would have a volumetric capacity of 653,000 gallons, with a net volumetric capacity of about 222,150 gallons before backflowing into the trench system. Freeport LNG designed the Liquefaction Area LNG Containment Sump to contain a 10-minute spill from a full rupture of the 26-inch diameter LNG transfer header, resulting in 220,680 gallons. The rupture of the largest refrigerant line that could drain to this sump, which would be the 36-inch propane line from the Propane Accumulator, would provide less than 64,810 gallons of propane liquid over a 10 minute period based on UniSim calculations done by Freeport LNG. Therefore, the proposed impoundment system would be sized to contain the largest volume of LNG or refrigerant that could be discharged into this impoundment from the full rupture of a single transfer pipe for a 10-minute spill.

Leaks from most propane equipment in the liquefaction trains would be directed to local concrete collection areas within curbed containment systems. Propane Collection Area A would have dimensions of 26 by 26 by 1.25 feet within a 191 by 229.5 by 0.5 foot curbed area, minus a 23 by 55.25 foot curbed inset. Freeport LNG determined that this curbed area would have a total liquid capacity of 214,500 gallons, including geometry inside the area such as sloped floors.

This sump capacity would be greater than the full 20,350 gallon capacity of the HP MR/MP Propane Vaporizer, of which Freeport LNG determined that only about 16,690 gallons would be expected to remain a liquid upon release. This capacity would also be greater than the largest potential piping release in that area, which would be from a 10 minute spill from the full rupture of the 36" propane line to the Vaporizers, having a total volume of 82,740 gallons based on UniSim software calculations provided by Freeport LNG.

Propane Collection Area B would have dimensions of 52.5 by 52.5 by 1.25 feet within a 140 by 52.5 foot area surrounded by a curb 0.5 feet in height. Additional depth in the curbed area would be provided by the sloped floor. Freeport LNG calculated this curbed area to have a total liquid capacity of 82,900 gallons, including the volume provided by the sloped floor. This sump capacity would be greater than the full 82,290 gallon capacity of the Propane Accumulator, of which Freeport LNG determined that about 22,720 gallons would be expected to remain a liquid upon release. This total curbed capacity would also be greater than the largest potential piping liquid release in that area, which would be from a 10 minute spill from the full rupture of the 36-inch line from the Propane Accumulator, resulting in less than 64,810 gallons based on UniSim software calculations provided by Freeport LNG.

Any potential spills from the refrigerant storage area would be captured by spill containment troughs and directed to the concrete Propane and Ethylene Containment Sump, which would be 15 feet long, 15 feet wide and 10 feet deep. This sump would provide a total of 16,830 gallons of sump capacity, with 15,000 gallons of capacity below the trough intersection. This capacity would accommodate the volume of any one of the 15,000 gallon refrigerant storage vessels, even though not all of the propane or ethylene would be expected to remain a liquid upon release. A sump of this size would also accommodate the total loss of containment of a delivery truck, which typically contains 6,000 gallons. (The refrigerant storage tanks would contain the amount of propane and ethylene needed for 90 and 70 days, respectively, of normal operation for the three liquefaction units. Trucks deliveries would refill these refrigerant tanks.)

Table 4.10.5-1 summarizes the Liquefaction Plant impoundments and their sizing spills.

Table 4.10.5-1

Liquefaction Plant Impoundment Sizing Spills

Spill Source	Sizing Spill (gallons)	Impoundment System	Impoundment Size (gallons)
26-inch-diameter LNG Transfer Header	220,680	Liquefaction Area LNG Containment Sump	222,150
Refrigerant Storage Tank	< 15,000	Propane and Ethylene Storage Containment Sump	15,000
36-inch Propane Line to Vaporizers	82,740	Propane Collection Area A System	214,500
36-inch Line from Propane Accumulator	< 64,810	Propane Collection Area B System	82,900

In addition, LNG spilled near the existing process area would flow into the existing Process Area LNG Drain Sump located near the LNG storage tanks. The sizing spill for the existing Process Area LNG Drain Sump was 10 minutes of the flow from a full break of a 26-inch diameter LNG

ship transfer line carrying 10,000 cubic meters per hour (m^3/hr), which was analyzed under docket CP03-75-000. This 10,000 m^3/hr spill would continue to be the largest liquid volume from a single source that could drain to the existing Process Area LNG Drain Sump.

Although the Liquefaction Project would replace the in-tank pumps in the existing and approved LNG storage tanks with higher capacity pumps, Freeport LNG proposes to operate fewer pumps in order to achieve the 10,000 m^3/hr ship transfer rate approved for the existing operations. Freeport LNG stated that operating procedures would be developed to ensure that the 10,000 m^3/hr rate is not exceeded in any piping segment. However, USDOT has indicated that in these situations mechanical prevention measures, such as interlocks, would be necessary to ensure that this flow rate is not exceeded. Therefore, **we recommend that:**

Prior to construction of the final design, Freeport LNG should file with the Secretary for review and written approval by the Director of OEP, details of the mechanical measures that would prevent the ship transfer rate from exceeding 10,000 m^3/hr in any pipe segment. This information should be filed a minimum of 30 days before approval to proceed is requested.

Phase II Modification Project Impoundments

For the Phase II Modification Project, two 26-inch-diameter vacuum-insulated aboveground LNG transfer lines would be constructed from the proposed Dock 2 area to the LNG storage tanks. The two 26-inch-diameter transfer lines would be installed within elevated troughs and potential spills occurring from the two transfer lines would drain into the troughs and be directed towards the existing LNG Drain Sump (Dock Area). The existing LNG Drain Sump (Dock Area), which was constructed under docket CP03-75-000, is 85-feet-long and 85-feet-wide with a depth of 14.8-feet. The existing LNG Drain Sump (Dock Area) has a volumetric capacity of 799,892 gallons, with a net volumetric capacity of 443,182 gallons (see table 4.10.5-2) before backflowing into the trench system. For the Phase II Modification Project, the largest spill to the existing LNG Drain Sump (Dock Area) would be from the guillotine rupture of one 26-inch-diameter transfer line at a maximum unloading/loading rate of 10,000 m^3/hr. The resulting 10-minute spill volume would be 440,287 gallons. Therefore, the existing LNG Drain Sump (Dock Area) is properly sized to contain the greatest volume of LNG that can be discharged into the impoundment system from the full rupture of a single transfer pipe during a 10-minute period.

Table 4.10.5-2

Phase II Modification Project Impoundment Area Sizing

Spill Source	Spill Size (gallons)	Impoundment System	Impoundment Size (gallons)
26-inch-diameter LNG Transfer Line from Dock 2	440,287	LNG Drain Sump (Dock Area)	443,182
26-inch-diameter LNG Transfer Line in process area	440,287	LNG Drain Sump (Process Area)	451,315

The two 26-inch-diameter LNG transfer lines would be routed from the proposed Phase II dock to the existing LNG storage tank and vaporization area. Potential spills occurring in the process

area from the two 26-inch-diameter LNG transfer lines would be captured in concrete troughs and drain to the existing LNG Drain Sump (Process Area). The existing LNG Drain Sump (Process Area), constructed under CP03-75-000, is 80-feet-long by 76-feet-wide by 16-feet-deep. The existing LNG Drain Sump (Process Area) has a volumetric capacity of 735,654, with a net volumetric capacity of 451,315 gallons (see table 4.10.5-2) before backflowing into the trench system. A 10-minute spill volume of 440,287 gallons from a guillotine rupture of the 26-inch-diameter LNG transfer line would be contained in the LNG Drain Sump (Process Area).

4.10.5.2 Design Spills for Facilities at the Terminal

Design spills are used in the determination of the hazard calculations required by Part 193. Prior to the incorporation of NFPA 59A in 2000, the design spill in Part 193 assumed the full rupture of "a single transfer pipe which has the greatest overall flow capacity" for not less than 10 minutes (old Part 193.2059(d)). With the adoption of NFPA 59A, the basis for the design spill for impounding areas serving only vaporization, process, or LNG transfer areas became the flow from any single accidental leakage source. Neither Part 193 nor NFPA 59A (2001) defines "single accidental leakage source."

In a letter to the FERC staff, dated August 6, 2013, USDOT requested that LNG facility applicants contact the Office of Pipeline Safety's Engineering and Research Division regarding the Part 193 siting requirements.[26] Specifically, the letter stated that USDOT required a technical review of the applicant's design spill criteria for single accidental leakage sources on a case-by-case basis to determine compliance with Part 193. In response, Freeport LNG provided USDOT with its design spill criteria and identified leakage scenarios for the proposed equipment. These are discussed below for the Liquefaction Plant and the Phase II Modification Project.

After a review of component failure rates and process conditions, as well as leak locations, Freeport LNG selected the following leakage source design spills for the Liquefaction Plant facilities:

- 6-inch hole in the LNG rundown line near Liquefaction Unit 11
- 2-inch hole in a propane line within Liquefaction Unit 11
- 2-inch hole in a mixed refrigerant line within Liquefaction Unit 11
- 3-inch hole in a propane line in the refrigerant storage area
- 3-inch hole in an ethylene line in the refrigerant storage area

Freeport LNG determined that Liquefaction Unit 11 was of most interest because it would be closer to the property boundary than the other liquefaction trains. The conditions for these design spills are listed in the following table 4.10.5-3.

[26] August 6, 2013 Letter from Kenneth Lee, Director of Engineering and Research Division, Office of Pipeline Safety to Terry Turpin, LNG Engineering and Compliance Branch, Office of Energy Projects. Filed in Docket Number CP12-509 under Accession Number 20130813-4010.

Table 4.10.5-3 Liquefaction Plant Design Spills					
Hole Diameter	**Location**	**Pressure (psig)**	**Temp. (°F)**	**Vapor Release Rate (kg/s)**	**Duration (s)**
6-inch	LNG rundown line	272	-261	462	600
2-inch	Propane process line	263	131	43.6	600
2-inch	Mixed refrigerant process line	807	-30	91.6	600
3-inch	Propane storage	165	95	92.9	318
3-inch	Ethylene storage	140	-50	82.7	344

Freeport LNG estimated the release heights for the design spills at 3 feet for the LNG rundown line, 10 feet for the propane and mixed refrigerant process lines, 10 feet for the propane storage release, and 5 feet for the ethylene storage release.

The conditions for the design spills for the Phase II Modification Project are listed in table 4.10.5-4 below.

Table 4.10.5-4 Phase II Modification Project Design Spills						
Hole Diameter	**Location**	**Pressure (psig)**	**Temperature (°F)**	**Vapor Release Rate (kg/s)**	**Release Height (ft)**	**Duration(s)**
2-inch	Process (Tank) Area	130	-258	35.51	15.5	600
2-inch	Tank T-3 Sendout Line at Top of the LNG Storage Tank	130	-258	35.51	144	600
2-inch	Dock 2 Transfer Line (at Dock 2)	81	-256	28.03	14.5	600
2-inch	Dock 2 Transfer Line (Halfway along transfer line)	81	-256	28.03	30	600

In general, higher flow rates would result in larger releases and longer dispersion distances, and higher pressures would result in higher rates of jetting and aerosol formation. Therefore, the pressure in the line was considered to be maintained by pumps and/or hydrostatic head to produce the highest total vapor flow rate.

For cases where a containment sump might be located a long distance from the leakage source location, a depressurized release may also be considered in order to produce the highest rate of liquid flow to the sump for vapor dispersion analysis in that area of the plant. However, the sumps in the Liquefaction Plant would be located in the same area of the plant as the leakage source releases and not closer to the nearby property lines. For the Phase II Modification Project, the extent of the vapor clouds from the existing sumps is discussed in section 4.10.5.4.

NFPA 59A Table 2.2.3.5, as adopted by 49 CFR 193, requires the design spill duration to be 10 minutes or less based on demonstrable surveillance and shutdown provisions that are acceptable to the USDOT. The design spill scenarios identified by Freeport LNG assume constant release rates for 10 minutes, except for the propane and the ethylene storage area releases, which were limited by the available inventory in the storage vessels.

USDOT reviewed the data and methodology Freeport LNG used to determine the design spills based on the flow from various leakage sources including piping, containers, and equipment containing LNG, refrigerants, and flammable fluids. On December 31, 2013, USDOT provided a letter to the FERC staff stating that USDOT had no objection to Freeport's methodology for determining the single accidental leakage sources to be used in establishing the Part 193 siting requirements for the proposed LNG facilities at the terminal site.[27,28] The design spills produced by this methodology were identified in the documents reviewed by USDOT and are the same design spills listed in this section.

DOT's conclusions on the single accident leakage sources used in the siting calculations required by Part 193 were based on preliminary design information which may be revised as the engineering design progresses. If Freeport LNG's design or operation of the proposed facilities differs from the details provided in the documents on which USDOT based its review, then the facilities may not comply with the siting requirements of Part 193. As a result, **we recommend that:**

> **Prior to the construction of the final design, Freeport LNG should file with the Secretary for review and approval by the Director of OEP, certification that the final design of the facilities at the terminal is consistent with the information provided to USDOT as described in the design spill determination letter dated December 31, 2013 (Accession Number 20140106-4003) as well as in Freeport LNG's filings on December 31, 2013 (Accession Numbers 20131231-5265 and 20131231-5266). In the event that any modifications to the design alters the single accidental leakage sources on which the Title 49 CFR Part 193 siting analysis was based, Freeport LNG should consult with USDOT on any actions necessary to comply with Part 193.**

4.10.5.3 Thermal Radiation Analysis at the Terminal

As discussed in section 4.10.2, if flammable vapors are ignited, the deflagration could propagate back to the spill source and result in a pool fire causing high levels of thermal radiation (*i.e.*, heat from a fire). In order to address this, 49 CFR Part 193.2057 specifies hazard endpoints for spills into LNG storage tank containment and spills into impoundments for process or transfer areas in terms of flux levels. For any distance from a pool fire, a flux level, which expresses how much thermal radiation would be received at that point, can be calculated.

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[27] December 31, 2013 Letter "Re: Freeport LNG Development, L.P., Freeport LNG Liquefaction, LLC, Freeport LNG Liquefaction 2, LLC, and Freeport LNG Liquefaction 3, LLC Freeport LNG Phase II and Liquefaction Projects FERC Docket Nos. CP12-29-000 and CP12-509-000 Design Spill Determination" from Kenneth Lee to Lauren H. O'Donnell. Filed in Docket Number CP12-509 under Accession Number 20140106-4003.

[28] PHMSA based this decision on the following documents: (1) Resource Report 11 Reliability and Public Safety, Accession Number 20120831-5215; (2) Resource Report 11 Reliability and Public Safety, Accession Number 20111209-5264; (3) Hazardous Analysis Assumptions for the Liquefaction Project, Accession Number: 20121015-5078 & 5079; (4) Freeport Response to Information Request # 1, Question # 1, Accession Number: 20130920-5154 & 5155; (5) Freeport Balance of response to Information Request #1, Questions 2, 3 & 4, Accession Number: 20130927-5205 & 5206. PHMSA has also indicated to FERC staff that this decision was based on Freeport's filings made on December 31, 2013 in Accession Numbers 20131231-5265 and 20131231-5266.

The Part 193 requirement for spills from process or transfer areas specifies that the 1,600 Btu/ft^2-hr flux level cannot extend beyond the facility's property line that can be built upon. This is the Part 193 standard that we used in assessing public impacts from the siting of the terminal facilities.

The 1,600 BTU/ft^2-hr flux level is associated with producing second degree burns in approximately 30 seconds, assuming no shielding from the pool fire. For distances farther away from the pool fire, the flux levels would be less.

Title 49 CFR 193 requires the use of either the LNGFIRE3 computer program model or the report developed by the Gas Technology Institute to determine the thermal radiation exclusion distances. Alternatively, a different model may be used subject to the approval of the USDOT.

In May 2012, the USDOE released a Report to Congress, *Liquefied Natural Gas Safety Research*, on the findings of new experimental data on large LNG pool fires conducted over water by Sandia National Laboratories. Using data gathered from these tests and earlier methane gas burner tests, Sandia developed recommendations on parameters, including mass burning rate, pool fire flame height, surface emissive power (SEP), and atmospheric transmissivity, appropriate for use in solid flame models for pool fires over water. We examined the effect of altering the LNGFIRE3 model to incorporate Sandia's recommendations regarding LNG pool fire modeling over water and on data provided by the largest LNG pool fire tests on land (Gaz de France Montoir tests) or water (Phoenix tests).[29] Our conclusions were that LNGFIRE3, as currently prescribed by 49 CFR 193, is appropriate for modeling thermal radiation from LNG pool fires on land and is suitable for use in siting onshore LNG facilities.

NFPA 59A, as incorporated in 49 CFR 193, also establishes certain atmospheric conditions (0 mph wind speed, 70°F, and 50 percent relative humidity), which are to be used in calculating the distances. However, section 193.2057 supersedes these requirements and stipulates that the wind speed, ambient temperature, and relative humidity that produce the maximum exclusion distances must be used, except for conditions that occur less than 5 percent of the time based on recorded data for the area.

Liquefaction Plant

In accordance with the thermal radiation siting regulations in Title 49 CFR Part 193.2057, Freeport LNG used LNGFIRE3 to predict the maximum distance to a thermal radiation level of 1,600-BTU/ft^2-hr for fires from the design spills in the sumps. Although LNGFIRE3 is specifically designed to calculate thermal radiation flux levels for LNG pool fires, LNGFIRE3 can also be used to conservatively calculate the thermal radiation flux levels for other flammable hydrocarbons such as ethylene and propane.

[29] "Recommended Parameters for Solid Flame Models for Land Based Liquefied Natural Gas Spills," Issued January 23, 2013 in Docket AD13-4-000 (eLibrary Accession Number: 20130123-4002).

LNGFIRE3 calculates thermal radiation flux using parameters that include the mass burning rate of the fuel and the SEP of the flame, which is an average value of the thermal radiation flux emitted by the fire. Both the mass burning rate and SEP of an ethylene or propane fire would be less than that of an equally sized LNG fire. Since the thermal radiation from a pool fire is directly proportional to the SEP, and other parameters would not counter this effect, Freeport LNG determined that the thermal radiation exclusion zone distances for ethylene and propane fires would not extend as far as the exclusion zone distance calculated for an LNG fire in the same sump. Based on our consultation with the USDOT, we determined that use of LNGFIRE3 for calculating thermal radiation from refrigerant fires complies with 49 CFR Part 193.

Consistent with the siting of the existing Freeport LNG terminal impoundments, the following weather data was used to calculate thermal radiation exclusion distance for the Liquefaction Area LNG Containment Sump: ambient temperature of 35°F; relative humidity of 60 percent; and a wind speed of 27.6 mph. For calculating thermal radiation distances from the Propane and Ethylene Storage Containment Sump, Freeport LNG used 70°F, a relative humidity of 50 percent and a wind speed of 30 mph. FERC staff also produced LNGFIRE3 results for thermal radiation from the Propane and Ethylene Storage Containment Sump using the weather conditions consistent with those approved for the original terminal siting, and these results demonstrated that Freeport LNG's weather selections for this sump provided conservative distances. Therefore, we agree that Freeport LNG's selection of weather data would result in conservative distances in both cases. The maximum distance calculated from each sump to the 1,600 Btu/ft^2-hr level is listed in table 4.10.5-5.

Table 4.10.5-5

Thermal Radiation from Liquefaction Plant Impoundments

Impoundment	Distance from Sump to 1,600 Btu/ft^2-hr (feet)	Distance from Sump to Nearest Property Line that Could be Built Upon (feet)
Liquefaction Area LNG Containment Sump	320	980
Propane and Ethylene Storage Containment Sump	105	430

Propane Collection Areas A and B would not have any liquid design spill that would drain into them. Due to the properties of propane, the propane design spills would turn entirely to vapor upon release. Therefore, no design spill thermal radiation zone would be calculated for these sub-impoundments. To be overly conservative, Freeport LNG modeled thermal radiation from the full surface area of Propane Collection Areas A and B. The results showed that the 1,600 Btu/ft2-hr zone would extend 165 and 290 feet from the collection areas, respectively, which would remain within Freeport LNG property.

None of the 1,600 Btu/ft^2-hr thermal radiation zones would extend beyond a property line that could be built upon. Based on our consultation with the USDOT, Freeport LNG's siting calculations for the project design would meet the requirements specified in Title 49 CFR 193.2051 and 193.2057 and NFPA 59A section 2.2.3.2 (2001 edition). As a result, we conclude that the siting of the proposed project would not have a significant impact on public safety. If the facility is constructed and operated, compliance with the requirements of 49 CFR 193 would be addressed as part of DOT's inspection and enforcement program.

An LNG fire over the full surface area of the existing Process Area LNG Drain Sump near the LNG storage tanks was previously examined under docket number CP03-75-000.

Phase II Modification Project

As described in the June 21, 2006 Phase II Project EA, under docket CP05-361-000, the thermal radiation for LNG storage tank T-3 was determined to meet the thermal radiation exclusion zone requirements. Additionally, the proposed facilities for the Phase II Modification Project would not affect the capacity of the existing spill containment systems and the impoundment sizing volumes that were used to determine the thermal radiation zones for the existing Freeport LNG Terminal. The thermal radiation exclusion zones considered under the original Freeport LNG project and the Phase II project (Docket Nos. CP03-75-000 and CP05-361-000, respectively) would remain unchanged. Therefore, based on our consultation with USDOT, we conclude the thermal radiation analysis provided by Freeport LNG for the spills associated with the proposed Phase II Modification Project equipment would meet the requirements specified in 49 CFR Part 193.2057 and would not have a significant impact on public safety. If the facility is constructed and operated, compliance with the requirements of 49 CFR 193 would be addressed as part of DOT's inspection and enforcement program.

4.10.5.4 Vapor Dispersion Analysis for Facilities at the Terminal

As discussed in section 4.10.2.2, a large quantity of LNG spilled without ignition would form a flammable vapor cloud that would travel with the prevailing wind until it is either dispersed below the flammable limit or encountered an ignition source. In order to address this hazard, 49 CFR Part 193.2059 requires each LNG container and LNG transfer system to have a dispersion exclusion zone in accordance with sections 2.2.3.3 and 2.2.3.4 of NFPA 59A (2001 edition). Taken together, Part 193 and NFPA 59A (2001) require that flammable vapors either from an LNG tank impoundment or a single accidental leakage source do not extend beyond a facility property line that can be built upon.

Title 49 CFR Part 193.2059 requires that dispersion distances be calculated for a 2.5 percent average gas concentration (one-half the LFL of LNG vapor) under meteorological conditions which result in the longest downwind distances at least 90 percent of the time. Alternatively, maximum downwind distances may be estimated for stability Class F, a wind speed of 4.5 mph, 50 percent relative humidity, and the average regional temperature.

The regulations in Part 193 specifically approve the use of two models for performing these dispersion calculations, DEGADIS and FEM3A, but also allow the use of alternative models approved by the USDOT. Although Part 193 does not require the use of a particular source term model, modeling of the spill and resulting vapor production is necessary prior to the use of vapor dispersion models. In the past, applicants have typically used the SOURCE5 program to model the vapor production from an LNG spill.

On July 7 and 16, 2010, the USDOT issued written interpretations in response to two requests regarding the regulations under 49 CFR 193.[30] Specifically, these requests sought clarification on whether Part 193.2059 allowed the use of the SOURCE5 source term model and whether Part 193.2059 required the effects of jetting and flashing to be considered in vapor dispersion exclusion zone calculations. In these interpretations, the USDOT stated that:

- SOURCE5 could no longer be used to determine the vapor gas exclusion zone for compliance with Part 193.2059 unless the deficiencies identified in the Fire Protection Research Foundation's reports "Evaluating Vapor Dispersion Models for Safety Analysis of LNG Facilities Research Project (Apr. 2007)" and "LNG Source Term Models for Hazard Analysis: A Review of the State-of-the-Art and an Approach to Model Assessment (Mar. 2009)" had been addressed;

- the effects of jetting and flashing must be considered in order to comply with Part 193.2059; and

- source term models must have a credible scientific basis and must not ignore phenomena which can influence the discharge, vaporization, and conveyance of LNG.

As a result of these interpretations, alternative dispersion models became necessary in order to examine the effects of jetting, flashing, and the conveyance of LNG for exclusion zone calculations. In August 2010, the USDOT issued Advisory Bulletin ADB-10-07 (Advisory Bulletin) to provide guidance on obtaining approval of alternative vapor-gas dispersion models under Subpart B of 49 CFR Part 193. In October 2011, two dispersion models were approved by USDOT for use in vapor dispersion exclusion zone calculations: PHAST-UDM Version 6.6 and Version 6.7 (submitted by Det Norske Veritas) and FLACS Version 9.1 Release 2 (submitted by GexCon). PHAST 6.7 and FLACS 9.1, with their built-in source term models, were used by Freeport LNG in its vapor dispersion analyses. Based on our consultation with the USDOT, we determined that these built-in source term models are suitable for flashing and jetting, pool spread and vaporization simulations, and that they comply with the siting requirements of Part 193.

For all the release scenarios in the Projects, Freeport LNG used the following conditions: average regional temperature of 71.5°F, relative humidity of 50 percent, wind speed of 4.5 mph, Pasquill-Gifford Atmospheric Stability Class F and a ground surface roughness of 0.03 meter.

Liquefaction Plant

Freeport LNG accounted for the facility geometry in the vapor dispersion model, including the impoundments, trenches and liquefaction train geometry details. The model also included vapor barriers that are proposed to be installed at specific locations along the southern plant property

[30] PHMSA Interpretation "Re: Request for Written Interpretation on the Applicability of 49 CFR 193 to Proposed Waterfront Liquefied Natural Gas Plant in the City of Fall River, Massachusetts" (July 7, 2010) and PHMSA Interpretation "Re: Request for Written Interpretation on the Applicability of 49 CFR 193 to Proposed LNG Import Terminal in Robbinston, Maine" (July 16, 2010).

line and inside the plant, as shown in figure 4.10.5-1. The vapor barriers would be 20 feet tall and impermeable.

The liquefaction units would include numerous air coolers, consisting of arrays of axial fans mounted to pull air from near ground level to flow through the pipe racks and then discharge it upwards. The air coolers for a liquefaction train would be operating continuously while that train is active and would continue running until they are stopped by operator intervention, even during automatic shutdowns. This is to ensure that the refrigerant in the pipes remains cool following a shutdown in order to prevent pressure buildup in the refrigerant lines. For conservative vapor dispersion simulation purposes, the air coolers were considered to be operating only for the train in which a release occurs.

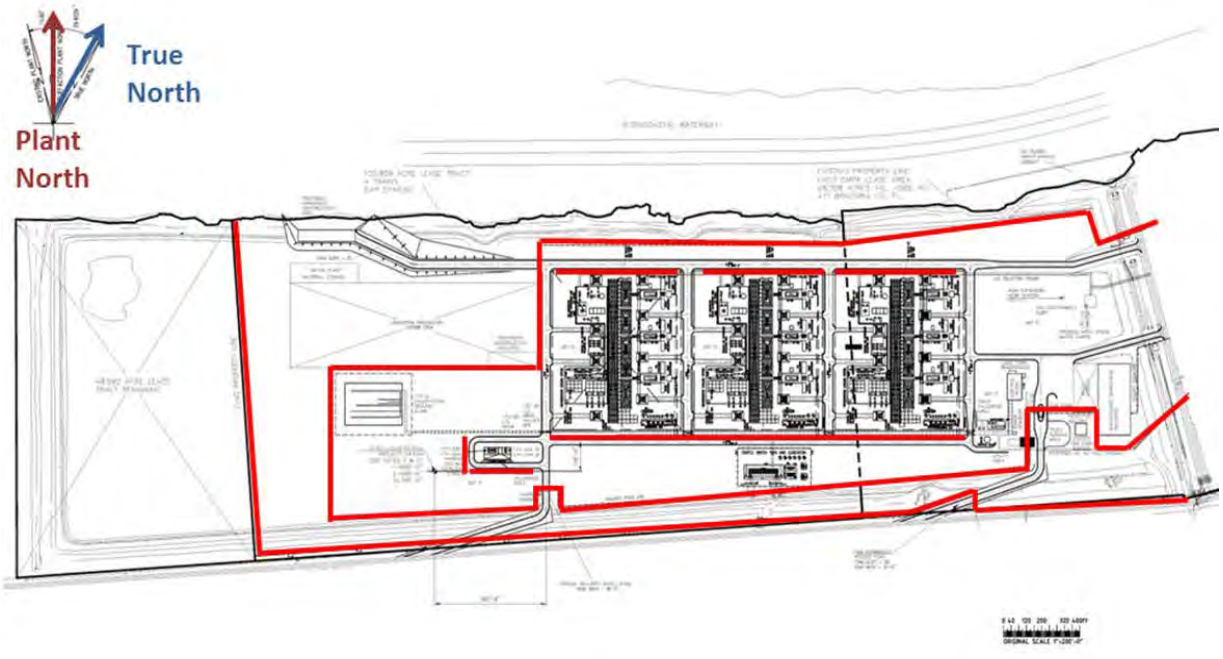


Figure 4.10.5-1 Vapor Barrier Placement – Shown as Red Lines

The Freeport LNG terminal receives power from CenterPoint Energy's transmission system rather than the distribution system, which is used elsewhere on Quintana Island. If a power outage would occur during a release scenario, the facility is designed to safely shut down the process operations, including the pumps. Since start up in 2008, the Freeport LNG terminal has experienced only one unexpected power outage, which was a momentary loss of power caused by a shrimp boat contacting the transmission lines.

Vapor dispersion was first evaluated from the long straight trench for the LNG rundown line because of the potential for a long vapor cloud to form when the wind direction would be parallel to the trench. Freeport LNG considered the guillotine rupture of the 24-inch-diameter LNG

rundown line, which is a much larger spill than the design spills identified in section 4.10.5.2, for the liquid release into the liquefaction area trough system, resulting in a flow rate of 15,570 gpm.

As seen in figure 4.10.5-2 below, the ½ LFL vapor cloud for this scenario would not reach significant distances from trough and would remain well within the Freeport LNG property line.

Liquid spills of refrigerant would be confined by curbing placed around the process areas and would be directed either into the same trenches used for LNG spills or to propane collection areas. Since LNG has a higher vaporization rate, LNG spills into trenches were considered to be the bounding case for the extent of vapor clouds that would be formed by liquid spills of refrigerants into the same trenches.

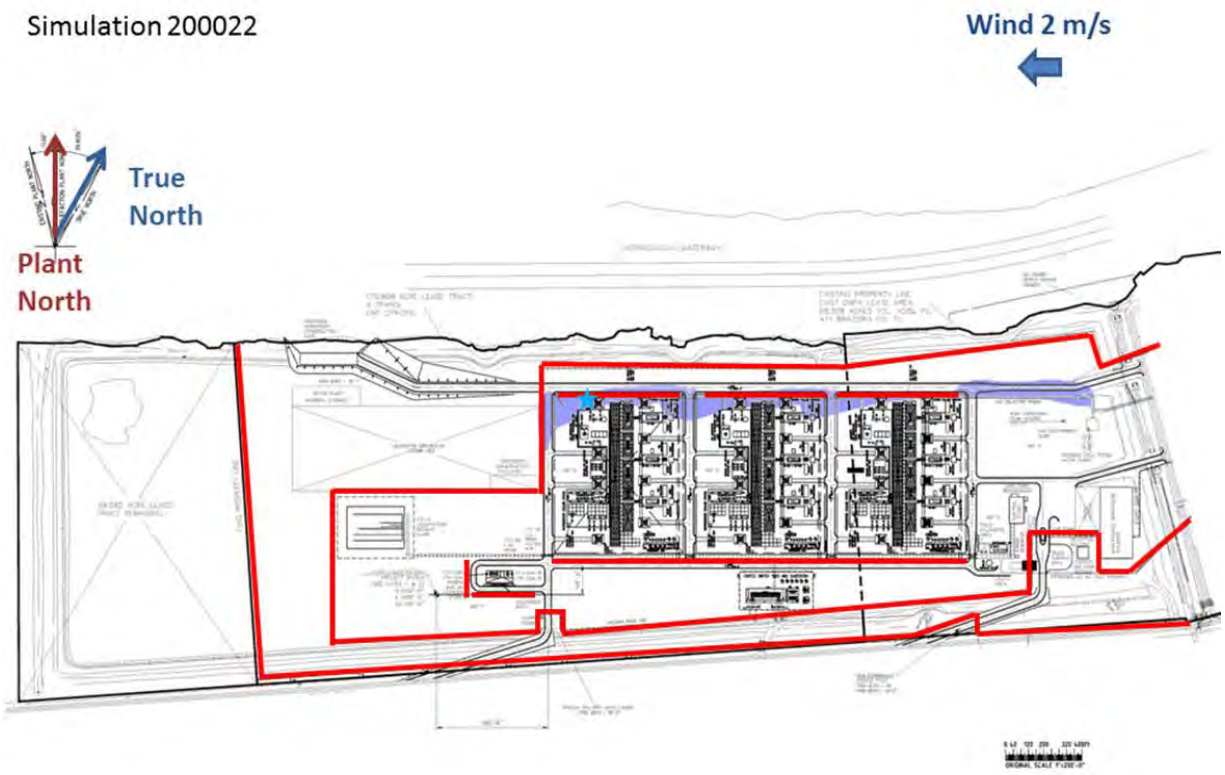


Figure 4.10.5-2 Flammable Vapor Dispersion from the LNG Trough with Parallel Wind – Shown as Shaded Area

As discussed in section 4.10.5.2, USDOT has no objections to Freeport LNG using the design spill selection methodology that resulted in the following set of design spills for determining compliance with 49 CFR Part 193 for the Liquefaction Plant:

1) a 6-inch diameter LNG flashing release from Liquefaction Unit 11;
2) a 2-inch diameter propane flashing release from Liquefaction Unit 11;
3) a 2-inch diameter mixed refrigerant flashing release from Liquefaction 11;
4) a 3-inch diameter ethylene flashing release from the refrigerant storage area; and
5) a 3-inch diameter propane flashing release from the refrigerant storage area.

This selection methodology considered failure rates for plant components, as well as process conditions and release locations.

Various wind directions and were modeled for each case. Freeport LNG found that the cases with the most significant vapor dispersion toward the southern plant property line were from a 3-inch ethylene release in the storage area with release and wind directions to either the south or to the west. See figures 4.10.5-3 and 4.10.5-4.



Figure 4.10.5-3 Flammable Vapor Dispersion from the Ethylene Storage Area Design Spill to the South – Shown as Shaded Area

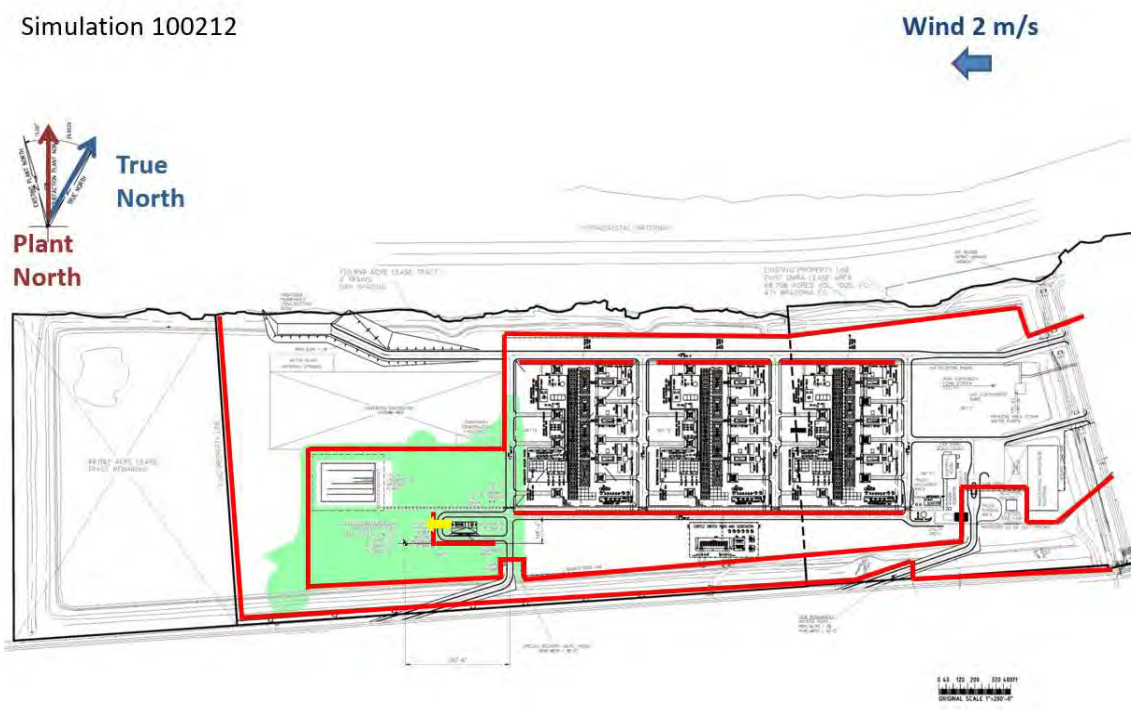


Figure 4.10.5-4 Flammable Vapor Dispersion from the Ethylene Storage Area Design Spill to the West – Shown as Shaded Area

Freeport LNG found the case with the most significant vapor dispersion to the north, toward the shoreline property across the IWC, to be the 6-inch LNG release from the LNG rundown line with release and wind directions to the north. See figure 4.10.5-5.

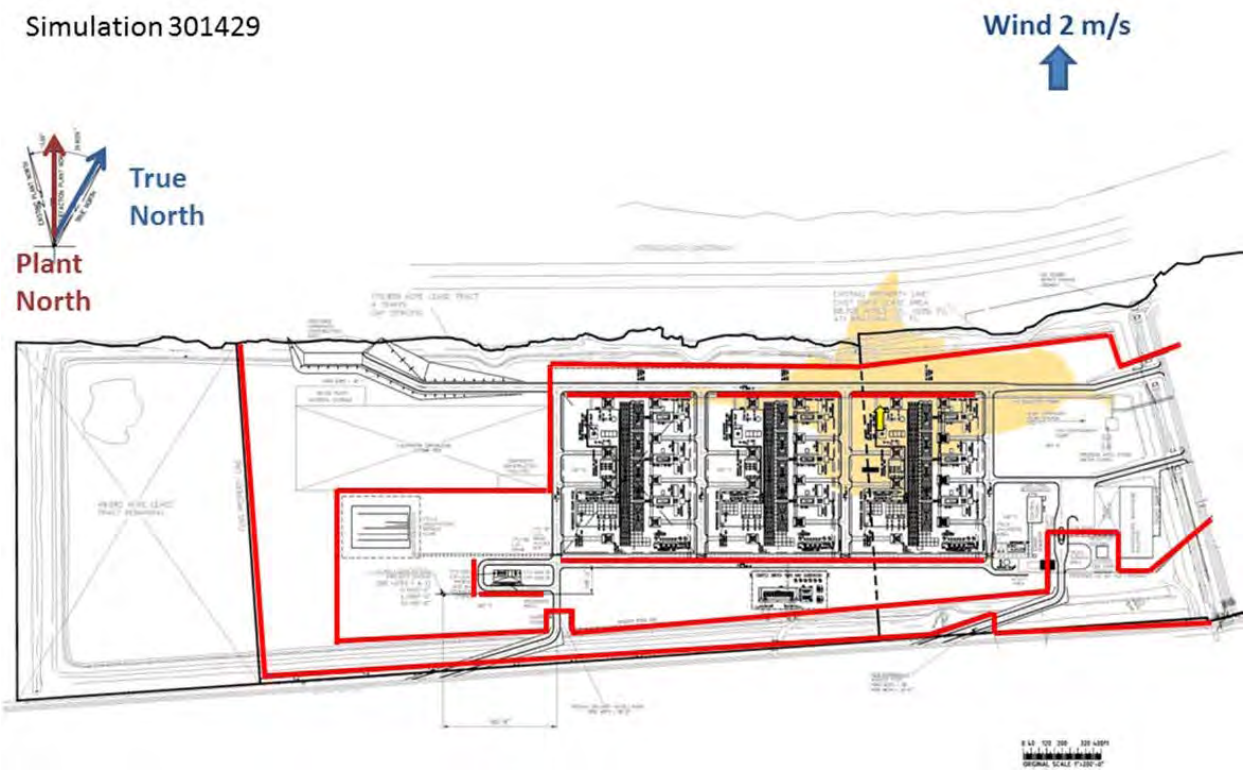


Figure 4.10.5-5 Flammable Vapor Dispersion from an LNG Rundown Line Design Spill to the North – Shown as Shaded Area

The FLACS simulations showed that, due to the proposed vapor barriers within the plant and near the property lines, none of the design spills would result in the ½ LFL vapor dispersion extending over a property line that could be built upon. Based on our consultation with the USDOT, Freeport LNG's siting calculations for the project design would meet the requirements specified in Title 49 CFR 193.2051 and 193.2059 and NFPA 59A section 2.2.3.4 (2001 edition). As a result, we conclude that the siting of the proposed Liquefaction Plant would not have a significant impact on public safety. If the facility is constructed and operated, compliance with the requirements of 49 CFR 193 would be addressed as part of DOT's inspection and enforcement program.

Phase II Modification Project

In the Phase II Modification Project, the facility geometry was accounted for in the vapor dispersion model, including large structures (LNG storage tanks, pipe racks, and the air tower building), existing impoundments, and trench geometry details as established by available plant layout drawings. The model also included the proposed vapor barriers that would extend along specific locations of the plant property line and inside the plant as shown in figure 4.10.5-6. The vapor barriers would be 10-feet, 12-feet, and 20-feet tall chain-link wire fences with privacy slats threaded through the metal links with 10 percent porosity. Figure 4.10.5-6 identifies the heights of the vapor barriers. The releases were initiated after 60 seconds had passed before the

introduction of LNG to allow the wind profile to stabilize from the effects due to the presence of buildings and other on-site obstructions.

In response to the DEIS, Freeport filed an updated vapor dispersion analysis that included new vapor barriers along the piperack north of the Exxon Mobil property. These new vapor barriers include a non-porous section along the southside of the piperack and a 10-percent porous horizontal section above the piperack and are depicted by the purple- and orange-colored lines in figure 4.10.5-6.

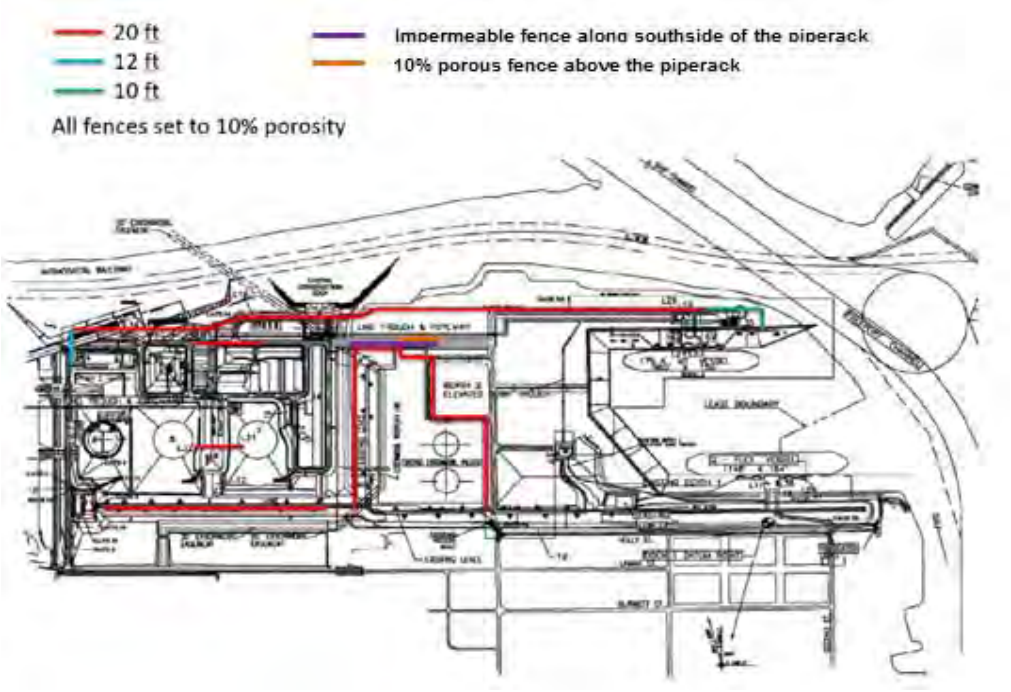


Figure 4.10.5-6 Vapor Barriers Proposed for the Phase II Modification Project

According to table 2.2.3.5 of NFPA 59A, the design spill is the largest flow from the container (*i.e.,* storage tank) withdrawal pumps for a 10-minute duration at full-rated capacity. In order to address the highest rate of LNG liquid flow (*i.e.,* liquid scenario) into the existing LNG Drain Sump – Process Area, Freeport LNG specified the design spill as the guillotine rupture of the 24-inch-diameter LNG Storage Tank T-3 discharge header with three in-tank pumps operating at maximum pump run-out [(7,378 gpm pump run-out flow) x (3 in-tank pumps) = 22,134 gpm]. FLACS was used to predict the extent of the ½-LFL vapor cloud. The FLACS simulations at the proposed Tank T-3 process area identified the need for a 20-foot tall barrier to prevent the LNG vapor from extending beyond the south property line. The results of the FLACS simulation, as shown in figure 4.10.5-7, showed that the ½-LFL vapor cloud would remain within the property boundary at all times as a result of the vapor barrier.

Although Freeport LNG selected 2-inch-diameter design spills for the Dock 2 area, a greater LNG liquid spill (*i.e.,* liquid scenario) into the existing LNG Drain Sump (Dock Area) was evaluated. Freeport LNG evaluated a hole equivalent to 1/3 the diameter of the 26-inch-diameter LNG unloading line at Dock 2, resulting in a 18,770 gpm spill rate. For the simulations, the

LNG is assumed to spill directly into the trench. The FLACS simulations were evaluated at the existing LNG Drain Sump (Dock Area) and in the trough at the Dock 2 area. The FLACS simulations at the existing LNG Drain Sump (Dock Area) showed that the vapor cloud did not extend beyond the property boundary.

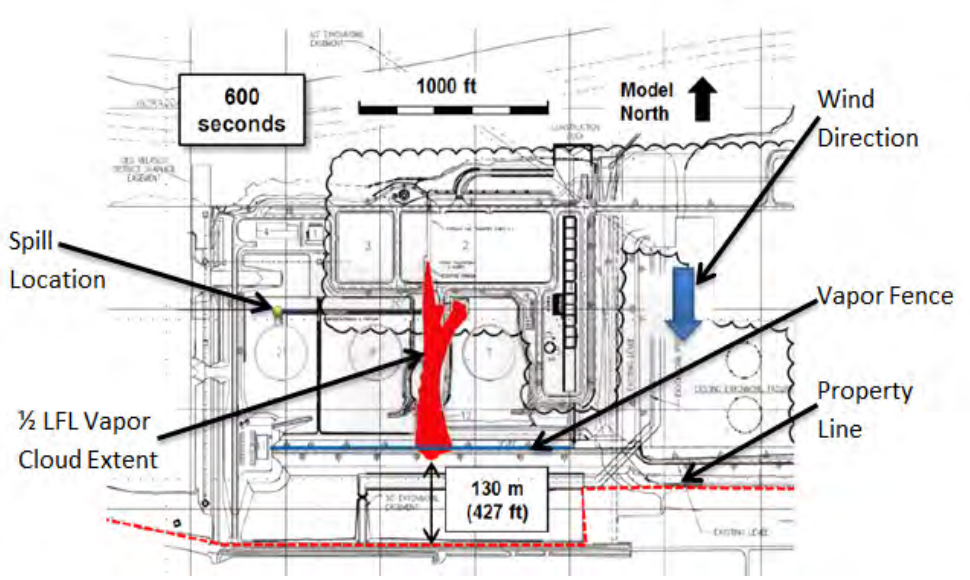


Figure 4.10.5-7 Tank 3 Sendout Vapor Dispersion Zone – Liquid Spill

The FLACS results, shown in figures 4.10.5-8 and 4.10.5-9, indicate that the ½-LFL vapor clouds would remain within the property boundary. Based on our consultation with the USDOT, Freeport LNG's siting calculations for vapor dispersion from LNG liquid spills would meet the requirements specified in Title 49 CFR 193.2059. As a result, we conclude that vapor dispersion from the LNG liquid spills evaluated for both the original Phase II project and the Phase II Modification Project would not have a significant impact on public safety. If the facility is constructed and operated, compliance with the requirements of 49 CFR 193 would be addressed as part of DOT's inspection and enforcement program.

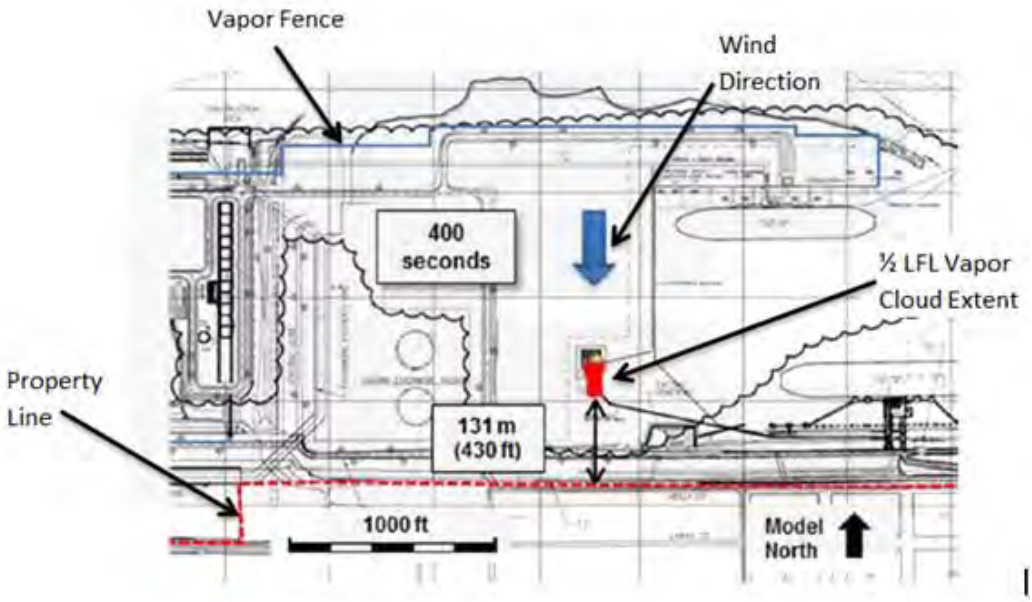


Figure 4.10.5-8 Dock 2 Vapor Dispersion Zone – Liquid Spill at Existing LNG Drain Sump (Dock Area)

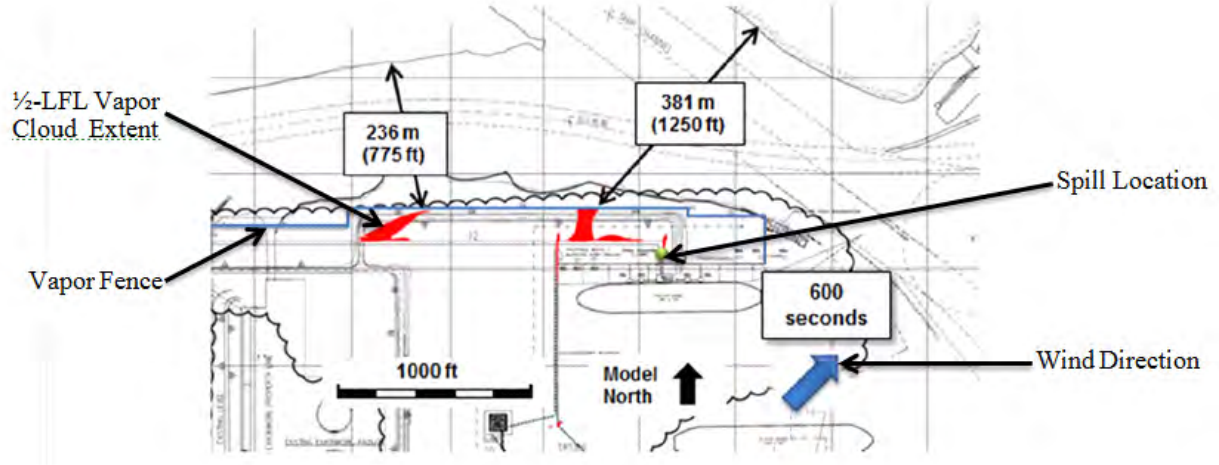


Figure 4.10.5-9 Dock 2 Vapor Dispersion Zone – Liquid Spill in Dock 2 Trough

Freeport LNG considered the highest rate of LNG flashing and jetting from the Dock 2 area would be a release from a 2-inch-diameter hole from the 26-inch-diameter unloading/loading line as shown in figure 4.10.5-10. Freeport LNG also considered 2-inch-diameter holes from the 24-inch-diameter Tank T-3 sendout LNG header in the process area and the 24-inch-diameter Tank T-3 sendout LNG header located at the top of Tank T-3. Freeport LNG determined that the largest hole size that would generate the greatest vapor production rate from each of the three release sources would be from a 2-inch-diameter hole. The FLACS results indicated that the ½-LFL vapor clouds at the Dock 2 and process area releases extended beyond the shoreline along the northern property line and into the ICW. DOT has indicated an exclusion zone that extends past a property line into a navigable body of water or onto a public road is typically acceptable unless the body of water contains a dock or pier that is not controlled by the LNG plant or if

another entity could build a building or members of the public could assemble[31]. Based on our consultation with USDOT, we conclude these vapor dispersion analyses over the ICW would not be prohibited under 49 CFR Part 193.

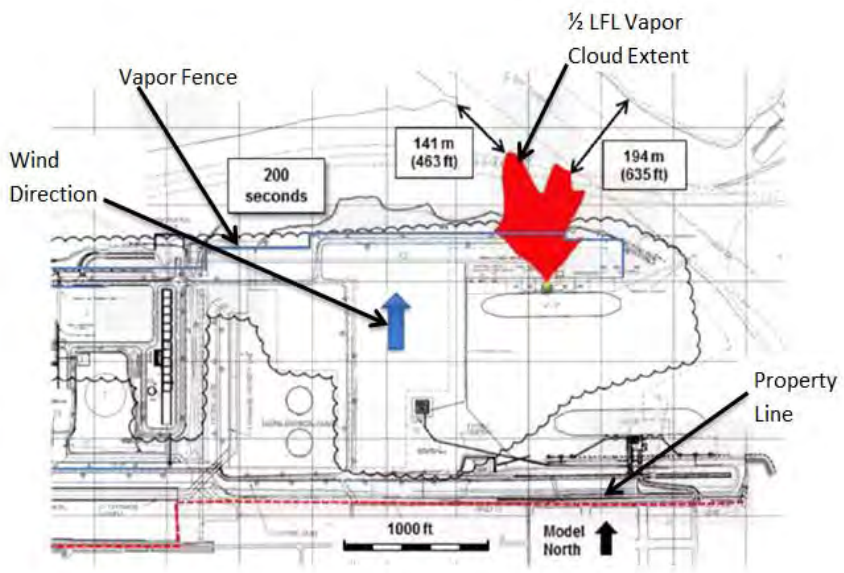


Figure 4.10.5-10 Dock 2 Vapor Exclusion Zone – Flashing and Jetting

As discussed in the DEIS, previous Freeport LNG filings showed that the ½-LFL vapor cloud from a 2-inch-diameter hole in the 26-inch-diameter unloading/loading line would extend onto the northern edge of the ExxonMobil property, which would be prohibited by 49 CFR 193. The ExxonMobil property is an adjacent industrial property as shown in figure 4.10.5-11 and is not under the legal control of Freeport LNG. We requested that Freeport LNG document how it would ensure that the portion of the vapor cloud extending onto the ExxonMobil facility would meet the requirements of 49 CFR 193.2059.

On April 11, 2014, Freeport LNG filed updated vapor dispersion modeling using FLACS that included the addition of two new vapor barriers along a portion of the unloading/loading piperack (see figure 4.10.5-6). A horizontal 10-percent porous vapor barrier would be installed above a short segment of the unloading/loading line piperack, and an impermeable barrier would be installed along a portion of the south side of the piperack to mitigate high momentum jetting and flashing releases and induce liquid rainout. For the revised vapor dispersion analysis, the release was directed south toward the ExxonMobil property with a wind speed of 2 m/s and an atmospheric stability class of F. The additional vapor barriers along the unloading/loading line piperack produced significant liquid rainout into the trench. The results of this modeling demonstrated that the ½-LFL vapor cloud would not extend onto the ExxonMobil property as shown in figure 4.10.5-11. As a result, we conclude the vapor dispersion from the unloading/loading line spill would not pose a significant impact to the public. If the facility is

[31] U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration, *LNG Facility Siting Application Requirements: Frequently Asked Questions*, http://primis.phmsa.dot.gov/lng/faqs.htm, March 31, 2014.

constructed and operated, compliance with the requirements of 49 CFR 193 would be further addressed as part of USDOT's inspection and enforcement program.

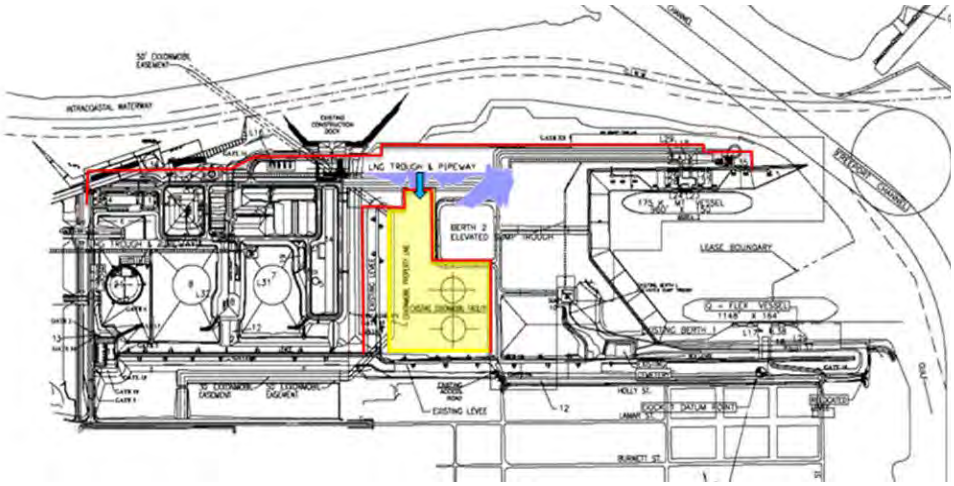


Figure 4.10.5-11 Dock 2 Vapor Dispersion Exclusion Zone - Flashing and Jetting

However, we also note that the utility source term model provided with FLACS may not provide an accurate representation of the deflection from the piperack vapor barriers, which are located in relatively close proximity to the release. In order to ensure that Freeport LNG's analysis accurately represents the effects of the vapor barriers on the dispersion, **we recommend that:**

> **Prior to initial site preparation, Freeport LNG should file with the Secretary, for review and written approval by the Director of OEP, a comparative analysis to support the FLACS results using a CFD model that is able to account for the presence of the piperack vapor barriers. This information should be filed a minimum of 30 days before approval to proceed is requested.**

In addition, the vapor barriers above and along the unloading/loading line piperack would only extend over a portion of the piperack north of the ExxonMobil property, and the design spill was located directly behind the barriers in the revised modeling. The USDOT has indicated that additional design spills should be evaluated immediately upstream and downstream of these vapor barriers to confirm that the barriers would have adequate length to prevent flammable vapor from dispersing onto the ExxonMobil property as a result of design spills located just outside of the barrier coverage. Therefore, **we recommend that**:

> **Prior to construction of the final design, Freeport LNG should file with the Secretary, for review and written approval by the Director of OEP, the results of consultation with USDOT indicating that the length of the vapor barriers applied above and along the unloading/loading line in the area of the ExxonMobil facility would be sufficient to provide compliance with 49 CFR 193.2059. This information should be filed a minimum of 30 days before approval to proceed is requested.**

Vapor Barriers

Because the vapor dispersion simulations for both the Liquefaction Plant and the Phase II Modification Project took into account the use of vapor barriers, Freeport LNG indicated that the vapor barriers would be incorporated into the existing facilities maintenance and inspection program and would be maintained in accordance with the vendor or manufacturer's specifications. The vapor barriers proposed for the Projects are at a preliminary design stage and would need to be designed and constructed to withstand the mechanical stress and thermal environment of a release. USDOT has also indicated that these barriers must be designed to withstand the wind loads specified in 49 CFR 193.2067. To ensure that the design of the vapor barriers and the procedures for maintaining the vapor barriers are appropriate, **we recommend that:**

> **Prior to construction of the final design, Freeport LNG should file with the Secretary, for review and written approval by the Director of OEP, design details of the vapor barriers as well as procedures to maintain and inspect the vapor barriers provided to meet the siting provisions of 49 CFR Part 193.2059. This information should be filed a minimum of 30 days before approval to proceed is requested.**

4.10.5.5 Overpressure Considerations for Facilities at the Terminal

The propensity of a vapor cloud to detonate or produce damaging overpressures is influenced by the reactivity of the material, the level of confinement and congestion surrounding the vapor cloud, and the flame travel distance. It is possible that the prevailing wind direction may cause the vapor cloud to travel into a partially confined or congested area. The primary flammable substances in the liquefaction area would be methane, propane, ethylene and mixed refrigerant. As adopted by Part 193, section 2.1.1 of NFPA 59A (2001 edition) requires an evaluation of potential safety incidents and safety measures incorporated in the design or operation of the facility. In order to address potential incidents related to overpressures associated with an LNG or refrigerant release, Freeport LNG analyzed the distance to an overpressure threshold value of 1 psi to determine the potential impact on the public. The 1 psi value is used in consequence analyses required under federal regulations such as Title 40 CFR Part 68.22 and thus is considered a reasonable threshold for consequence analyses.

Freeport LNG modeled overpressures based on the proposed layout and pipe rack cross-sections of the Liquefaction Plant using FLACS Version 9.1 software. Distances were determined with a safety factor of 2 (*i.e.*, ½ psi), as a result of previous validation studies and peak-pressure averaging (Hansen, *et al.*, 2010).

As discussed in the section 4.10.2.4, unconfined methane or LNG vapor clouds would not be expected to produce damaging overpressures given the LNG compositions handled onsite and the expected vapor dispersion characteristics. For this reason, Freeport LNG did not model unconfined LNG releases in its overpressure analysis.

However, ignition of a confined LNG vapor cloud could result in higher overpressures. To address this concern, gas detectors would be installed in the vicinity of the air intakes of all combustion equipment and all buildings. The detectors would be calibrated based upon the

potential flammable vapors near each location. If multiple types of flammable vapors would be possible at a specific location, the respective detector(s) would be calibrated accordingly. Gas detection would lead to alarms, and in certain cases, equipment shutdown. Therefore, we determined the potential for overpressures from confined vapor clouds is negligible.

As discussed in the section 4.10.2.4, propane, ethylene and mixed refrigerant have higher reactivities than methane, and therefore ignition of these substances would have a higher potential to result in damaging overpressures and would pose a higher risk to the public.

In the event of a vapor cloud deflagration, the largest overpressures would typically be produced by flame acceleration within the regions of the vapor cloud with the largest degrees of congestion and/or confinement. The Liquefaction Plant would have three liquefaction units containing areas of congestion. The most important unit to be evaluated for overpressure hazards is Liquefaction Unit 11, which would be closer to the property line than the others.

Each liquefaction unit includes two significant refrigerant process streams: propane and mixed refrigerant. In order to determine the most reactive stream, identical near-stoichiometric vapor clouds of both fluids were placed in the congested region of a liquefaction train in the computer model, and ignition was simulated. This comparison demonstrated that the mixed refrigerant vapors would produce more significant overpressures than the propane vapors.

In order to determine which mixed refrigerant vapor dispersion scenario would most likely result in the largest overpressure hazard, the mixed refrigerant release was evaluated to determine the combination of release direction, wind speed, and wind direction that would create the greatest equivalent stoichiometric cloud within the congested area of a liquefaction process train. This method converts non-homogeneous clouds into equivalent stoichiometric clouds that can be modeled using FLACS, considering that both the reactivity of a mixture and its gas expansion ratio are functions of the local stoichiometry. The largest equivalent stoichiometric cloud occurred for a release to the south with wind from the northeast at 4.5 mph. This stoichiometric cloud was inserted into the congested areas of Liquefaction Train 11, at locations nearest to property lines, and ignited at locations that would allow the most flame acceleration toward the property lines. As shown in figure 4.10.5-12, these results demonstrated that an overpressure of 1 psi, which was actually modeled to the ½ psi to account for any uncertainty in the model, would remain onsite.

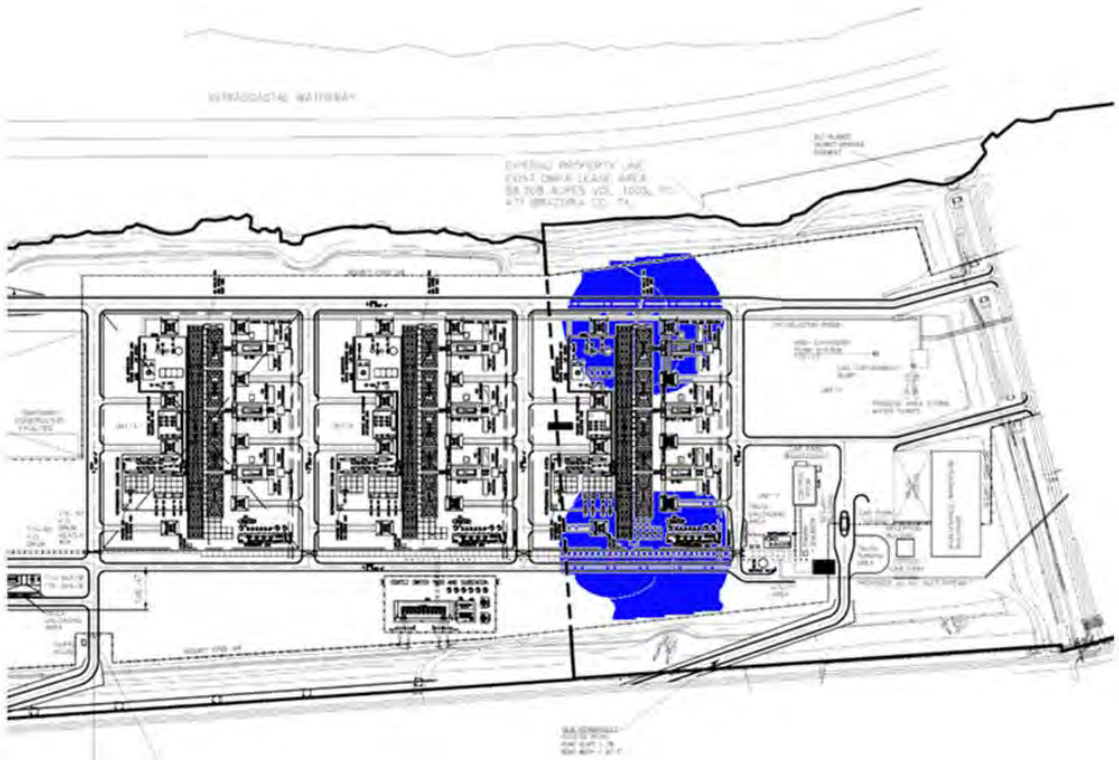


Figure 4.10.5-12 Extent of 1 Psi Overpressures Due to a Design Spill in the Liquefaction Plant Process Area – Shown as Shaded Areas

In addition, Freeport LNG performed FLACS modeling of potential overpressures in the refrigerant storage area. A near stoichiometric cloud of ethylene was placed over the entire refrigerant storage area and ignited at a location that would allow the most flame acceleration toward the nearest property line. Freeport LNG notes that this stoichiometric cloud size was extremely conservative, given that dispersion results showed only 10 percent of the available area would be included in an equivalent stoichiometric cloud. The company indicated that this degree of conservatism would have a more significant effect than any layout changes made after the modeling was conducted, either in FEED or in final design. Because the model showed that the ½ psi distance for this conservative scenario would remain onsite and because ethylene has a higher reactivity than propane, the results indicate that an overpressure of 1 psi would remain onsite for flammable vapor scenarios in the refrigerant storage area. See figure 4.10.5-13.

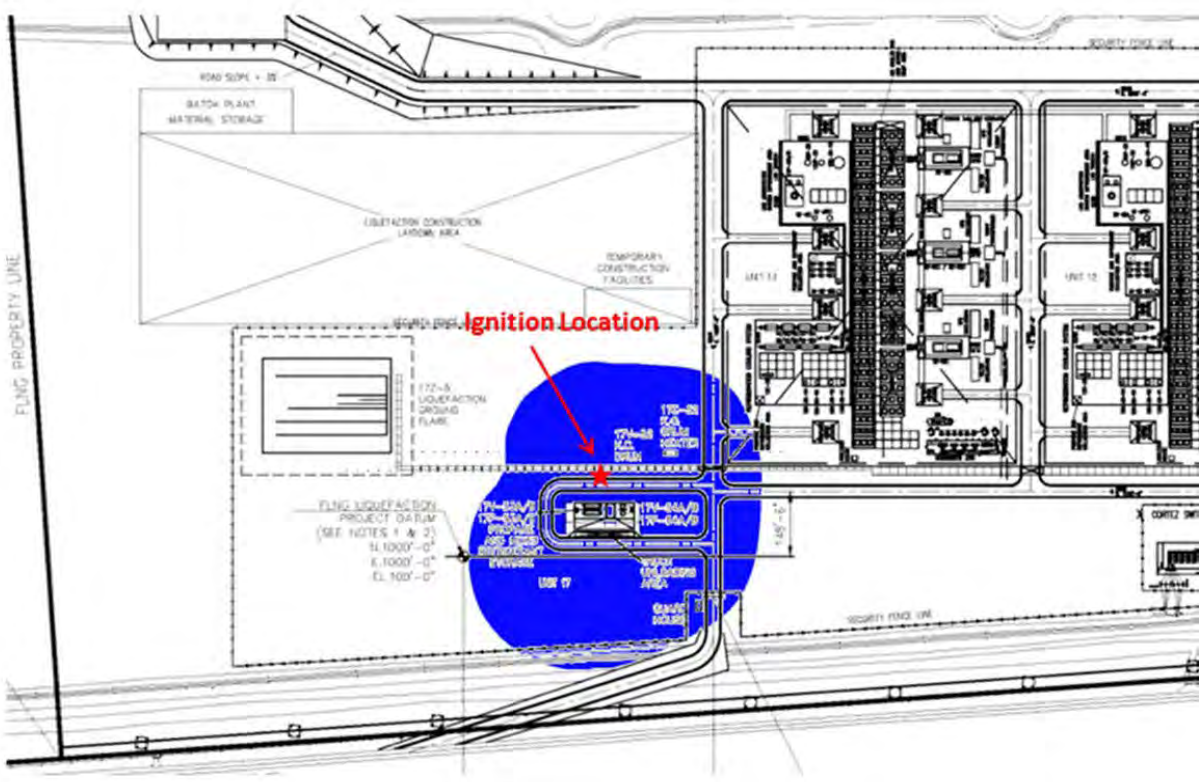


Figure 4.10.5-13 Extent of 1 Psi Overpressures Due to a Design Spill in the Liquefaction Plant Refrigerant Storage Area – Shown as Shaded Areas

Using FLACS, Freeport LNG also analyzed the potential for overpressures from the substation shown to the south of the middle liquefaction train. The substation area was completely filled with a stoichiometric cloud of ethylene and ignited at corners opposite the nearest property line in order to project any blast waves in that direction. However, because the substation area has very little congestion, the maximum pressure produced was 1/4 psi, which did not leave the substation area.

The ground flare, which is also an area with very little congestion, can be seen located to the north and west of the refrigerant storage area in figure 4.10.5-13. Tall, opaque wind fencing would be installed around the flare field, and this would inhibit vapors from entering that area. If flammable vapor entered the flare field, the vapor would ignite before it could fill the entire area. In addition, the wind fences would be spaced at least 200 feet apart with little or no congestion between the fences. Therefore, a significant overpressure event would not be expected in this area.

Freeport LNG indicated that the minimum distance between parallel vapor barriers is about 120 feet, and no congestion is present. FLACS modeling of a stoichiometric mixed refrigerant cloud inside approximately a 360-foot length of these parallel vapor barriers produced pressures of only 0.2 psi. The longest continuous segment of parallel barriers, spaced about 120 feet apart,

that vapor was shown to extend into appears to be slightly longer. However, the stoichiometric cloud used in the model would cause overestimation of actual overpressures. Therefore, the confinement provided by the parallel vapor barriers would not be expected to create hazardous overpressures.

None of the vapor dispersion scenarios from the design spills would have the potential for offsite overpressures of 1 psi. Based on our consultation with the USDOT, Freeport LNG's overpressure analyses for LNG and refrigerants for the project design would meet the requirements specified by Title 49 CFR 193.2051 and NFPA 59A section 2.1.1 (2001 edition). As a result, we conclude that the siting of the proposed Liquefaction Plant would not have a significant impact on public safety. If the facility is constructed and operated, compliance with the requirements of 49 CFR 193 would be addressed as part of DOT's inspection and enforcement program.

The overpressure analyses were based on the preliminary information contained in the FEED submitted by Freeport LNG. Piping and equipment arrangements may differ in final design, potentially resulting in increased congestion or confinement in the liquefaction area and an increase in the overpressure distance. Therefore, **we recommend that:**

> **Prior to construction of the final design, Freeport LNG should file with the Secretary, for review and written approval by the Director of OEP, plant geometry models or drawings that verify the confinement and congestion represented in the FEED of the Liquefaction Project or provide revised overpressure calculations indicating that a 1 psi overpressure would not impact the public. This information should be filed a minimum of 30 days before approval to proceed is requested.**

4.10.5.6 Boiling Liquid Expanding Vapor Explosion

Freeport LNG would install two pressurized propane storage tanks and two pressurized vacuum-insulated ethylene storage tanks at the Liquefaction Plant. Freeport LNG originally proposed to locate the Propane and Ethylene Storage Area Sump within the curbed area around the storage tanks. However, the company revised the layout to provide passive protection from a BLEVE of a storage tank by locating this sump 113 feet away from the closest storage tank and 93 feet away from the truck unloading area. This arrangement would locate the tanks and truck unloading area outside of the 3,000 Btu/ft^2-hr thermal radiation zone from a fire over the full surface area of the Propane and Ethylene Storage Area Sump. In addition, Freeport LNG would orient flanges and small nozzles in the refrigerant storage area so that a jet fire would not impinge on adjacent equipment or piping. Where necessary, Freeport LNG would use mitigation measures such as flange shrouds and the use of welded valves.

As additional layers of protection in the event of a fire, water spray and fire water monitors would be installed to cool the propane and ethylene storage tanks as well as the delivery truck tanks in the unloading area. The water spray would be designed in accordance with API 2510A to provide 0.25 gpm/ft^2 of water for the surface of the tanks. Three firewater monitors in the area would also be designed in accordance with API 2510A to provide 500 gpm of cooling water each.

As there would be no pressurized storage vessels proposed as part of the Phase II Modification Project, we would not expect public safety impacts from BLEVEs at the Phase II Modification Project facilities.

Based on our consultation with the USDOT, Freeport LNG's siting calculations for the Liquefaction Plant design would meet the requirements specified by Title 49 CFR 193.2051 and NFPA 59A section 2.1.1 (2001 edition). As a result, we conclude that the siting of the proposed Liquefaction Plant would not have a significant impact on public safety. If the facility is constructed and operated, compliance with the requirements of 49 CFR 193 would be addressed as part of DOT's inspection and enforcement program.

4.10.6 Siting Analysis for the Pretreatment Plant

As previously discussed, we applied the Part 193 siting standards to the Pretreatment Plant in order to provide a consistent assessment of potential public impacts with could result from the construction of the facilities at both this site and the terminal site. Although the Part 193 siting standard was used for our review, the Pretreatment Plant does not appear to satisfy the definition of an LNG facility in § 193.2007 and would not have to comply with any of the requirements under 49 CFR 193 unless otherwise determined by USDOT.

4.10.6.1 Pretreatment Plant - Impoundment System

The proposed Pretreatment Plant impoundment system would have several curbed concrete spill containment areas. The first area would contain spills in the Utility Storage Area and would be 198 feet long by 79 feet wide by 14 inches deep. This containment area would contain 110 percent of the volume of the amine storage tank, which is the largest tank in that area, having a capacity of 103,490 gallons.

Two other spill containment areas would be located in each of the three pretreatment process units, Pretreatment Collection Area A having dimensions of 178 feet long by 60 feet wide with a 6 inch curb and Pretreatment Collection Area B being 122 feet long and 54 feet wide with a 6-inch curb. Both containment areas would have a 13 foot by 13 foot by 2 foot sub-impoundment and would have total containment volumes of 47,720 and 22,560 gallons respectively, including internal geometry such as sloped floors. Although there would be no storage tanks in the pretreatment units and the supports for the process vessels would have cryogenic insulation where needed and fireproofing, these impoundment systems would be sized adequately to contain the total potential liquid releases from all the process vessels located within them. Freeport LNG determined that this would result in total liquid spills of 1,980 gallons for Collection Area A and 2,830 for Collection Area B. These collection areas would also contain 10 minutes of the greatest liquid release from a single pipe in that area, which would be less than 1,640 gallons from the 6-inch feed line to the Deethanizer Reflux Pump for Collection Area A and less than 4,230 gallons from the 10-inch line from the Absorber Bottoms for Collection Area B, based on calculations done in UniSim software by Freeport LNG.

Paving within the containment areas would be sloped a minimum of 1 percent to grated drainage channels. The drainage system includes a normally closed valve located outside of each

containment area to allow fluids to be inspected and then either released to the plant drainage system or removed by vacuum truck if needed.

In addition, an NGL Surge Drum impoundment would contain any hydrocarbon spills from the NGL surge drum. This impoundment would have a sump that is 60-feet long by 3.5-feet wide by 2.5-feet deep, with an additional 6-inch curb around a 60-foot by 32-foot area, which together would contain a volume of 7,960 gallons, considering all internal geometry. This capacity would fully contain the 7,460 gallon liquid capacity of the NGL Surge Drum. The greatest liquid release from any single pipe in this area for 10 minutes would be 935 gallons from the 6-inch inlet line to the NGL Surge Drum, based on calculations done in UniSim software by Freeport LNG.

The process impoundments and their sizing spills are summarized in table 4.10.6-1 below.

Table 4.10.6-1

Pretreatment Plant Process Impoundment Sizing

Spill Source	Sizing Spill (gallons)	Impoundment	Impoundment Size (gallons)
NGL Surge Drum	7,460	NGL Surge Drum impoundment	7,960
Deethanizer and Debutanizer Vessels	1,980	Pretreatment Collection Area A	47,720
10-inch Line from Absorber Bottoms	< 4,230	Pretreatment Collection Area B	22,560

4.10.6.2 Pretreatment Plant – Design Spills

As discussed in section 4.10.5.2, design spills are used to determine thermal radiation and vapor dispersion distances.

Freeport LNG indicated that its siting calculations for the Pretreatment Plant would be conducted in accordance with 49 CFR 193. To select the design spills, Freeport LNG evaluated the Pretreatment Plant's design in the same manner as that for the terminal facilities, basing the selections on failure rate design in the same manner as that for the terminal facilities, basing the selections on failure rate criteria and the proposed process conditions. This selection process identified the design spills listed in table 4.10.6-2.

Table 4.10.6-2

Natural Gas Liquids Release Mass Flow Rates and Rainout Percentages

Spill #	Process Line Diameter (inch)	Hole Size (inch)	Release Mass Flow Rate (lb/hr)	Liquid Spill (%)	Vapor Mass Flow Rate (lb/hr)
NGL-3	4	4	52,965	93%	3,708
NGL-12	10	1	81,289	0%	81,289
NGL-14	4	4	63,488	90%	6,349
NGL-17	6	6	33,204	93%	2,324

In order to address the most significant vapor dispersion scenario from each design spill, Freeport LNG determined the hole sizes that would release the greatest vapor mass flow rate. Table 4.10.6-3 demonstrates that the vapor flow rates were maximized by reducing the 4-inch diameter holes to 1-inch and the 6-inch diameter hole to 0.5-inch.

The design spill durations were 10 minutes. All leaks were assumed to be horizontal. The release heights were estimated to be 7 feet for case NGL-3 and 10 feet for NGL-12, 14 and 17.

Table 4.10.6-3

Natural Gas Liquids Hole Size Sensitivity Analysis

Spill #	HOLE Size (in)	Equilibrium Pressure (psig)	Equilibrium Temp (°F)	Release Mass Flow Rate (lb/hr)	Rainout Percentage	Vapor Mass Flow Rate (lb/hr)
NGL-3	4	0.21	-213	52,695	93%	3,708
	2	3.5	-206.2	54,107	84%	8,657
	1.5	12	-192.1	55,753	65%	19,514
	1	**66**	**-142.6**	**55,434**	**0%**	**55,434**
NGL-12	**1**	**159**	**111**	**81,289**	**0%**	**81,289**
NGL-14	4	0.3	-38.21	63,488	90%	6,349
	2	5	-25.21	64,354	73%	17,376
	1.5	16	-2.77	63,953	44%	35,814
	1	**82**	**67.39**	**61,516**	**0%**	**61,516**
NGL-17	6	0.015	76	33,204	94%	1,992
	4	0.09	76	36,149	93%	2,530
	2	1.3	76	34,347	90%	3,435
	1	24	76	36,783	43%	20,966
	0.5	**147**	**76**	**22,819**	**0%**	**22,819**

The design spills were chosen at various steps in the pretreatment process and represent varying NGL compositions. The composition of scenario NGL-3 would be expected to produce greater flammable vapor dispersion than the other heavier compositions. However, the heavier compositions would be expected to have greater reactivity when considering the potential for overpressures from within a congested area. Table 4.10.6-4 presents the design spill compositions.

Based on a review of the potential leakage sources, FERC staff determined that the NGLs design spills were selected in accordance with the philosophy used for design spill selection from the Liquefaction Plant.

Table 4.10.6-4 Natural Gas Liquids Design Spill Compositions				
Component	**NGL-3 (mol%)**	**NGL-12 (mol%)**	**NGL-14 (mol%)[5]**	**NGL-17 (mol%)**
Nitrogen	0.017	0.0	0.0	0.0
Methane	18.38	0.006	0.006	0.0
Ethane	33.25	5.285	5.285	0.0
Propane	36.76	45.23	45.23	0.0
Butane (n-Butane & i-Butane)	10.76	42.53	42.53	1.0
Pentane (n-Pentane & i-Pentane)	0.789	6.857	6.865	62.68
C6s (Hexane)	0.002	0.027	0.027	16.18
C7s (Heptane)	0.0	0.0	0.0	9.298
C8s (Octane)	0.0	0.0	0.0	4.226
C9s (Nonane)	0.0	0.0	0.0	1.6905

Our conclusions on the single accidental leakage sources were based on preliminary design information which may be revised as the engineering design progresses. If Freeport LNG's design or operation of the proposed facilities differs from that provided, our conclusions may change. As a result, **we recommend that:**

> **Prior to the construction of the final design, Freeport LNG should file with the Secretary for review and approval by the Director of OEP, certification that the final design of the Pretreatment Plant facilities is consistent with the information provided to FERC in the project docket. In the event that any modification to the design alters the single accidental leakage sources on which the siting analysis was based, Freeport LNG should consult with FERC staff on any actions necessary to re-evaluate the siting of the Pretreatment Plant facilities.**

4.10.6.3 Pretreatment Plant - Thermal Radiation

Amine would be handled at temperatures below its flash point (the lowest temperature at which it can vaporize to form an ignitable mixture in air), which would also be above ambient temperatures. Therefore, the amine solution would not pose a thermal radiation hazard. Aqueous ammonia in an outdoor environment is also generally not considered to be a flammable hazard.

However, spills of NGLs would pose a fire hazard. For the reasons discussed in section 4.10.5.3, Freeport LNG used LNGFIRE3 to conservatively estimate the thermal radiation from impoundments serving these heavier hydrocarbons. The same climate conditions used for thermal radiation modeling at the terminal were used: an ambient temperature of 35°F, wind speeds of 0 to 27.6 mph, and 60 percent relative humidity.

Freeport LNG determined that the largest liquid design spill in the NGL Surge Drum impoundment would be a 10-minute spill from the rupture of the 6-inch piping into the NGL

surge drum, having a total potential liquid release of 1,025 gallons. The ignition of this design spill in the 60-foot long by 3.5-foot wide NGL Surge Drum Containment Sump would produce a thermal flux level of 1,600 Btu/ft^2-hr at a maximum of 92 feet from the sides of the sump and 62 feet from the ends of the sump.

The largest liquid design spill release into the 13 by 13 foot sub-impoundment in either Collection Area A or B would be 2,240 gallons. The maximum distance to a thermal flux level of 1,600 Btu/ft^2-hr from a fire in each sub-impoundment would be 93 feet (see table 4.10.6-5).

Table 4.10.6-5

Thermal Radiation from Pretreatment Area Impoundments

Impoundment	Maximum Distance to 1,600 Btu/ft2-hr (feet)	Distance to Nearest Property Line that Could be Built Upon (feet)
NGL Surge Drum Containment Sump	92	775
Pretreatment Collection Area A sub-impoundment	93	680
Pretreatment Collection Area B sub-impoundment	93	690

These thermal radiation zones would stay within the Pretreatment Plant property line. As a result, we conclude that thermal radiation hazards from the Pretreatment Plant would not have a significant impact on public safety. If the facility is constructed and operated, compliance with the requirements of 49 CFR Parts 192 and 193 would be addressed as part of DOT's inspection and enforcement program.

4.10.6.4 Pretreatment Plant - Flammable Vapor Dispersion

A large quantity of NGL released without ignition would form a flammable vapor cloud that would travel with the prevailing wind until it either dispersed below the flammable limit or encountered an ignition source. For the Pretreatment Plant facilities, Freeport LNG used the same conditions as the Liquefaction Plant for modeling vapor dispersion: average regional temperature of 71.5 °F, relative humidity of 50 percent, wind speed of about 4.5 mph, Pasquill-Gifford Atmospheric Stability Class F and a ground surface roughness of 0.03 meter.

Freeport LNG submitted vapor dispersion modeling using PHAST software for cases NGL-12, NGL-14, and NGL-17 in unobstructed terrain and using FLACS software for the NGL-3 case in the actual plant geometry. The release and wind directions that could cause vapor dispersion toward the nearest property lines, to the north and to the east, were evaluated. As with the vapor dispersion modeling done for the terminal facilities, vapor dispersion was performed with a safety factor of 2 to account for uncertainty in the model (using the ½ LFL rather than the LFL).

The most significant ½ LFL distance with respect to the northern property line occurred for the NGL-3 case. The results of this case are shown in figure 4.10.6-1 below.

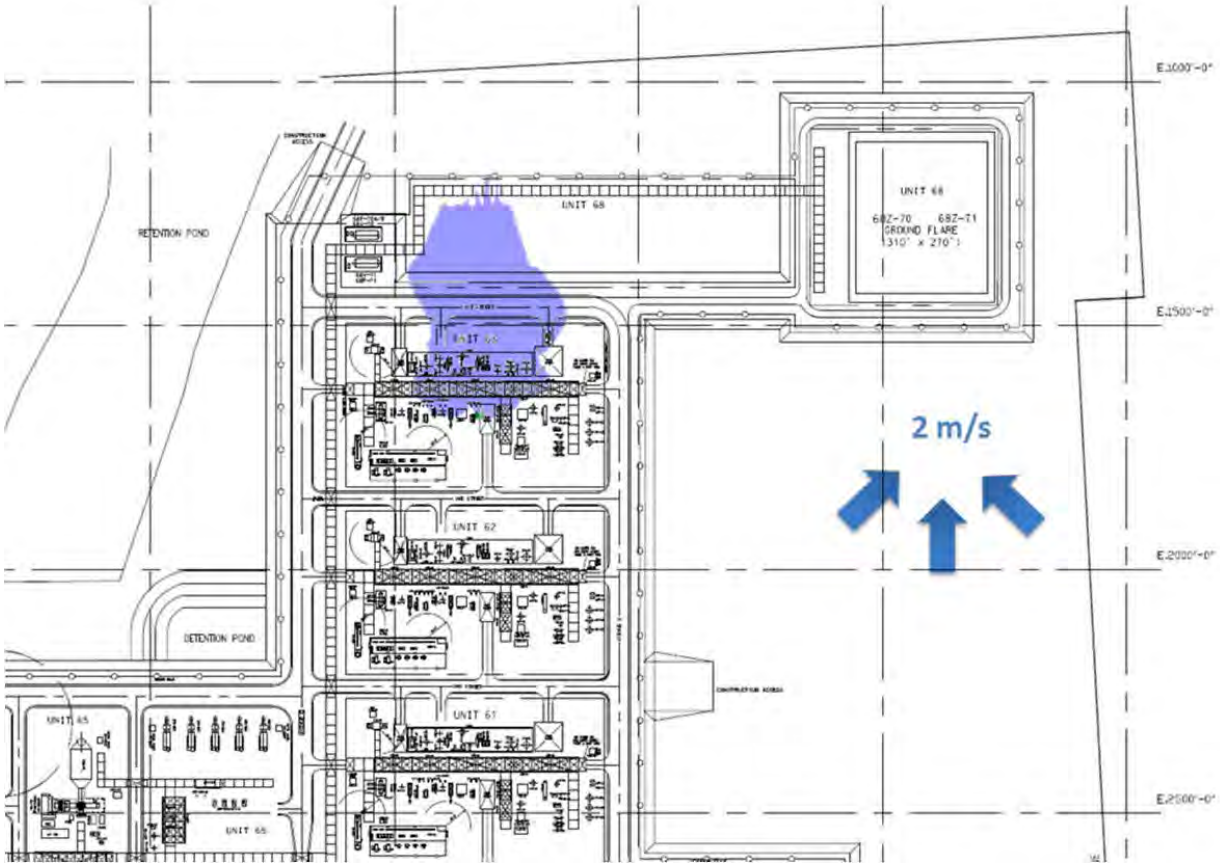


Figure 4.10.6-1 Flammable Vapor Dispersion from the N-3 Design Spill in the Pretreatment Plant Process Area for Wind Directions to the North

The most significant ½ LFL distance toward the eastern property line occurred for the NGL-17 case. See figure 4.10.6-2.

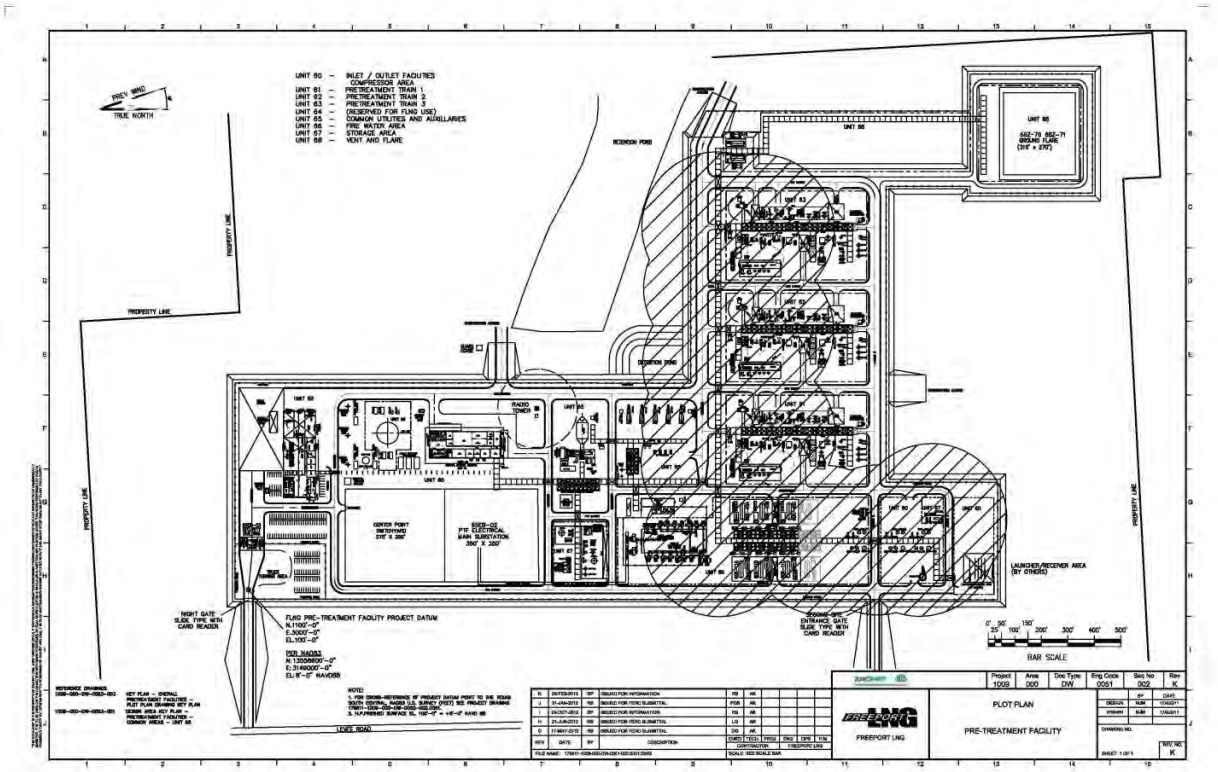


Figure 4.10.6-2 Flammable Vapor Dispersion from the N-17 Design Spill in the Pretreatment Plant Areas for all Wind Directions Combined

No flammable vapor would reach a property line that could be built upon in any design spill scenario. As a result, we conclude that flammable vapor dispersion hazards from the pretreatment area would not have a significant impact on public safety. If the facility is constructed and operated, compliance with the requirements of 49 CFR parts 192 and 193 would be addressed as part of DOT's inspection and enforcement program.

4.10.6.5 Pretreatment Plant – Overpressures

The propensity of a vapor cloud to detonate or produce damaging overpressures is influenced by the reactivity of the material, the level of confinement and congestion surrounding the vapor cloud, and the flame travel distance.

Consistent with the refrigerant overpressure analysis at the Liquefaction Plant, Freeport LNG used an overpressure threshold value of 1 psi to determine the potential impact on the public. The 1 psi value is used in consequence analyses required under federal regulations such as Title 40 CFR Part 68.22 and thus is considered to be reasonable.

Freeport LNG modeled overpressures based on the proposed layout of piping and equipment in the pretreatment area. Overpressure distances were evaluated using the FLACS model and

considering a safety factor of 2 (*i.e.*, ½ psi), as a result of previous validation studies and peak-pressure averaging (Hansen, *et al.*, 2010).

A reactivity comparison indicated that spills NGL-12, 14, and 17 would have very similar reactivities, while recognizing that spill NGL-3 would have less reactivity due to its higher methane component. Therefore, because the release locations for each of these spills are relatively near to each other and spills NGL-12 and 14 have the largest flow rates, NGL-12 and 14 were selected for overpressure modeling.

In order to determine which of these vapor dispersion scenarios would most likely result in the largest overpressure hazard, the NGL-12 and 14 scenarios were evaluated to determine which potential vapor dispersion cloud within a pretreatment process train area would convert to the greatest equivalent stoichiometric cloud. This method takes into account that both the reactivity of a mixture and its gas expansion ratio are functions of the local stoichiometry. The greatest equivalent stoichiometric cloud was found to result from the NGL-12 scenario when released to the north with winds to the south.

The equivalent stoichiometric cloud was placed fully within the congested region of a pretreatment train. This cloud was ignited at the end that would allow the most flame acceleration but only resulted in peak overpressures of 0.15 to 0.30 psi at the property line, which would be less than the 0.5 psi threshold. As a result, we conclude that overpressure hazards from the Pretreatment Plant would not have a significant impact on public safety. If the facility is constructed and operated, compliance with the requirements of 49 CFR Parts 192 and 193 would be addressed as part of DOT's inspection and enforcement program.

As with the overpressure modeling done for the Liquefaction Plant, this overpressure analysis is based on the preliminary information contained in the FEED submitted by Freeport LNG. Piping and equipment arrangements may differ after final design, resulting in increased congestion or confinement in the facilities and an increase in the overpressure distance. Therefore, **we recommend that:**

> **Prior to construction of the final design, Freeport LNG should file with the Secretary, for review and written approval by the Director of OEP, plant geometry models or drawings that verify the confinement and congestion represented in the FEED of the Liquefaction Project or provide revised overpressure calculations indicating that a 1 psi overpressure would not impact the public. This information should be filed a minimum of 30 days before approval to proceed is requested.**

4.10.6.6 Pretreatment Plant – Toxic Dispersion

The NGLs would contain potentially toxic products: benzene and toluene. Aqueous ammonia and H_2S would also be present at the pretreatment site and would have potential for toxicity. Freeport LNG calculated the dispersion distances for these substances to toxic threshold exposure limits based on the Acute Exposure Guideline Level (AEGLs) maintained by the USEPA. AEGLs are recommended for use by federal, state, and local agencies, as well as the private sector for emergency planning, prevention, and response activities related to the

accidental release of hazardous substances. Other federal agencies, such as the USDOE, use AEGLs as the primary measure of toxicity.

There are three AEGLs which are distinguished by varying degrees of severity of toxic effects with AEGL-1 (level 1) being the least severe to AEGL-3 being the most severe. AEGL-1 is the airborne concentration of a substance that the general population, including susceptible individuals, could experience notable discomfort, irritation, or asymptomatic nonsensory effects. However, these effects are not disabling and are temporary and reversible upon cessation of the exposure. AEGL-2 is the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape. AEGL-3 is the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death. The USEPA provides AEGLs for a list of chemicals at varying exposure times (10 minutes, 30 minutes, 1 hour, 4 hours, and 8 hours).

PHAST Version 6.7 was used to perform the toxic dispersion modeling. PHAST is an industry standard model for performing various hazard modeling and is validated against numerous experiments. Similar to the flammable vapor dispersion modeling, a safety factor of 2 was applied to the AEGL results to account for uncertainty in the model. The averaging times used in the modeling were based on the exposure duration.

Of the design spills identified for the process areas (see section 4.10.6.2), stream N-17 was determined to be the worst case scenario for this analysis as it contains the highest concentration and mass flow rate of benzene and toluene. The maximum distances calculated by PHAST to each AEGL level are listed in table 4.10.6-6 below.

Table 4.10.6-6

Benzene and Toluene Vapor Dispersion Distances

Component:	½ AEGL-1 10 minutes Distance (feet)	½ AEGL-2 10 minutes Distance (feet)	½ AEGL-3 10 minutes Distance (feet)
Benzene	344	56	None
Toluene	287	26	None

The distance from these releases to the nearest property line would be 640 feet. All of these dispersion distances would remain within Freeport LNG property.

Design spills were also calculated for the piping and equipment in the aqueous ammonia system using the same failure rate data used to identify the process area design spills. The following aqueous ammonia system design spills were identified:

- A-9: A full rupture of a 1-inch diameter aqueous ammonia line
- A-10: A 0.4-inch hole in the aqueous ammonia storage vessel

Release conditions for each aqueous ammonia release scenario are reported in table 4.10.6-7.

Table 4.10.6-7

Aqueous Ammonia System Design Spills

Scenario	Hole Size (inch)	Operating Pressure (psig)	Temperature (°F)	Vapor Mass Flow Rate (lb/hr)	Duration (s)
A-9	1.0	35	80	1,120	600
A-10	0.4	15	80	1,155	600

Freeport LNG estimated these releases to occur at a height of 10 feet. Freeport LNG calculated the maximum distances to AEGL levels 1, 2 and 3 for both scenarios with a safety factor of 2, and these distances are provided in the table 4.10.6-8 below.

Table 4.10.6-8

Aqueous Ammonia Vapor Dispersion Distances

Scenario	Hole Size (inch)	½ AEGL-1 10 minutes Distance (feet)	½ AEGL-2 10 minutes Distance (feet)	½ AEGL-3 10 minutes Distance (feet)
A-9	1.0	727	239	None
A-10	0.4	447	258	96

The distance from these releases to the nearest property line would be 650 feet. Therefore, the ½ AEGL-1 level for the A-9 scenario would extend approximately 80 feet offsite. However, no residences are located in this area, and the AEGL-1 concentrations would have reversible effects if experienced by persons in that area during a release.

Based on the component failure rate data, the largest design spill identified for the acid gas stream is a 0.4-inch hole in the amine reflux drum, which would occur at a height of 30 feet. Because of the low concentration of H_2S in the acid gas, no ½ AEGL hazard was calculated for this release at any distance.

As none of the potentially toxic substances for the design spills at the Pretreatment Plant would result in an AEGL levels that would impact the public, we conclude that toxicity hazards from the Pretreatment Plant would not have a significant impact on public safety. If the facility is constructed and operated, compliance with the requirements of 49 CFR Parts 192 and 193 would be addressed as part of DOT's inspection and enforcement program.

4.10.7 Emergency Response

Both the USDOT's regulations in 49 CFR 193 and the USCG's regulations in 33 CFR 127 establish requirements for the development and content of emergency response plans for LNG facilities. These plans, which are required to be developed prior to facility operation or LNG transfer from a ship, are to address the facility staff's response to onsite emergencies. For emergencies that may impact the public, the regulations contain requirements for notification, coordination and cooperation with local officials, hospitals, fire departments, police departments and other emergency response organizations. In addition, the NGA under Title 15, USC, Section

717b-1(e) stipulates that in any order authorizing an LNG terminal, the Commission shall require the LNG terminal operator to develop an Emergency Response Plan (ERP) and Cost Sharing Plan (CSP) in consultation with the USCG and state and local agencies. The NGA requires that this plan, intended to address security and safety needs at the LNG terminal and in proximity to vessels that serve the facility, be approved prior to the beginning of facility construction. The ERP for the existing Freeport LNG terminal has been in place since 2008 and has been updated annually.

We received many comments on emergency response and evacuation planning for both the LNG terminal site and the Pretreatment Plant site. In response to our data request issued May 9, 2014, Freeport LNG filed an updated evacuation plan for Quintana Island on May 14, 2014. This document provides preliminary evacuation information, such as the methods of response depending on the type of emergency, access to the CAER notification systems, locations of on-site and remote incident command centers, and the locations of marine evacuation points.

To enhance coordination with emergency responders, Freeport LNG has trained 26 employees in the National Incident Management System (NIMS) used by local, county, state and federal agencies to respond to emergencies. Freeport LNG also has two NIMS certified Incident Command Instructors onsite. Freeport LNG states it has conducted quarterly drills each year since implementing NIMS in 2010. These drills for the existing facility have involved area industry representatives, Quintana Town Council members, the Mayor of Quintana, and the Quintana Emergency Management Coordinator.

During an event involving the existing equipment, Liquefaction Plant, Phase II facilities or Pretreatment Plant, Freeport LNG would contact local response agencies such as the USCG, the Freeport Fire/Police Department, the Quintana Emergency Management Coordinator, the Quintana Mayor, Brazoria County Sheriff, the Texas Department of Public Safety, Brazoria County Emergency Response, and the Brazosport Industrial CAER. The response actions described in the preliminary evacuation plan for Quintana Island vary depending on the extent and location of an incident, but include options for sheltering in place as well as partial and full evacuation of the area. Freeport LNG would rely on first responders and the Town of Quintana Emergency Management Coordinator to direct actions, make determinations on sheltering in place or determine areas to be evacuated.

If a public evacuation is ordered on Quintana Island, local police, sheriff deputies, state police, and other emergency agencies would notify the public and coordinate the evacuation. Freeport LNG lists possible evacuations for Quintana Island as use of the existing FM 1495 bridge, water-based evacuations, or air lift evacuation. At the east end of the island, the proposed marine evacuation points include the Freeport LNG ship dock area, the mooring slip at the former Zeus dock, and the Freeport Harbor Channel jetty. Freeport LNG states that helicopters could be used in any open areas that are safe to land in and accessible to the evacuees. Freeport LNG explains that the Freeport Fire/Police Department, the USCG, and the Texas Department of Public Safety would assemble the vessels necessary for an air or marine evacuation.

Freeport LNG's filing provides details which indicate that the framework for updating its emergency response procedures and coordination exists through its existing ERP. The Town of

Quintana has also provided comments that the evacuation points, methods, assembly points, and marine pick up points are considered acceptable. For both the LNG terminal area and the Pretreatment Plant area, detailed plans for evacuations considered necessary by the first responders listed in Freeport LNG's May 14, 2014 filing would need to be developed with emergency responder input, including consideration of the responders' abilities and identification of any additional resources or infrastructure needed. The detailed analyses would need to include consideration of evacuation zones required by the first responders that are not necessarily dependent on wind direction and would need to identify and address any timeframe, capacity, or congestion issues associated with evacuation of the residents and larger numbers of visitors. Freeport LNG would need to demonstrate that sufficient evacuation boats and helicopters could be provided and staffed in the timeframe needed. Consideration of the rate and method for boarding people onto the boats would also be expected. The plan would also need to explain the methods for alerting the public of an emergency incident and the methods for ensuring that residents and visitors would understand what to do. As the overall ERP would need to be updated to include the proposed Projects and emergencies related to the handling of hazardous fluids, **we recommend that:**

- **Freeport LNG should file an updated Emergency Response Plan which addresses on-site and off-site emergency response for both the LNG terminal site and the Pretreatment Plant. The Emergency Response Plan should include evidence of consultation and coordination with all incident response organizations or personnel responsible for emergency response, public notification, and shelter-in-place/evacuation actions. Information pertaining to items such as off-site emergency response and procedures for public notification and evacuation would be subject to public disclosure. The Emergency Response Plan should be filed with the Secretary for review and written approval by the Director of OEP prior to initial site preparation and a minimum of 30 days before approval to proceed is requested.**

- **The updated Emergency Response Plan should include a Cost-Sharing Plan identifying the mechanisms for funding all project-specific security/emergency management costs that would be imposed on state and local agencies. In addition to the funding of direct transit-related security/emergency management costs, this comprehensive plan should include funding mechanisms for the capital costs associated with any necessary security/emergency management equipment and personnel base. The Cost-Sharing Plan should be filed for review and written approval by the Director of OEP prior to initial site preparation.**

4.10.8 Facility Security and LNG Vessel Safety

Security requirements for the facilities at the terminal are governed by 49 CFR 193, Subpart J – Security. This subpart includes requirements for conducting security inspections and patrols, liaison with local law enforcement officials, design and construction of protective enclosures, lighting, monitoring, alternative power sources, and warning signs. Additional requirements for maintaining security of the terminal are found in 33 CFR 105.

The Freeport LNG terminal commenced service in July 2008 and has been receiving LNG shipments for import and re-export purposes. The existing facility has a Facility Security Plan, as required by 33 CFR 105, which has been approved by the USCG. Marine safety and vessel maneuverability studies were submitted for the Freeport LNG terminal under FERC docket numbers CP03-75-000 and CP05-361-000. Freeport LNG has also consulted with the Captain of the Port (COTP) regarding the Projects. In a letter to the USCG dated November 19, 2010, Freeport LNG detailed the Liquefaction Project modifications, which included no changes to the marine facilities. The COTP issued a letter on December 15, 2010, stating that since the Liquefaction Project would not result in an increase in the size and/or frequency of LNG marine traffic, neither submission of a LOI nor revision to the WSA is required. In that letter, the USCG also specified that applicable amendments to the Operations Manual, Emergency Manual, and Facility Security Plan must be made to capture changes to the operations associated with the Liquefaction Project.

Additionally, in a letter to the USCG dated September 13, 2011, Freeport LNG described the proposed Phase II project modifications. In a letter dated November 11, 2011, the USCG states that an LOI and a revision to the WSA are not required. However, the USCG specified that applicable amendments to the Operations Manual, Emergency Manual, and Facility Security Plan must be made that capture changes to the operations associated with the proposed projects.

For the Pretreatment Plant, the Department of Homeland Security, which includes the Transportation Security Administration for pipeline security, along with the USDOT (requirements administered by the RRC) would have oversight of the security plan. This plan would be shared, reviewed, and exercised with local authorities and responders including the Brazoria County Sheriff's Department. Although the Pretreatment Plant would not be subject to the security requirements in 49 CFR 193, the Pretreatment Plant would have similar security features as the terminal site, including security fencing, security cameras, and intrusion detection. Therefore, we conclude that the Pretreatment Plant would be provided with a level of security appropriate for this type of facility.

4.10.9 Conclusions on Facility Reliability and Safety

As part of the review required for a FERC authorization, Commission staff must assess whether the proposed facilities would be able to operate safely and securely. Based on our technical review of the preliminary engineering designs, we conclude that sufficient layers of safeguards would be included in the facility designs to mitigate the potential for an incident that could damage the facility, injure operating staff, or impact the safety of the off-site public.

The principal hazards associated with the substances involved in the liquefaction, storage and vaporization of LNG result from cryogenic and flashing liquid releases; flammable and toxic vapor dispersion; vapor cloud ignition; pool fires; BLEVEs; and overpressures. As part of our review, we also assess the potential for public safety impacts using the information which Freeport LNG must produce to comply with the federal siting standards in 49 CFR 193. Therefore, as provided, Freeport LNG's siting analysis indicates that the siting of the facilities at the terminal would not have a significant impact to public safety. If the facility is constructed and operated, compliance with the requirements of 49 CFR 192 and 193 would be addressed as

part of DOT's inspection and enforcement program. Final determination of whether a facility is in compliance with the requirements of Part 193 would be made by DOT staff during those inspections.

In order to provide a consistent assessment of potential public impacts which could result from the construction of the facilities at both the terminal site and the Pretreatment Plant, we applied a similar review technique to the Pretreatment Plant facilities, which do not fall under the jurisdiction of the Part 193 regulations. Based on our review of Freeport LNG's siting analyses, we conclude that potential hazards from the Pretreatment Plant would also not have a significant impact on public safety.

4.11 AIR QUALITY AND NOISE

4.11.1 Air Quality

Construction and operation of the Projects can potentially have effects on local and regional air quality. The climatic conditions in the Brazoria area are outlined at the beginning of section 4 and can have a significant change how emissions of pollutants impact local air quality. The term *air quality* refers to relative concentrations of pollutants in the ambient air. The subsections below describe well-established air quality concepts that are applied to characterize air quality and to determine the significance of increases in air pollution. This includes metrics for specific air pollutants known as ambient air quality standards (AAQS), regional designations to manage air quality known as Air Quality Control Regions (AQCRs), and efforts to monitor ambient air concentrations.

Federal and state air quality standards have been designed to protect human health and the environment from airborne pollutants. The USEPA has developed National Ambient Air Quality Standards (NAAQS) for criteria air pollutants such as nitrogen oxides (NO_x) and carbon monoxide (CO), ozone (O_3), SO_2, and inhalable particulate matter ($PM_{2.5}$ and PM_{10}). $PM_{2.5}$ includes particles with an aerodynamic diameter less than or equal to 2.5 microns, and PM_{10} includes particles with an aerodynamic diameter less than or equal to 10 microns. The NAAQS were set at levels the USEPA determined are necessary to protect human health and welfare.

GHG, the most common of which are CO_2, CH_4, nitrous oxide (N_2O), O_3, hydrofluorocarbons, and perfluorocarbons, are naturally-occurring pollutants in the atmosphere and products of human activities, including burning fossil fuels. Fossil fuel combustion emits CO_2, CH_4, and N_2O. GHG emissions are generally calculated in terms of CO_2 equivalents (CO_2e) where the global warming potential of each gas is expressed as a multiple of the global warming potential of CO_2.

4.11.1.1 Existing Air Quality and Regulations

The USEPA has established NAAQS for criteria pollutants. Primary standards are set to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards are set to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. The NAAQS are

codified in 40 CFR Part 50 and summarized in table 4.11.1-1. Attainment with the NAAQS is determined based on whether or not measured ambient air pollutant concentrations are above or below the NAAQS. Texas has adopted the Federal NAAQS at Title 30 (TAC 30) Part101.21.

Ambient Air Quality

The TCEQ maintains an extensive network of air quality monitors located throughout the state for a variety of purposes. Data from these monitors are reported to the USEPA AirData database (AirData). Estimates of existing ambient air quality for the area were obtained from the most recent available data reported to AirData from the nearest available representative monitoring station for each criteria pollutant. The resulting estimates are summarized in table 4.11.1-2. The 8-hour and 1-hour O_3 concentrations reported in table 4.11.1-2 are greater than the NAAQS. As discussed below, the Projects are located in a designated O_3 nonattainment area.

Table 4.11.1-1

National Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Standard		Secondary Standard		Form
		(ppm)	(ug/m^3)	(ppm)	(µg/m^3)	
Carbon Monoxide (CO)	8-hour	9	10,300	---	---	Not to be exceeded more than once per year
	1-hour	35	40,000	---	---	Not to be exceeded more than once per year
Lead (Pb)	3-month rolling	---	0.15	---	0.15	Not to be exceeded
Nitrogen Dioxide (NO_2)	1-hour	0.1	188	0.100	188	98th percentile, averaged over 3 years
	Annual	0.053	100	0.053	100	Annual Mean
Ozone (O_3)	8-hour (2008)	0.075	147	0.075	147	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
	8-hour (1997)	0.08	157	0.08	157	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
	1-hour	0.12	236	0.12	236	Not to be exceeded more than once per year
Fine Particulate ($PM_{2.5}$)	Annual	---	12	---	15	Annual mean, averaged over 3 years
	24-hour	---	35	---	35	98th percentile, averaged over 3 years
Respirable Particulate (PM_{10})	24-hour	---	150	---	150	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)	1-hour	0.075	196	---	---	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	3-hour	---	---	0.5	1,300	Not to be exceeded more than once per year

Notes:
ppm = parts per million
µg/m3 = micrograms per cubic meter.

We received several comments from the public requesting that Freeport LNG fund and/or install an air quality monitor near the site to monitor ambient air quality. Because Freeport LNG would not significantly contribute to violations of the NAAQS (as seen below), and the TCEQ already operates several monitors nearby, we conclude that an additional air monitor is not necessary.

Table 4.11.1-2

Existing Ambient Air Quality

Pollutant	Monitoring Station	Monitoring Station ID	Averaging Time	Years	Concentrations	
					(ppm)	($\mu g/m^3$)
CO	Deer Park	48-201-1039	8-hour	2010-2012	0.933	1,069
			1-hour		1.476	1,690
Pb	Houston East	48-201-1034	3-month rolling	2006-2008	---	0.008
NO_2	Lake Jackson	48-201-1016	1-hour	2010-2012	0.020	37.8
			Annual		0.0076	14.3
O_3	Deer Park	48-201-1039	8-hour	2010-2012	0.085	167
			1-hour		0.114	223
$PM_{2.5}$	Galvestone 99th Street	48-167-1034	Annual	2009-2011	---	9.3
			24-hour		---	20.7
PM_{10}	Deer Park	48-201-1039	24-hour	2010-2012	---	41.0
SO_2	Houston Seabrook Friendship Park	48-201-1050	1-hour	2010-2012	0.021	55.1
			3-hour		0.014	36.8

Notes:
ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter.

AQCRs and Attainment Status

The USEPA has established AQCRs in accordance with the CAA of 1970, which are defined as contiguous areas within a state or an interstate metropolitan area considered to have relatively uniform ambient air quality, and are treated as single units for reducing emissions and determining compliance with the NAAQS. The proposed Project would be in the Metropolitan Houston-Galveston Intrastate AQCR (HG-AQCR). The AQCR is a nonattainment area for both the 1-hour and 8-hour O_3 standards. The designations for other criteria pollutants are attainment or the equivalent.

Federal Air Quality Requirements

The CAA of 1970, 42 USC 7401 *et seq*., amended in 1977 and 1990, and codified at 40 CFR Parts 50-99 are the basic federal statutes and regulations governing air pollution. Currently in Texas, the USEPA is the lead agency for permitting emissions of GHG. The TCEQ is the lead agency for all other air quality permitting. The TCEQ implements its own regulations which incorporate USEPA's federal regulatory requirements. The Brazoria County Health Department does not have any air permit requirements beyond those in the federal and state programs. The

following federal requirements were reviewed to determine their applicability to the proposed Project.

Conformity of Federal Actions

A General Conformity Analysis (General Conformity) is required when a federal action would generate emissions exceeding conformity threshold levels of pollutants for which an air basin is designated as nonattainment. According to Section 176(c)(1) of the CAA (40 CFR Section 93.153), a federal agency cannot approve or support activity that does not conform to an approved State Implementation Plan (SIP). General Conformity is not applicable to activities at locations in attainment areas or operating emissions covered by an air quality permit.

The proposed Projects would be in the HG-AQCR, which is a nonattainment area for both the 1-hour and 8-hour O_3standards. The designations for other criteria pollutants are attainment or the equivalent.

The proposed Projects would generate air emissions as a result of its construction and long-term operation that would be subject to a General Conformity applicability determination. Air pollutants would be emitted from vehicles transporting workers to and from the construction sites, and from vehicles and barges used to transport materials and equipment to the construction site. Fugitive dust and mobile source emissions would result from construction equipment operating within the Liquefaction Plant, Pretreatment Plant and during pipeline construction. In addition, the General Conformity Determination for the previously approved Phase II Project expired after 5 years under 40 CFR 93.157(a). While the construction emissions for the Phase II Modification Project is included in table 4.11.1-3, we requested that the emissions from the LNG vessels be included in the conformity determination for the Projects. Construction emissions would occur between 2014 through 2018. As can be seen in table 4.11.1-3, the construction emissions from 2014 through 2018 would exceed the General Conformity Applicability Threshold with the HG-AQCR.

Table 4.11.1-3
Summary of Estimated Emissions for Facility Construction
Material Deliveries, Worker Commuting, and Construction Equipment

Year	Estimated Emissions (tons)							
	VOC	PM_{10} a/	$PM_{2.5}$ a/	CO	NO_x	SO_2	CO_2e	Total HAPs
Houston-Galveston-Brazoria Nonattainment Area								
2014	17.8	689.9	77.8	382.6	145.2	9.8	40,171	7.0
2015	67.4	706.6	94.1	1,895.0	374.5	30.5	80,523	17.0
2016	94.5	703.3	90.9	3,028.9	331.3	27.0	77,293	14.8
2017	80.0	693.4	81.1	2,710.5	193.1	13.4	53,438	9.8
2018	33.3	685.9	73.7	1,129.5	85.1	5.8	19,071	3.3
Applicability b/	25	---	---	---	25	---	---	---

Note:
HAPs = Hazardous Air Pollutants

a/ Does not include fugitive dust
b/ General Conformity applicability thresholds for O_3severe non-attainment area

In addition, the vessels that transport construction materials and equipment may travel through other areas including the Beaumont-Port Arthur and Baton Rouge maintenance areas, and attainment areas. Table 4.11.1-4 provides a breakdown of the vessel emissions among these areas. As can be seen, the NO_x and volatile organic compound (VOC) emissions in the two maintenance areas would be less than the General Conformity applicability thresholds for each area (each 100 tpy).

Table 4.11.1-4

Summary of Estimated Emissions for Facility Construction Barge Deliveries a/

Year	Estimated Emissions (tons)							
	VOC	PM_{10}	$PM_{2.5}$	CO	NO_x	SO_2	CO_2e	Total HAPs
Beaumont-Port Arthur Maintenance Area								
2014	0.3	0.4	0.4	2.6	5.1	0.7	518	0.2
2015	0.9	1.3	1.3	8.8	17.3	2.3	1,755	0.8
2016	0.5	0.6	0.6	5.0	9.8	1.3	1,001	0.5
2017	0.1	0.3	0.3	1.6	3.1	0.4	316	0.2
2018	0.2	0.2	0.2	1.1	2.1	0.3	213	0.1
Baton Rouge Maintenance Area								
2014	0.1	0.3	0.3	1.9	3.7	0.4	373	0.1
2015	0.6	0.9	0.9	6.3	12.4	1.6	1,264	0.3
2016	0.3	0.5	0.5	3.6	7.1	1.0	724	0.2
2017	0.1	0.2	0.2	1.2	2.2	0.3	225	0.1
2018	<0.1	0.2	0.2	0.8	1.6	0.2	156	<0.1
Louisiana Attainment Areas								
2014	0.9	1.3	1.3	9.3	18.1	2.5	1,848	0.2
2015	3.1	4.5	4.5	31.4	61.6	8.2	6,256	0.8
2016	1.8	2.6	2.6	17.9	35.0	4.7	3,575	0.5
2017	0.6	0.8	0.8	5.7	11.1	1.5	1,123	0.2
2018	0.3	0.5	0.5	3.8	7.4	0.9	766	0.1

a/ Estimated from Freeport LNG's application.

A General Conformity Determination is required for the HG-AQCR to demonstrate that NO_x and VOC emissions resulting from construction activities (2014 through 2018) and operation of LNG carriers and assist tugs (2019 and later) would not cause new violations of the O_3 NAAQS, increase the frequency or severity of O_3 NAAQS violations, or delay timely attainment of the O_3NAAQS.

Freeport LNG must comply with General Conformity and thus we are including a condition that would require Freeport LNG to offset the emissions of NO_x and VOC from construction, obtain a specific commitment from TCEQ to account for emissions of NO_x and VOC in the region's SIP, or otherwise comply with the General Conformity demonstration under the CAA. Freeport LNG

would be required to conform with the Houston-Galveston-Brazoria (HGB) SIP based on the criterion provided in 40 CFR Part 93.158(a)(5)(i)(A).

As the lead agency, the FERC must prepare and make public both the draft General Conformity Analysis and the final General Conformity Analysis prior to authorization of construction. This separate document would be prepared once the appropriate information is obtained from Freeport LNG.

So that the FERC can prepare a General Conformity Determination, **we recommend that:**

At least 90 days prior to the start of construction, Freeport LNG should file documentation:

a. from the TCEQ that the Liquefaction Project's direct and indirect construction and operation emissions, including Phase II vessel NO_x and VOC emissions, together with all other emissions in the HGB area, would not exceed the emissions budgets specified in the federally-approved HGB SIP; or

b. that the TCEQ commits to explicitly include the Proposed Liquefaction Project's direct and indirect NO_x and VOC emissions in the next revision of the HGB SIP; or

c. that Freeport LNG would provide a demonstration of obtained offsets or an alternative demonstration of General Conformity under the CAA.

New Source Review

PSD and Nonattainment New Source Review (NNSR) were established for pre-construction review of proposed projects in attainment areas and nonattainment areas, respectively. A project can undergo both types of review, depending on its potential emissions and the attainment status of the area in which it is located.

The PSD program applies to the construction of a new major stationary source of air pollutants, or a major modification to existing major stationary sources of air pollutants, in an attainment area. PSD is intended to prevent the new source from contributing to deterioration of air quality to levels which violate the NAAQS.

NNSR applies to the construction of a major stationary source of air pollutants, or a major modification to existing major stationary sources of air pollutants in a nonattainment area. NNSR applies to pollutants that are classified as nonattainment and their precursors. NNSR is intended to help ensure that areas which have not achieved the NAAQS with respect to one or more criteria pollutants do so within prescribed time frames. Fugitive emissions are not counted when determining NSR applicability, except for the 28 categories listed in 40 CFR 52.21(b)(1)(i). Emissions from the Quintana Island terminal operations are not within one of these 28 categories. Therefore, the 1.18 tpy of fugitive emissions from the Phase II modifications are not counted for NSR applicability.

The Pretreatment Plant and the Liquefaction Plant are treated differently by TCEQ and USEPA for permitting purposes. The USEPA indicated their intent to permit the facilities as a single stationary source because they share Standard Industrial Classification Code 1321, are under common control, and operate interdependently. The TCEQ has indicated that they would issue separate permits for the Pretreatment Plant and Liquefaction Plant however they would look at the Pretreatment Plant and Liquefaction Plant as a single facility for air modeling purposes.

Prevention of Significant Deterioration

The emissions threshold for major stationary sources under PSD depends on the facility type. As defined by 40 CFR Part 52.21(b)(1)(i), a facility is considered major stationary source under PSD if:

- it emits or has the potential to emit 250 tpy or more of any regulated New Source Review (NSR) pollutant; and

- it is in one of the 28 source categories listed in 40 CFR Part 52.21(b)(1)(i)(a) and emits or has the potential to emit 100 tpy or more of any regulated NSR pollutant.

None of the Projects' facilities are in one of the 28 source categories. A new source is also subject to PSD if it's potential or actual GHG emissions equal or exceed 100,000 tpy on a CO_2e basis, and the applicable major source threshold on a mass-basis. GHGs include CO_2, CH_4, N_2O, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

As defined by 40 CFR Part 52.21(b)(2), a major modification is any physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase of a regulated NSR pollutant. As defined by 40 CFR 52.21(b)(23) significant net emissions increase is a rate of emissions that would equal or exceed one of the following:

- CO - 100 tpy
- Nitrogen dioxide (NO_2) - 40 tpy
- SO_2 - 40 tpy
- Particulate matter (PM) - 25 tpy
- PM_{10} - 15 tpy
- $PM_{2.5}$ - 10 tpy
- O_3 - 40 tpy of VOCs or NO_x
- Lead (pb) - 0.6 tpy
- Sulfuric acid mist (H_2SO_4) - 7 tpy
- H_2S - 10 tpy
- Total reduced sulfur - 10 tpy
- GHG - 70,000 tpy CO_2e.

If a project is a major source or major modification, PSD applies to any attainment pollutant whose potential or actual emissions equals or exceeds the significance level.

Note that fugitive emissions are not counted toward the major source or major modification thresholds unless the source in question is included in one of the 28 listed source categories.

For all pollutants except GHG, the TCEQ has been delegated authority by the USEPA to prepare the PSD Permit. However, the State of Texas has only recently passed a law (Texas House Bill 788) allowing TCEQ to include GHG permitting within the PSD permitting process. Thus the USEPA Region 6 is the lead for permitting the stationary GHG emissions under PSD until such a time that the USEPA approves the TCEQ for GHG permitting.

Table 4.11.1-5 lists the estimated operating emissions for the existing and proposed facilities. These facilities are interdependent and therefore considered to be one source by the USEPA. A comparison of the potential emissions and regulatory thresholds shows that the stationary facilities are subject to PSD permitting for GHG, NO_x, PM_{10}, $PM_{2.5}$, and SO_2. The required PSD permitting studies include an air quality analysis to show that proposed emissions would not significantly cause or contribute to a prohibited violation of any NAAQS or PSD increment.

Table 4.11.1-5

Air Emission Estimates for the Existing and Proposed Stationary Facilities

Source	Potential Emissions (tpy)								
	NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_x	H_2SO_4	H_2S	CO_2e
Existing Phase I Facilities									
Vaporization Plant	24.6	80.2	6.5	6.4	6.4	2.3	0.22	---	715,023
Proposed Facilities									
Liquefaction Plant	14	26	7	0.07	0.07	0.003	<0.001	0.00	12,241
Pretreatment Plant	51	68	17	87	87	25	2	1.86	1,568,667
Total	65	94	24	87	87	25	2	1.86	1,580,907
Regulatory Thresholds									
Federal NNSR Major Source	25	---	25	---	---	---	---	---	---
Federal PSD Major Source	250	250	250	250	250	250	250	250	100,000
Federal PSD Significant Modification	40	100	100	15	10	40	7	10	70,000
Federal Title V Major Source	25	100	25	100	100	100	100	100	100,000
Texas Mass Emissions Cap and Trade	10	---	---	---	---	---	---	---	---

The PSD and NNSR applications to the TCEQ are currently under review as PSD Permit No. PSD-TX-1302 and Nonattainment NNSR permit No. N170 for the Pretreatment Plant, and Permit No. PSD-TX-1282 and N150 for the Liquefaction Plant.

USEPA has published in the Federal Register the draft PSD permit for the GHG emissions on December 2, 2013. The USEPA concluded that the Liquefaction Project would utilize energy-efficient technologies (primarily electric motors and variable speed drives for its primary drivers) and process design features (primarily modular liquefaction trains and natural gas pretreatment units) to minimize GHG emissions and their adverse impacts. Electric motors produce no GHG emissions, have energy efficient operating characteristics over a wide range of weather and load conditions, and can be sized to allow for a more efficient design. Variable speed drives allow the

electric motor to operate in the most efficient manner for a given load. The Liquefaction Project would employ three modular liquefaction trains, each with a natural gas pretreatment unit, which would promote energy efficiency over the range of throughputs that may occur.

As part of the TCEQ PSD permitting process, Freeport LNG submitted a refined air quality modeling analysis for the combined Pretreatment and Liquefaction Plants. This analysis is presented later in this section.

Federal Class I Areas

Federal Class I areas are required to have more stringent air quality protection for air quality-related values such as visibility. The closest Class I Area is Breton NWR located southeast of New Orleans, approximately 300 miles east. As part of the PSD permitting process, Freeport LNG is required under PSD rules to determine if the PSD Permitted facility would have any impacts on air quality related values. It is required to notify the Federal Land Manager if a project may affect a Class I area. Such notification must be made in writing and include a copy of all information relevant to the permit application within 30 days of receipt of and at least 60 days prior to public hearing by the State on the application for permit to construct. The meaning of the term "may affect" is interpreted by USEPA include all major sources or major modifications which propose to locate within 100 km of a Class I area. However, the Federal Land Manager may ask Freeport LNG to perform an analysis of the proposed major source's potential impacts a Class I area even if it is located more than 100 km distant.

As the closest Class I area is located approximately 300 miles east of Quintana Island, no Class I areas should be affected, and there should be not have any impact on air quality related values in Class I areas.

Nonattainment New Source Review

NNSR applies to a new major sources or a major modification at an existing source for pollutants where the area in which the source is located is not in attainment with the NAAQS. NNSR requirements are customized for the nonattainment area. Sources that trigger NNSR are subject to a variety of requirements, including the need to apply control technologies capable of achieving the Lowest Achievable Emission Rate (LAER) and the need to obtain emissions offsets. The HGB area is a severe nonattainment area for the 1-hour O_3standard, and a marginal nonattainment area 8-hour O_3 standard. The major source threshold for O_3 precursors, NO_x and VOC, is 25 tpy. Table 4.11.1-5 lists the estimated operating emissions for the existing and proposed facilities. These show that the Projects would be subject to NNSR permitting for NO_x. As stated above, a permit application has been submitted to the TCEQ. As is discussed above, air dispersion modeling for NO_2 was performed as a part of the PSD permitting studies.

New Source Performance Standards

New Source Performance Standards (NSPS) establish emission limits and associated requirements for monitoring, reporting, and recordkeeping for various emission source categories. The following NSPS apply to affected new, modified, or reconstructed sources.

- 40 CFR 60 Subpart A - General Provisions
- 40 CFR 60 Subpart KKK - Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants
- Subpart LLL - Onshore Natural Gas Processing: SO_2
- 40 CFR 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
- 40 CFR 60 Subpart KKKK - Standards of Performance for Stationary Combustion Turbines

National Emissions Standards for Hazardous Air Pollutants

National Emissions Standards Hazardous Air Pollutants (NESHAP) standards, at 40 CFR 61, apply to emissions of specific Hazardous Air Pollutants (HAPs) from specified source categories. Natural gas processing facilities are not a specified category under 40 CFR 61 and would not apply to the Projects.

Maximum Achievable Control Technology (MACT) standards, 40 CFR 63, apply to major sources and certain area sources of HAPs in specified source categories. A major source of HAPs is a stationary source with the potential to emit 10 tpy or more of any individual HAP or 25 tpy of aggregate HAPs. An area source is a stationary source with potential HAP emissions less than the aforementioned thresholds. Table 4.11.1-6 summarizes the potential HAP emissions. The proposed Projects are area HAP sources.

Table 4.11-1-6

Hazardous Air Pollutant Emission Estimates for the Existing and Proposed Facilities

Source	Potential Emissions	
	Single HAP (tpy)	**Aggregate HAPs (tpy)**
Existing Phase I Facilities		
Vaporization Plant	<10-a/	<25-a/
Proposed Facilities		
Liquefaction Plant	0.04 - Hexane	0.06
Pretreatment Plant	3.48 - Formaldehyde	6.60
Regulatory Thresholds		
Major Source of HAPs (either)	10	25
Area Source of HAPs (both)	<10	<25

a/ The principal HAPs emitted are formaldehyde, acetaldehyde, and acrolien. From 2010 through 2012, the estimated total annual emissions of these pollutants were less than 1 ton per year due to low operation levels.
b/ Hexane
c/ Formaldehyde

As previously stated, for the Phase II Modification Project at the Quintana Island terminal, the only operation emissions would be fugitive VOC emission, totaling 1.18 tpy, from piping systems. These would not trigger NSR Permitting. Therefore, all Project facilities would be area sources of HAPs.

The following NESHAP rules would not apply to the facilities:

- 40 CFR 63 Subpart HH – Hazardous Air Pollutants from Oil and Natural Gas Production Facilities

- 40 CFR 63 Subpart HHH – Hazardous Air Pollutants from Natural Gas Transmission and Storage Facilities

- 40 CFR 63 Subpart YYYY– Hazardous Air Pollutants for Stationary Combustion Turbines

The following NESHAP rules would apply:

- 40 CFR 63 Subpart ZZZZ – Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. The emergency generators and firewater pump engines would comply with 40 CFR 60 Subpart IIII.

Title V Operating Permit

The Title V Permit Program, as described in 40 CFR Part 70, requires major sources of air emissions and certain affected non-major sources to obtain federal operating permits. In Texas, authority to issue Title V operating permits has been delegated by USEPA to the TCEQ. Title V Operating Permit No. O2878 was issued by TCEQ to cover operations at the Quintana Island terminal on February 8, 2012, and is in effect through February 7, 2017.

TAC 30 Section 112 requires that a new or modified source submit a Title V permit abbreviated application prior to starting operation as major source or major modification. TCEQ then sends the source a letter which specifies the information required for a Site Operating Permit application. Freeport LNG has indicated its intent to submit application for any necessary amendments to the current permit for Quintana Island terminal 12 to 18 months prior to the anticipated start of operation of the Phase II Modification Project. The Pretreatment Plant would be a new major source for Title V. Freeport LNG has indicated its intent to submit an application for the Title V permit 12 to 18 months prior to the anticipated start of operation. This schedule is in accordance with the applicable requirements.

Greenhouse Gas Reporting Rule

The USEPA's Mandatory Reporting of GHGs Rule requires reporting of GHG emissions from suppliers of fossil fuels and facilities that emit greater than or equal to 25,000 tonnes of GHG CO_2e per year.

Based on the existing GHG emission estimates, the Pretreatment Plant, Liquefaction Plant and existing Vaporization Plant would be subject to the GHG Mandatory Reporting rule and would be required to report the GHG emissions to USEPA if the actual emissions exceed 25,000 tonnes of GHG CO_2e per year.

State Air Quality Requirements

Air emission sources in Texas must meet state air emission standards codified in TAC Section 30 (TAC 30) Chapters 100-122. Emission related standards that would apply to the proposed Projects are discussed below.

TAC 30 Chapter 101, Subchapter H, Division 3 (Mass Emissions Cap and Trade) would apply to the Projects, since they would have an uncontrolled design capacity to emit 10 tpy or more of NO_x. Freeport LNG would be required to hold on March 1 of each year adequate NO_x allowances in its compliance account to cover its emissions during the prior calendar year.

TAC 30 Section 111.111 limits visible emissions from stationary vents to opacity of no greater than 20 percent averaged over a six-minute period. The use of natural gas and ultra-low sulfur diesel as fuels and proper equipment maintenance and operation would help ensure that visible emission limits are satisfied.

TAC 30 Section 111.145 requires the use of water or suitable oil or chemicals to control dust from demolition and construction activities at sites greater than one acre in size. Freeport LNG would utilize dust suppressants, such as water or chemicals, to minimize fugitive dust emissions during construction.

TAC 30 Section 111.151 limits emissions of PM as a function of stack gas volumetric flow rate. The proposed Project would be designed and operated such PM emissions would be below these limits.

TAC 30 Section 112.3 limits impacts of SO_2 emissions at off-site location to no greater than 0.28 parts per million on a volume basis (ppmv), equivalent to approximately 734 $\mu g/m^3$, over a 30-minute period. Dispersion modeling results show that, albeit on a one-hour average basis, predicted off-site concentrations of SO_2 are a small fraction of this limit.

TAC 30 Section 112.9 limits SO_2 emissions from the combustion of liquid fuel to no greater than 440 ppmv averaged over a 3-hour period. Calculations show that the proposed SO_2 emissions from the emergency generators and the fire water pumps would be below the levels allowed by 30 TAC Part112.9. The use of ultra-low sulfur diesel fuel would help ensure that this limit is satisfied.

TAC 30 Section 112.31 limits impacts of H_2S emissions at off-site locations to no greater than 0.08 parts per million (ppm) on a 30 minute average. Scaling the dispersion modeling results for SO_2 by the ratio of H_2S to SO_2 emissions shows that, albeit on a one-hour average basis, predicted off-site concentrations of H_2S are a small fraction of this limit.

TAC 30 Section 112.41 limits impacts of H_2SO_4 emissions at off-site locations to no greater than 15 $\mu g/m^3$ on a 24-hour average, to no greater than 50 $\mu g/m^3$ on a 1-hour average, and to no greater than 100 $\mu g/m^3$ at any time. Scaling the dispersion modeling results for SO_2 by the ratio of H_2SO_4 to SO_2 emissions shows that these ambient limits would not be exceeded.

TAC 30 Section 115 Subchapter D, Division 3 contains requirements for the control of fugitive emissions of VOC in O_3nonattainment areas. These apply to a variety of operations, including natural gas processing. Freeport LNG would comply with all applicable VOC control requirements and satisfy the associated monitoring and inspection requirements.

TAC 30 Section 116.111(a)(2)(C) requires an application for a NSR permit to include a demonstration that Best Available Control Technology (BACT) would be applied. Freeport LNG would implements BACT controls for emission sources of GHG, NO_x, PM_{10}, $PM_{2.5}$, and SO_2, and LAER, which is equally or more stringent than BACT, for emission sources of NO_x and VOC.

TAC 30 Section 117 Subchapter B Division 3 sets requirements for control NO_x from major sources in the HGB O_3nonattainment area. Freeport LNG would comply with all applicable NO_x control requirements and satisfy the associated monitoring and inspection requirements.

4.11.1.2 Air Quality Impacts and Mitigation

Construction Air Pollutant Emissions

During construction, a temporary reduction in ambient air quality would result from emissions and fugitive dust generated by construction equipment. Fugitive dust emission levels would vary in relation to moisture content, composition, and volume of soils disturbed. Fugitive dust and other emissions from construction activities generally do not result in a significant increase in regional pollutant levels, although local pollutant levels could increase temporarily.

Construction air pollutant emissions include exhaust and crankcase emissions from construction equipment, vehicles that transport workers and materials, vessels that transport equipment and constructing materials. All construction emissions are summarized in tables 4.11.1-3 and 4.11.1-4.

To mitigate construction-related emissions, Freeport LNG would maintain all construction equipment in accordance with manufacturers' recommendations and minimize engine idling time. Construction equipment would combust diesel fuel with no more than 0.0015 percent sulfur, and vessels would combustion fuel that complies with International Convention for the Prevention of Pollution from Ships (MARPOL) and USEPA standards for sulfur content.

Freeport LNG would employ proven construction practices, such as water sprays and dust suppressants, to mitigate fugitive dust emissions during construction. The particular frequencies and methods employed would depend on the specific construction activities, terrain, soil conditions, and weather conditions. Additionally, all areas disturbed by construction would be stabilized in accordance with the Freeport LNG's Plan.

Emissions would occur over the duration of construction activity and would vary along the length of the Pipeline/Utility Line System. Construction emissions, including dust emissions would impact residents near to the Liquefaction and Pretreatment Plant. As stated, impacts from construction equipment would be temporary, but would occur over the 4.5 years of construction at the Quintana Island terminal. While these would not result in a significant impact on regional air quality or result in any violation of applicable ambient air quality standard, it may result in elevated pollutant levels near to the construction sites.

As is discussed above, measures to mitigate the air emissions during Project construction include the following:

- use of construction equipment engines which incorporate modern pollution control technology;
- properly maintaining construction equipment engines;
- use of clean fuels in construction equipment engines;
- use of dust control measures water sprays and dust suppressants; and
- stabilizing areas disturbed by construction.

As was noted previously, the Projects are subject to General Conformity. As such, we have included a recommendation that Freeport LNG much submit, at least 90 days prior to construction either documentation showing that the Projects' direct and indirect construction and operation emissions, together with all other emissions in the HGB area, would not exceed the emissions budgets specified in the federally-approved HGB SIP; or documentation that the TCEQ commits to explicitly include the Proposed Liquefaction Project's direct and indirect NO_x and VOC emissions in the next revision of the HGB SIP.

Air Pollutant Emissions from Operations

Anticipated emission for the proposed Project facilities are shown in table 4.11.1-5. The emission estimates are based on manufacturer-supplied emission factors supplemented with USEPA default emission factors obtained from AP-42 (*i.e.,* AP-42 refers to USEPA's Compilation of Air Pollutant Emission Factors, Volume 1, Fifth Edition).

Table 4.11.1-7 lists the estimated operating emissions for operation of the 400 LNG vessels and the associated tug vessels while the carriers are within Texas waters. These emission estimates are based on calculations submitted by Freeport LNG and modified by FERC to better characterize the expected operations. These numbers are highly conservative. Additional information on the assumptions and calculations for the ship emissions can be found in appendix F.

Table 4.11.1-5 lists the estimated operating emissions for the existing and proposed stationary facilities. As identified previously, these show that the Projects would be subject to NNSR permitting for NO_x and VOC, and PSD permitting for GHG, NO_x, PM_{10}, $PM_{2.5}$, and SO_2.

For the Phase II Modification Project at the Quintana Island terminal, the only operation emissions would be fugitive emissions, totaling 1.18 tpy of VOC from piping systems. These would not trigger NSR Permitting.

We received a comment requesting we address thermal pollution. In addition to the air pollutant emissions, heat would be emitted in hot plumes which would rise quickly due to its thermal buoyance and would dissipate in the atmosphere well above ground level. No portion of the heat would directly impact the Town of Quintana, as mixing with the atmosphere would occur over a larger region.

Table 4.11.1-7

Air Emission Estimates for the Anticipated LNG Vessels and Support Vessels

Source	Potential Emissions (tpy)						
	NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_x	CO_2e
LNG Vessels							
Main Engines	22.2	17.2	1.2	1.8	1.6	0.8	25,338
Auxiliary Engines	186.4	75.4	13.4	0.8	0.8	0.6	9,042
Total	208.8	92.4	14.6	2.4	2.4	1.4	34,380
Assist Tugs							
Main Engines	63.8	16.2	1.8	1.8	1.6	0.8	4,516
Auxiliary Engines	9.0	1.4	0.2	0.2	0.2	0.2	640
Total	73.0	17.6	2.0	2.0	1.8	1.0	5,156
Total Vessel Emissions	**281.6**	**110.2**	**16.6**	**4.4**	**4.4**	**2.2**	**39,536**

Freeport LNG submitted its PSD Permit Air Dispersion Modeling Report for the Pretreatment Plant and Liquefaction Plant to the TCEQ on July 19, 2013. AERMOD was used to model simultaneously the proposed emissions from the Pretreatment Plant, the Liquefaction Plant, and offsite stationary sources as warranted. The detailed modeling process, including assumptions, is described in appendix F.

At the request of FERC, in December 2013 Freeport LNG submitted the estimates of the emissions of NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, VOC, and GHG from the existing LNG ships, tugs and escort vessels within the moored safety zone as well as those within Texas waters. Also at the request of FERC, Freeport LNG provided the results Project's $PM_{2.5}$ multi-source air dispersion modeling (*i.e.*, the modeling submitted to TCEQ with its air permit application) with these vessel emissions included. In January 2014 FERC revised the emission calculations to better characterize the expected operations and account for all the reasonably expected vessel emissions. The assumption and details on how the air modeling was conducted is identified in appendix F

For refined multi-source modeling, two sets of runs, significance and multi-source were executed with AERMOD.

- The significance runs identify the impact area - which is the area where the predicted concentrations exceed the USEPA significant impact levels (SILs). The SILs are used

to determine if additional modeling is required. Any impacts below the SILs would not have a potential to result in exceedances of the NAAQS

- The multi-source runs include both the emission sources, and important sources within 50 km of the impact area.

The basis of the refined multi-source modeling is the modeling reviewed and approved by TCEQ for the Freeport LNG Project PSD permit. This was revised by Freeport LNG to include its vessel emission, and submitted to FERC on December 2013. As a first step, FERC ran AERMOD to benchmark these analyses, and successfully reproduced their results for both the 24-hour and annual impacts.

The December 2013 analysis included our revised vessel emission rates (retaining same source inventories, source parameters, source groups, receptor arrays, meteorology, and AERMOD model version) to create new January 2014 model results. A summary of all the modeling results are included in table 4.11.1-8.

As shown in table 4.11-1-9, the significance runs (project emissions, including vessel emissions were applicable) were approximately 2 $\mu g/m^3$ higher for 24-hour impacts and marginally higher (0.01 $\mu g/m^3$) for annual impacts. However, the revised vessel emission rates substantially increased the size of the 24-hour and annual impact areas by 124 percent and 42 percent. Previously, the impact areas were surrounding the Pretreatment Plant. The new impact areas include locations near the Liquefaction Plant, Quintana Island and Industrial facilities across the ICW.

Thus, although the revised vessel emissions do not by themselves markedly increase the predicted impacts of Project, they trigger the need to greatly expand the region where the multi-source impacts must be calculated. This is especially relevant in the vicinity of existing industrial facilities located near the LNG carrier loading berths.

As shown in table 4.11.1-10, the multi-source runs did not demonstrate compliance with the NAAQS for either averaging time (24-hour and annual), due to the significant receptors adjacent to the Liquefaction Plant. These receptors were outside the impact areas for the December 2013 submittal.

Figure 4.11.1-1 shows the grid points at which the total predicted impact of the Projects' sources, sources not part of the Projects, and background exceed the 24-hour $PM_{2.5}$ NAAQS. These are located over industrial facilities.

Table 4.11.1-8

Air Dispersion Modeling Summary

Pollutant and Averaging Time	Pollutant Concentration (µg/m^3)								
	Modeling Significant Impact Level	PSD Class II Increment Standard	NAAQS	Single-Source Modeling Results	Background a/	Freeport LNG Multi-Source Modeling Results	Freeport LNG Multi-Source Modeling Results Result + Background	FERC Multi-Source Modeling Results Result + Background	PSD Class II Increment Results
CO									
8-hour	---	500	10,300	325.3	1,069		Not Required		
1-hour	---	2,000	40,000	550.3	1.476		Not Required		
NO_2									
1-hour	7.5	---	188	4.64	37.8		Not Required		
Annual	1	25	100	0.49	14.3		Not Required		
$PM_{2.5}$									
Annual	0.3	4	12 b/	0.88	9.3	2.35	11.65	14.5	0.89
24-hour	1.2	9	35 b/	4.95	20.7	10.63	31.33	248.5	4.88
PM_{10}									
Annual	1	17	c/	0.88	---		Not Required		
24-hour	5	30	150	4.95	41		Not Required		
SO_2									
1-hour	7.9	---	196	4.34	55.1		Not Required		
3-hour	25	512	1,300	3.00	36.8		Not Required		

a/ From table 4.11.1-2
b/ Remanded back to Court on 1/22/13, but not precluded from being used
c/ Revoked
µg/m3 = micrograms per cubic meter.

Table 4.11.1-9

Air Emission Estimates for the Anticipated LNG Carriers and Support Vessels

Averaging Period	Model Runs	Maximum $PM_{2.5}$ Predicted Concentration (ug/m^3)	$PM_{2.5}$ Significance Level (ug/m^3)	Number of Receptors in the Impact Area
24 hour	Freeport LNG December 2013 Submittal	4.50	0.3	3,639
24-hour	FERC January 2014 Revision	6.49	0.3	8,131
Annual	Freeport LNG December 2013 Submittal	0.76	1.2	1,083
Annual	FERC January 2014 Revision	0.77	1.2	1,535

Table 4.11.1-10

$PM_{2.5}$ Predicted Cumulative Impacts

Averaging Period	Model Runs	$PM_{2.5}$ Concentration (ug/m^3)			
		Multi-Source Maximum Predicted	Background	Multi-Source Maximum Predicted + Background	NAAQS
24 hour	Freeport LNG December 2013 Submittal	10.5	20.7	31.2	35
24 hour	FERC Revision	228.3	20.7	249.0	35
Annual	Freeport LNG December 2013 Submittal	2.4	9.3	11.7	12
Annual	FERC Revision	5.5	9.3	14.8	12

Table 4.11.1-11

$PM_{2.5}$ Predicted Cumulative Impacts Breakdown

Case	Averaging Period	Predicted $PM_{2.5}$ Concentration (ug/m^3)					
		Freeport LNG Onshore Facilities	Freeport LNG Carriers and Tugs	Other Facilities	Background	Freeport LBG Onshore + Vessels + Other Facilities + Background	NAAQS
Maximum Freeport LNG Onshore + Vessels + Other Facilities + Background	24-hour	0.1	1.0	227.2	20.7	249.0	35
	Annual	0.1	0.6	4.8	9.3	14.8	12
Maximum Freeport LNG Onshore + Vessels	24-hour	0.8	9.4	---	20.7	30.9	35
	Annual	0.9	0.2	---	9.3	10.4	12

PM2.5 NAAQS 24-Hour, Significant Receptors

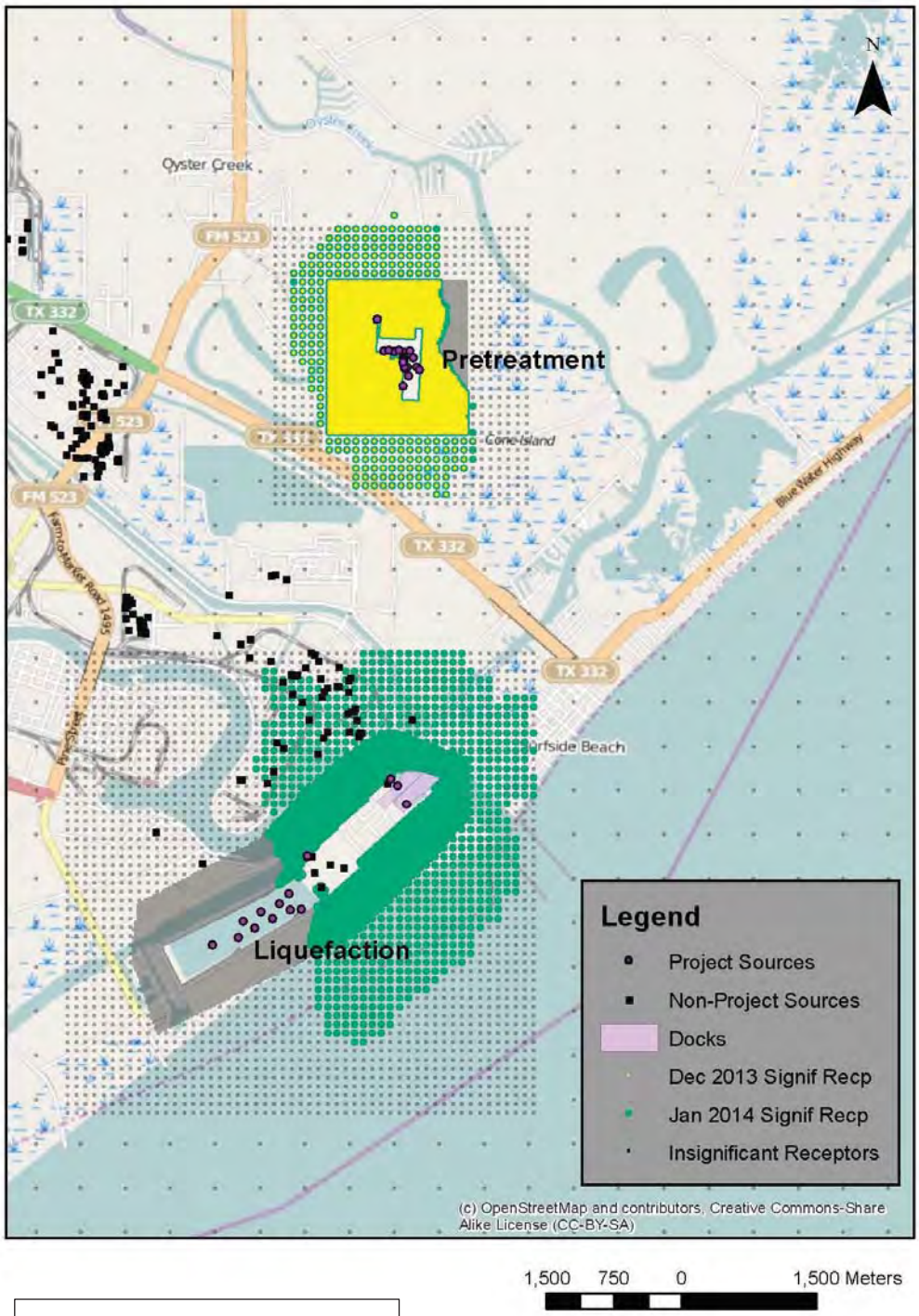


Figure 4.11.1-1

The results demonstrate that impacts are below NAAQS with the exception of $PM_{2.5.}$ As part of the TCEQ permitting process, Freeport LNG used an air dispersion model to assess the air quality impacts from the Projects. Freeport LNG's modeling results indicate that air quality impacts from the Projects would not contribute significantly to a violation of the NAAQS.

At our request, Freeport LNG modified its modeling parameters to include the emissions from the LNG vessels and escort vessels. The results indicated that there would be no NAAQS violations caused by operation of the vessels plus Freeport LNG's onshore facilities.

We modified this air quality model with revised emissions from the LNG vessels and escort vessels to add another layer of conservatism. Our analysis predicts that Freeport LNG's existing terminal, ship traffic, and the Liquefaction and Pretreatment Plant would not cause or contribute significantly to violations of the $PM_{2.5}$ NAAQS.

Near the Liquefaction Plant, the impacts from only the Liquefaction Project (Liquefaction Plant, Pretreatment Plant, Vessel Emissions) would result in impacts below the NAAQS. However, because there are numerous industrial facilities near the Liquefaction Plant, the cumulative impacts would be above the NAAQS. These impacts in excess of the NAAQS near the Liquefaction Plant exist regardless of the emissions from the Projects. Thus, Freeport LNG's facilities are not the cause of the exceedances and significant adverse impacts on residents or sensitive environments are not expected to occur as a result of operation of the Liquefaction or Phase II Modification Projects.

We received a comment that the indirect emissions resulting from the hypothetical use of on-site natural gas-fired combustion turbines to power the refrigeration compressors at the Liquefaction Plant had not been compared to the direct emissions resulting from the proposed use of electric-driven motors to power the compressors. Appendix F includes an analysis to compare these alternatives. Based on the latest available eGRID data (2010) from the USEPA, the estimated GHG emissions resulting from the use of on-site natural gas-fired turbines would be about 5% less than the emissions resulting from the use of electric motors. We find that the actual advantage would be less than this for the following reasons:

- the analysis did not account for the parasitic losses resulting from operation of ancillary equipment associated with on-site combustion turbines;
- the analysis did not account for the loss of efficiency associated with operation of the on-site combustion turbines at partial loads and normal wear and tear;
- the analysis did not account for the indirect emissions associated with transmission of natural gas to on-site combustion turbines;
- it is reasonable to assume that the GHG emissions per unit of electric output from the grid would decrease over time as older coal-fired power plants are replaced by more efficient natural gas-fired units and renewable energy sources; and
- the eGRID data is from 2010, and the Liquefaction Plant would not commence operation until approximately a decade later.

The estimated NO_x emissions resulting from the use of on-site natural gas-fired turbines are about 39% greater than the estimated emissions resulting from the use of electric motor. The

estimated SO_2 emissions resulting from the use of on-site natural gas-fired turbines would be within a few percent of the estimated emissions resulting from the use of electric motor. This is because natural gas contains very little sulfur.

In summary, the estimated GHG emissions associated with the hypothetical use of on-site natural gas-fired combustion turbines to power the refrigeration compressors are in approximately equal to estimated emissions that resulting from planned use of electric-driven motors to power these compressors. With on-site natural gas-fired combustion turbine-driven compressor, the expected NO_x emission would be greater, and the expected SO_2 emissions would be less than the emissions resulting from the use of electric motor-driven compressors. Over the life of the Project, the indirect pollutant emissions associated from power obtained from the electrical grid are reasonably expected to decrease, while those from on-site natural gas-fired combustion turbines would remain constant.

We received comments from the public and inquiries from the USEPA and NOAA Fisheries regarding deposition impacts on local wildlife. Depositional impacts on wildlife, vegetation, and aquatic ecosystems are discussed in section 4.6.1.1. The analyses also show that the Projects' air emissions would not produce significant adverse impacts on soils, vegetation, or visibility.

Thus through implementation of construction work practices, our recommendation for a general conformity analysis of the estimated emissions from construction and operation, and an analysis of the modeled air quality impacts from operation of Liquefaction Plant, Pretreatment Plant and Vaporization Plant, we find there would be no regionally significant impacts on air quality although residents near the construction areas would have elevated fugitive dust impacts during the period of construction.

4.11.2 Noise and Vibration

Noise quality can be affected during construction and operation of the Projects and the magnitude and frequency of noise can vary considerably during the day, week, or the seasons, based on changing weather conditions, vegetative cover, and non-Project sources of noise. Two measures that associate the time-varying quality of noise to its effect on people are the 24-hour equivalent sound level (L_{eq}) and day-night averaged sound level (L_{dn}). The L_{eq} is the level of steady sound with the same total (equivalent) energy as the time-varying sound of interest, averaged over a 24-hour period. The L_{dn} is the L_{eq} plus 10 decibels on the A-weighted scale (dBA), added to account for people's greater sensitivity to nighttime sound (between the hours of 10 p.m. and 7 a.m.). The A-weighted scale is used as human hearing is less sensitive to low and high frequencies than mid-range frequencies. The human ear's threshold of perception for noise change is considered to be 3 dBA; 6 dBA is clearly noticeable to the human ear, and 9 dBA is perceived as a doubling of noise.

In 1974, the USEPA published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. This publication evaluates the effects of environmental noise with respect to health and safety. The document provides information for state and local governments to use in developing their own ambient noise standards. The USEPA has determined that to protect the public from activity interference

and annoyance outdoors in residential areas, noise levels should not exceed an L_{dn} of 55 dBA. The FERC has adopted this criterion for new compression and associated facilities, and it is used here to evaluate the potential noise impact from operation of each of the proposed compressor stations. An L_{dn} of 55 dBA is equivalent to a continuous noise level L_{eq} of 48.6 dBA for facilities that operate at a constant level of noise.

The City of Freeport noise ordinance is mainly a "nuisance" type ordinance which basically prohibits loud and unreasonable sounds such as radios and television sets, which disturb the peace and quiet of neighboring residents, unnecessary horns and signaling devices on automobiles, yelling and shouting, and un-muffled exhausts of internal combustion engines. Other unreasonable sounds are also enumerated. The ordinance does not place numerical limits on any noise generating sources associated with the Projects. There are no applicable state or county noise regulations.

4.11.2.1 Existing Ambient Noise Conditions

Liquefaction Project

The ambient sound level of a region is defined by the total noise generated within the specific environment, and is usually comprised of sound emanating from natural and artificial sources. At any location, both the magnitude and frequency of environmental noise may vary considerably over the course of the day, throughout the week, and over the course of the year. This variation is caused in part by changing weather conditions and the effects of seasonal vegetative cover.

Freeport LNG conducted a baseline sound level survey at both the Liquefaction Plant site and the Pretreatment Plant site on June 5-6, 2012. Existing Noise Sensitive Area (NSAs) were identified in the vicinity of each of the sites. Five locations were chosen for the Liquefaction Plant, and two for the Pretreatment Plant. Some locations were chosen to represent the nearest NSAs, while others were taken at the Projects' property lines. For the Liquefaction Plant, NSAs were present at three of the five noise monitoring locations. For the Pretreatment Plant, one monitoring location was selected to represent nearby NSAs and a second location was at the Pretreatment Plant property line.

Measurements were conducted during daytime and nighttime hours. For locations where nighttime measurements were not taken, the area was assumed to experience the same sound level as the nighttime sound level at the nearest site where monitoring was conducted. The noise monitoring locations and NSAs, their distance and direction from each site, and the measured or estimated noise levels are summarized in table 4.11.2-1.

Phase II Modification Project

The existing noise environment as described above for the Liquefaction Plant provides representative data for the Phase II Modification Project.

Table 4.11-2-1

Identified NSA Locations and Measured/Estimated Ambient Noise Levels

Project	Monitoring Site	NSA	Distance/Direction	L_{Day}	L_{Night}	L_{dn}
Liquefaction Plant	Site 1	Property Line (no NSA)	2,765 feet / WSW	49.3	43.6	51.4
	Site 2	Property Line (no NSA)	1,250 feet / E	45.5	44.1	50.7
	Site 5 a/	NSA 1 Cortez Street	2,210 feet / SE	47.7	44.1 b/	51.2
	Site 6	NSA 3 Lamar Street	4,140 feet / E	54.1	44.1 b/	54.1
	Site 7	NSA 2 Deep Sea Drive	3,345 feet / WSW	53.1	44.1 b/	53.5
Pretreatment Plant		NSA 1 Jeffers Road	3,560 feet / W			
	Site 3	NSA 2 Johnson Drive	4,275 feet / NW	51.1	42.0	51.5
		NSA 3 Duncan Drive	4,390 feet / NW			
	Site 4	Property Line (no NSA)	2,765 feet / WSW	39.7	42.0	48.1

a/ This NSA was subsequently purchased by Freeport LNG and no longer exists.
b/ L_{night} was not measured at these locations; it was assumed to be equal to the L_{Night} of Site 2.

4.11.2.2 Liquefaction Project Impacts and Mitigation

Construction Noise

Freeport LNG conducted detailed noise analyses to determine estimated noise levels associated with pile driving activities and dredging. The analyses included calculating construction noise at nearby NSAs and comparing the levels to measured ambient noise levels. Pile driving would be conducted for multiple areas of the Liquefaction Project including the construction dock/fire water intake structure, electric substation, liquefaction train pads, LNG storage tank, aggregate dock, ground flare/pipe rack, main plant entrance, warehouse/office building, and LNG berthing dock at the Quintana Island terminal site for up to 3 years. Dredging would occur for the new construction dock/firewater intake structure, the new aggregate dock, the existing construction dock, and the new LNG berthing dock for approximately 120 days.

Pile Driving

Freeport LNG stated in their analysis, that pile driving activities would be limited to daytime hours only but would occur for a period of 3 years. Their noise analysis consisted of identifying the nearest NSAs within one half mile of each pile driving area, and calculating estimated pile driving noise levels at these NSAs. Freeport LNG obtained impact pile driving noise levels from measurements conducted at another site. A noise emission level of 90 dBA at 50 feet was utilized. Their analysis also assumed a 20 percent usage factor (*i.e.*, the percentage of time that the maximum sound level is generated), which is standard practice for construction noise analyses. Freeport LNG calculated pile driving noise levels for the nearest NSAs at each pile driving site. Table 4.11.2-2 provides a summary of the pile driving areas, the nearest NSAs, measured ambient noise levels, calculate pile driving noise levels, and projected increases over ambient conditions.

In addition to the above analysis, Freeport LNG also evaluated eight potential scenarios for pile driving, where multiple piles would be driven simultaneously at multiple sites. A summary of this analysis is provided in table 4.11.2-3.

Table 4.11.2-2

Single Impact Pile Driving Noise Levels

Pile Driving Locations and Nearest NSA	Distance (feet)/Direction to NSA	Daytime Ambient L_{eq} (dBA)	Calculated L_{eq} Pile Driving Noise at NSA (dBA) a/	Impact Pile Driving Plus Ambient (dBA)	Increase Above Ambient (dBA)
Aggregate Dock/Crane Barge Area					
NSA-A	1,877 / SW	51.4	51.5	54.5	3.1
Firewater Intake Structure/Construction Dock					
NSA-B	1,975 / SE	47.7	51.1	52.7	5.0
NSA-C	2,335 / E	47.7	49.6	51.8	4.1
Liquefaction Train					
NSA-B	2,307 / ENE	47.7	49.7	51.8	4.1
NSA-A	3,064 / WSW	51.4	47.3	52.8	1.4
LNG Berthing Dock					
NSA-E	1,579 / SE	46.1	53.0	53.8	7.7
NSA-D	1,900 / SE	46.1	51.4	52.5	6.4
NSA-F	2,240 / NE	46.1	50.0	51.5	5.4
LNG Storage Tank					
NSA-B	1,253 / E	47.7	55.0	55.8	8.1
NSA-C	2,020 / ENE	47.7	50.9	52.6	4.9
Ground Flare					
NSA-A	1,833 / SW	51.4	51.7	54.6	3.2
Main Plant Entrance					
NSA-B	988 / NE	47.7	57.1	57.6	9.9
NSA-C	2,190 / NE	47.7	50.2	52.1	4.4
Electric Substation					
NSA-B	1,995 / ENE	47.7	51.0	52.7	5.0
Warehouse/Office Building					
NSA-B	1,451 / ENE	47.7	53.8	54.7	7.0
NSA-C	2,551 / NE	47.7	48.9	51.3	3.6
Pretreatment Plant					
NSA-1	2,806 / W	51.1	48.0	52.8	1.7

a/ Assumes one pile driver at each location and a 20 percent usage factor. L_{max} levels would be 7 dBA greater.

Table 4.11.2-3

Multiple Impact Pile Driving Noise Levels

Pile Driving Locations and Nearest NSA	Daytime Ambient L_{eq} (dBA)	Calculated L_{eq} Pile Driving Noise at NSA (dBA) a/	Impact Pile Driving Plus Ambient (dBA)	Increase Above Ambient (dBA)
Construction Dock/Firewater Intake, Electric Substation				
NSA-B	47.7	54.0	55.0	7.3
Construction Dock/Firewater Intake, Electric Substation, LNG Tank, Ground Flare				
NSA-A	51.4	51.7	54.6	3.2
NSA-B	47.7	57.6	58.0	10.3
NSA-C	47.7	53.3	54.4	6.7
Construction Dock/Firewater Intake, Electric Substation, LNG Tank, Ground Flare, Liquefaction Trains				
NSA-A	51.4	54.1	55.9	4.5
NSA-B	47.7	58.8	59.1	11.4
NSA-C	47.7	53.3	54.4	6.7
Construction Dock/Firewater Intake, Electric Substation, LNG Tank, Ground Flare, Liquefaction Trains, LNG Berthing Dock, Main Plant Entrance, Warehouse/Office Area				
NSA-A	51.4	54.1	55.9	4.5
NSA-B	47.7	61.8	62.0	14.3
NSA-C	47.7	56.0	56.6	8.9
NSA-D	46.1	51.4	52.5	6.4
NSA-E	46.1	53.0	53.8	7.7
NSA-F	46.1	50.0	51.5	5.4
Construction Dock/Firewater Intake, LNG Tank, Ground Flare, Liquefaction Trains, Main Plant Entrance, Warehouse/Office Area				
NSA-A	51.4	54.9	56.5	5.1
NSA-B	47.7	61.7	61.9	14.2
NSA-C	47.7	56.0	56.6	8.9
LNG Tank, Ground Flare, Liquefaction Trains, Main Plant Entrance, Warehouse/Office Area				
NSA-A	51.4	54.9	56.5	5.1
NSA-B	47.7	61.3	61.5	13.8
NSA-C	47.7	54.8	55.6	7.9
Liquefaction Trains, Main Plant Entrance, Warehouse/Office Area				
NSA-A	51.4	52.0	54.7	3.3
NSA-B	47.7	60.1	60.4	12.7
NSA-C	47.7	52.6	53.8	6.1
Liquefaction Trains				
NSA-A	51.4	52.0	54.7	3.3
NSA-B	47.7	54.5	55.3	7.6

a/ Assumes multiple pile drivers at multiple locations and a 20 percent usage factor. L_{max} levels would be 7 dBA greater.

The results of Freeport LNG's analysis of single piles being driven at any one site (table 4.11.2-2) indicates that L_{eq} noise levels would range from 47.3 dBA to 57.1 dBA at any NSA. Increases over ambient conditions were shown to range from 1.4 dBA to 9.9 dBA. As noted previously, the analysis accounted for a 20 percent usage factor to arrive at an L_{eq} noise level. The maximum impact noise level (L_{max}) that occurs during each hammer strike would be 7 dBA higher. Accordingly, L_{max} levels from pile driving would range from 54.3 dBA to 64.1 dBA and increases over ambient conditions would be 8.4 dBA to 16.9 dBA.

Freeport LNG's analysis for multiple piles at multiple sites (table 4.11.2-3) indicated higher L_{eq} pile driving noise levels (up to 62 dBA), with much larger increases over ambient conditions, ranging from 3.2 dBA to 14.3 dBA. As noted above, L_{max} levels would be 7 dBA greater, resulting in maximum levels of up to 69 dBA, and increases over ambient conditions of up to 21 dBA.

The above discussed pile driving noise levels, in absolute levels, and as increases over ambient conditions, would result in significant noise impacts if unmitigated. Freeport LNG is proposing to limit pile driving to daytime hours and has identified several noise mitigation measures that could be utilized in order to reduce noise levels and minimize the potential for noise impacts. These measures include the following:

- pile driving caps;
- pile driving caps with acoustical enclosures;
- noise mitigation blankets;
- encasements; and
- noise dampening compound painted onto piles.

Freeport LNG noted that in particular, wood pile driving caps can reduce pile driving noise by 11 dBA, however, Freeport LNG has not committed to implement any specific mitigation measures and thus the nearby residents of the Town of Quintana would be subjected to the impulse noise from pile driving for 3 years.

Dredging

Freeport LNG's analysis of dredging, similar to their pile driving analysis, utilized dredging noise emission data from another project, with a noise level of 80 dBA at 50 feet being utilized. Dredging would be conducted 24 hours per day for approximately 120 days. Freeport LNG's analysis did not account for any intervening terrain or structures, which would act to reduce noise levels somewhat over their calculated levels. Provided in table 4.11.2-4 is a summary of Freeport LNG's analysis, which includes measured ambient noise levels, dredging noise levels, and increases over existing conditions.

A review of the data in table 4.11.2-4 reveals that dredging noise would be near to just over 55 dBA as an L_{dn} at the nearest NSAs to Dredging Areas 1 through 4, ranging from 54.9 dBA to 56.9 dBA. It is anticipated that the aforementioned intervening structures would act to reduce these noise levels somewhat, such that noise levels would be below FERC's 55 dBA L_{dn} criterion.

Table 4.11.2-4

Dredging Noise Analysis

Dredging Area	Distance (feet) and Direction to Nearest NSA	Existing Ambient L_{dn} Noise Level (dBA)	Calculated L_{dn} Dredging Noise Level (dBA)	Combined Dredging Plus Ambient L_{dn} Noise Level (dBA)	Increase Above Ambient (dBA)
1	NSA 1, 1,500 / WSW	57.8	56.9	60.4	2.6
2	NSA-2, 2,004 / SE	54.1	54.3	57.2	3.1
3	NSA 3, 1,834 / SE	54.1	55.1	57.6	3.5
4	NSA-3, 1,885 / SE	54.1	54.9	57.5	3.4
5	NSA-5, 448 / SE	54.1	67.4	67.6	13.5

Much higher noise levels were calculated at NSA-5 near Dredging Area 5, with an L_{dn} of 67.4. Freeport LNG's Dredging Plan suggests mitigation for Freeport LNG to follow should noise levels exceed 55 dBA, but does not committed to implement the mitigation measures. These measures include: residential grade mufflers on the power generation units; the construction of temporary noise barriers around the predominant noise producing units; the use of noise dampening blankets, or temporary relocation of nearby residents.

Without mitigation, there could be significant noise impacts from construction due to the length of time for pile driving and dredging construction. During the construction of the Quintana Island terminal, Freeport LNG documented several instances of noise and vibration complaints from nearby residents. As with the construction of the original project, pile driving would last approximately 36 months at the Liquefaction Plant site, 20 months at the Pretreatment Plant site and 18 months at the Phase II LNG Berthing dock. Dredging would last up to 120days on a continuous bases. Overall construction at the Quintana Island terminal could last up to 4.5 years. Thus to ensure that the noise impacts from dredging are reduced to 55 dBA, and pile driving noise is minimized **we recommend that:**

> **Prior to construction, Freeport LNG should file a Construction Noise Mitigation Plan, for review and approval by the Director of the OEP that identifies measures that Freeport LNG would implement to reduce dredging noise to no greater than 55 dBA L_{dn} at NSAs, and pile driving noise (L_{max}) to no greater than 10 dBA over ambient levels.**

Horizontal Directional Drill Noise

HDD techniques would be utilized at five locations where river, wetland, and roadway crossings are proposed. These locations are:

- Channel;
- ICW;
- Wetland;
- Oyster Creek; and
- Pretreatment Plant.

Freeport LNG has identified the nearest NSAs at each HDD entry and exit point. Freeport LNG also conducted ambient noise level measurements at each HDD site where NSAs were identified within a 0.5 mile radius of each site. The Pretreatment Plant HDD and the Wetland HDD site has no NSAs within 0.5 miles of the HDD exit point.

Freeport LNG utilized the SoundPLAN noise model in order to calculate expected HDD noise levels at the nearby NSAs. The model incorporated area topography, spreading of sound waves with distance, and atmospheric absorption using the ISO 9613-2 standard. A noise emission level of 83 dBA and 71 dBA at 50 feet was utilized for the entry and exit sound levels, respectively, and 24 hour HDD operation was assumed. Results of the initial calculations showed that expected sound levels would exceed the FERC limit of 55 dBA as an L_{dn} and/or an increase over existing ambient conditions of 10 dBA or more. Mitigation in the form of temporary barrier walls, providing a nominal 10 dBA decrease in sound, reduced levels to below the FERC criteria at all but two HDD sites. Results for the HDD analysis, including the distance and direction to the nearest NSAs at each site, are provided in table 4.11.2-5.

Based on the estimates presented in the acoustical analysis, even with noise mitigation incorporated, it appears that HDD related noise may exceed the stated criteria in at least two HDD sites, however considering the mitigation that would be utilized, the limited time of drilling and the short drill length the noise impacts on nearby residents should not be significant due to the HDD.

In conclusion, construction noise impacts would be particularly intrusive to residents of the Town of Quintana near the Liquefaction Plant and Phase II Modification Project. Pile driving would result in high levels of impulse noise levels over 3 years, dredging noise impacts for up to 120 days; and general construction noise extending up to 4.5 years. Even with mitigation, these adverse noise impacts would likely cause residents of the Town of Quintana annoyance. Therefore, we conclude that the impacts from construction noise on the nearby residents of the Town of Quintana would be significant and unavoidable.

The Pretreatment Plant noise impacts would also result in elevated noise impacts during construction, but due to the distance between the construction areas and the nearby residents, the construction noise impacts would not be significant.

For the Pipeline/Utility Line System, the noise would be elevated but would only occur during daytime, and would be short-term. Freeport LNG has also proposed mitigation to address HDDs. Therefore, we expect noise impacts from construction of the Pipeline/Utility Line System to be minor.

Table 4.11.2-5

Calculated HDD Noise Levels at the Nearest NSA Locations at Each Site (dBA)

HDD Location and NSAs	Distance (feet) / Direction	Ambient L_{dn}	Without Mitigation			With 10 dBA Mitigation		
			Calculated L_{dn} due to HDD	HDD Noise plus Ambient	Increase Above Ambient	Calculated L_{dn} due to HDD with 10 dBA Mitigation	HDD Mitigated Noise plus Ambient	Increase Above Ambient with Mitigation
Channel HDD Entry								
NSA 1	1,080 / SW	52.5	61.2	61.7	9.2	51.2	54.9	2.4
NSA 2	1,410 / SW	52.5	58.3	59.3	6.8	48.3	53.9	1.4
NSA 3	2,150 / N	52.5	53.7	56.1	3.6	43.7	53.0	0.5
Channel HDD Exit								
NSA 1	182 / E	55.1	66.3	66.6	11.5	56.3	58.8	3.7
NSA 2	592 / NE	55.1	55.4	58.3	3.2	45.4	55.5	0.4
NSA 3	1,120 / WSW	55.1	46.7	55.7	0.6	36.7	55.2	0.1
ICW HDD Entry								
NSA 1	586 / S	56.3	67.3	67.6	11.3	57.3	59.8	3.5
NSA 2	938 / NNE	56.3	62.6	63.5	7.2	52.6	57.8	1.5
NSA 3	1,120 / WSW	56.3	60.8	62.1	5.8	50.8	57.4	1.1
ICW HDD Exit								
NSA 1	864 / SSE	50.4	51.7	54.1	3.7	41.7	50.9	0.5
NSA 2	2,410 / SW	50.4	41.0	50.9	0.5	31.0	50.4	0.0
NSA 3	2,640 / NE	50.4	40.0	50.8	0.4	30.0	50.4	0.0
Wetland HDD Entry								
NSA 1	751 / SE	52.7	64.9	65.1	12.4	54.9	56.9	4.2
NSA 2	1,150 / SW	52.7	60.5	61.2	8.5	50.5	54.7	2.0
NSA 3	1,720 / W	52.7	56.2	57.8	5.1	46.2	53.6	0.9
Oyster Creek HDD Entry								
NSA 1	1,440 / SE	61.3	58.1	63.0	1.7	48.1	61.5	0.2
NSA 2	1,600 / SSE	61.3	57.0	62.7	1.4	47.0	61.5	0.2
NSA 3	2,080 / NW	61.3	54.1	62.1	0.8	44.1	61.4	0.1
Oyster Creek HDD Exit								
NSA 1	363 / N	62.7	60.0	64.6	1.9	50.0	62.9	0.2
NSA 2	1,190 / NW	62.7	48.5	62.9	0.2	38.5	62.7	0.0
NSA 3	1,1400 / NW	62.7	46.8	62.8	0.1	36.8	62.7	0.0

Operational Noise

Freeport LNG performed noise analyses to calculate noise levels that would be attributable to operation of both the proposed Liquefaction Plant and the Pretreatment Plant. These levels were evaluated against the existing baseline L_{dn} noise levels and our impact criterion to determine potential impacts at the nearby NSAs. For both Projects, Freeport LNG utilized the SoundPLAN noise model in order to calculate expected operational noise levels at the nearby NSAs. The model incorporated area topography, spreading of sound waves with distance, and atmospheric absorption using the ISO 9613-2 standard. The analysis included downwind conditions for all receiver points. The proposed elevation changes at both sites were also incorporated into the

analysis. Ground cover was modeled as acoustically reflective for waterbodies and paved surfaces, and acoustically absorptive for most remaining areas. Freeport LNG provided estimates of noise emissions data for the major facility sources at each Project site, and the number of each piece of equipment anticipated. Noise mitigation features were also included in the analysis of each site.

Liquefaction Plant

The Liquefaction Plant would contain many significant noise generating sources, including multiple compressors, combustion turbines, coolers, piping and pumps. A total of three liquefaction trains would be operational. The noise modeling analysis for Liquefaction Plant operational noise included several iterations with noise mitigation added to reduce noise levels at the NSAs. Freeport LNG's analysis revealed that even with extensive noise mitigation, the 55 dBA L_{dn} limit could not be achieved at the nearest NSAs along Cortez Street. Freeport LNG subsequently purchased all of the NSAs along Cortez Street.

The calculated Liquefaction Plant operational noise levels at the remaining NSA locations with mitigation measures included, existing ambient levels, and projected increases in future noise, are provided in table 4.11.2-6.

Table 4.11.2-6

Liquefaction Plant Calculated Operational Noise Levels Summary – All Three Trains in Operation

Entity	Location	Existing Measured L_{dn} (dBA)	Calculated Project L_{dn} Level (dBA)	Cumulative Future Noise Level (L_{dn}) a/ (dBA)	Increase Over Existing (dBA)
Liquefaction Plant	Site 6	54.1	54.8	57.5	3.4
	Site 7	53.5	51.9	53.5	2.3

a/ L_{dn} of station plus ambient noise.

The noise modeling analysis included significant noise mitigation measures in order to achieve compliance with our 55 dBA L_{dn} noise level limit at any NSAs. Freeport LNG indicated that these measures were included in their noise analysis to achieve the noise levels presented. These mitigation measures included some or all of the following measures:

- acoustical enclosures;
- pipe lagging;
- silencers; and
- equipment specific noise limits.

The results of Freeport LNG's analysis reveals that the Liquefaction Plant, with noise mitigation measures incorporated, would achieve compliance with our 55 dBA L_{dn} noise limit at all remaining NSA locations. Increases in noise over existing conditions would range from about 2-3 dBA. Increases in noise of 3 dBA or less are not considered to be significant.

Cooldown Flaring

A multiple tip ground flare system would be installed at the Liquefaction Plant site. The flare system would have a radiation barrier surrounding all four sides of the system. Flaring operations would include planned and emergency flaring. Planned flaring (cooldown flaring) would be associated with plant start-up, and during maintenance, which would only happen once every few years. Freeport LNG states that cooldown flaring would only last 8-10 hours during either plant start-up or maintenance. Emergency flaring may never occur.

Freeport LNG conducted a noise modeling analysis to determine noise levels that would occur with cooldown flaring and normal plant operation. The flaring modeling analysis utilized the same methodology as for the above discussed operational noise modeling. Provided in table 4.11.2-7 are the calculated noise levels anticipated during cooldown flaring at the nearest NSA locations.

Table 4.11.2-7

Liquefaction Plant Calculated Cooldown Flaring Noise Levels Summary

Entity	Location	Calculated Cooldown Flaring Plus Normal Plant Operation L_{eq} Level (dBA)
Liquefaction Plant	Site 6	53.8
	Site 7	61.9

Freeport LNG provided the above as calculated L_{eq} noise levels, not L_{dn} levels, because cooldown flaring would not be a continuous or 24-hour noise source. The above calculated levels would be significant if they were to occur continuously over longer periods of time, be significant, as they would be well above our 55 dBA L_{dn} limit (6.4 dBA must be added to an L_{eq} level in order to arrive at an L_{dn} level). However, because cooldown flaring would only occur once every few years, and the duration was stated by Freeport LNG as being limited to 8 to 10 hours, we do not anticipate significant noise impacts associated with cooldown flaring.

Much higher noise levels would be associated with emergency flaring, although this would be an emergency event only, and may never occur.

Pretreatment Plant

The modeling analysis for Pretreatment Plant operational noise included several iterations with noise mitigation added to reduce noise levels at the NSAs. The calculated Pretreatment Plant operational noise levels, existing ambient levels, and projected increases in future noise, are provided in table 4.11.2-8.

Table 4.11.2-8

Pretreatment Plant Calculated Operational Noise Levels Summary

Entity	Location	Existing Measured L_{dn} (dBA)	Calculated Project L_{dn} Level (dBA)	Cumulative Future Noise Level (L_{dn}) a/ (dBA)	Increase Over Existing (dBA)
Pretreatment Plant	Site 3	51.5	54.2	56.1	4.6

a/ L_{dn} of station plus ambient noise.

The noise modeling analysis included specific noise mitigation measures in order to achieve compliance with our 55 dBA L_{dn} noise level limit at any NSAs. These measures were included in the noise analysis to achieve the noise levels presented. Mitigation measures included some or all of the following measures:

- Acoustical enclosures;
- Pipe lagging;
- Silencers; and
- Equipment specific noise limits.

The above analysis indicates that a noise level of less than 55 dBA as an L_{dn} would be achieved at the nearest NSA. A 4.6 dBA increase over existing ambient conditions is projected.

The Liquefaction Project is required to operate in compliance with our noise criteria and minimize noise impacts. Because of the complex and disparate operations of the Liquefaction Plant and Pretreatment Plant, we have developed separate conditions to ensure that noise impacts from these facilities would not result in significant adverse noise impacts on local residents. Therefore, for the Pretreatment Plant**, we recommend that:**

> **Freeport LNG file a full load noise survey for the Pretreatment Plant no later than 60 days after placing the plant into service. If a full load condition noise survey is not possible, Freeport LNG should file an interim survey at the maximum possible operation within 60 days of placing the Pretreatment Plant into service and file the full load survey within 6 months. If the noise attributable to the operation of all the equipment of the Pretreatment Plant at full operation exceeds 55 dBA L_{dn} at any nearby NSAs, Freeport LNG should install additional noise controls to meet the level within 1 year of the in-service date. Freeport should confirm compliance with this requirement by filing a second full power noise survey with the Secretary no later than 60 days after it installs the additional noise controls.**

The Liquefaction Plant would have a phased in-service, thus to ensure that the noise would not significantly impact local residents during all phases of operation, **we recommend that:**

> **Freeport LNG should file, a full load survey for the Liquefaction Plant, with the Secretary no later than 60 days after each of the first two liquefaction trains are placed into service at the Liquefaction Plant. If the noise attributable to the**

operation of the equipment at the Liquefaction Plant exceeds 55 dBA L_{dn} at any nearby NSA, Freeport should reduce operation of the Liquefaction Plant or install noise mitigation to reduce noise levels at the nearest NSAs. Freeport LNG should confirm compliance with this requirement by filing a second full power noise survey with the Secretary no later than 60 days after it installs the additional noise controls.

Freeport LNG should file, a full load noise survey for the Liquefaction Plant no later than 60 days after placing the plant into service. If a full load noise survey is not possible, Freeport should file an interim survey at the maximum possible operation within 60 days of placing the Liquefaction Plant into service and file the full operational surveys within 6 months. If the noise attributable to the operation of all the equipment of the Liquefaction Plant at full operation exceeds 55 dBA L_{dn} at any nearby NSAs, Freeport LNG should install additional noise controls to meet the level within 6 months of the in-service date. Freeport should confirm compliance with this requirement by filing a second full power noise survey with the Secretary no later than 60 days after it installs the additional noise controls.

LNG Vessel Transit and Loading Noise and Vibration

Freeport LNG conducted an analysis to determine expected noise levels associated with LNG vessel docking and loading, LNG transfer and vessel hoteling, and the potential for noise induced vibration from these activities. Their analysis consisted of conducting noise level measurements of an actual LNG vessel in operation in Freeport Harbor Channel and extrapolating the measured levels to nearby NSA locations.

Four NSA locations in the vicinity of the LNG berthing dock and LNG transit route were identified for analysis. Ambient noise level measurements were conducted at three nearby locations the day before the arrival of an LNG vessel.

LNG vessel docking includes navigation into the harbor and vessel backing into the dock. LNG vessels are maneuvered within the channel by tugboats, which are the main noise generators. Noises from the LNG vessel are not as significant as those from the tug boats during docking. Provided in table 4.11.2-9 are the NSA locations, the measured ambient noise levels, the calculated LNG vessel docking noise levels, and the projected increases over ambient conditions.

The data in table 4.11.2-9 reveal that ambient noise level increases would range from 2.2 dBA to 6.4 dBA during vessel backing, which is the loudest activity but may occur up to 400 times per year. Vessel backing is a short-term event, and increases in noise during this activity would be less than 10 dBA. Accordingly, no significant adverse noise impacts are anticipated due to vessel transit maneuvering and docking within the harbor.

Table 4.11.2-9

LNG Vessel Transit Noise Levels Within Harbor

Location	Existing Measured L_{eq} (dBA)	Calculated LNG Vessel Docking Noise L_{eq} (dBA) a/	Cumulative Future Noise Level (L_{eq}) b/ (dBA)	Increase Over Existing (dBA)
NSA 1	47.7	52.0	53.4	5.7
NSA 2	47.7	49.0	51.4	3.7
NSA 3	47.7	45.9	49.9	2.2
NSA 4	48.7 c/	54.0	55.1	6.4

a/ Vessel backing into the dock is the loudest activity, and is the noise level presented here
b/ Measured ambient level plus LNG vessel noise
c/ Ambient noise level for NSA 4 measured during an October 4, 2012 noise survey.

An additional analysis was conducted to determine noise levels that would occur during LNG transfer activities and vessel hoteling. The analysis included two vessels transferring LNG simultaneously. Provided in table 4.11.2-10 are the results of this analysis.

Table 4.11.2-10

LNG Transfer Noise Levels – Two Vessels

Location	Existing Measured L_{eq} (dBA)	Calculated LNG Transfer Noise L_{eq} (dBA) a/	Cumulative Future Noise Level (L_{eq}) b/ (dBA)	Increase Over Existing (dBA)
NSA 1	47.7	39.1	48.3	0.6
NSA 2	47.7	36.4	48.0	0.3
NSA 3	47.7	34.5	47.9	0.2
NSA 4	48.7	33.3	48.8	0.1

a/ Two vessels transferring LNG.
b/ Measured ambient level plus LNG transfer noise

As provided in table 4.11.2-10 noise levels associated with LNG transfer at two vessels simultaneously would generate low noise levels, and result in minimal increases over ambient conditions. The L_{eq} noise levels presented, even when converted to L_{dn} levels, would be below our 55 dBA noise level limit. No significant noise impacts are therefore anticipated to occur with LNG transfer activities.

LNG Vessel Noise Induced Vibration

Freeport LNG conducted an analysis to determine the potential for noise induced vibration during LNG vessel transit and LNG transfer at the four nearby NSA locations. Their analysis included evaluating the calculated noise levels at each NSA in the lower octave band center frequencies (31.5 Hertz, 63 Hertz and 125 Hertz) associated with LNG vessel transit and LNG transfer and comparing these levels against the American National Standards Institute (ANSI) S12.2 standard for determining the potential for noise induced vibration. The ANSI S12.2 standard includes two vibration thresholds: Moderately Perceptible Vibration and Clearly Perceptible Vibration.

Freeport LNG's analysis revealed that during LNG vessel backing (a short term event) the Moderately Perceptible Vibration threshold would be exceeded at the NSA 4 location in the Town of Quintana, although noise levels would be below the Clearly Perceptible Vibration Threshold. Noise levels would be below both threshold levels at the remaining locations. In addition, the Commission has received complaints from residents of Town of Quintana through our Enforcement hotline regarding vibration and noise impacts from ship traffic from the existing Quintana Island terminal.

Noise levels during LNG transfer, which is a much longer activity, would be well below both thresholds at all NSA locations, and no noise induced vibration would be expected during LNG transfer.

Noise induced vibration may be experienced during the LNG vessel backing at the NSA 4 area. Under previous authorizations up to 400 ship- calls may occur at the Quintana Island terminal, and up to 200 at the dock nearest to the NSAs. There is a potential for excess noise and vibration during LNG vessel transit. The draft EIS included a request that Freeport LNG submit a Ship Noise and Vibration Monitoring Plan to ensure that noise from the ships would not exceed 55 dBA Ldn and would not cause vibration in excess of the Clearly Perceptible Vibration Threshold under ANSI S12.2-2008. Freeport LNG has indicated that the public concerns relating to ship noise and vibration were primarily based on the LNG vessel visit in 2012 that was operating a Gas Combustion Unit (GCU), which was identified as the source of excessive noise and vibration. Freeport LNG has stated that they have instituted operational procedures to preclude the use of GCUs while ships are docked.

In addition, Freeport LNG has committed to use the following steps to ensure noise and vibration is minimized:

- Freeport LNG would request that the harbor tugboats have industry standard or better mufflers/silencers installed to mitigate ship transit and hoteling noise as much as possible;

- Freeport LNG would require that all GCU-equipped LNG vessels that are at the Freeport LNG dock and not loading or discharging LNG to direct their BOG to the terminal, via the vapor cargo arm, in preference to combusting BOG in the GCU; and

- operations staff would periodically monitor and document noise levels during LNG vessel visits.

Freeport has indicated that should its personnel hear noise that may significantly exceed previously monitored levels or if excessive vibration is perceived during ship hookup or LNG transfer, the cooperation of the LNG vessel's crew would be sought to identify the source and to develop a mitigation plan to reduce the noise/vibration to acceptable levels. As a result, these measures satisfy our previous request and we conclude that with the mitigation listed above and the monitoring plan, noise and vibration impacts may cause moderate impacts, but would typically be minor during the operational life of the facility.

In conclusion, Freeport LNG has proposed mitigation to minimize its operational noise and vibration levels, and our recommendations above would ensure that the 55 dBA L_{dn} noise standard is met for the Pretreatment and Liquefaction Plants. Therefore, we expect noise impacts associated with operation of the Liquefaction Project to be minor, with occasional minor vibrational impacts at one NSA due to LNG vessel movement.

Phase II Modification Project

Construction

Freeport LNG relied on the construction noise assessment for the original LNG facility to estimate potential construction related noise levels for the Phase II Modification Project. Construction activities associated with the Phase II Modification Project would generate short-term increases in sound levels, but would occur over an approximate 36 month period, predominately during the day.

The construction equipment utilized would differ during each phase of construction, but in general, heavy equipment (bulldozers, loaders, dump trucks) would be used during the excavation phase. Noise is generated during construction primarily from diesel engines that power the equipment. Exhaust noise is usually the predominant source of diesel engine noise. Pile drivers would also be used during preparation of the dock foundation.

Pile driving activity would generate the highest construction related sound levels, and has the potential to generate sound levels in excess of existing ambient conditions. In addition, dredging of the dock would also result in increased ambient noise levels. Freeport has indicated that pile driving activities would only be done during daytime hours and dredging would be a 24-hour activity. Both construction activities has the potential for significant adverse noise impacts, thus we have recommended that Freeport LNG prepare a Construction Noise Mitigation Plan to ensure that noise impacts are minimized.

Operation

No new operational noise generating sources would be associated with the Phase II Modification Project that were not already assessed and approved under the Phase II Project.

In conclusion, the above recommendation would minimize construction noise and no new operational noise levels are expected associated with the Phase II Project. Therefore noise impacts from the Phase II Project are expected to be minor.

4.12 CUMULATIVE IMPACTS

4.12.1 Introduction

Cumulative impacts may result when the environmental effects associated with a proposed project are added to temporary (construction-related) or permanent (operations-related) impacts associated with past, present, or reasonably foreseeable projects. The need for a cumulative impact analysis, required by NEPA Part1508.7, stems from the fact that although impacts might be insignificant if they were to occur in isolation on an individual project basis, the additive effects of multiple projects can be significant.

Because of the isolation of the Quintana Island with respect to the mainland, the residents of the town would be subjected to numerous adverse impacts from construction and operation of the Projects for up to 4.5 years. The residents of the island would have: significant noise impacts from pile driving noise for up to 3 years, dredging noise impacts for up to 120 days, general construction noise, large increases in barge traffic, large increases in construction vehicle traffic including numerous bus trips to deliver workers, large increases in tandem truck deliveries of materials and supplies, higher traffic flows on the mainland roads, and increased dust and air pollutants during construction. During construction of the original Quintana Island terminal, Freeport LNG documented several instances of complaints from the public regarding noise and vibration. Although individual members of the community may be affected to a greater or lesser extent, these aggregate impacts would result in significant and unavoidable impact on the residents of the Town of Quintana.

This cumulative impact analysis considers the effects of the proposed Projects (*i.e.*, including the Liquefaction Project, Phase II Project,[32] and the Phase II Modification Project), and other existing or proposed Project developments that:

- affect a resource or resources potentially affected by the proposed Project for which the cumulative impacts analysis is being undertaken;
- cause this impact within all, or part of, the study area; and
- cause this impact within all, or part of, the time span associated with the potential impact from the proposed Project.

Brazoria County was selected as the geographic study area of investigation for the cumulative impacts analysis as the predominance of environmental impacts occur there. Based on the analysis of impacts addressed in this EIS, we identified a subset of resources that could incur additional, or cumulative, impacts as a consequence of the construction and operation of the Projects (see table 4.12.1-1). CEQ regulations require agencies to consider environmental effects of proposed actions, including direct and indirect effects, if these effects are reasonably foreseeable. We do not consider impacts from induced production and pipeline transportation

[32] Previously authorized proposed Phase II work was also considered in this analysis to provide a full and complete understanding of cumulative impacts in the area. In this Section, the proposed previously authorized Phase II work and the Phase II Modification Project are referred to together as the "Phase II developments."

associated with additional shale gas development as "reasonably foreseeable". There is no specific shale-gas play that has been identified as a source of natural gas and the proposed Project does not depend on additional shale gas production. In addition, shale gas production has occurred for reasons unrelated to the Project and over which the Commission has no control, such as state permitting for additional gas wells. Thus cumulative impacts from shale gas production have not been addressed in this EIS.

The FERC also does not evaluate end user cumulative impacts of the LNG exports as it is not possible to know who those end users would be, or for the FERC to realistically be able to characterize those impacts (especially in foreign countries, where environmental constraints would be different from the U.S. permitting process). Thus determining the end users and associated impacts is not reasonable foreseeable.

Table 4.12.1-1

Freeport LNG Liquefaction Project
Factors Selected for Cumulative Impacts Analysis

Environmental		Socioeconomic
Wetlands	Air Quality	Land Use
Waterbodies	Noise Levels	Visual Impacts
Essential Fish Habitat (EFH)	Water Quality	Traffic / Roads
Listed Species		Housing
		Public Services
		Water Supply

4.12.2 Regional and Economic Context

Brazoria County's economy is built around a diverse array of employment sectors, primarily the petrochemical industry, deep water port (Port Freeport), fishing, tourism, agribusiness, education, medical, and retail. All eight of the petrochemical companies listed as major employers in the county have manufacturing plants located in southern Brazoria County. The eight companies and their locations are Dow (Freeport), ConocoPhillips (Sweeny), BASF Corporation (Freeport), Ascend Performance Materials (Chocolate Bayou), INEOS Olefins & Polymers (Chocolate Bayou), Chevron Phillips Chemical Company (Sweeny), Shintech (Freeport), and SI Group (Freeport) (The Economic Development Alliance for Brazoria County [EDC-BC], 2012).

The Brazoria County economy added about 500 workers a month in the preceding 12 months, many of these workers being attributable directly or indirectly to industrial sector production growth resulting from the low price of shale gas used for fuel and as a chemical feedstock (The Facts, 2012). Net job growth continued in the first quarter of 2013, mainly in the construction sector.

Most of the recent and proposed industrial development is concentrated in southern Brazoria County, specifically Freeport, Sweeny, and Chocolate Bayou. About $20 billion of new and expanded industrial facilities, including those proposed by Freeport LNG, are under construction or would be developed in the next several years (The Facts, 11-10-13). Collectively, these developments would require approximately 15,950 new construction workers and 885 new

operational jobs. Many of the construction worker requirements would overlap. In addition, Port Freeport is undergoing a comprehensive expansion program which, along with the widening and deepening of the FHC, would allow larger vessels to utilize the port and would increase cargo handling capacity.

4.12.3 Present and Reasonably Foreseeable Projects

Major current and proposed developments in Brazoria County are listed in table 4.12.3-1. Figures 4.12.3-1 and 4.12.3-2 show the general locations of the Projects within Brazoria County and the Freeport area, respectively.

4.12.3.1 Industrial Developments

In addition to Freeport LNG's proposed Projects (Liquefaction Project, Phase II Project and Phase II Modification Project), which involve construction at and adjacent to the existing Quintana Island terminal (and at additional locations in the case of the Liquefaction Project), various industrial developments have recently been completed, are currently under construction, or are proposed for construction in Brazoria County over the next several years. Many of the developments are in the Freeport area and represent significant expansions of or upgrades to existing facilities. These projects share the greatest similarities with Freeport LNG's Projects and involve similar potential impacts.

Airgas Carbonic – Carbon Dioxide Manufacturing Plant

Airgas Carbonic is planning to build a $9.9 million CO_2 manufacturing plant just north of Alvin, approximately 40 miles from the Quintana Island terminal. The plant will ship 450 tons of liquid CO_2 daily. Construction, requiring 10 workers, was scheduled to begin in June 2013. The plant will employ 14 operational personnel (The Facts, 04-25-13).

Artland Louisiana and Performance Contractors – Pipe Fabrication Facility

In 2013, Artland Louisiana and Performance Contractors announced plans to build a pipe Fabrication Facility on an 18-acre site in Rosharon, approximately 27 miles from the Quintana Island terminal. The facility was scheduled for completion between May and December, 2013, with operational start-up in January 2014. The project would require 60 construction, and 45 operational workers (The Facts, 04-25-13).

Ascend Performance Materials – Propane Dehydrogenation Plant

Ascend Performance Materials is proposing to construct a $1.2 billion propane dehydrogenation plant on a 30-acre site at the company's existing Chocolate Bayou industrial facility, approximately 22 miles from the Quintana Island terminal. The project will require 1,500 construction, and 100 permanent workers. Construction is scheduled to begin in October 2014 and will be completed in 2015 (The Facts, 03-08-13).

Table 4.12.3-1

Freeport LNG Liquefaction Project
Present and Reasonably Foreseeable Actions within the Cumulative Impacts Study Area

Company/Sponsor	New Project	Regional Location	Site	Construction Timeframe	Present or Reasonably Foreseeable a/
Industrial Developments					
BASF	Ammonium Sulfate Crystallizer	Freeport	Existing Plant Site	2012	Present
Chevron Phillips	Two Plastic Resin Producing Facilities	Old Ocean	Existing Plant Site	2014 - 2017	Reasonably Foreseeable
Cyanco	Sodium Cyanide Plant	Chocolate Bayou	Existing Plant Site	2012	Present
Dow	Chlor-alkali Plant	Freeport	Existing Plant Site	2013	Present
Dow	Propane Dehydrogenation Plant	Freeport	Existing Plant Site	2011 - 2015	Present
Dow	Ethylene Plant	Freeport	Existing Plant Site	2013 - 2017	Reasonably Foreseeable
Dow	AgroSciences Plant	Freeport	Existing Plant Site	2015 (in-service)	Reasonably Foreseeable
INEOS	Cracking Furnace	Chocolate Bayou	Existing Plant Site	2012 - 2013	Present
Shin-Etsu	Silicon Plant	Freeport	Existing Plant Site	2013 - 2014	Reasonably Foreseeable
Port & Harbor Channel Developments					
Port Freeport & Local	FHC Widening	Freeport	Offshore	2013 - 2018	Reasonably Foreseeable
Port Freeport & USACE	FHC Deepening	Freeport	Offshore & Onshore	2015 - 2021	Reasonably Foreseeable
Port Freeport	Velasco Terminal Development	Freeport	Existing Port Site	2008 - 2016	Present
Pipeline Developments					
Dow	30-inch Hydrogen Pipeline (2.3 miles)	Freeport	Between Existing Plant Sites	2012	Present
Enterprise	24-inch NGL Pipeline (2 miles in Brazoria County)	Alvin	Pipeline Right-of-way	2012	Present
Seaway	30-inch Crude Oil Pipeline - Flow Reversal in Existing Pipeline (43 miles in Brazoria County)	Damon southwards to Jones Creek	Pipeline Right-of-way	2012	Present
Seaway	30-inch Crude Oil Loop (43 miles in Brazoria County)	Damon southwards to Jones Creek	Pipeline Right-of-Way	2013 - 2014	Reasonably Foreseeable

Table 4.12.3-1

Freeport LNG Liquefaction Project
Present and Reasonably Foreseeable Actions within the Cumulative Impacts Study Area

Company/Sponsor	New Project	Regional Location	Site	Construction Timeframe	Present or Reasonably Foreseeable a/
Kinder Morgan / Phillips 66	27-mile, 12-inch Crude Oil Lateral Pipeline	Sweeny	Pipeline Right-of-way	2012 - 2014	Reasonably Foreseeable
Seaway	Jones Creek to Echo Crude Oil Extension Pipeline	Jones Creek northeastwards	Pipeline Right-of-way	2012 -2014 (assumed)	Reasonably Foreseeable
Oil & Gas Field Developments					
Most Active Companies: Denbury, Maverick, Hilcorp and Chalker – account for 59 of 74 well applications	74 New, Recompleted, or Re-entered wells	Clustered: Pearland/Alvin Damon Sweeny Danbury	Appear to be Established Oil Fields with Existing Infrastructure	2012	Present (assumed)
Land & Air Transportation Developments					
State and County Roadway Improvement Projects	SH 288 overpasses in Lake Jackson and Clute	Lake Jackson and Clute	Existing Road Corridor	2010 - 2012	Present
	SH 288 Tollway	Northern Brazoria County near Pearland	Existing SH 288 Median between SH 59 and Beltway 8	2016+	Reasonably Foreseeable
	FM 1495 / SH 36 grade separation	Freeport	Existing Intersection at Port Freeport	2014	Reasonably Foreseeable
	Improvements to SH 35, SH 36, SH 288, SH 332, CR 220	Various	Existing Road Corridors	2012 - 2013	Present
Brazoria County	Texas Gulf Coast Regional Air Expansion	5 miles south of Angleton	Existing Airport Site	2012 - 2013	Present
Commercial Developments					
Kelsey-Seybold	Office Building	Pearland	Existing Commercial Zone	2012 - 2013	Present
Ref-Chem	Office Building	Pearland	Existing Commercial Zone	2012 - 2013	Present
Angleton/Danbury Medical Center	Medical Pavilion	Angleton	Existing Hospital Site	2012+	Reasonably Foreseeable

Table 4.12.3-1

Freeport LNG Liquefaction Project
Present and Reasonably Foreseeable Actions within the Cumulative Impacts Study Area

Company/Sponsor	New Project	Regional Location	Site	Construction Timeframe	Present or Reasonably Foreseeable a/
Residential Developments					
Aplin Homes	108 New Houses – Northwoods Estates	Lake Jackson	Residential Subdivision	2013+	Reasonably Foreseeable
Aplin Homes	250 New Houses - Oyster Bend Subdivision	Lake Jackson	Residential Subdivision	2013+	Reasonably Foreseeable
Cresco	Alden Lakes Master Planned Community	Lake Jackson	Residential Subdivision	2013+	Reasonably Foreseeable
Miscellaneous Developments					
City of Lake Jackson	Downtown Revitalization	Lake Jackson	Downtown Area	2011 - 2012	Present
City of Surfside Beach	Walking Trail	Surfside	Near Shoreline	2012 - 2014	Reasonably Foreseeable
General Land Office	Beach Re-nourishment	Surfside	Shoreline	2012	Present

a/ Projects are identified as "present" if construction was completed in 2012/2013 or are scheduled for completion in 2014. "Reasonably foreseeable" projects are those for which development plans have been announced and construction is scheduled for completion after 2014. Future construction dates are estimates only.

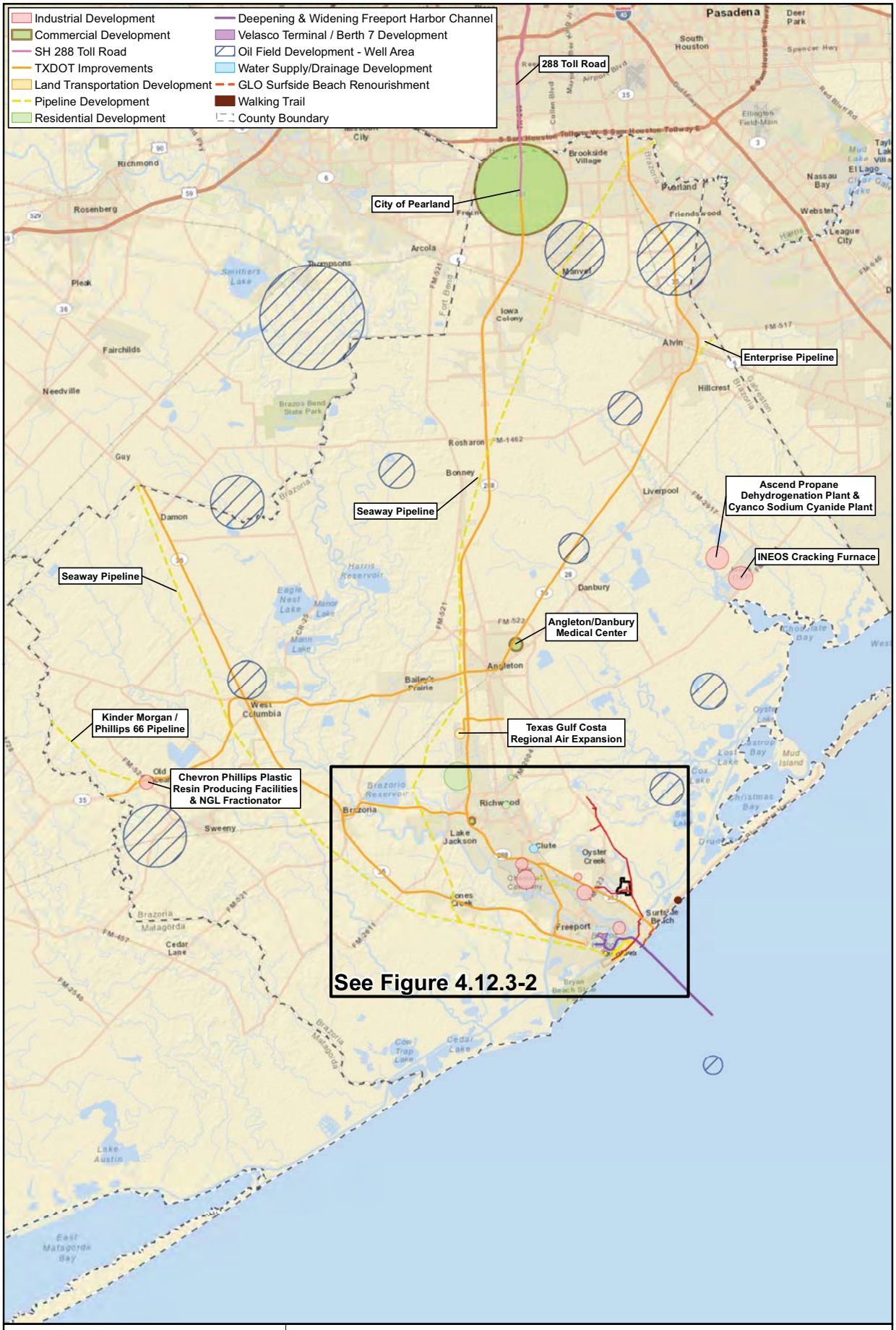
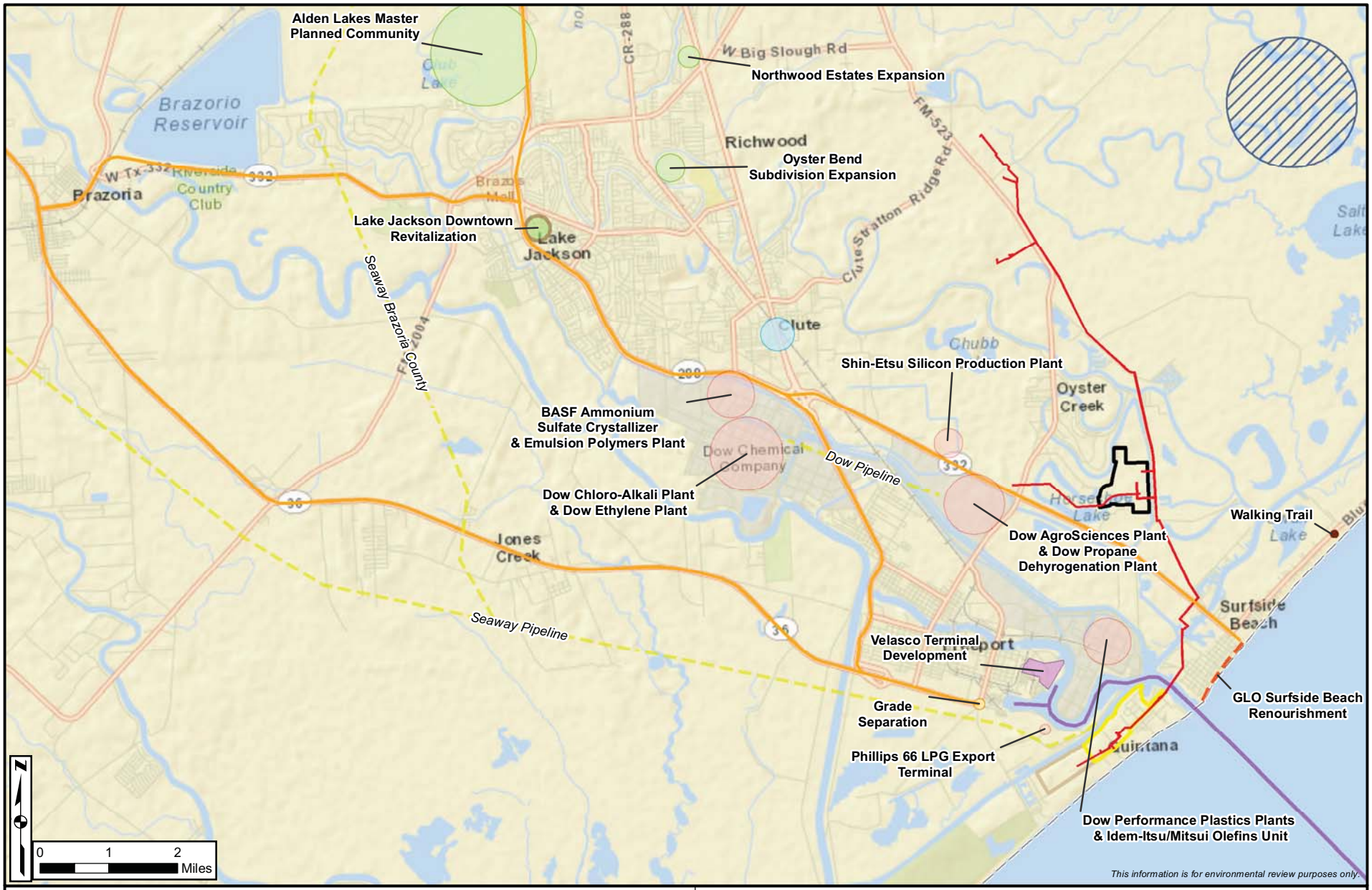


Figure 4.12.3-1
Brazoria County Project Developments
Freeport LNG - Liquefaction Project

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Quintana Island Terminal
DMPA Property Boundary
Pretreatment Plant Site
Pipeline Utility System
Industrial Development
Commercial Development
Deepening & Widening Freeport Harbor Channel
Velasco Terminal / Berth 7 Development
Pipeline Development
Oil Field Development - Well Area
Residential Development
County Boundary
TXDOT Improvement
Land Transportation Development
Water Supply/Drainage Development
GLO Surfside Beach Renourishment
Walking Trail

1 in = 2 miles

Figure 4.12.3-2
Freeport Area Project Developments
Freeport LNG - Liquefaction Project

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BASF - Ammonium Sulfate Crystallizer

BASF, in association with American Plant Food Corporation, is constructing a new $13 million ammonium sulfate crystallizer at BASF's existing Copper Road facility site in Freeport, approximately seven miles from the Quintana Island terminal. Ammonium sulfate is a byproduct of caprolactum production and would be sold as plant fertilizer. Construction was originally scheduled to occur between April and October in 2012; however, construction was initiated in mid-2013 and is expected to be completed by mid-2015. The project will require 20 new construction workers but no new operational jobs (The Facts, 04-25-12; PRNewswire, 2013).

BASF – Emulsion Polymers Plant

BASF is constructing a new $90 million emulsion polymers plant at the company's existing Copper Road facility site in Freeport, approximately 7 miles from the Quintana Island terminal. The new plant will use acrylic acid produced elsewhere on site to make chemicals used in paints, pigments, and coatings for paper. Groundbreaking took place in February 2013 and the plant is scheduled for start-up in mid-2014. The project will require approximately 200 new construction, 20 new operational workers (BIC Magazine, February 2013; The Facts, 02-09-13).

Chevron Phillips Chemical Company – Resin Production Facilities

Chevron Phillips Chemical Company is proposing two plastic resin production facilities at its existing Old Ocean facility site in Sweeny, approximately 27 miles from the Quintana Island terminal. Each facility would be capable of producing up to 500,000 tons of plastic resin per year. The $1 billion project would be constructed between 2014 and 2017; it would require 1,000 new construction workers and 92 new operational workers (The Facts, 05-01-12).

Cyanco International / Ascend Performance Materials – Sodium Cyanide Plant

Cyanco International is constructing a new $47 million sodium cyanide plant at Ascend Performance Materials' existing Chocolate Bayou facility site, approximately 22 miles from the Quintana Island terminal. The 55,000 ton plant will manufacture cyanide briquettes, which are used in the gold mining process. Construction was completed and in September 2012 Cyanco International began production at the facility. (The Facts, 07-16-12; Brazoria County Community Plan 2012-2013; BIC Magazine, 2014).

Dow-Mitsui Chlor-Alkali LLC – Chlorine Plant

Dow-Mitsui Chlor-Alkali LLC is constructing a new $411 million chlorine plant at Dow's existing Plant B facility site in Freeport, approximately five miles from the Quintana Island terminal. The plant will provide chlorine and caustic soda feedstock for Dow products. The new plant was scheduled for completion in mid-2013 (current status undocumented) requiring 1,000 new construction workers and 50 new operational workers (Dow "Impact", Spring/Summer 2012; the Facts, 04-22-12).

Dow Chemical Company - Propane Dehydogenation Plant

Dow is constructing a propane dehydrogenation (propylene) plant at the company's existing Oyster Creek Plant in Freeport, approximately four miles from the Quintana Island terminal. The new plant would provide raw materials for derivatives such as epoxy and polyurethanes. Construction started in January 2014 and is scheduled for completion in 2015. The Project will require 1,300 new construction workers and 120 new operation workers (Dow "Impact", Spring/Summer 2012; The Facts, 03-08-12; Dow Press Release, 03-18-13).

Dow Chemical Company - Ethylene Plant

Dow is proposing a $1.7 billion, 1.5 million tonnes per year ethylene plant at the company's existing Plant B facility site in Freeport, approximately five miles from the Quintana Island terminal. The new plant would produce ethylene from ethane and other NGLs. Construction is scheduled from 2014 through 2017 and the project would require 2,000 new construction, and 150 new operational workers (Dow "Impact", Spring/Summer 2012; The Facts, 04-19-12; The Facts, 01-02-13; ICIS, 2013).

Dow AgroSciences - AgroSciences Plant

In April 2012, Dow AgroSciences announced the planned construction of a new facility at its existing Oyster Creek Plant, approximately four miles from the Quintana Island terminal. The new plant is designed to produce 2,4-D choline, a key component of certain herbicides produced by the company. Construction start-up was scheduled for spring 2013 and the project will be completed by the summer of 2014. Employment projections include 150 construction workers and 10 operational workers (Brazoria County, 2012; The Facts, 01-02-13; Dow Press Release, 04-19-13).

Dow Chemical Company – Performance Plastics Plant

Dow is proposing two performance plastics plants at the company's existing Plant A facility site in Freeport, approximately one mile from the Quintana Island terminal. The new plants, referred to as "Alpha" and "Beta" will produce materials for products in various market segments, *e.g.*, packaging, hygiene and medical, and electrical and telecommunications. Construction of both units is scheduled to begin in 2015; the Alpha unit will be completed in 2016 and the Beta unit will be completed in 2017. The project will require 2,000 new construction, and 100 new operational workers (Dow "Impact", Spring/Summer 2012; The Facts, 04-19-12; Houston Business Journal, 2013a; The Facts, 02-27-13).

Idem-Itsu Kosan. Co. & Mitsui Co. – Linear Alpha Olefins Unit

Idem-Itsu Kosan Co. and Mitsui Co. are planning to lease 46 acres at Dow's Plant A Freeport site to build and operate a $496 million linear alpha olefins unit, which will produce components needed for plastic products. Construction was scheduled to start in January 2014 and will last until March 2016. The project will require 2,200 construction, and 50 operational workers. The facility will require 103 tons of water per hour to operate (The Facts, 08-28-13).

INEOS Olefins & Polymers - Cracking Furnace

INEOS Olefins & Polymers is constructing a new $1.7 billion cracking furnace for NGLs and other liquids at its existing Chocolate Bayou facility site, approximately 22 miles from the Quintana Island terminal. The furnace will add 465 million pounds per year of olefins production capacity and was scheduled for completion in November 2013 (current status undocumented) (ICIS News, 05-31-12).

Phillips 66 – LPG Export Terminal

Phillips 66 is planning a $2 billion liquefied propane gas (LPG) export terminal at its existing terminal and storage facility on the north side of the ICW, opposite Freeport LNG's Quintana Island terminal site. The new facility will have an export potential of 4.4 million barrels of LPG export per month. The LPG will be supplied from Phillips 66's Sweeny complex in Old Ocean. Construction is scheduled to begin in mid-2016 (The Facts, 11-10-13; Houston Business Journal, 2013b).

Phillips 66 – NGL Fractionator

In April 2013, Phillips 66 announced plans to construct a 100,000 barrel per day NGL fractionator at its existing Sweeny facility. The project will require 200 to 300 construction, and 25 full-time workers. Construction is scheduled to begin in the first half of 2014 and operations will begin in late 2015 (The Facts, 04-03-13; Phillips 66 Press Release, 12-06-13).

Sabar Power Services – Electrical Equipment Fabrication Facility

In 2013, Sabar Power Services constructed and opened a new electrical equipment fabrication facility on an 8-acre site in Rosharon, approximately 36 miles from the Quintana Island terminal. The $2.5 million facility focuses on electrical system and substation testing, maintenance, commissioning, construction and emergency repair. The facility requires 40 new workers. (Brazoria County, 2012).

Shin-Etsu Silicones of America – Silicon Production Plant

Shin-Etsu Silicones of America (Shin-Etsu) is proposing a $65 million silicon production plant at its existing Freeport facility site, approximately three miles from the Quintana Island terminal. The new plant would produce silicones for paint and sealant additives, fiberglass shingles, and coatings for hydraulic fracturing. The project is scheduled for construction from early 2013 to mid-2014 and would require 80 new construction, and 15 new operational workers (The Facts, 04-11-12).

City of Sweeny – Industrial Park

The City of Sweeny is developing a 79-acre Industrial Park, designed for multiple industrial occupants. At present, Phillips 66 pipeline is planning to construct an office building, warehouse, and laydown area on 10 acres at the park. The new office building will house up to

20 employees, including 10 new full-time positions over the next decade. Apache Oil is also planning an office building and tank farm at the park (The Facts, 12-13-13).

Mitsubishi Heavy Industries Manufacturing Site

In late 2013/early 2014, Mitsubishi Heavy Industries Compressor Corporation broke ground on a new 26-acre manufacturing site in Pearland. The new facility will produce, service, and market industrial compressors and steam turbines. The project will require 100 new operational workers and the facility is scheduled for operational start-up in the fall of 2014 (Houston Business Journal, 01-13-14).

4.12.3.2 Port and Harbor Channel Developments

Port Freeport continues its efforts to deepen and widen its ship channel in anticipation of the opening of the expanded Panama Canal in 2014. A deeper and wider ship channel will allow the Port to accommodate the much larger container ships that in 2014 will be able to make passage through the expanded Panama Canal.

Port Freeport – Freeport Harbor Entrance Channel Widening

Port Freeport is proposing to widen the 45-foot-deep Freeport Harbor Entrance Channel from 400 feet to up to 600 feet for 6.1 miles, including 0.6 mile between the USCG Station and Surfside Jetty Park across from the Quintana Island terminal, and 5.5 miles off-shore in the Gulf. Financial assistance for the $35 million project is being provided wholly by local interests. Construction was scheduled to commence in early 2013 and would be completed over several years. The federal government would assume responsibility for channel maintenance when the project is complete. The project would accommodate the largest LNG tankers in service today and would allow two-way traffic for certain class vessels (Port Freeport, 2012a, b).

Port Freeport and USACE – Freeport Harbor Entrance Channel Deepening

Port Freeport and the USACE are proposing to deepen the Freeport Harbor Entrance Channel from 45 feet to between 50 feet and 57 feet depending on location. The channel section adjacent to the Quintana Island terminal would be deepened to 55 feet. Approximately 11.8 miles of dredging would be involved, including turning basins and channel sections inland from the Freeport Harbor Entrance Channel. The project would allow two-way traffic, night-time operations for larger vessels, and navigation that is currently restricted under certain weather and channel flow conditions. Larger crude and container carriers would have direct access to Port facilities instead of lightering. Overall, the project would improve the control and flow of maritime shipping and reduce transportation costs (Port Freeport, 2012a, b).

A feasibility study for the project was initiated by the USACE over a decade ago and was released by the USACE Civil Works Review Board on August 23, 2012 for review. The final EIS for the project was issued by the USACE on September 7, 2012 (USACE, 2012). The Chief of Engineers gave approval in January 2013 and the project was submitted for Congressional review. The $291 million project would be completed between 2015 and 2021.

Port Freeport – Velasco Terminal Development

Port Freeport is currently constructing a new 85-acre terminal ("Velasco Terminal") at its existing port facilities, consisting of two berths totaling 2,400 feet in length, a truck gate, on-dock rail, maintenance and repair facilities, marine buildings, and an administration building. The Velasco Terminal Project is recognized as the first major development project to be implemented under Port Freeport's Master Plan. It will allow separation of like cargoes and will provide better service and facilities for Port Freeport's customers. The overall $201 million project is scheduled for completion in 2016 and it will required an estimated 7,500 direct and indirect temporary and/or workers (Port Freeport, 2012a, b). One (Berth 7) of the two planned berths is currently operational (Port Freeport, 2013).

4.12.3.3 Pipeline Developments

Four significant pipeline projects are wholly or partly located in Brazoria County as described below.

Dow Chemical Company – Hydrogen Pipeline

In January 2012, Dow submitted a notice to begin construction one month later of a 2.3- mile-long, 30-inch-diameter hydrogen pipeline in Freeport between Plant B and the Oyster Creek Plant, about four miles from the Quintana Island terminal.

Enterprise Products Operating LLC – NGL Pipeline

In January 2011, Enterprise Products Operating LLC submitted a notice to begin construction in March 2012 of a 48.9-mile long, 20-inch-diameter NGL pipeline between Alvin and Mont Belvieu (Chambers County). The pipeline was scheduled to be placed in service during the fourth quarter of 2012. Approximately two miles of the pipeline route crosses the northern sector of Brazoria County, approximately 34 miles from the Quintana Island terminal.

Kinder Morgan, Inc. & Phillips 66 – Crude Oil & Condensate Pipeline

Kinder Morgan, Inc. and Phillips 66 are planning to construct a 27-mile-long, 12-inch- diameter pipeline to deliver crude oil/condensate from a mainline in neighboring Wharton County to the Phillips 66 refinery in Sweeny, approximately 27 miles from the Quintana Island terminal. Approximately nine miles of the new pipeline route crosses Brazoria County. Construction was scheduled to begin in spring 2013 and would be completed in first quarter 2014.

Enterprise Products Partners L.P. & Enbridge, Inc. – Seaway Crude Oil Pipeline System

Enterprise Products Partners L.P. (Enterprise) and Enbridge, Inc. (Enbridge), through a joint venture (Seaway Crude Pipeline Company LLC [Seaway]), reversed the flow of the existing 500-mile-long Seaway pipeline in May 2012, to deliver crude oil from the Cushing, Oklahoma hub to the Enterprise's existing terminal at Jones Creek, approximately six miles from the Quintana Island terminal. Seaway is also proposing construction of a new 500-mile-long, 30-

inch-diameter loop pipeline alongside the existing line, to carry additional crude oil between the same origination and receipt points. Approximately 43 miles of the loop pipeline would cross Brazoria County. The total system capacity would be 850,000 barrels per day. The pipeline is scheduled to be in service by mid-2014. In addition, a 65-mile-long, 36-inch-diameter lateral pipeline would carry crude oil from the Jones Creek terminal to Enterprise's ECHO storage facility in southeast Houston.

4.12.3.4 Oil & Gas Field Developments

Review of the RRC database for oil/gas well applications (W-1s) submitted in 2012 and 2013 (RRC, 2012) indicates that most of the proposed drilling activity is led by a small group of companies and is concentrated in several existing production areas. The most active companies in terms of applications for new, recompleted, or reentered wells are Denbury Onshore LLC, Maverick Production Company, Inc., Hilcorp Energy Company, and LINC Gulf Coast Petroleum. Collectively these four companies account for 113 of the 171 applications reviewed for new, reentered, or recompleted wells.

Drilling activity is clustered around Pearland/Alvin, Damon, Sweeny, and Danbury; the closest of these areas of activity (Danbury) is located over 22 miles from the Quintana Island terminal. The closest non-clustered well for which an application was sought in 2012 is located over nine miles from the Quintana Island terminal. Based on review of aerial imagery, most or all drilling activity appears to be in known oil fields with existing pad and road infrastructure. This cumulative impacts analysis assumes that all well development would be undertaken between 2012 and 2014.

4.12.3.5 Land & Air Transportation Developments

The TxDOT's Detail Letting Schedule for 2013 (TxDOT, 2013) lists 29 road construction projects in Brazoria County, including improvements to SH 35, SH 36, SH 288, SH 332, and CR 220, many of which are in southern Brazoria County. Of note is the proposed grade separation at the intersection of FM Route 1495 and SH 36 which would separate Port Freeport traffic from other traffic and is located approximately one mile from Freeport LNG's terminal on the only road (FM Route 1495) that provides access to Quintana Island.

A $2.8 million expansion of the Texas Gulf Coast Regional Airport was initiated in September 2010 and completed in August 2013. Additions to the existing airport, located approximately five miles south of Angleton and 14 miles from the Quintana Island terminal, include a new 11,000 square foot terminal plus a 12,000 square foot aircraft hangar. The expansion is expected to increase the number of corporate and private planes using the airport (The Facts, 09-26-12; HoustonNewcomerGuides.com, 2013; Houston Chronicle, 01-08-13).

4.12.3.6 Commercial, Residential, and Miscellaneous Developments

In addition to the projects described in sections 4.12.3.1 through 4.12.3.5, various commercial, residential, and miscellaneous developments in Brazoria County have recently been initiated or announced. Several communities are undergoing downtown revitalization, including Lake

Jackson. Most of the larger scale residential and commercial developments are concentrated in northern Brazoria County, particularly in the Pearland area, which has 222 newly constructed homes for sale (Realtor.com, 2012). Several residential community developments are planned in the Brazosport area as indicated in table 4.12.3-1 and table G-1 and G-2 in appendix G (The Facts, 01-03-12, 04-22-12, 01-01-13).

4.12.4 Analysis of Cumulative Impacts

To illustrate the cumulative impact of the Freeport LNG work, cumulative impacts were first assessed for the Liquefaction Project in combination with Freeport LNG's Phase II Modification Project across applicable impact categories noted in table 4.12.1-1 (*i.e.,* wetlands, waterbodies, EFH, listed species, air quality, noise levels, water quality, land use, visual, traffic, housing, public services, and water supply). After this, the collective impact of Freeport LNG's work was evaluated with respect to other proposed development projects within the development categories noted in table 4.12.3-1 (*i.e.,* industrial, port and harbor, oil and gas fields, land and air transportation, commercial, residential, and miscellaneous work) and then combined overall cumulative impacts were described. Projects considered are detailed in appendix G and impacts are discussed further below.

Wetlands

Collectively, Freeport LNG's Projects would temporarily impact 25.7 acres of wetlands, including 11.9 acres of palustrine emergent wetland, 13.6 acres of estuarine emergent wetland, and 0.2 acre of palustrine emergent/scrub-shrub wetlands. Freeport LNG's Projects would also permanently impact 19.6 acres of wetland, including 11.8 acres of palustrine emergent wetlands, 7.7 acres of estuarine emergent wetlands, and 0.1 acre of palustrine scrub-shrub wetland. In total, the Projects would impact 45.3 acres of wetland, either temporarily or permanently.

Where sufficient siting information is available, review of NWI maps and recent aerial imagery suggests that none of the other present or reasonably foreseeable industrial developments identified in southern Brazoria County would impact wetlands. All of the industrial developments are on existing industrial sites that have undergone significant modifications through time and if any wetlands were present in the past they have been likely lost through historic industrial development. For several of the other project groups, including oil and gas field developments, land and air transportation developments, commercial developments, residential developments, and miscellaneous developments, a lack of specific site footprint information precluded quantification of wetlands acreage or functional impacts.

There are four pipeline development projects in Brazoria County that are more than 56 miles long and likely cross multiple wetlands. Impacts would occur through trench excavation although these are generally considered temporary in emergent and scrub-shrub wetlands and both acreage and functional quality would be restored through mitigation. None of the wetlands potentially affected by pipeline development would be contiguous with or close to Freeport LNG's proposed Projects. The closest pipeline development would be at Jones Creek, approximately 6 miles from the Quintana Island terminal.

New oil and gas well developments are unlikely to cause significant wetlands impacts. Pads for the new wells proposed would be set outside wetlands where possible. The nearest new well to Freeport LNG's Projects is approximately 6 miles east of the Pipeline/Utility Line System near Stratton Ridge.

The only wetland impacts identified in the general vicinity of the Freeport LNG Project footprint are those associated with the USACE's Freeport Harbor Entrance Channel Deepening Project, Port Freeport's Velasco Terminal Project, and the SH 36/FM Route 1495 Grade Separation Project. As indicated in tables E-1 and E-2 of appendix G, the channel deepening project would generate 17.3 million yd^3 of dredge spoil, which would be deposited in two newly constructed DMPAs on the west bank of the Brazos River, just south of Dow's Plant B and approximately 4 miles from the Quintana Island terminal. Approximately 39 acres of palustrine emergent wetland would be lost at the DMPAs, which would cover an overall area of 418 acres.

According to the final EIS (USACE, 2012) for the Freeport Harbor Entrance Channel Deepening Project, the Velasco Terminal Project is expected to permanently impact approximately 2.1 acres of wetlands (NWI mapping suggests palustrine emergent wetlands). These wetlands are at least one mile from the Quintana Island terminal and are not contiguous with or hydraulically connected to any wetland associated with Freeport LNG's Projects. The final EIS indicates that compensatory mitigation for the 2.1-acre loss would involve creation/enhancement of approximately 15.7 acres of wetlands, specifically creation of 8.5 acres of new wetland and enhancement of 7.2 acres of existing wetland in the Justin Hurst WMA.

Various development projects in Brazoria County, including Freeport LNG's Projects, have recently affected or would impact wetlands in the next several years. However, given the distances separating the projects and the lack of direct hydraulic connectivity or spatial contiguity between the wetland areas, the overall impact appears only at the scale of a larger watershed. Moreover, all development projects in Brazoria County would need to obtain permit authorization from the USACE and water quality certification from the RRC or TCEQ for construction activities in wetlands. This authorization is contingent upon providing appropriate mitigation for temporary impacts, permanent acreage loss, and any decrease in functional quality. As such, Freeport LNG Projects are unlikely to cause any significant cumulative impact on area wetlands.

Waterbodies

Collectively, Freeport LNG's Projects would temporarily impact 37.3 acres of waterbodies through in-stream excavation and/or dredging. Freeport LNG's projects would also permanently impact 2.9 acres of waterbodies through facility placement. In total, the Projects would impact 40.2 acres of waterbodies, either temporarily or permanently. The Projects would involve 145,000 yd^3 and 1,188,000 yd^3 of dredging and/or excavation in waterbodies, respectively.

The cumulative impact profile for waterbodies, with respect to both the individual project groupings and the collective evaluation, is very similar to that discussed for wetlands: The industrial projects beyond those of Freeport LNG would have no measurable impact on waterbodies in terms of acreage loss, and any impacts associated with pipeline projects are

expected to be temporary only. In addition, new oil and gas well pad placement would avoid waterbodies where possible, and, except for the harbor channel deepening and widening projects, a lack of specific site location information precludes a quantitative evaluation for other project group impacts.

The Freeport Harbor Entrance Channel Widening Project would involve a 3.9-acre increase in open water where scrub-shrub vegetation, beach, and tidal mud flats would be cut back to widen a section of the existing channel fringing Surfside and located opposite Freeport LNG's berthing area. No acreage loss would be associated with widening the channel from 400 feet to up to 600 feet for 6.1 miles. The main impact would be associated with the removal of 2.9 million yd^3 of clay/silt material and 300,000 yd^3 of silty sand material. The clay/silt material would be placed in the New Work Ocean Dredged Material Disposal Site (ODMDS), located about 5.9 miles offshore from the Quintana Island terminal; the silty sand dredged material would be placed on Quintana Beach in front of the Seaway DMPA. About 3.3 million yd^3 of material would be removed during long-term maintenance, an increase of about one million yd^3 per year over the current maintenance volume. This material would continue to be placed in the Maintenance ODMDS, located about 3.3 miles offshore from the Quintana Island terminal (USACE, 2012).

The Freeport Harbor Entrance Channel Deepening Project would generate an estimated 17.3 million yd^3 of dredged material during construction and 176 million yd^3 of additional dredged material over 50 years of maintenance. Of the 17.3 million yd^3 of material dredged during construction, 12.7 million yd^3 would be placed in the New Work ODMDS, and 4.6 million yd^3 would be placed in the two new onshore DMPAs on the west side of the Brazos River (USACE, 2012).

In comparison with the dredge volumes for the channel widening and deepening projects described above, the amounts associated with Freeport LNG's Liquefaction Project and Phase II developments are relatively small and would be placed in one or more onshore DMPAs, separate from those for the channel deepening projects. It is possible that the channel widening and deepening projects could overlap with Freeport LNG's activities in terms of schedule. The projects are in close proximity, and as such, the Freeport LNG Projects and the two channel projects would generate cumulative impacts at the larger watershed scale. However, given the relative size of the dredging activities proposed by Freeport LNG and the mitigation measures proposed to reduce impacts, we conclude that the Projects would not cause a significant cumulative impact on waterbodies.

Essential Fish Habitat

Of the projects listed in table 4.12.3-1, and also in table G-1 and G-2 in appendix G, the only ones potentially affecting marine or estuarine habitat, and therefore EFH, are Freeport LNG's proposed Projects, the Port and Harbor Channel Developments, and the Surfside Beach Re-nourishment Project. The latter project is expected to have a neutral or positive impact on local habitat. No adverse modifications to EFH have been identified for the Freeport LNG Projects and, according to the USACE (2012), the Freeport Harbor Entrance Deepening Project would have no adverse effect on EFH. Given the close similarity of the Freeport Harbor Channel Widening Project and the Velasco Terminal Project to Freeport LNG's Projects in terms of

geographic location and dredging scope, no significant cumulative impacts on EFH are anticipated.

Threatened and Endangered Species

Of the projects listed in table 4.12.3-1, and also in table G-1 and G-2 in appendix G, and other than Freeport LNG's Projects, the only ones for which the results of any listed species impact assessments appear publicly available are the Freeport Harbor Entrance Channel Widening and Deepening Projects, and the INEOS Cracking Furnace Project.

According to the final EIS for the Deepening Project (USACE, 2012), dredging associated with channel deepening is likely to adversely affect four species of sea turtles (green, hawksbill, Kemp's Ridley, and loggerhead) and may affect, but is not likely to adversely affect, one species of sea turtle (leatherback). Placement of dredged materials in the New Work ODMDS may affect, but is not likely to adversely affect, all five turtle species. The final EIS also indicates that the Deepening Project is likely to adversely affect, but is not likely to jeopardize, the continued existence of all five turtle species.

The greatest concern for both the Freeport Harbor Entrance Channel Widening and Deepening Projects relates to the use of hopper dredging as opposed to pipeline or hydraulic dredging. Both projects call for the use of both hopper and pipeline dredges. The final EIS for the Deepening Project states that "It has been well documented that hopper dredging activities occasionally result in sea turtle entrainment and death, even with seasonal dredging windows." It also states that "Sea turtles easily avoid pipeline dredges due to the slow movement of the dredge" and indicates that use of hopper dredges should be restricted to between December 1 and March 31, when sea turtle abundance is lowest throughout coastal waters in the Gulf. Freeport LNG's dredging activities would be restricted to the ICW and the existing berthing area, where turtles might reasonably be expected to be less common than in off-shore Gulf waters. Also, Freeport LNG is proposing to use conventional barge-mounted cutter/suction dredging or a combination of shore-based dragline and barge-mounted cutter/suction techniques, rather than hopper dredging. No adverse impacts on sea turtles are expected to result from Freeport LNG's Project activities; consequently, no cumulative impacts are anticipated.

A BA (TRC, 2012) was completed for INEOS' Cracking Furnace Project, located at the company's existing Chocolate Bayou facility. The BA was prepared in support of a permit application to the USEPA under the GHG PSD Program. The BA concluded that no federally-listed species would be affected by the project; precluding the possibility of any cumulative impact associated with Freeport LNG's Liquefaction Project and Phase II Modification Project.

Air Quality

The proposed Project would be located in the HG-AQCR. The HG-AQCR is a nonattainment area for both the 1-hour and 8-hour O_3NAAQS. The designations for other criteria pollutants are attainment or the equivalent. Air pollutants would be released as a result of Project facilities construction and operation. Release of pollutants during construction would be intermittent, temporary, and short-term. Given the relatively modest quantities of pollutants released, the

limited duration of their release, and the fact that releases would occur over a wide area, the cumulative air quality impacts due to construction would not be significant.

The cumulative impacts resulting from construction of the Project's facilities can be assessed by comparing the construction emissions to the budgets listed in the SIP. Updates to the HGB SIP proposed by TCEQ include budgets for point sources, area sources, non-road vehicles, and on-road vehicles. The proposed 2018 HGB weekday O_3 season NO_x budgets for non-road and on-road vehicles are 119.88 and 55.39 tons per day (tpd), respectively. The proposed 2018 HGB weekday O_3season VOC budgets for non-road and on-road vehicles are 59.84 and 46.68 tpd, respectively. As is shown previously in table 4.11.1-3, the maximum NO_x and VOC estimated emissions for construction equipment, material deliveries, worker commuting, and construction equipment are 374.5 and 94.5 tpy, respectively, in 2015 and 2016. Assuming 250 working days per year, these are equivalent to daily NO_x and VOC emissions of 1.50 and 0.38 tpd, respectively. These correspond to 0.85 percent and 0.36 percent of the HGB 2018 vehicle weekday O_3season budgets for NO_x and VOC, respectively. These emissions would be spread roughly uniformly through the year, would constitute a small fraction of the total emissions in the HG-AQCR, and would not have an appreciable cumulative impact on air quality. Note that the aforementioned vehicle NO_x and VOC budgets should not be confused with the motor vehicle emission budget for transportation conformity.

Both Freeport LNG and FERC staff performed air dispersion modeling for NO_x, CO, SO_2, PM_{10}, and $PM_{2.5}$ for the direct emissions resulting from operation of the Project facilities using the USEPA-guideline AERMOD modeling system. AERMOD is a steady-state plume dispersion model for near-field applications (within 50 km) in areas with both simple and complex terrain. The air dispersion modeling demonstrates that air pollutants released by the Projects would not be the cause of any exceedance of the NAAQS, however as identified in section 4.11.1, as a result of the number of industrial facilities in the area of the Liquefaction Plant, the operation of existing facilities are the prime factor in any NAAQS exceedance. Hence, the air dispersion modeling demonstrates that operation of the Project would not cause significant adverse air pollution impacts on nearby residents, to the Brazoria NWR, or to birds and other wildlife. It also demonstrates that modest contribution from operation of the Projects would occur within the HG-AQCR.

The cumulative impacts resulting from operation of the Projects can also be assessed by comparing its emissions to the budgets listed in proposed updates to the HGB SIP. The proposed 2018 RFP point source inventories for NO_x and VOC are 158.75 and 185.38 tpd, respectively. As is shown in table 4.11.1-5, the maximum NO_x and VOC estimated emissions for facility operation are 65 and 24 tpy. Assuming 365 operating days per year, these are equivalent to daily NO_x and VOC emissions of 0.18 and 0.066 tpd, respectively. These correspond to 0.11 percent and 0.04 percent of the 2018 RFP point source inventories for NO_x and VOC. These very small percentages indicate that operation of the facilities would contribute modestly to the cumulative impacts on air quality in the HG-AQCR.

Climate Change

Climate change is the modification of climate over time, whether due to natural causes or as a result of human activities. Climate change cannot be represented by single annual events or individual anomalies. For example, a single large flood event or particularly hot summer is not an indication of climate change. However, unusually frequent or severe flooding, or several consecutive years of abnormally hot summers over a large region may be indicative of climate change.

The Intergovernmental Panel on Climate Change (IPCC) is the leading international, multigovernmental scientific body for the assessment of climate change. The United States is a member of the IPCC and participates in the IPCC working groups. The leading United States scientific body on climate change is the United States Global Change Research Program (USGCRP). The Academy of Sciences, the Federal Committee on Environment, Natural Resources, and Sustainability, and 13 federal departments and agencies[33] participate in the USGCRP, which began as a presidential initiative in 1989 and was mandated by Congress in the Global Change Research Act of 1990.

The USGCRP has recognized that:

- Globally, anthropogenic GHGs have been accumulating in the atmosphere since the beginning of the industrial era causing recent global warming;
- Combustion of fossil fuels (coal, petroleum, and natural gas), combined with agriculture and clearing of forests is primarily responsible for the accumulation of GHG;
- The anthropogenic GHG emissions are the primary contributing factor to recent climate change; and
- Impacts extend beyond atmospheric climate change alone, and include changes to water resources, transportation, agriculture, ecosystems, and human health.

The USGCRP issued its Third National Climate Assessment (NCA) titled, *Climate Change Impacts in the United States*, in May 2014 summarizing the impacts climate change has already had on the United States and what projected impacts climate change may have in the future. The report includes a breakdown of overall impacts by resource and impacts described for various regions of the United States.

The NCA identifies climate change impacts that have occurred along coastal regions in the continental Southeast and Gulf Coast. Climate change has modified the environment in the area around the Projects and is projected to cause additional changes to the project area. Previous impacts on historical baseline climate area are identified below:

[33] The USEPA, USDOE, Department of Commerce, Department of Defense, Department of Agriculture, Department of the Interior, Department of State, USDOT, Department of Health and Human Services, National Aeronautics and Space Administration, National Science Foundation, Smithsonian Institution, and Agency for International Development.

- Average temperatures have risen about 2° F since 1970 and are projected to increase another 4.5 to 9°F during this century;

- Increases in illness and death due to greater summer heat stress;

- Destructive potential of Atlantic hurricanes has increased since 1970 and the intensity (with higher peak wind speeds, rainfall intensity, and storm surge height and strength) is likely to increase during this century;

- In the United States, within the past century, relative sea level changes ranged from falling several inches to rising about 2 feet and are projected to increase another 3 to 4 feet this century;

- Coastal waters have risen about 2°F in several regions and are likely to continue to arm as much as 4 to 8°F this century; and

- The oceans are currently absorbing about a quarter of the CO_2 emitted to the atmosphere annually and are becoming more acidic as a result, leading to concerns about potential impacts on marine ecosystems;

- Declines in dissolved oxygen in streams and lakes have caused fish kills and loss of aquatic species diversity;

- Moderate to severe spring and summer drought areas have increased 12 percent to 14 percent (with frequency, duration and intensity also increasing also projected to increase);

Climate Change is projected to cause additional changes to the project area. Projected climate change impacts that could affect the Projects are:

- Longer periods of time between rainfall events may lead to declines in recharge of groundwater and decreased water availability;

- Responses to decreased water availability, such as increased groundwater pumping, may lead to stress or depletion of aquifers and strain on surface water sources;

- Increases in evaporation and plant water loss rates may alter the balance of runoff and groundwater recharge, which would likely to lead to saltwater intrusion into shallow aquifers;

- Increasing risk from sea-level rise and storm surge;

- Coastal water warming may lead to the transport of invasive species through BWE during ship transit.

The USEPA, in their draft PSD Permit concluded that the Liquefaction Project would utilize energy-efficient technologies. Should the TCEQ issue the PSD Permit, Freeport LNG has committed to using the same technologies, including the following:

- electric motors (which produce no GHG emissions) and variable speed drives (which have energy-efficient operating characteristics over a wide range of weather and load conditions) for its primary drivers, and

- modular design for the liquefaction trains, which would promote energy efficiency over the range of throughputs that may occur.

As identified in section 4.11.1, the Projects would obtain a PSD Permit from the USEPA or the TCEQ to limit emissions of GHG from the Projects. The USEPA's draft PSD GHG Permit is attached as appendix B. Freeport LNG's GHG emissions are small in relation to overall GHG emissions within the area.

We received a comment that the draft EIS did not consider measures to reduce GHG emissions. These technologies were addressed in the BACT analysis for the PSD GHG Permit. The following technologies were evaluated and judged to be technically feasible in the BACT for GHG emissions:

- carbon capture and storage (CCS);
- efficient turbine design;
- proper thermal oxidizer design;
- fuel selection; and
- good combustion, operating, and maintenance practices.

As is described in USEPA Region 6 Statement of Basis for the draft GHG Permit, the cost to implement CCS was found to be prohibitive. USEPA determined that implementation of CCS would impose energy penalties and result in unacceptable collateral increases of GHG, NO_x, CO, VOC, PM, and SO_2 emissions. Therefore, the CCS was rejected, and the other technologies listed above were chosen for the Projects.

Although the Projects emissions would contribute to the overall amount of atmospheric GHG, it is impossible to quantify the impacts that the emissions of GHG from construction and operation of the Projects would have on climate change.

Noise Levels

Cumulative noise impacts could occur during construction and operation of Freeport LNG's Projects if any of the other projects under consideration were in close enough spatial proximity to exert a compounding effect. This would be of greatest significance if any regulatory thresholds were consequently exceeded.

However, only the Freeport Harbor Entrance Channel Widening and Deepening Projects appear in close enough proximity to Freeport LNG's Projects to potentially add to or compound noise

levels. This would likely be most relevant during any overlap between construction of Freeport LNG's new facilities and channel dredging operations. The final EIS (USACE, 2012) for the Deepening Project indicates that neither channel deepening nor widening would have an adverse effect on noise levels, either singly or in combination with other area projects, including Freeport LNG's Phase II Project (as originally proposed) and periodic maintenance dredging of the ICW. In this respect, the final EIS states that "noise impacts included in those projects associated with dredging would include operation and maintenance noise. This impact would be temporary, would move up and down the project area depending on the section being dredged, and is not expected to differ from current maintenance dredging for many of the projects. Additionally, it is unlikely dredging would occur for more than one of the reviewed projects at one time." Freeport LNG anticipates its own off-shore construction activities and channel dredging operations would be temporally sequenced to avoid concurrent and potentially conflicting activities in terms of workspace congestion and associated safety concerns. Consequently, we conclude that the noise impact of the Projects is largely not additive with other ongoing construction and would only contribute minor cumulative noise impact on the larger region.

Water Quality

With respect to the projects listed in table 4.12.3-1, and also in table G-1 and G-2 in appendix G, the only potential for direct hydraulic overlap with Freeport LNG's Projects is associated with the Freeport Harbor Entrance Channel Widening and Deepening Projects. The most significant consideration relates to the increase in turbidity caused by sediment disturbance during dredging, spoil placement, and other off-shore construction activities. Such disturbance can also deplete oxygen levels in the water column and release sediment-bound contaminants and nutrients.

Turbidity impacts associated with channel dredging, off-shore spoil placement, and Freeport LNG's Projects would be of short duration and would not be expected to overlap temporally (see section 4.3.2), precluding the chance of any spatial overlap at the interface of Freeport LNG's existing berthing area and the FHC, where the projects are in relatively close proximity. The final EIS (USACE, 2012) for the Deepening Project concludes that if turbidity-induced temporary degradation in water quality occurs, a rapid return to ambient conditions would follow the completion of dredging.

Operational water discharges from local industrial facilities could theoretically have a compounding cumulative effect if discharge streams were mixed. However, permit levels for constituents and physico-chemical parameters are developed on the basis of total loadings for a given area, thereby incorporating consideration of cumulative effects into regulatory control. Thus, even if process water discharges from Freeport LNG's proposed facilities were mixed with those of neighboring facilities, permit conditions would help to preclude any compounding effects. If is likely that if the dredging from the USACE and the Projects overlap, impacts would be cumulative, but due to the high turbidity existing in the Brazosport turning basin, FHC, and the ICW it is unlikely that the 120 days of dredging would result in significant worsening of the water quality.

4.12.4.1 Socioeconomic Issues

Land Use

Based on available site information for the projects listed in table 4.12.3-1 and also in table G-1 and G-2 in appendix G, there would be some minor changes in land use classifications, but no synergistic cumulative effects on land use patterns. The industrial projects, which are concentrated in southern Brazoria County and represent the most significant land-based projects in relatively close proximity to Freeport LNG's Project footprint, would be constructed almost exclusively on existing disturbed sites within the boundaries of existing industrial facilities, in much the same way as Freeport LNG's proposed facilities at and adjacent to the Quintana Island terminal.

Visual Impacts

Cumulative visual impacts could occur during facility construction and operation if Freeport LNG's work activities or new facilities occupy the same viewshed as the work activities or new facilities of one or more of the other projects listed in table 4.12.3-1, and also in table G-1 and G-2 in appendix G. However, based on the degree of geographic separation and, in some cases, the presence of intervening structures, Freeport LNG's proposed facilities would not occupy the same viewshed as any of the other proposed facilities, except those to be constructed in existing heavily industrialized settings on the north side of the ICW; therefore, cumulative visual impacts would not occur with respect to new facilities. In terms of inclusion in the same viewshed, the only cumulative impacts for Freeport LNG's Projects would occur if dredging activities for the Freeport Harbor Entrance Channel Widening and Deepening Projects occurred within the same timeframe as construction or operation of Freeport LNG's new facilities. In this case, viewsheds from Surfside, Quintana, or Freeport could include channel dredging equipment and Freeport LNG's construction equipment and/or new facilities. However, the impact would essentially be insignificant given the industrial setting and the amount of commercial shipping that regularly passes through the channel on a day-to-day basis.

Road Traffic

Of the projects listed in table 4.12.3-1 and also in table G-1 and G-2 in appendix G, the only ones that are likely to have a cumulative impact on traffic patterns and road use are the industrial development projects and the Velasco Terminal Project in Freeport, and this would occur only during construction. The other projects, even those located elsewhere in southern Brazoria County (*e.g.*, Chocolate Bayou and Sweeny), are likely too remote geographically to influence or be influenced by Freeport LNG's traffic patterns. However, table 4.12.3-1 indicates that, between 2014 and 2018, a total of about 13,150 construction workers, including the 4,200 workers estimated for Freeport LNG's Projects, would be required at five plant sites within a roughly 3-mile radius. This represents a significant group of commuters in a city with a population of just over 12,000, even if many of the commuters live locally. In addition, each project would likely involve multiple road deliveries of supplies and equipment on a daily basis.

Freeport LNG's Projects are scheduled for construction between mid-2014 and 2018. Where other projects or project phases are constructed at the same time, the potential for significant traffic congestion exists, particularly where the projects share routes for workers and/or site deliveries. In this case, a compounding cumulative impact could be realized.

In combination with Freeport LNG's Projects, traffic flows in the immediate vicinity of Quintana Island could be influenced most heavily by the Velasco Terminal Project, due for completion in 2016, the associated grade separation at the nearby SH 36/FM Route 1495 intersection, due for completion in 2014, and the Phillips 66 LPG Export Terminal Project, located near this intersection. If the grade separation coincides with construction on Quintana Island, a bottleneck could result. Conversely, completion of the grade separation prior to Freeport LNG's Project construction could help separate Quintana Island and Port Freeport traffic flows, thereby helping to alleviate congestion. Additionally, the recent major improvements to SH 288 in Lake Jackson and Clute, would improve traffic flows and access to the other project sites further north in Freeport, allowing quicker and safer access for traffic destined for Freeport LNG's work sites.

Housing

The projects listed in table 4.12.3-1 and also in table G-1 and G-2 in appendix G represent extensive, long-term capital development county-wide, with about $20 billion invested in industrial expansion projects in southern Brazoria County alone, including those of Freeport LNG. For these industrial projects, the need to accommodate a potential peak cumulative construction workforce of about 15,950 personnel, about 26 percent of whom would be assigned to Freeport LNG's Projects, represents a significant issue with respect to short-term accommodation. In addition, long-term housing would be required for the estimated 885 new operational workers associated with the industrial projects.

The cumulative impact of Freeport LNG's Projects in association with other industrial projects in Freeport and southern Brazoria County could be heavy, sustained use of motels, campgrounds, and recreational vehicle parks during construction, with increased competition for space among transient construction workers, tourists, and other visitors. Much would depend on the exact specific timing of the respective projects; 15,950 represents the sum of the peak estimated workforce numbers for each project, but it is highly unlikely that all these workers would be mobilized at the same time and it is estimated that only about 50 percent would relocate to the Brazosport area from elsewhere and require residential accommodation. Nonetheless, the Freeport LNG Projects would contribute a significant influx of workers, which would exacerbate the existing low housing inventory and would result in workers enduring longer commute times from temporary accommodations in more distant communities than preferred such as Northern Brazoria County, Houston, or Galveston. The Projects may result in hotel/motels in the area being fully booked and rate increases in hotel/motels. Effects would be temporary, lasting only for the duration of construction, and there would be no long-term cumulative impacts on temporary housing like hotels and campground. If a large portion of the workers stay in the area permanently, then higher levels of housing prices and rents would be expected. Positive cumulative impacts would be associated with the increase in local spending on food, lodging, and entertainment by construction personnel.

With respect to permanent housing for the estimated 885 new operational workers in southern Brazoria County, the local real estate market has recently been fairly static in terms of construction with no significant increase in the number of new houses available for occupancy. The seven cites of southern Brazoria County (Alvin, Angleton, West Columbia, Lake Jackson, Freeport, Brazoria, Sweeny) currently have 2,144 houses for sale, including 408 in the Lake Jackson/Freeport area (Realtor.com, 2014). Commute times to the new industrial facilities from new large-scale residential developments in northern Brazoria County (specifically the Pearland/Rosharon/ Manvel area) are reasonable and this latter area offers additional housing opportunities for new permanent workers.

Public Services

As discussed previously, Freeport LNG's Projects and the other major industrial projects in southern Brazoria County would require about 15,950 new workers and 885 new operational workers. Much of the construction worker requirement would overlap. As such, they would likely result in increased demand for public services such as schools, health care facilities, social services, utilities, and emergency services.

The cumulative impact of Freeport LNG's Projects and the others listed in table 4.12.3-1 and appendix G on public services during construction would depend on the number of projects underway at any one time. In Freeport, where most of the new projects are concentrated, local schools could see student enrollment numbers increase, depending on how many temporary workers are accompanied by their families. Demands on police, fire, and ambulance services would be alleviated to some extent by the fact that the new industrial projects are at or adjacent to existing facilities with well-established emergency response plans, where site-security and day-to-day events would be handled by site personnel.

The Brazosport Industrial CAER program provides information to the local community in the event that an emergency should occur at one of the area's industrial plants. CAER deals with internal safety precautions in addition to emergency response plans for the community and stresses two-way communication between the public and industry. The CAER program greatly reduces the probability of a major chemical emergency due to the fact that both the community and industry are prepared. In addition to Freeport LNG, member companies in the CAER program include Air Liquide, BASF, ChevronPhillips, ConocoPhillips, Enterprise Crude Pipeline, DM, Dow, DSM Nutritional, Gulf Chemical, Huntsman, INEOS, Mineral Research, Nalco, Perstorp Coatings, Shin-Etsu Silicones of America, Shintech, and SI Group. With respect to public safety, the CAER program constitutes a well-established and effectively functioning system that would allow easy integration of the new industrial expansions proposed by Freeport LNG and other companies in Brazosport.

Water Supply

The Liquefaction Project, in concert with other industrial developments in southern Brazoria County, would increase local water supply demands. As indicated in tables G-1 and G-2 of appendix G, Freeport LNG's Projects would require 38,400 gpd of process water and 375 gpd of potable water beyond current use. Other industrial developments would require additional water

too, which could put a burden on local supplies, particularly during a severe drought like that experienced in 2011.

The primary source of water for industries and communities in Freeport LNG's Project area is the Brazos River. One intake on the Brazos River (the "Dow Intake") provides process water for all of Dow's Freeport operations and is also the primary potable water supply for Brazosport through the Brazosport Water Authority (BWA). The BWA supplies potable water to seven municipalities (Clute, Freeport, Lake Jackson, Oyster Creek, Quintana, Richwood, and Surfside Beach), two prison systems, and multiple industrial users.

Freeport LNG would require an estimated 38,400 gallons per day (gpd) of process water at the Pretreatment Plant. Fire water and potable water would also be needed. Freeport LNG proposes to reduce a portion of the referenced water requirement via the use of mole sieve equipment which strips water from natural gas while the remainder would be obtained from a municipal water supply that is being planned by the City of Freeport to support another development in the vicinity of the pretreatment facilities. The 4.7-mile-long water line from Dow Chemical that was described in the draft EIS is no longer proposed. Freeport LNG's groundwater use would increase overall water withdrawals proposed in the area. However, Freeport LNG's efforts toward water conservation via the use of mole sieve equipment would help to minimize cumulative water use impacts to the extent possible.

4.12.5 Conclusion

Freeport LNG's Projects would not have any significant and readily identifiable cumulative impacts from a natural resources perspective. While some additive effects would occur (*e.g.*, Freeport LNG's Projects would increase the sum total of wetland acreage impacts and, in concert with FHC improvements, may cause water column turbidity across a wider area) no compounding effects have been recognized. Often any such effects appear to be precluded by the degree of geographic separation between projects, which is also the case with visual impacts.

With respect to socioeconomic factors other than visual impacts, Freeport LNG's Projects could contribute to cumulative impacts in so much as the demand for housing and number of workers would increase and there may be associated additional burdens on road usage and public services. However, as with natural resource factors, these impacts would essentially be additive rather than compounding. More road congestion could theoretically occur but it is unlikely to precipitate a complete functional breakdown of traffic flows. In summary, impacts on housing and traffic would be offset by the economic benefits but would not offset the environmental impacts on the residents of the Town of Quintana during construction. However, at the scale of Brazoria County, no significant cumulative impacts are expected.

CONCLUSIONS AND RECOMMENDATIONS

SECTION 5

5.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations presented in this section are those of the FERC environmental staff. Our conclusions and recommendations are based on input from the USDOE, USEPA, USDOT, the USACE, and the NOAA Fisheries as cooperating agencies. However, the USDOE, USEPA, and USACE may present their own conclusions and recommendations in their respective Records of Decision and can adopt this final EIS consistent with 40 CFR 1501.3 if, after an independent review of the document, they conclude that their requirements have been satisfied. Otherwise, they may elect to conduct their own supplemental environmental analyses.

We conclude that construction and operation of Freeport LNG's Liquefaction Project and the Phase II Modification Project would result in mostly temporary and short-term adverse environmental impacts. Certain adverse impacts from construction, such as noise, traffic, dust and air emissions may vary in intensity and composition over the 4.5 years of construction and would require our recommended mitigation to reduce impacts. However, as identified in Section 4.12.1 - Cumulative Impacts, Section 4.8.5 - Traffic Impacts, and Section 4.11.2 - Noise and Vibration, construction would result in significant and unavoidable impacts on the residents of the Town of Quintana. Permanent impacts are limited and include changes to land use, wetlands impacts, minor socioeconomic impacts (traffic, decrease in housing availability), and increases in ambient noise and regional air pollutants. In addition, we considered the cumulative impacts of the proposed Projects with the past, present, and reasonably foreseeable actions in the Brazoria County region. As part of our analysis, we developed specific mitigation measures that we determined are practical, appropriate, and reasonable for the construction and operation of the Projects. We are, therefore, recommending that these mitigation measures be attached as conditions to any authorization issued by the Commission. We conclude that implementation of the mitigation proposed by Freeport LNG and our recommended mitigation would ensure that impacts in the area would, with the exception of construction impacts on the residents to the Town of Quintana, be avoided or minimized and would not be significant. Further, based on the mitigation that Freeport LNG proposed, and our additional recommendations, we conclude that the Projects would be in compliance with the ESA, the NHPA, and the CZMA.

A summary of the Projects' impacts and our conclusions are presented below by resource.

5.1 ALTERNATIVES CONSIDERED

5.1.1 Liquefaction Project

We conducted an alternatives analysis for the Liquefaction Project and found no other practicable alternative that would result in less environmental impact and would meet the purpose of the Liquefaction Project. Alternatives considered included the No Action Alternative, system alternatives, and site alternatives.

With respect to the No Action Alternative, this is not viable as the purpose of the proposed Liquefaction Project would not be met and Freeport LNG would not be able to provide U.S. natural gas producers with new access to global gas markets.

With respect to system alternatives, we analyzed proposed LNG export facilities on the West Coast, Gulf Coast, and East Coast of the United States and whether these could be considered system alternatives. In all cases we found that these alternatives would not address the Liquefaction Project's purpose and would not offer any significant environmental advantage.

We considered the possibility of expanding the size of another proposed LNG export terminal to address Freeport LNG's desired export capacity. However, this alternative would involve further impacts such as: construction of additional liquefaction infrastructure plus the potential need for expanded docking facilities. Hence, the environmental impacts would not be significantly different that those that would occur as a result of Freeport LNG's proposals.

We evaluated site alternatives for the components of the Liquefaction Project but did not find any viable alternatives that addressed the purpose and need of the Liquefaction Project. Siting of the Liquefaction Plant was dictated by the need to be sited close to the existing offloading areas, LNG storage tanks, docking area, and other existing LNG infrastructure at the Quintana Island terminal. Thus, it was not practicable to site the Liquefaction Plant in an area other than on Quintana Island, as that would require the construction of duplicative and significantly costly infrastructure at another location with added environmental impacts.

We evaluated the feasibility of lowering the pad elevation of the Liquefaction Plant and the difference this would have on visibility, noise, safety, stormwater, and site engineering. The results of the work showed that this alternative would not provide substantial improvements in visibility and noise attenuation, and that there would be significant issues with respect to geological safety, engineering design, traffic and land use.

We assessed ten sites for the Pretreatment Plant. All of which were deemed unsuitable due to site constraints and or environmental impacts, except for one site (Site E) located along CR 792, and northeast of the proposed site. Several of these sites were considered based on comments from residents regarding the lack of a suitable evacuation route in case of emergency at Site E.

As a result of concerns expressed by persons living in residential areas in proximity to Site F, we requested evaluation of four additional alternative sites. However these sites were not deemed viable alternatives due to site constraints and or environmental impacts. During the draft EIS comment period, we received comments from the public that Dow Texas currently has a cleared vacant area approximately 120 acres in size within the portion of its plant property known as "the thumb". The site is directly across the ICW from the Quintana Island terminal, and between the Brazosport Turning Basin and ICW Upper Turning Basin. We investigated this as one of the ten possible alternative sites since it is located in an industrial area and further away from residential areas. However, there are problems with the site, which include the lack of development rights to the property. Consequently, we concluded that the proposed site provides a suitable location without the safety issues regarding access to homes during an emergency.

With respect to the siting of the Pipeline/Utility Line System, the main criteria were the functional interdependency and geographic locations of the proposed process facilities (Liquefaction Plant and Pretreatment Plant), Freeport LNG's existing natural gas sendout pipeline, and the existing sendout pipeline meter station at Stratton Ridge. The existing sendout

pipeline route constitutes the "preferred" route as it follows an area already disturbed right-of-way and minimizes environmental impacts.

5.1.2 Phase II Modification Project

The purpose of Freeport LNG's Phase II Modification Project is to provide enhanced LNG storage and ship handling options to allow Freeport LNG to respond to import, re-export, and export opportunities with optimum market positioning and service flexibility. Such enhanced options cannot be achieved through new or modified LNG terminal facilities elsewhere in the U.S., given that the location, design, and purpose of the Phase II Modification Project facilities are predicated on and inextricably linked to the existing plant facilities and operations at Freeport LNG's terminal. As such, no system alternatives exist that could achieve the same level of functional integration or optimize the terminal's operational flexibility and capabilities.

The location, design, and purpose of the Phase II Modification Project facilities are wholly dependent on the existing plant facilities and operations at the Quintana Island terminal; therefore, other geographically separate sites beyond the terminal are not viable.

The location and configuration of the proposed Phase II facilities (both for the Phase II Project and the Phase II Modification Project) at the terminal site are essentially dictated by technological considerations and the need for compatible design integration into the existing Phase I layout, and thus relocating these structures elsewhere onsite is not a viable alternative.

5.2 GEOLOGY

5.2.1 Liquefaction Project

The area of the Liquefaction Project sites is not known to be actively seismic. No faults were identified east and west the Liquefaction Plant, though the Pretreatment Plant fault study identified three faults in proximity to the site. Freeport LNG submitted a detailed fault investigation report to FERC that identified a surface fault in the northern portion of the Pretreatment Plant property extending generally south-southwest. Based on the findings of this report we have included a recommendation requiring an assessment of the Project's design with respect to faulting in section 5.15.

Freeport LNG conducted an investigation that concluded liquefaction beneath the Liquefaction Plant area was unlikely due to the proposed improvements. Similarly, at the Pretreatment Plant site there is a low risk of seismic activity and a low propensity for the underlying soils to undergo liquefaction. However, we are recommending that Freeport LNG provide detailed final design and construction details for the Liquefaction Plant to ensure that the design would minimize the risk from geological hazards. Thus, we conclude that construction and operation of the Liquefaction Project would not have a significant impact on geological resources in the area, and the potential for geologic hazards or other natural events to significantly impact the Liquefaction Project (*e.g.*, subsidence, flooding, and shoreline erosion) is low.

5.2.2 Phase II Modification Project

The Phase II Modification Project would have a very limited footprint within the existing Quintana Island terminal site and there would be no significant impact on geological resources and/or from geological hazards.

5.3 SOILS AND SEDIMENTS

5.3.1 Liquefaction Project

The Liquefaction Plant would result in approximately 147.3 acres of temporary construction workspace, and approximately 132.5 acres of permanent impacts for the aboveground facility. Construction impacts on soils would be minor in the area of Quintana Island given the vast majority of the site is a dredge disposal area and or contains disturbed soils. The Pretreatment Plant site would result in approximately 104.9 acres of temporarily impacts for construction workspace and approximately 113.4 acres of permanent impacts for facility placement and operation. The Pipeline/Utility Line System would result in 119.3 acres of temporary impacts associated with construction and installation and no permanent impacts as it would be installed in the existing right-of-way. The overall impacts on soils at the Pretreatment Plant site and for the Pipeline/Utility Line System would be minor, and minimized through the use of Freeport LNG's Procedures and SWPPP. No significant impacts on soils, including hydric soils, or sediments would occur from construction or operation of the Liquefaction Project.

5.3.2 Phase II Modification Project

The Phase II Modification Project would result in approximately 14.6 acres of temporarily impacts for construction workspace and approximately 23.9 acres of permanent impacts. The overall impacts on soils from the Phase II Modification Project would be minor, and minimized through the use of Freeport LNG's Procedures and SWPPP. No significant impacts on soils would result from the construction and operation of the Phase II Modification Project.

5.4 WATER RESOURCES

5.4.1 Ground Water

5.4.1.1 Liquefaction Project

The Town of Quintana operates two municipal water wells located approximately 125 feet south of the temporary workspace for the Pipeline/Utility Line System at MP 0.20. The greatest potential for impact on groundwater would be from spills, leaks, or other releases of hazardous substances during construction or operation. Water for the Pretreatment Plant would be obtained either from a municipal water supply that is being planned by the City of Freeport to support another development in the vicinity of the Pretreatment Plant or from mole seives that extract water from the natural gas stream.

To minimize the potential effects of a hazardous substance release, Freeport LNG would implement the preventative and mitigative measures specified in its SPCC Plan. No known active water wells are located within 150 feet of the construction workspace for the Pretreatment Plant or Pipeline/Utility Line System. Similarly, there would be no significant groundwater impacts from the Liquefaction Plant. Thus, construction and operation of the Liquefaction Project would not have a significant impact on groundwater resources in the area, including the underlying Chicot Aquifer.

5.4.1.2 Phase II Modification Project

Because the Phase II Modification Project is located in the same area as the Liquefaction Project, and Freeport LNG would follow the same procedures to minimize the potential for a spill, it would not have a significant impact on groundwater resources in the area.

5.4.2 Surface Waters

5.4.2.1 Liquefaction Project

Along the Freeport Harbor Channel and ICW, dredging of approximately 1,333,000 yd^3 of material would be required to construct a new LNG dock and berthing area, construction dock, aggregate dock, firewater intake, and to dredge at the existing construction dock.

Two waterbodies would be directly affected by construction of the Liquefaction Plant on Quintana Island: one intermittent drainage channel and the ICW. We analyzed the worst case extent of increased turbidity due to dredging and determined that aquatic resources and residents of Quintana Island could be affected, although impacts would be temporary. To minimize impacts associated with dredging, Freeport LNG developed a Dredging Plan that outlines procedures to minimize the spread of turbidity in surface waters. We have reviewed Freeport LNG's Dredging Plan and find it acceptable.

Seven waterbodies would be affected at or adjacent to the Pretreatment Plant site: two drainage channels, two areas of open water in the existing excavation pit, an unnamed pond, a drainage ditch, and the Western Velasco ditch. Eleven waterbodies would be affected by construction of the Pipeline/Utility Line System: seven perennial, two intermittent streams, and two unnamed intermittent drainage channels. To minimize impacts on surface waters, Freeport LNG would use the HDD method to entirely avoid construction impacts at six waterbody crossings along the Pipeline/Utility Line System, and would implement the measures in its Procedures and its SPCC Plan to minimize impacts on the remaining waterbodies at the Pretreatment Plant. We are recommending that prior to construction, Freeport LNG submit a final site-specific HDD monitoring and contingency plan for review and approval that addresses all the HDDs proposed for the Liquefaction Project.

LNG exports through the Liquefaction Project would not result in any increase in the maximum number of vessel visits (400 per year) that were authorized in the Commission Order approving the Phase II Project. Discharge of ballast water in the terminal's berthing area could provide a pathway for the introduction of exotic aquatic nuisance species into U.S. coastal waters.

However, these potential impacts are mitigated by USCG regulations that require all vessels equipped with ballast water tanks that enter or operate in U.S. waters to implement a ballast water management plan. This is discussed further below in section 5.7.1.

With the implementation of Freeport LNG's Procedures and our recommendation, construction and operation of the Liquefaction Project would not have a significant impact on surface waters.

5.4.2.2 Phase II Modification Project

Construction of the Phase II Modification Project would directly affect two waterbodies, and the Freeport Harbor adjacent to the site. The ICW would be indirectly affected by the Phase II Modification Project. To minimize impacts on waterbodies from construction and operation of the Phase II Modification Project, Freeport LNG's would implement its Procedures. In addition, we are recommending that Freeport LNG consult with the Velasco Drainage District and file an updated Erosion and Sediment Control Plan to incorporate drainage modifications specific to the Phase II Modification Project. Through the use of Freeport LNG's Procedures, and with our recommended mitigation, construction and operation of the Phase II Modification Project would not have a significant impact on surface waters.

5.4.3 Wetlands

5.4.3.1 Liquefaction Project

Construction of the Liquefaction Plant would result in 1.70 acres of permanent impacts on wetlands and no temporary impacts on wetlands. The Pretreatment Plant would result in approximately 5.5 acres of temporary impacts on wetlands and approximately 11.8 acres of permanent impacts on wetlands, and the Pipeline/Utility Line System would result in 20.2 acres of temporary impacts on wetlands, and no permanent impacts on wetlands. The required adherence to permit conditions and implementation of Freeport LNG's Procedures, SWPPP, and SPCC Plan would minimize the potential for indirect impacts (*e.g.*, from stormwater runoff) on the wetlands that lie beyond the proposed construction workspace. Freeport LNG submitted a wetland mitigation plan that provides for compensatory wetlands to address permanent wetland impacts from the Projects. In consideration of the type, condition, and extent of wetlands affected by the Project, we conclude that the forthcoming Compensatory Wetland Mitigation Plan approved the USACE would sufficiently offset wetland impacts. We further conclude that the impact on wetlands would not be significant.

5.4.3.2 Phase II Modification Project

The Phase II Modification Project would result in permanent impacts on 6.2 acres of wetlands. Freeport LNG is working with the USACE to amend its existing Section 404/10 permit authorization and to update its Compensatory Wetland Mitigation Plan, as necessary to mitigate for the permanent impacts on wetlands. With this mitigation plan, we conclude that construction and operation of the Phase II Modification Project would not have a significant impact on wetlands.

5.5 VEGETATION

5.5.1 Liquefaction Project

Approximately 84.9 acres of vegetation would be cleared during construction of the Liquefaction Plant at and adjacent to the Quintana Island terminal. Of the total, 70.8 acres would be temporarily affected, and 14.1 acres would be permanently affected. Of the 70.8 acres temporarily affected, 18.3 acres lie inside the previously authorized construction footprint for the Phase II Project, and generally consist of vegetation associated with the dredge disposal site, and another 50 acres is located within the Seaway DMPA. These areas do not have a high value with respect to wildlife habitat or contain rare vegetative species.

About 164.9 acres of vegetation would be cleared during construction at the Pretreatment Plant, of which approximately 86.9 acres would be temporarily affected and approximately 78 acres would be permanently affected. Impacts on vegetation from construction of the Pretreatment Plant would be minor because the facility would impact an area predominantly used for cattle grazing where there are no special and rare vegetative communities.

About 80.6 acres of vegetation would be cleared during construction of the Pipeline/Utility Line System. The Pipeline/Utility Line System would be collocated with existing pipelines and utilities within previously disturbed and maintained corridors, which minimizes vegetation impacts. The areas would be restored and revegetated according to Freeport LNG's Procedures. Therefore, the Liquefaction Project would not have a significant impact on vegetation.

5.5.2 Phase II Modification Project

The Phase II Modification Project would affect approximately 9.1 acres of vegetation temporarily as a result of construction and 14.3 acres permanently as a result of project operation. As noted above, most of this area does not have a high value with respect to wildlife habitat or contain rare vegetative species, and vegetative impacts are minor. Thus, the Phase II Modification Project would not have a significant impact on vegetation.

5.6 WILDLIFE

5.6.1 Liquefaction Project

Wildlife habitat at the Liquefaction Plant includes previously disturbed herbaceous upland, scrub-shrub upland, barren or graveled industrial upland, emergent wetland, scrub-shrub wetland, and open water (*i.e.*, berthing area, ICW, three drainage channels, and two man-made ponds). Wildlife habitats at the Pretreatment Plant site and along the proposed Pipeline/Utility Line System include herbaceous upland, scrub-shrub upland, barren or graveled industrial upland, emergent wetland, scrub-shrub wetland, and open water (*e.g.*, Horseshoe Lake and Oyster Creek). Much of the herbaceous upland and drier emergent wetland areas, including those that characterize the Pretreatment Plant site, support cattle grazing and can be categorized also as pasture land.

The primary impact on wildlife would be the cutting, clearing, and/or removal of existing vegetation within the construction work areas, and the permanent loss of habitat associated with new aboveground facilities. As the area supports currently operating industrial facilities within the larger Port Freeport, Oyster Creek, and Stratton Ridge areas, wildlife present are likely fairly tolerant of industrial activity and noise. Additionally, because the habitats affected by construction are widespread and common in the area, it is expected that the small numbers of wildlife displaced during construction would relocate, either temporarily or permanently, to suitable habitat nearby.

To protect raptors and other large birds, we are recommending that Freeport LNG implement FWS's Avian Protection Plan Guidelines when constructing the new electric transmission lines needed for the Projects. Wildlife activity in the area would likely resume soon after the completion of construction of the Liquefaction Project, and with our mitigation, would not have a significant impact on migratory birds or other wildlife.

5.6.2 Phase II Modification Project

Because the Phase II Modification Project location is within the area of the Liquefaction Plant, impacts on wildlife would be the same as those described for the Liquefaction Plant and would not be significant.

5.7 AQUATIC RESOURCES

5.7.1 Liquefaction Project

Potential fishery resources and habitat impacts that could occur during construction and dredging of the Liquefaction Project at the Quintana Island terminal site. Construction may cause temporary emigration of fish populations from the immediate area in order to avoid areas of elevated suspended sediments. However, it is unlikely that relocation or disrupted migration would significantly affect fish populations because construction activities are expected to be short term and localized. In addition, Freeport LNG's Procedures and its Dredging Plan would minimize migration of sediments from the Liquefaction Project sites.

Operation of the Projects would result in the discharge of ballast water of approximately 7.1 billion gallons (21,890 acre feet) annually, assuming a rate of 400 ships per year and a mix of LNG vessel sizes. Discharge of ballast water in the Quintana Island terminal’s berthing area could provide a pathway for the introduction of exotic aquatic nuisance species into U.S. coastal waters near Quintana Island. However, these potential impacts are mitigated via USCG regulations that require all vessels equipped with ballast water tanks, which enter or operate in U.S. waters to maintain a ballast water management plan.

Impacts on fisheries and other aquatic life are expected to be minor, short-term, and localized, based on the expanse of each waterbody and the ready availability of similar habitat beyond the construction sites. These features would allow displaced fish and other fauna to relocate temporarily elsewhere and disturbed vegetation would be reestablished from peripheral stock. Impacts would also be minimized by implementation of Freeport LNG's Procedures.

The proposed construction of the Pipeline/Utility Line System would result in temporary in-stream impacts. Although some sedimentation and turbidity would be associated with construction disturbance in these waterbodies, population-level impacts on fisheries and other aquatic life are expected to be minor, short-term, and localized. Impacts would be minimized through implementation of Freeport LNG's Procedures and the use of the HDD to cross the FHC, the ICW, Oyster Creek, the eastern Velasco Ditch, and the western Velasco Ditch.

The Brazos River Estuary is designated as EFH for four groups of shellfish and finfish, and includes those portions of the FHC, ICW, Oyster Creek, unvegetated shallow water estuarine areas, and estuarine wetlands crossed by the proposed Pipeline/Utility Line System. It does not include waterbodies on or adjoining the Pretreatment Plant site. NOAA Fisheries previously concluded for Freeport LNG's Phase I and Phase II Projects that, with the implementation of appropriate and previously defined mitigation measures, dredging required for the Liquefaction Project would have no adverse effects on the aquatic resources. Consultation is ongoing with NOAA Fisheries to ensure that impacts on the aquatic species are minimized.

As a result, we conclude that with careful implementation of Freeport LNG's Procedures and Dredging Plan, and our recommendations the current work would not result in significant impacts on these EFH resources.

5.7.2 Phase II Modification Project

Because the Phase II Modification Project location is within the area of the Liquefaction Project, and the same mitigation measures would be employed as discussed above, impacts on aquatic resources would be minor and not significant.

5.8 THREATENED AND ENDANGERED SPECIES

5.8.1 Liquefaction Project

Of the FWS jurisdictional federally-listed species in Brazoria County, two bird species (piping plover and whooping crane) and two reptiles (Kemp's Ridley sea turtle and loggerhead) have suitable habitat within or near the Liquefaction Project. The Kemp's Ridley and loggerhead sea turtles have been known to nest in the vicinity of the Liquefaction Project.

Of the NOAA Fisheries jurisdictional federally-listed species in the Gulf of Mexico, two marine mammal species (blue whale and humpback whale have suitable habitat near the Liquefaction Project (*e.g.,* within the general area frequented by LNG ships navigating to and from the Quintana Island terminal). Of the eight potential Species of Concern recognized by NOAA Fisheries that may occur in the Gulf of Mexico, two fish species (dusky shark and sand tiger shark) have suitable habitat near the Liquefaction Project.

Based on our review and the mitigation proposed, we have determined that the Liquefaction Project *may affect, but is not likely to adversely affect* the referenced federally-listed species from construction or operation of the Liquefaction Project. The referenced Species of Concern are not likely to be present or affected. Mitigation proposed includes Freeport LNG's FLDP,

which helps minimize lighting and potential for bird strikes. No threatened/endangered habitat exists at the Liquefaction Plant site, Pretreatment Plant site or Pipeline/Utility Line System areas. Any such habitat is separated and buffered by other land.

Our effects determination is supported by the lack of any known impact on threatened/endangered species caused by the construction and operation of Freeport LNG's Phase I and Phase II facilities as evidenced in part by its 4 year long bird strike study. The bird strike study showed no injuries or mortalities to any threatened/endangered (or BCC) avian species occurred during construction and operation of the Phase I terminal facilities, which includes the two LNG storage tanks, air tower, LNG dock unloading arms, and installed power lines. We have included a recommendation to ensure that consultation with FWS and NOAA Fisheries are finalized prior to construction.

At the request of public commenters and the USEPA, we analyzed potential impacts on federally-listed threatened/endangered species from air emissions. Air emissions stemming from construction and operation of the Freeport LNG Project contain nitrogen and sulfur compounds that contribute to acidification and nitrogen enrichment in the environment that may adversely impact terrestrial and aquatic ecosystems. Based on cumulative data of air emission deposition and its impacts on the environment, we conclude that the construction and operation emissions would not result in a "take" for the federally-listed endangered species. Thus, depositional impacts do not change the previous determinations of *may affect, but is not likely to adversely affect* for each of the federally-listed threatened/endangered species.

As previously discussed, the Liquefaction Project does not represent a change in number of LNG ships from what was analyzed in the Freeport LNG Import Facility Phase I (CP03-75-000) and Phase II Project (CP05-361-000) and thus we do not anticipate further impacts on threatened/endangered species under the Liquefaction Project due to shipping.

There are 27 state-listed species with potential to occur in the area (*i.e.*, 10 birds, 1 fish, 1 marine mammal, 4 terrestrial mammals, 3 mollusks, 6 aquatic reptiles, and 2 terrestrial reptiles). Due to the characteristics of these species, Freeport LNG's mitigation measures, and our recommendation for the design of the electric lines to accommodate raptors and large birds, construction or operation of the Liquefaction Project is not expected to impact these species.

5.8.2 Phase II Modification Project

The federally-listed and state-listed species identified above have similar potential to occur in the vicinity of the Phase II Modification Project because the footprint is within the Liquefaction Plant area.

5.9 LAND USE

5.9.1 Liquefaction Project

Work on Quintana Island related to the Liquefaction Plant would involve 147.4 acres of temporary impact and 144.6 acres of permanent impact and generally would take place adjacent

or close to existing industrial uses of the LNG terminal and does not represent a substantial change in land use. The majority of the land affected at the Liquefaction Plant is open land and industrial land.

The site of the Pretreatment Plant was selected as a result of concerns expressed by stakeholders about land use impacts including visual, noise traffic impacts, and safety concerns at the original site considered by Freeport LNG. Construction of the Pretreatment Plant would require 218.3 acres, of which 104.9 acres would be temporary impacts, and 113.4 acres would be permanent impacts. Open land is the largest affected land use at the Pretreatment Plant site, accounting for 164.6 acres (75 percent) of the 218.3 acres affected overall. The Pretreatment Plant work chiefly represents a change in land use from agricultural (associated with cattle grazing) to an industrial land use.

Construction and operation of the Pipeline/Utility Line System would not permanently change the existing land use profile. Construction and operation of the linear underground facilities would involve only temporary impacts, and the footprints of the aboveground ancillary facilities (<0.1 acres total) would be within Freeport LNG's existing pipeline rights-of-way or industrial property. Impacts on land use associated with the Pipeline/Utility Line System would be minimized by locating the work along existing rights-of-ways.

Photo simulations show that the while residences to the south and west of the Liquefaction Plant on Quintana Island would have views of the new facility, their views toward the Liquefaction Plant already have an industrial context as a result of the existing Freeport LNG Quintana Island terminal. In addition, views would be partially blocked by the 21-foot-high levee that runs along the southern perimeter of the terminal site and the 30-foot-high levee that runs along the southern and western perimeter of the adjacent former DMPA. Nighttime simulations of the facility show similar results: although the residential areas of Quintana Island would be able to see the lighting from the Liquefaction Plant, the residential locations already have views of the existing Freeport LNG terminal, and Freeport LNG has taken measures to reduce lighting impacts offsite using its FLDP.

Visual impacts would also occur around the Pretreatment Plant. Here the closest residence is situated about 0.17 mile from the construction footprint and about 0.47 mile from the operational footprint. The visual simulation shows the Pretreatment Plant adds an industrial dimension to the otherwise open landscape, though the distance between the plant and the closest residence minimizes visual impacts.

With respect to TCMP review, Freeport LNG has not received its coastal zone consistency determination from the TCMP Texas General Land Office, CCC. We are recommending that Freeport LNG not be allowed to begin construction until it receives the CCC's determination that the Projects are consistent with the CZMA.

As a result, while the residents of the Town of Quintana and the residents near the Pretreatment Plant would be able to see the proposed facilities, and would have minor visual impacts, the Liquefaction Project would not result in a significant impact on land use including planned developments, land ownership, transportation, recreation and special interest areas, residential areas and visual resources.

5.9.2 Phase II Modification Project

A total of 38.5 acres of land would be required for the Phase II Modification Project, including 14.6 acres that would be temporarily disturbed during construction and 23.9 acres within existing fence line or on existing DMPA that would be affected on a permanent basis for operation. Like the land use impacts associated with the Liquefaction Plant, the Phase II Modification Project is located at or adjacent to the existing Freeport LNG terminal and the land affected consists mostly of open lands (21.6 acres) and industrial land (10.3 acres). Visual impacts associated with the Phase II Modification Project would not be significant given the industrial nature of the existing Freeport LNG terminal and the minor changes proposed.

5.10 SOCIOECONOMICS

5.10.1 Liquefaction Project

The Liquefaction Project as a whole would require, during the peak construction period, more than 3,000 temporary workers and operation of the Liquefaction Project facilities would require the addition of approximately 163 permanent workers. We determined that the current constriction of housing availability would continue or get worse due to the large influx of workers competing for the limited number of available homes and apartments. Although temporary housing (hotels, trailer parks, and campgrounds) offer some limited capacity, many of the workers would need to travel significant distances. This would lead to increased congestion of roadways leading to the Liquefaction Plant and Pretreatment Plant.

Freeport LNG submitted a Transportation Management Plan, outlining traffic and transportation mitigation measures, which address both construction and worker traffic. Nearby residents, especially those of the Town of Quintana would be most affected by the large increase in construction and worker vehicle traffic. This would be minimized to the extent practicable by the Transportation Management Plan; however, this would result in significant and unavoidable impacts on the residents of the Town of Quintana during construction of the Liquefaction Plant and Phase II Modification Projects. In addition, residents near the Pretreatment Plant would see increased traffic impacts during morning and evening rush hour and during the workday from construction vehicles. For the wider Brazoria County, Freeport LNG's Transportation Management Plan would mitigate some of these impacts and we conclude that the construction and operation of the Liquefaction Project would not have a significant adverse impact on public services, traffic, schools, emergency services, and disadvantaged communities in the larger Brazoria County area.

5.10.2 Phase II Modification Project

The Phase II Modification Project would require, during the peak construction period, up to 500 to 600 temporary workers and operation of the Phase II Modification Project would require approximately three to five new permanent workers. The construction traffic would add cumulatively to the impacts from the Liquefaction Project. The impacts on the local population would be similar, but less, than that of the Liquefaction Project due to the smaller workforce.

5.11 CULTURAL RESOURCES

5.11.1 Liquefaction Project

Freeport LNG prepared a cultural resources overview report for the Liquefaction Plant site and the Pretreatment Plant site and concluded that no impacts on cultural resources would occur. The Texas SHPO concurred with these recommendations. Based on our review, we also agree with the determination. Freeport LNG has not documented that all elements of its Pipeline/Utility Line System and the Seaway DMPA have been covered by cultural resources surveys. The FERC must ensure that our responsibilities under the NHPA and the ACHP's implementing regulations for Section 106 at 36 CFR 800 are met. Accordingly, we are recommending that work not commence until Freeport LNG files: (1) remaining cultural resources survey report(s) and their attachments for work proposed by Freeport LNG; (2) site evaluation report(s) and avoidance/treatment plan(s), as required; and (3) comments on the cultural resources reports and plans from the SHPO. With the limited scope and our recommendation to complete the Section 106 process, we would ensure the Liquefaction Project would not have a significant impact on cultural resources.

5.11.2 Phase II Modification Project

Freeport LNG has prepared a cultural resources overview report for the area of the Phase II Modification work and concluded that no impacts on cultural resources would occur. The Texas SHPO has concurred with these recommendations and we also agree with the determination. therefore, we find that the phase ii modification project would not have significant impacts on cultural resources.

5.12 RELIABILITY AND SAFETY

We evaluated the safety of the proposed pipeline and LNG facilities associated with the Liquefaction Plant and the Phase II Modification Project, including a review of the cryogenic design of the facilities proposed for liquefaction, related facilities, and safety systems. Our assessments addressed hazards, preliminary engineering design, siting requirements, siting analysis, emergency response, and facility security. In accordance with the working arrangements allowed by the 1985 MOU between the FERC and the USDOT, the USDOT reviewed our analysis of Freeport LNG's compliance with the requirements in 49 CFR 193, as well as our recommended mitigation measures, and has no objections at this time. Section 5.15 identifies the specific recommendations to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service. Included is a recommendation for

Freeport LNG to finalize the ERP prior to construction with appropriate emergency responder input.

Freeport LNG would design, construct, operate and maintain its pipeline facilities to meet or exceed the USDOT Minimum Federal Safety Standards in 49 CFR 192 and other applicable federal and state regulations.

Based on our technical review of the preliminary engineering designs, we conclude that sufficient layers of safeguards would be included in the design of the Projects to mitigate the potential for an incident that could impact the safety of the off-site public.

The principal hazards associated with the substances involved in the liquefaction, storage and vaporization of LNG result from cryogenic and flashing liquid releases; flammable and toxic vapor dispersion; vapor cloud ignition; pool fires; BLEVEs; and overpressures. As part of our review, we assessed the potential for public safety. Prior to the end of the draft EIS comment period, Freeport LNG is required to provide information to FERC staff detailing how the portion of the vapor cloud extending onto the ExxonMobil facility would comply with the exclusion zone requirements of 49 CFR 193. The small area of the ExxonMobil property that the vapor dispersion extends over is an adjacent industrial property and is not publicly accessed.

In order to provide a consistent assessment of potential public impacts, we applied a similar review technique to the Pretreatment Plant facilities. Based on our review of Freeport LNG's siting analyses, we conclude that potential hazards from the Pretreatment Plant would also not have a significant impact on public safety. As a result, we conclude that the siting of the Pretreatment Plant, Liquefaction Plant and Phase II Modification Project would not have a significant impact on public safety and would represent only a slight increase in risk to the nearby public.

5.13 AIR AND NOISE

5.13.1 Air Quality

Air emissions during the construction of the Projects would consist of tailpipe emissions (due to fossil fuel combustion from equipment and vehicles) and fugitive dust (ground and roadway dust). The greatest emissions for any given year of construction are estimated to be the following: NO_x 650.8 tpy; CO 5,871.6 tpy; VOC 180.7 tpy; PM_{10} 727.4 tpy; $PM_{2.5}$ 114.5 tpy; SO_2 54.2 tpy; and GHG 101,821 tpy CO_2e.

These emissions would be temporary and may vary in intensity and composition over the 4.5 years of construction. While, the construction emissions would not significantly affect air quality in the region, they may cause elevated dust and pollutant levels in close proximity to the Projects. Freeport LNG must comply with General Conformity for construction of the Projects and the vessel emissions from the Phase II Project. Thus, we are recommending that Freeport LNG offset the emissions of NO_x and VOC, obtain a specific commitment from TCEQ to account for emissions of NO_x and VOC in the region's SIP, or otherwise comply with the General Conformity demonstration under the CAA. As the lead agency, the FERC must prepare

and make public both the draft General Conformity Analysis and the final General Conformity Analysis prior to authorization of construction. This separate document would be prepared once the appropriate information is obtained from Freeport LNG.

Air emissions from the operation of the Liquefaction Plant, and Pretreatment Plant stationary sources would be minimized by using electric-powered equipment, high-efficiency equipment, state of the art emission controls, burning natural gas, and using proper maintenance and operating procedures. The emissions from stationary sources are estimated to be the following: NO_x 65 tpy; CO 95 tpy; VOC 24 tpy; PM_{10} 87 tpy; $PM_{2.5}$ 87 tpy; SO_2 25 tpy; and GHG 1,580,866 tpy CO_2e. Freeport LNG submitted permit applications to the TCEQ and USEPA for these emissions. These applications included simulations showing that the emissions would not cause a violation of a NAAQS or PSD Increment.

For the Phase II Modification Project, the only operation emissions would be fugitive emissions, totaling 1.18 tpy of VOC, from piping systems at the Quintana Island terminal.

As part of the TCEQ permitting process, Freeport LNG used an air quality model to estimate the air quality impacts from the facilities. The results demonstrated that air quality impacts from the facilities and surrounding industrial facilities would not exceed the NAAQS. We updated this air quality model with revised emissions from the LNG vessels and escort vessels. Thus we looked at the combined emissions of the Phase I, Phase II, Phase II modification Project and the Liquefaction Project for the export mode of the Projects.

We confirmed that cumulative impacts from all the industrial facilities in the area combined with operation of the Projects would exceed the NAAQS for $PM_{2.5}$; however, Freeport LNG's facilities are not the cause of the exceedance. Thus, we conclude that impacts on air quality would not be significant.

5.13.2 Environmental Noise and Vibration

5.13.2.1 Liquefaction Project

The ambient noise environment would be affected during construction of the Pipeline/Utility Line System, and construction and operation of the Pretreatment and Liquefaction Plants.

Residents in the immediate vicinity of construction activities at the Pretreatment and Liquefaction Plants would experience an increase in noise during the 4.5 years of construction. Certain construction activities at the Liquefaction Plant, such as HDD work, dredging, and pile driving, would result in longer term noise impacts and greater annoyance of the residents and visitors in the Town of Quintana.

Based upon Freeport LNG's noise calculation, noise from pile driving at the Liquefaction Plant would be distinctly heard by Quintana Island residents with noise increases up to 21 dBA over ambient and above 55 dBA. However, pile driving would only be done during daytime hours. Dredging activities have the potential for 24-hour per day elevated noise impacts sustained over 120 days. Freeport LNG estimated that the dredging noise impact would be over 55 dBA L_{dn} at

one NSA. To address noise concerns associated with both pile driving and dredging, we are recommending that Freeport LNG submit a Construction Noise Mitigation Plan that outlines measures to reduce dredging noise to no greater than 55 dBA L_{dn}, and includes mitigation measures to reduce pile driving noise (L_{max}) to no greater than 10 dBA over ambient levels. Pile-driving would result in a doubling of existing ambient noise and would be a significant adverse impact on the residents of the Town of Quintana during construction.

HDD noise for the pipeline installation would elevate noise levels at several NSAs. At most locations where noise would be above 55 dBA L_{dn}, Freeport LNG committed to install mitigation to reduce noise to below 55 dBA L_{dn}. At a few NSAs, the mitigation would not reduce noise below 55 dBA L_{dn}; however the noise increase over ambient would be below 6 dBA and would not be significant.

Operational noise at the Pretreatment Plant would increase ambient noise for nearby residents such as the communities of Turtle Creek, Oyster Creek, and Hide-Away. However, the noise attributable to the facility would remain below 55 dBA L_{dn}. We are recommending that Freeport LNG conduct a full load noise survey to confirm this after the facility becomes operational.

Ship loading, and LNG vessel movement would be other sources of noise and vibration. Freeport LNG estimated that ship loading noise would be minor, and should not rise to levels above 55 dBA L_{dn} at the nearest NSA. LNG vessel movement may cause short term noise elevation above 55 dBA L_{dn}, but would not exceed 10 dBA above ambient at the nearest NSAs. At our request, Freeport prepared a Ship Noise & Vibration Monitoring Plan that details how Freeport LNG would monitor noise and vibration from LNG ship movement and loading operations to ensure that noise would not exceed 55 dBA L_{dn}, and would not cause significant vibration. Freeport LNG filed the plan and we conclude that it is acceptable.

The noise modeling analysis for the Liquefaction Plant operation initially revealed that even with extensive noise mitigation, the 55 dBA L_{dn} limit could not be achieved at some of the nearest NSAs. Freeport LNG subsequently purchased all of the NSAs where noise impacts could not be mitigated. Operational noise at the Liquefaction Plant would increase ambient noise; however, the noise attributable to the facility would remain below 55 dBA L_{dn} at the remaining NSAs. Freeport LNG would include significant noise mitigation measures in order to achieve compliance with our 55 dBA L_{dn} noise level limit at any NSAs and noise increases would be below 3 dBA at the nearest NSAs. We are recommending that Freeport LNG conduct a noise survey after each Liquefaction Train becomes operational to ensure that the noise attributable to the Liquefaction Plant would not exceed 55 dBA L_{dn}.

The only exception to this would be cool down flaring operations, which would occur very infrequently, (once every few years), but would have elevated noise levels during this operation.

With Freeport LNG's mitigation, and our recommendations, we expect noise impacts associated with operation or the Liquefaction Project to be minor, with minor to moderate vibration impacts at least one NSA in the Town of Quintana.

5.13.2.2 Phase II Modification Project

The Phase II Modification Project would have construction noise impacts similar to the noise from construction of the Liquefaction and Pretreatment Plant. No new operational noise generating sources would be associated with the Phase II Modification Project that were not already assessed and approved under the Phase II Project.

5.14 CUMULATIVE IMPACTS

Freeport LNG's Liquefaction and Phase II Modification Projects would not have any significant and readily identifiable cumulative impacts from a natural resources perspective. While some additive effects would occur, *e.g.*, Freeport LNG's Projects would increase the sum total of wetland acreage impacts and, in concert with FHC improvements, may cause water column turbidity across a wider area, no compounding effects have been recognized. Often any such effects appear to be precluded by the degree of geographic separation between projects, which is also the case with visual impacts. Similarly, construction and operation of the Projects along with other facilities would be additive to the existing air quality problems in Brazoria County. As discussed in section 4.11.1, although the Projects would not be the primary cause of any violation of the NAAQS, they would add a small amount to the existing nonattainment status of the area.

We conclude that the construction impacts on the small Town of Quintana would not be minor, as residents in the small community would be subjected to compounding adverse impacts from construction and operational noise, dust and air pollutants from construction and operation, vibration, visual impacts, and much higher traffic flows of construction vehicles during the 4.5 years of construction. During construction of the original Quintana Island terminal, Freeport LNG documented several instances of complaints from the public regarding noise and vibration. Although individual members of the community may be affected to a greater or lesser extent, construction impacts on the residents of the Town of Quintana would be significant and unavoidable.

With respect to socioeconomic factors, Freeport LNG's Projects would contribute to cumulative impacts in so much as the demand for housing and number of workers would increase and there would be associated additional burdens on road usage and public services. However, as with natural resource factors, these impacts would essentially be additive rather than compounding. In summary, cumulative impacts associated with Freeport LNG's Projects should not result in significant additional burdens on public service, housing or other socioeconomic factors on Freeport, Brazosport, and across Brazoria County.

5.15 FERC STAFF'S RECOMMENDED MITIGATION

We conclude that construction and operation of the Projects would result in adverse impacts on certain resources and nearby communities. We have identified that there would be significant and unavoidable impacts on residents of the Town of Quintana due to construction noise and construction traffic if the Projects are approved by the Commission. The other adverse impacts would be reduced to less-than-significant levels with the implementation of Freeport LNG's mitigation measures and the additional measures we recommend in this EIS.

If the Commission authorizes the proposed Projects, we recommend that the following measures be included as specific conditions in the Commission's Order. We conclude that these measures would further mitigate environmental impacts associated with construction and operation of the proposed Projects. Where the recommended conditions require the filing of information, the information should be filed with the Secretary of the Commission.

1. Freeport LNG shall follow the construction procedures and mitigation measures described in their applications, supplemental filings (including responses to staff data requests), and as identified in the EIS, unless modified by the Order. Freeport LNG must:

    a. request any modification to these procedures, measures, or conditions in a filing;

    b. justify each modification relative to site-specific conditions;

    c. explain how that modification provides an equal or greater level of environmental protection than the original measure; and

    d. receive approval in writing from the Director of OEP **before using that modification**.

2. The Director of OEP has delegated authority to take all steps necessary to ensure the protection of life, health, property, and the environment during construction and operation of the Projects. This authority shall include:

    a. stop-work authority and authority to cease operation; and

    b. the design and implementation of any additional measures deemed necessary to assure continued compliance with the intent of the conditions of the Order.

3. **Prior to any construction**, Freeport LNG shall file an affirmative statement, certified by a senior company official, that all company personnel, EIs, and contractor personnel will be informed of the EI's authority and have been or will be trained on the implementation of the environmental mitigation measures appropriate to their jobs **before** becoming involved with construction and restoration activities.

4. The authorized facility locations shall be as shown in the EIS, as supplemented by filed alignment sheets. **As soon as they are available, and before the start of construction**, Freeport LNG shall file any revised detailed survey alignment maps/sheets at a scale not smaller than 1:6,000 with station positions for facilities approved by the Order. All requests for modifications of environmental conditions of the Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.

5. Freeport LNG shall file detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all route realignments or facility relocations, and staging areas, pipe storage yards, new access roads, and other areas that would be used or

disturbed and have not been previously identified in filings. Approval for each of these areas must be explicitly requested in writing. For each area, the request must include a description of the existing land use/cover type, documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species would be affected, and whether any other environmentally sensitive areas are within or abutting the area. All areas shall be clearly identified on the maps/sheets/aerial photographs. Each area must be approved in writing by the Director of OEP **before construction in or near that area**.

This requirement does not apply to extra workspace allowed by the Freeport LNG's Procedures and/or minor field realignments per landowner needs and requirements which do not affect other landowners or sensitive environmental areas such as wetlands.

Examples of alterations requiring approval include all route realignments and facility location changes resulting from:

a. implementation of cultural resources mitigation measures;

b. implementation of endangered, threatened, or special concern species mitigation measures;

c. recommendations by state regulatory authorities; and

d. agreements with individual landowners that affect other landowners or could affect sensitive environmental areas.

6. **Within 60 days of the acceptance of the authorization and before construction begins**, Freeport LNG shall file a single Implementation Plan for the review and written approval by the Director of OEP for the Projects. Freeport LNG must file revisions to the plan as schedules change. The plan shall identify:

   a. how Freeport LNG will implement the construction procedures and mitigation measures described in its respective application and supplements (including responses to staff data requests), identified in the EIS, and required by the Order;

   b. how Freeport LNG will incorporate these requirements into the contract bid documents, construction contracts (especially penalty clauses and specifications), and construction drawings so that the mitigation required at each site is clear to onsite construction and inspection personnel;

   c. the number of EIs assigned per spread and aboveground facility sites, and how the company will ensure that sufficient personnel are available to implement the environmental mitigation;

   d. company personnel, including EIs and contractors, who will receive copies of the appropriate materials;

e. the location and dates of the environmental compliance training and instructions Freeport LNG will give to all personnel involved with construction and restoration (initial and refresher training as the Projects progress and personnel change), with the opportunity for OEP staff to participate in the training session(s);

f. the company personnel (if known) and specific portion of Freeport LNG's organization having responsibility for compliance;

g. the procedures (including use of contract penalties) Freeport LNG will follow if noncompliance occurs; and

h. for each discrete facility, a Gantt or PERT chart (or similar Project scheduling diagram), and dates for:

1) the completion of all required surveys and reports;
2) the environmental compliance training of onsite personnel;
3) the start of construction; and
4) the start and completion of restoration.

7. Freeport LNG shall employ at least one EI for the Liquefaction Plant and the Phase II Modification Project and at least one EI for the Pretreatment Plant and the Pipeline/Utility Line System. Each EI shall be:

a. responsible for monitoring and ensuring compliance with all mitigation measures required by the Order and other grants, permits, certificates, or other authorizing documents;

b. responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see condition 7 above) and any other authorizing document;

c. empowered to order correction of acts that violate the environmental conditions of the Order, and any other authorizing document;

d. a full-time position, separate from all other activity inspectors;

e. responsible for documenting compliance with the environmental conditions of the Order, as well as any environmental conditions/permit requirements imposed by other federal, state, or local agencies; and

f. responsible for maintaining status reports.

8. Beginning with the filing of its Implementation Plan, Freeport LNG shall file updated status reports on a **bi-weekly** basis for the Projects until all construction and restoration activities are complete. On request, these status reports will also be provided to other federal and state agencies with permitting responsibilities. Status reports shall include:

a. an update on Freeport LNG's efforts to obtain the necessary federal authorizations;

b. the construction status at the Liquefaction and Phase II Modification Project sites, work planned for the following reporting period, and any schedule changes for stream crossings or work in other environmentally sensitive areas;

c. a listing of all problems encountered and each instance of noncompliance observed by each EI during the reporting period (both for the conditions imposed by the Commission and any environmental conditions/permit requirements imposed by other federal, state, or local agencies);

d. a description of the corrective actions implemented in response to all instances of noncompliance, and their cost;

e. the effectiveness of all corrective actions implemented;

f. a description of any landowner/resident complaints which may relate to compliance with the requirements of the Order, and the measures taken to satisfy their concerns; and

g. copies of any correspondence received by Freeport LNG from other federal, state or local permitting agencies concerning instances of noncompliance, and Freeport LNG's response.

9. Freeport LNG shall develop and implement an environmental complaint resolution procedure. The procedure shall provide affected landowners with clear and simple directions for identifying and resolving their environmental mitigation problems/concerns during construction and restoration of the Projects. **Prior to construction**, Freeport LNG shall mail the complaint procedures to each landowner whose property would be crossed by the Projects.

a. In its letter to affected landowners, Freeport LNG shall:

1) provide a local contact that the landowners should call first with their concerns; the letter should indicate how soon a landowner should expect a response;
2) instruct the landowners that if they are not satisfied with the response, they should call Freeport LNG's Hotline; the letter should indicate how soon to expect a response; and
3) instruct the landowners that if they are still not satisfied with the response from Freeport LNG's Hotline, they should contact the Commission's Dispute Resolution Division Helpline at 877-337-2237 or at ferc.adr@ferc.gov.

b. In addition, Freeport LNG shall include in its biweekly status report a copy of a table that contains the following information for each problem/concern:

1) the identity of the caller and date of the call;
2) the location of the affected property;
3) a description of the problem/concern; and
4) an explanation of how and when the problem was resolved, will be resolved, or why it has not been resolved.

10. **Prior to receiving written authorization from the Director of OEP to commence construction of the Projects**, Freeport LNG shall file documentation that it has received all applicable authorizations required under federal law (or evidence of waiver thereof).

11. Freeport LNG must receive written authorization from the Director of OEP **prior to introducing hazardous fluids into the Projects**. Instrumentation and controls, hazard detection, hazard control, and security components/systems necessary for the safe introduction of such fluids shall be installed and functional.

12. Freeport LNG must receive written authorization from the Director of OEP **before placing the Projects into service**. Such authorization will only be granted following a determination that the facilities have been constructed in accordance with FERC approval and applicable standards, the facilities can be expected to operate safely as designed, and the rehabilitation and restoration of the areas affected by the Projects are proceeding satisfactorily.

13. **Within 30 days of placing the authorized facilities in service**, Freeport LNG shall file an affirmative statement, certified by a senior company official:

    a. stating that the facilities have been constructed in compliance with all applicable conditions, and that continuing activities will be consistent with all applicable conditions; or

    b. identifying which of the Order conditions Freeport LNG has complied with or will comply with. This statement shall also identify any areas affected by the Projects where compliance measures were not properly implemented, if not previously identified in filed status reports, and the reason for noncompliance.

14. **Prior to construction**, Freeport LNG shall file with the Secretary the following information for the Pretreatment Plant site, stamped and sealed by the professional engineer-of-record:

    a. an analysis of the suitability and sensitivity of proposed structures within the fault hazard zone to potential offsets and either relocate those structures outside the fault hazard zone or provide structures that are designed to acceptably accommodate the potential fault offsets;

    b. an analysis of the potential need to redesign or re-orient utilities or other structures that cross the fault, hazard zone and provide design details that demonstrate that the utilities and other structures acceptably accommodate

potential fault offsets, including a plan to enable such structures to be periodically re-leveled;

c. a review of vertical support structures (if any) within the fault hazard zone;

d. threshold fault offset levels (total and differential) for movement-sensitive structures that cross the fault and action items for exceedance of those levels; and

e. a fault monitoring program in accordance with section 4.6 of the 2014 April 25, 2014 Detailed Fault Study Report No. 04.10130160 prepared by Fugro Consultants, Inc.

In addition, Freeport LNG shall file, in its Implementation Plan, the schedule for producing this information. *(section 4.1.1.3)*

15. Freeport LNG shall file with the Secretary the following information for the Liquefaction Plant, stamped and sealed by the professional engineer-of-record:

a. an updated slope stability analysis of the north side of Liquefaction Plant area including the slope below the water level. This analysis shall include an updated bathymetry along the waterway channel that defines the underwater continuation of the slope included in the stability analysis;

b. site preparation drawings and specifications;

c. design drawings and calculations of structures and foundations of the Liquefaction Plant; and

d. seismic specifications used in conjunction with procuring Liquefaction Plant equipment prior to the issuing of requests for quotations.

In addition, Freeport LNG shall file, in its Implementation Plan, the schedule for producing this information. (*section 4.1.1.3*)

16. **Prior to the start of HDD operations**, Freeport LNG shall file a final site-specific HDD Monitoring and Contingency Plan for review and written approval by the Director of the OEP. (*section 4.3.2.1*)

17. **Prior to construction of the Projects**, Freeport LNG shall file an updated Erosion and Sediment Control Plan to incorporate drainage modifications that meet the requirements of the Velasco Drainage District. (*section 4.3.2.2*)

18. Freeport LNG shall avoid vegetation clearing during the primary nesting season for migratory birds, April 1 through July 15. If Freeport LNG is unable to avoid this vegetation clearing restriction time-frame, it shall consult with the FWS regarding Freeport LNG's vegetation clearing time-frame and file with the Secretary the results of the consultation prior to construction.

19. **Prior to construction,** Freeport LNG shall incorporate the FWS Avian Protection Plan Guidelines into the design for the proposed 2.93-mile-long 138 kV electric transmission line to the Liquefaction Plant, and the 1.98-mile-long 138 kV electric transmission line to the Pretreatment Plant. (*section 4.5.3.1*)

20. Freeport LNG **shall not begin construction activities** until:

    a. the staff completes formal consultation with the FWS and NOAA Fisheries; and

    b. Freeport LNG **has received written** notification from the Director of OEP that construction or use of mitigation may begin. (*section 4.6.1.4*)

21. Freeport LNG **shall not begin construction** of the Projects until it files a copy of the determination of consistency with the Texas Coastal Management Program issu*ed by the CCC.* (*section 4.7.4*)

22. Freeport LNG **shall not begin construction** of its Pretreatment Plant electric line, and the Pipeline/Utility Lines System, and/or use of related ancillary areas for staging, storage, and temporary work areas (including the Seaway DMPA) and new or to-be-improved access roads, **until**:

    a. Freeport LNG files:

        1) remaining cultural resources survey reports;
        2) site evaluation report and avoidance/treatment plan, as required; and
        3) comments on the cultural resources reports and plans from the SHPO;

    b. the ACHP is afforded an opportunity to comment if historic properties would be adversely affected; and

    c. the FERC staff reviews and the Director of OEP approves the cultural resources reports and plans, and notifies Freeport LNG in writing that treatment plans/mitigation measures (including archaeological data recovery) may be implemented and/or construction may proceed.

    All materials filed with the Commission containing location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: **"CONTAINS PRIVILEGED INFORMATION - DO NOT RELEASE."** (*section 4.9.4*)

Recommendations 23 through 75 shall apply to the Projects. Information pertaining to these specific recommendations shall be filed for review and written approval by the Director of OEP either: **prior to initial site preparation**; **prior to construction of final design**; **prior to commissioning; prior to introduction of hazardous fluids; or prior to commencement of service**, as indicated by each specific condition. Specific engineering, vulnerability, or detailed design information meeting the criteria specified in Order No. 683 (Docket No. RM06-24-000), including security information, shall be filed as critical energy infrastructure information (CEII) pursuant to 18 CFR 388.112. See Critical Energy Infrastructure Information, Order No. 683, 71

Fed. Reg. 58,273 (October 3, 2006), FERC Stats. & Regs. 31,228 (2006). Information pertaining to items such as: offsite emergency response; procedures for public notification and evacuation; and construction and operating reporting requirements, will be subject to public disclosure. All information shall be filed **a minimum of 30 days** before approval to proceed is requested.

23. **Prior to initial site preparation**, Freeport LNG shall provide procedures for controlling access during construction.

24. **Prior to initial site preparation**, Freeport LNG shall file an updated Emergency Response Plan which addresses on-site and off-site emergency response for both the LNG terminal site and the Pretreatment Plant. The Emergency Response Plan shall include evidence of consultation and coordination with all incident response organizations or personnel responsible for emergency response, public notification, and shelter-in-place/evacuation actions. Information pertaining to items such as off-site emergency response and procedures for public notification and evacuation would be subject to public disclosure.

25. **Prior to initial site preparation**, the updated Emergency Response Plan should include a Cost-Sharing Plan identifying the mechanisms for funding all project-specific security/emergency management costs that would be imposed on state and local agencies. In addition to the funding of direct transit-related security/emergency management costs, this comprehensive plan should include funding mechanisms for the capital costs associated with any necessary security/emergency management equipment and personnel base.

26. **Prior to initial site preparation**, Freeport LNG shall file the quality assurance and quality control procedures for construction activities.

27. **Prior to initial site preparation**, Freeport LNG shall file a plot plan of the final design showing all major equipment, structures, buildings, and impoundment systems.

28. **Prior to initial site preparation**, Freeport LNG shall file an overall project schedule, which includes the proposed stages of the commissioning plan.

29. **Prior to initial site preparation**, Freeport LNG should file a comparative analysis to support the FLACS results using a CFD model that is able to account for the presence of the piperack vapor barriers.

30. **Prior to construction of the final design**, Freeport LNG should file the results of consultation with USDOT indicating that the length of the vapor barriers applied above and along the unloading/loading line in the area of the ExxonMobil facility would be sufficient to provide compliance with 49 CFR 193.2059.

31. **Prior to construction of the final design**, Freeport LNG should file the plant geometry models or drawings that verify the confinement and congestion represented in the FEED of the Liquefaction Project or provide revised overpressure calculations indicating that a 1 psi overpressure would not impact the public.

32. **Prior to the construction of the final design**, Freeport LNG should file certification that the final design of the facilities at the terminal is consistent with the information provided to USDOT as described in the design spill determination letter dated December 31, 2013 (Accession Number 20140106-4003) as well as in Freeport LNG's filings on December 31, 2013 (Accession Numbers 20131231-5265 and 20131231-5266). In the event that any modifications to the design alters the single accidental leakage sources on which the Title 49 CFR Part 193 siting analysis was based, Freeport LNG should consult with USDOT on any actions necessary to comply with Part 193.

33. **Prior to the construction of the final design**, Freeport LNG should file certification that the final design of the Pretreatment Plant facilities is consistent with the information provided to FERC in the project docket. In the event that any modification to the design alters the single accidental leakage sources on which the siting analysis was based, Freeport LNG should consult with FERC staff on any actions necessary to re-evaluate the siting of the Pretreatment Plant facilities.

34. **The final design** shall address the information/revisions to Freeport LNG's responses to the Engineering Information Requests identified in table 4.10.3-1 of the EIS, which indicated features to be included in the final design and documentation.

35. **The final design** shall include change logs that list and explain any changes made from the FEED provided in Freeport LNG's applications and filings. A list of all changes with an explanation for the design alteration shall be provided and all changes shall be clearly indicated on all diagrams and drawings.

36. **The final design** shall provide up-to-date Process Flow Diagrams with heat and material balances and P&IDs, which include the following information:

    a. equipment tag number, name, size, duty, capacity, and design conditions;

    b. equipment insulation type and thickness;

    c. storage tank pipe penetration size and nozzle schedule;

    d. valve high pressure side and internal and external vent locations;

    e. piping with line number, piping class specification, size, and insulation type and thickness;

    f. piping specification breaks and insulation limits;

    g. all control and manual valves numbered;

    h. relief valves with set points; and

    i. drawing revision number and date.

37. **The final design** shall provide P&IDs, specifications, and procedures that clearly show and specify the tie-in details required to safely connect to the existing facilities.

38. **The final design** shall provide an up-to-date complete equipment list, process and mechanical data sheets, and specifications.

39. **The final design** shall provide complete drawings and a list of the hazard detection equipment. The drawings shall clearly show the location and elevation of all detection equipment. The list shall include the instrument tag number, type and location, alarm indication locations, and shutdown functions of the hazard detection equipment.

40. **The final design** shall provide complete plan drawings and a list of the fixed and wheeled dry-chemical, hand-held fire extinguishers, and other hazard control equipment. Drawings shall clearly show the location by tag number of all fixed, wheeled, and hand-held extinguishers. The list shall include the equipment tag number, type, capacity, equipment covered, discharge rate, and automatic and manual remote signals initiating discharge of the units.

41. **The final design** shall provide facility plans and drawings that show the location of the firewater and foam systems. Drawings shall clearly show: firewater and foam piping; post indicator valves; and the location, and area covered by, each monitor, hydrant, deluge system, foam system, water-mist system, and sprinkler. The drawings shall also include P&IDs of the firewater and foam system.

42. **The final design** shall provide an updated fire protection evaluation of the proposed facilities carried out in accordance with the requirements of NFPA 59A 2001, chapter 9.1.2 as required by 49 CFR Part 193. A copy of the evaluation, a list of recommendations and supporting justifications, and actions taken on the recommendations shall be filed.

43. **The final design** shall specify that for hazardous fluids, the piping and piping nipples 2 inches or less are to be no less than Schedule 160.

44. **The final design** shall provide an air gap or vent installed downstream of process seals or isolations installed at the interface between a flammable fluid system and an electrical conduit or wiring system. Each air gap shall vent to a safe location and be equipped with a leak detection device that: shall continuously monitor for the presence of a flammable fluid; shall alarm the hazardous condition; and shall shutdown the appropriate systems.

45. **The final design** shall provide electrical area classification drawings.

46. **The final design** shall provide spill containment system drawings with dimensions and slopes of curbing, trenches, and impoundments.

47. **The final design** of the hazard detectors shall account for the calibration gas when determining the LFL set points for methane, propane, ethylene, and NGLs.

48. **The final design** shall include a HAZOP review of the completed design prior to issuing the P&IDs for construction. A copy of the review, a list of recommendations, and actions taken on the recommendations shall be filed.

49. **The final design** shall include the cause-and-effect matrices for the process instrumentation, fire and gas detection system, and ESD system. The cause-and-effect matrices shall include alarms and shutdown functions, details of the voting and shutdown logic, and setpoints.

50. **The final design** shall include a plan for clean-out, dry-out, purging, and tightness testing. This plan shall address the requirements of the American Gas Association's Purging Principles and Practice required by 49 CFR 193, and shall provide justification if not using an inert or non-flammable gas for cleanout, dry-out, purging, and tightness testing.

51. **The final design** shall include the sizing basis and capacity for the final design of pressure and vacuum relief valves for major process equipment, vessels, storage tanks, and vent stacks.

52. **The final design** shall provide the procedures for pressure/leak tests which address the requirements of ASME VIII and ASME B31.3, as required by 49 CFR 193.

53. **The final design** shall include a drawing showing the location of the ESD buttons. ESD buttons shall be easily accessible, conspicuously labeled and located in an area which would be accessible during an emergency.

54. **The final design** shall include a delayed automatic start for the ICW firewater pumps.

55. **The final design** shall provide a hydraulic study for the LNG storage tank piping with the larger in-tank pumps, and confirm the final size of the discharge nozzle and header pipe.

56. **The final design** shall ensure that the LNG storage tank piping supports are adequately designed for the higher rated in-tank pump flow rates.

57. **The final design** shall provide a list of the UPS locations, sizes with load capacities, and services.

58. **The final design** shall include detection of a leak through the pump primary electrical seals, in addition to monitoring and alarming the nitrogen gas pressure to the seal purge, in order to account for small leaks that pressure indicators may not be able to detect. Low temperature or flammable gas detection shall be provided downstream of primary seal. The junction box shall be equipped with flammable gas detection.

59. **The final design** shall include the addition of high pressure alarm and shutdown on the LNG Transfer Drums.

60. **The final design** shall include double isolation valves on the propane vaporizer drains.

61. **The final design** shall specify that the refrigeration system vent lines be equipped with double isolation valves.

62. **The final design** shall specify a pipe class of T39 for the LNG cooldown lines (4"-LNG-111032, 4"-LNG-121032, and 4"-LNG-131032) to downstream of isolation valves (V10448, V20448, and V30448), respectively.

63. **The final design** shall specify that relief valves shall not vent back into a system that has a design pressure equal to or above the relief valve set pressure. The calculated operating pressure of all relief valves shall not exceed the allowable operating pressure of that particular relief valve under any condition.

64. **The final design** shall include a list of the recommendations not considered or included in the final design that are listed in the HAZID review of December 8, 2011 and the justification for the omission.

65. **The final design** shall include the details of the vapor barriers as well as procedures to maintain and inspect the vapor barriers provided to meet the siting provisions of 49 CFR Part 193.2059.

66. **The final design** shall include details of the mechanical measures that would prevent the ship transfer rate from exceeding 10,000 m^3/hr in any pipe segment.

67. **Prior to commissioning,** Freeport LNG shall file plans and detailed procedures for: testing the integrity of onsite mechanical installation; functional tests; introduction of hazardous fluids; operational tests; and placing the equipment into service.

68. **Prior to commissioning**, Freeport LNG shall provide a detailed schedule for commissioning through equipment startup. The schedule shall include milestones for all procedures and tests to be completed: prior to introduction of hazardous fluids and during commissioning and startup. Freeport LNG shall file documentation certifying that each of these milestones has been completed before authorization to commence the next phase of commissioning and startup will be issued.

69. **Prior to commissioning,** Freeport LNG shall provide tag numbers on equipment and flow direction on piping.

70. **Prior to commissioning**, Freeport LNG shall tag all instrumentation and valves in the field, including drain valves, vent valves, main valves, and car-sealed or locked valves.

71. **Prior to commissioning**, Freeport LNG shall file updates addressing the Projects in the operation and maintenance procedures and manuals, as well as safety procedures.

72. **Prior to commissioning**, Freeport LNG shall maintain a detailed training log to demonstrate that operating staff has completed the required training.

73. **Prior to introduction of hazardous fluids**, Freeport LNG shall complete a firewater pump acceptance test and firewater monitor and hydrant coverage test. The actual coverage area from each monitor and hydrant shall be shown on facility plot plan(s).

74. **Prior to introduction of hazardous fluids**, Freeport LNG shall complete all pertinent tests (Factory Acceptance Tests, Site Acceptance Tests, Site Integration Tests) associated with the Distributed Control System and Safety Instrumented System that demonstrates full functionality and operability of the system.

75. **Prior to commencement of service**, progress on the construction of the proposed systems shall be reported in **monthly** reports filed with the Secretary. Details shall include a summary of activities, problems encountered, contractor non-conformance/deficiency logs, remedial actions taken, and current project schedule. Problems of significant magnitude shall be reported to the FERC **within 24 hours**.

In addition, recommendations 76 through 78 shall apply throughout the life of the Freeport LNG facilities.

76. The facility shall be subject to regular FERC staff technical reviews and site inspections on at least an **annual basis** or more frequently as circumstances indicate. Prior to each FERC staff technical review and site inspection, Freeport LNG shall respond to a specific data request, including information relating to possible design and operating conditions that may have been imposed by other agencies or organizations. Up-to-date detailed P&IDs reflecting facility modifications and provision of other pertinent information not included in the semi-annual reports described below, including facility events that have taken place since the previously submitted semi-annual report, shall be filed.

77. Semi-annual operational reports shall be filed to identify changes in facility design and operating conditions, abnormal operating experiences, activities (including ship arrivals, quantity and composition of imported and exported LNG, liquefied and vaporized quantities, boil-off/flash gas, etc.), plant modifications, including future plans and progress thereof. Abnormalities shall include, but not be limited to: unloading/loading/shipping problems, potential hazardous conditions from off-site vessels, storage tank stratification or rollover, geysering, storage tank pressure excursions, cold spots on the storage tanks, storage tank vibrations and/or vibrations in associated cryogenic piping, storage tank settlement, significant equipment or instrumentation malfunctions or failures, non-scheduled maintenance or repair (and reasons therefore), relative movement of storage tank inner vessels, hazardous fluids releases, fires involving hazardous fluids and/or from other sources, negative pressure (vacuum) within a storage tank and higher than predicted boil-off rates. Adverse weather conditions and the effect on the facility also shall be reported. Reports shall be submitted **within 45 days after each period ending June 30 and December 31**. In addition to the above items, a section entitled "Significant Plant Modifications Proposed for the Next 12 Months (dates)" also shall be included in the semi-annual operational reports. Such information would provide FERC staff with early notice of anticipated future construction/maintenance projects at the LNG facility.

78. Significant non-scheduled events, including safety-related incidents (*e.g.,* LNG, refrigerant, or natural gas releases, fires, explosions, mechanical failures, unusual over pressurization, and major injuries) and security-related incidents (*e.g.,* attempts to enter site, suspicious activities) shall be reported to FERC staff. In the event an abnormality is of significant magnitude to threaten public or employee safety, cause significant property damage, or interrupt service, notification shall be made **immediately**, without unduly interfering with any necessary or appropriate emergency repair, alarm, or other emergency procedure. In all instances, notification shall be made to FERC staff **within 24 hours**. This notification practice shall be incorporated into the LNG facility's emergency plan. Examples of reportable hazardous fluids related incidents include:

    a. fire;

    b. explosion;

    c. estimated property damage of $50,000 or more;

    d. death or personal injury necessitating in-patient hospitalization;

    e. release of hazardous fluids for five minutes or more;

    f. unintended movement or abnormal loading by environmental causes, such as an earthquake, landslide, or flood, that impairs the serviceability, structural integrity, or reliability of an LNG facility that contains, controls, or processes hazardous fluids;

    g. any crack or other material defect that impairs the structural integrity or reliability of an LNG facility that contains, controls, or processes hazardous fluids;

    h. any malfunction or operating error that causes the pressure of a pipeline or LNG facility that contains or processes hazardous fluids to rise above its maximum allowable operating pressure (or working pressure for LNG facilities) plus the build-up allowed for operation of pressure limiting or control devices;

    i. a leak in an LNG facility that contains or processes hazardous fluids that constitutes an emergency;

    j. inner tank leakage, ineffective insulation, or frost heave that impairs the structural integrity of an LNG storage tank;

    k. any safety-related condition that could lead to an imminent hazard and cause (either directly or indirectly by remedial action of the operator), for purposes other than abandonment, a 20 percent reduction in operating pressure or shutdown of operation of a pipeline or an LNG facility that contains or processes hazardous fluids;

    l. safety-related incidents to hazardous fluids vessels occurring at or en route to and from the LNG facility; or

m. an event that is significant in the judgment of the operator and/or management even though it did not meet the above criteria or the guidelines set forth in an LNG facility's incident management plan.

In the event of an incident, the Director of OEP has delegated authority to take whatever steps are necessary to ensure operational reliability and to protect human life, health, property or the environment, including authority to direct the LNG facility to cease operations. Following the initial company notification, FERC staff would determine the need for a separate follow-up report or follow-up in the upcoming semi-annual operational report. All company follow-up reports shall include investigation results and recommendations to minimize a reoccurrence of the incident.

79. **At least 90 days prior to the start of construction** Freeport LNG shall file documentation:

a. from the TCEQ that the proposed Liquefaction Project's direct and indirect construction and operation emissions, including Phase II vessel NO_x and VOC emissions, together with all other emissions in the HGB area, will exceed the emissions budgets specified in the federally-approved HGB SIP; or

b. that the TCEQ commits to explicitly include the Proposed Liquefaction Project's direct and indirect NO_x and VOC emissions in the next revision of the RFP SIP; or

c. that Freeport LNG would obtain offsets or an provide alternative demonstration of General Conformity under the CAA. (*section 4.11.1*)

80. **Prior to construction**, Freeport LNG shall file a Construction Noise Mitigation Plan, for review and approval by the Director of OEP that outlines measures to reduce dredging noise to no greater than 55 dBA L_{dn} at NSAs, and to reduce pile driving noise (L_{max}) to no greater than 10 dBA over ambient levels. (*section 4.11.2.2*)

81. Freeport LNG shall file a full load noise survey **no later than 60 days** after placing the Pretreatment Plant into service. If a full load condition noise survey is not possible, Freeport LNG shall file an interim survey at the maximum possible load **within 60 days** of placing the Pretreatment Plant into service and file the full load survey **within 6 months**. If the noise attributable to the operation of the equipment at the Pretreatment Plant at full load exceeds 55 dBA L_{dn} at any nearby NSAs, Freeport LNG shall install additional noise controls to meet the level **within 1 year** of the in-service date. Freeport LNG shall confirm compliance with this requirement by filing a second full load noise survey **no later than 60 days** after it installs the additional noise controls. (*section 4.11.2.2*)

82. Freeport LNG shall file a full load noise survey **no later than 60 days** after each of the first two liquefaction trains are placed into service at the Liquefaction Plant. If the noise attributable to the operation of the equipment at the Liquefaction Plant exceeds 55 dBA L_{dn} at any nearby NSA, Freeport LNG shall reduce operation of the Liquefaction Plant or install noise mitigation to meet that level at the nearest NSAs. Freeport LNG shall

confirm compliance with this requirement by filing a second full power noise survey **no later than 60 days** after it installs the additional noise controls. (*section 4.11.2.2*)

83. Freeport LNG shall file a full load noise survey **no later than 60 days** after placing the entire Liquefaction Plant into service. If a full load noise survey is not possible, Freeport LNG shall file an interim survey at the maximum possible load within 60 days of placing the Liquefaction Plant into service and file the full operational surveys **within 6 months**. If the noise attributable to the operation of all the equipment of the Liquefaction Plant at full load exceeds 55 dBA L_{dn} at any nearby NSAs, Freeport LNG shall install additional noise controls to meet the level **within 6 months** of the in-service date. Freeport LNG shall confirm compliance with this requirement by filing a second full load noise survey **no later than 60 days** after it installs the additional noise controls. (*section 4.11.2.2*)

APPENDIX A

Distribution List

APPENDIX A
DISTRIBUTION LIST

FEDERAL GOVERNMENT AGENCIES

Advisory Council on Historic Preservation
Director of Cultural Resources

Center for Disease Control
National Center for Environmental Health

Council on Environmental Quality
Associate Director for NEPA Oversight
Horst Greczmiel
Director for NEPA Oversight
General Counsel
Senior Counsel
Ellen Athas

Department of Agriculture
Forest Service
Director of Lands
Director Environmental Coordinator Staff
Ecosystem Management Coordination
National Forest System
Deputy Chief
Natural Resources Conservation Service
National Environmental Coordinator
John Matthew Harrington
Soils Section
State Conservationist
Donald W. Gohmert

Department of the Air Force
Office of the Deputy Secretary
Environment, Safety, and Occupational Health

Department of Commerce
Director of Ecology and Conservation
Secretary
Gary Locke
Office of the Secretary
Senior Policy Advisor

Department of Defense

Installations and Environment

Deputy Undersecretary

Robert Uhrich

Department of Energy

Director

Bob Corbin

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Director for Import/Export Activities

Intergovernmental Affairs

Office of Environmental Compliance

Office of Fossil Energy

Natural Gas Analyst

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Oil and Gas Global Security and Supply

John Anderson

Secretary

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Department of Health and Human Services

Secretary

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Department of Homeland Security

Secretary

Janet Napolitano

Department of the Interior

Director of Environmental Policy and Compliance

Land and Minerals Management

Deputy Assistant Secretary

Mineral Management Service

Deputy Director

Department of Justice

Land and Natural Resources Division

Department of Labor

Office of Regulatory Economics

Department of State

Office of Environment/Health

Department of Transportation

Director of Environment and Policy
Environmental Policies Team Leader
Office of Hazardous Material Enforcement
SW Region/Houston Office
Pipeline and Hazardous Materials Safety Administration
Southwest Regional Office
Billy C. Hines, Jr., Chief
Office of Pipeline Safety
John Jacobi
Research and Special Programs Administration
SW Region/Houston Office

Environmental Protection Agency

Region 6
Alfred Dumaual
Pat Rankin
Office of Regional Counsel
Assistant Regional Counsel
Tina A. Arnold
Office of Planning and Coordination
Rhonda Smith, Chief
Regional Administrator
Alfredo Armendariz
Sam Coleman (Acting Regional Administrator)
Natural Gas STAR
Jerome Blackman
Permits and Technical Assistance Section (6WQ-PP)
Laurence E. Giglio
Water Quality Protection Division (6WQ)
Miquel I. Flores, Director
Air Permits Section (6PD-R)
Aimee Wilson

Federal Emergency Management Agency

Region VI
Regional Administrator
Tony Russell

Federal Energy Regulatory Commission

Atlanta Region

Regional Engineer

Housing and Urban Development

Acting Director

Charles Bien

Director of Environment

Interstate Commerce Commission

Chief of Energy and Environment

National Marine Fisheries Service

Habitat Conservation Division

Supervisory Fishery Biologist

Rusty Swafford

Asst. Regional Administrator

Miles Croom

Office of Habitat Protection

Marine Resource Habitat Specialist

Protected Resources Division

Kyle Baker

Fishery Management Officer

David Bernhart

Section 7 Coordinator

Eric Hawk

Southeast Regional Office

Regional Administrator

Roy Crabtree

ESA Section 7 Coordinator

Eric G. Hawk

National Oceanic and Atmospheric Administration

NEPA Coordinator

Stephen L. Leathery

National Park Service

Office of the Assistant Secretary of the Army

Civil Works

Tribal and Regulatory Affairs

Office of the Assistant Secretary of the Navy

Installations and Environment

Office of Federal Activities

Director

United States Army Corps of Engineers

James Hand

Galveston District

Fred Anthamatten, Chief Regulatory Branch

Dwayne Johnson

Janet Thomas-Botello

Office of the Chief of Army Engineers

Regulatory Branch

Pete Serio, Chief

United States Coast Guard

Commandant

Admiral Robert J. Papp

Cmdr.

Rear Admiral Mary E. Landry

Marine Safety Office

Commanding Officer

Marine Safety Unit

Office of Operating and Environmental Standards

Sector Houston-Galveston

Captain of the Port

Station Freeport

United States Fish and Wildlife Service

Field Supervisor

Steve Parris

Fish and Wildlife Biologist

Catherine Yeargan

Moni Belton

Southwest Regional Office

Regional Director

Benjamin Tuggle

United States Senate

Committee on Energy and Natural Gas

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Rep. Randy K. Weber
Senator John Cornyn
Senator Kay Bailey Hutchinson

Oregon
Senator Ron Wyden

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Greg Abbott

Governor
Rick Perry

Lt. Governor
David Dewhurst

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Executive Director
W. Lane Lanford

Railroad Commission of Texas
Chief Geologist
Leslie Savage
Environmental Permits and Support
Program Manager
Jill Hybner
Executive Director
John Tintera
Oil and Gas Director
Tommie Seitz
Safety Director
Mary McDonald

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Commissioner
Jerry Patterson

Texas Commission on Environmental Quality

Air Permits Division

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Executive Director

Mark Vikery

Zak Covar

Office of Compliance and Enforcement

Deputy Director

John Sadlier

Ramirez Garcia, Jr.

Office of Water

Deputy Director

L'Oreal W. Stepney, P.E.

Region 12 – Houston

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Stephen Smith

Air Section Manager

Jason Harris

Manuel Bautista

Texas Department of Transportation

Brazoria Area Office

Area Engineer

Eliza Paul

District 3 – Houston

Director

District Engineer

Delvin Dennis

Executive Director

Amadeo Saenz, Jr.

Texas Forest Service

Steve Pollock

State Forester and Director

Tom Boggus

Texas Historical Commission

Executive Director

Mark S. Wolfe

State Historic Preservation Office

Texas Parks and Wildlife Department

Executive Director

Carter Smith

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Cherie O'Brien

Mike Morgan

Assistant Area Manager

David Butler

Environmental Assessment Biologist

Amy Hanna

Environmental Review Coordinator

Celeste Brancel

Program Leader

Kathy Boydston

Wildlife Management Area

Facilities Coordinator

Dennis Gissell

Texas Water Development Board

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Senator Joan Huffman

NATIVE AMERICAN TRIBES

Alabam-Coushatta Tribe of Texas

Debbie Thomas

Caddo Nation of Oklahoma

Bobby Gonzales

Tonkawa Tribe of Oklahoma

Don Patterson

LOCAL AND COUNTY GOVERNMENT

Brazoria County

Brazoria County Groundwater Conservation District
Brazoria County Environmental Health Department
Karen Carroll, Director of Environmental Health
Brazoria County MUD #11
Brazoria County Parks Department
Brazoria County Sherriff's Department
Charles Wagner, Sherriff
County Commissioner
Dude Payne, Precinct 1
Matt Sebesta, Precinct 2
Stacy Adams, Precinct 3
L.L. Larry Stanley, Precinct 4
Flood Plain Administrator
Kelly Hambly

Brazos River Harbor Navigation District
Freeport Fire Department
Brian Davis, Chief

City Of Freeport
Larry McDonald, Mayor
City Council
Nicole Mireles
Police Department
Tyrone Morrow, Chief

City of Lake Jackson
City Secretary

City of Oyster Creek

Quintana Town Council
Jeff Kapala
Harold Doty
Linda Martin
Barrett Blackwell
Tammi Cimiotta, City Secretary
Gary Wilson, Mayor

Velasco Drainage District

Village of Bonney
Raymond Cantu, Mayor

West Brazoria County Drainage District #11
Randy L. Stroud

INTERVENORS

Andrew Degetaire, Resident
ConocoPhillips, Regulatory Affairs, Peter W. Frost, Director
Dan Rucker (Individually and for Coastal Bend Property Development, LP)
Sierra Club, Nathan Matthews, Associate Attorney
Tres Palacios Gas Storage, LLC, Brad Bacon
Harold Doty, Quintana Council, Position 2

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Clute Library
Freeport Library
Lake Jackson Library
Library of Congress

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455 Creek Drive Llc
AA Sharp Investments, Ltd.
Air Liquide America Corporation
Air Products, L.P.
American Crafted Homes LLC
American Gas Association
American Gas Association
American Shore & Beach Preservation
American Tower Lp
Angleton Chamber Of Commerce
Basf Corporation
Batesville Invstment Co
Blue Dolphin Pipeline Co.
BP Pipelines North America, Inc.
Brazoria Chamber Of Commerce
Brazoria County Modelers Assoc.
Brazoria Interconnector Gas Pipeline Llc
Brazoria National Wildlife Refuge
Brazos Pilots Association
Brazos Pipe & Steel Fabricators Inc.
Brazosport Area Chamber Of Commerce
Brazosport Isd In Trust
Brazosport Marine Action Team
Bryan Consolidated Business Interests Ltd
C & M Investments LLC
Celanese
Centerpoint Energy, Inc.
Chevron
Coastal Bend Property Development LLC
Coastal Properties Limited Partnership
Commodore Cove Imp Dist Trust Property
ConocoPhillips, Inc.
Cradle Of TX Conservancy
Dow Chemical Company, Tax Dept.
Dow Hydrocarbons And Resources, Inc.
Ecodiesel Inc
Exxon/Mobil – Exx01
First Capitol Of Texas Properties Llc
Friends Of Brazoria Refuges
Galveston Bay Foundation
Galveston Bay Foundation
Greater Texas Electric Inc
Greg Flaniken And Associates
Gulf Coast Bird Observatory
Hide-A-Way On The Gulf C/O Property Owners Assoc
Houston Audubon
Houston Audubon Society
Houston Chronicle
K & B Properties Lp
Kinder Morgan
Lake Jackson Civic Center
Macquarrie Energy, LLC
Magnolia Storage Ltd
Mid-Coastal Properties
Mission Energy Inc.
National Western Life Ins
Nature Conservancy
Oyster Creek Property Assoc.
Oyster Creek South Partnership
Panacaea LLC
Park Circle CO LTD
Partex Corporation
Pinto Energy Partners, L.P.
Pipe Line Contractors Association
Port Freeport
QKB Inc.
Quintana Realty Inc.
River Oaks Tr Co/L. Roberts
Rocky Mountain P/L Constr Assoc
Sierra Club - Houston Regional Group
Stringfellow Rel Interest C/O Percival T. Beacroft Jr.
TBD Family Limited
Texas Association Of Regional Councils
The Dow Chemical Company
The Facts
The Westcap Corporation
The Wilderness Society
TPC Transmission Company (Enbridge Pipeline Company-Seachrest Llp)
Tucker F L Ltd
Turtle Cove Lot Owners Association Inc
U.S. Chamber Of Commerce

University Of St Thomas
Vernor Material & Equip. Co.
VHI Properties LP

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Albert Vrazel, Freeport, TX
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Alfred W & Cathleen Heinsohn, Freeport, TX
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Deborah Muston, Houston, TX
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Jimmy D & Carol Walden, Lake Jackson, TX
Jimmy D. & Guindal A. Smith, Freeport, TX

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John Richard Cranston, Spring, TX
John Taylor Kersh, Freeport, TX
John Wiley Thomas, The Hills, TX
John Williams, Portland, OR
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Johnny & Diane Shipman, Sealy, TX
Johnny L & Linda Richey, Freeport, TX
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Jon Shafer, Montgomery, TX
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Jordan Family Trust, Lake Jackson, TX
Jorge G. Lopez, Freeport, TX
Jose A Torres, Katy, TX
Jose Lopez, Freeport, TX
Jose V & Julie A Saavedra, Lake Jackson, TX
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Joseph F Kresse, Freeport, TX
Joseph H Walsh, Stafford, TX
Joseph H. Snow, Angleton, TX
Josephine W Session, Manvel, TX
Joyce Burch, Freeport, TX
Joyce Smith, Jones Creek, TX
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Juanita Booth, Baytown, TX
Judge Allen L Stilley, Spring, TX
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Julian S Harmon, Freeport, TX
K C Sharak, West Hollywood, CA
Kara Lee Brandwood, Ottawa, Ottowa, Ontario, Canada
Karen Collins, St Thomas, VI
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Kari Macon, Freeport, TX
Kari Maion, Freeport, TX
Karl M. Jr. & Florence Parker, Freeport, TX
Katherine M & Robert M Perry, San Antonio, TX
Kathleen Williams &, West Columbia, TX
Kathy Davis
Keith C & Shelley D Strack, Spring, TX
Kelly Craft, Lake Charles, LA
Ken Plato, Freeport, TX
Kenneth A Gonzales Estate, Palm Beach Gard, FL
Kenneth Edwards, Pearland, TX
Kentaro Toyokawa, Houston, TX
Kevin B & Debra Mays, Freeport, TX
Kevin Foster, Sargent, TX
Kevin Tilley, Freeport, TX
Kevin Walker, Houston, TX
Kevin William Durham, Port Lavaca, TX
Kim & Scott Foster, Freeport, TX
Kim Living Jesse Nugent, Houston, TX
Kimberly A. Roper Flannery, Dripping Springs, TX
Kirby Marina Inc C/O Lj Kirby, Pasadena, TX
Kodi Maynard, Oyster Creek, TX
Kristin Plunkett, Lake Jackson, TX
Kurt Evans, Clute, TX
L.L. Rhodes, Freeport, TX
Lamar Jordan, Lake Jackson, TX
Lance Albin, Bush, LA
Larry Bontekoe, TX
Larry & Judy Shaefer, Angleton, TX

Larry G & Laura S Jones, Freeport, TX
Larry J & Patricia Heidel, Freeport, TX
Larry Ortiz, Angleton, TX
Larry W Davison, Freeport, TX
Laura & Larry Jones, Freeport, TX
Laura Patricia Ruiz, Spring, TX
Laura Ruddick Abbott, Freeport, TX
Lawrence Kelly, Dickinson, TX
Lawrence Ray & Jimmie Louise Vernon, College Sta, TX
Lawson Revocable Living Trust, England, AR
Leon A Richardson, Sugar Land, TX
Leonard C & Audrey F Koska, Tomball, TX
Leslie Don Jackson, Dallas, TX
Leslie S Willard, West Columbia, TX
Linda J Harris, Houston, TX
Linda M & Mark Felder, Plano, TX
Lisa Annette Moody, Conroe, TX
Lisa Cardenas Jackson, Houston, TX
Lolita Mcneill Muhm, Brazoria, TX
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Louis & Debra Snider, Freeport, TX
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Louisi Hinososa, Clute, TX
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Lyndsey Miller Delange, Richmond, TX
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Mancil Wilfred, Freeport, TX
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Mark Hess, Houston, TX
Mark Mallett, Cypress, TX
Mark Troyer, Rickwood, TX
Martha Burnett Trustee, Houston, TX
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Marvin D Lynch, Pasadena, TX
Marvin Eugene Reneau, Clute, TX
Marvin Lynch, Freeport, TX
Mary Ann Thomas, Angleton, TX
Mary E Coulter, Freeport, TX
Mary Kathryn Cornett, Freeport, TX
Mary W. Carter, Houston, TX
Matthew & Yvette Schenck, Conroe, TX
Matthew D. Baumgart, Freeport, TX
Matthew John Briedenbaugh, Houston, TX
Max Bowen, Alvin, TX
Melanie Oldham, Angleton, TX
Michael & Kirsten Elledge, Freeport, TX
Michael & Susan Luycx, Freeport, TX
Michael Chao, Houston, TX
Michael Cox, Lake Jackson, TX
Michael D Blanchard, Freeport, TX
Michael Duane Merkel, Alvin, TX
Michael F Williamson, Freeport, TX
Michael G Sanderson, Freeport, TX
Michael J. & Lori E. Sorrell, Oyster Creek, TX
Michael Lee Terry, Freeport, TX
Michael T Mcclure, Palestine, TX
Michael Wayne & Helen Mabe, Santa Fe, TX
Michael Wayne Luycx, Freeport, TX
Miguel M Suarez And Celia Von Mering, Quintana, TX
Mike Blanchard, Freeport, TX
Mike H Ainbinder, Freeport, TX
Mike Holmes, Oyster Creek, TX
Mike Lange, Lake Jackson, TX
Miles & Julia Prillaman, Houston, TX
Milton Mendoza Jr, Grand Prairie, TX
Minh Dang, Pflugerville, TX
Morrison Living Trust, Fort Worth, TX
Mrs. Elva Mae Blachowiak, Houston, TX
Mrs. Evelyn H Mcneill Trustee, Brazoria, TX
Mrs. Fay Hudson, Jersey Village, TX
Mrs. Frank T Smith, Victoria, TX
Mrs. M S Munson Estate, Brazoria, TX
Mrs. Polly Beacroft Estate, Freeport, TX
Mrs. C Ezon, Deal, NJ
Ms. Karen Robertson, Freeport, TX
Nancy Hadeler Wilson, Freeport, TX
Nancy Wilson, Freeport, TX
Neida J Krebbs Estate, Muldrow, OK
Nicole Tomich, Houston, TX

Noe & Guillerma Martinez, Freeport, TX
O T Maxwell, Midland, TX
O.T. Maxwell, Albuquerque, NM
Oscar Acuna, Freeport, TX
Oscar Dowdy, Oyster Creek, TX
P.M. Williams C/O B.H. Williams, Houston, TX
Pat Barnes & Debbie Gann, Benbrook, TX
Patricia A Pettit, Freeport, TX
Patrick D & Susan Burke, Freeport, TX
Patrick F. & Nancy L. Laurie, Freeport, TX
Patt And John Swanson, Houston, TX
Paul & Starlet Zuma, Freeport, TX
Paul A Batts, Freeport, TX
Paul D Gonzales Trustee, Palm Beach Gardens, FL
Paul E Daugherty Jr, Dallas, TX
Paul J Lucco, Sugarland, TX
Paul Layton Brillon, Freeport, TX
Pearl Bales Exec C/O K.G. Archer, Mesa, AZ
Peggy L. Madden, Freeport, TX
Percival T Beacroft Jr, Freeport, TX
Perry Corridor C/O Tom Scott, Midland, TX
Perry Warren Hardwick, Houston, TX
Pete Kaldis, Burton, TX
Peter M. & Martha Lee Lucas, Freeport, TX
Phan Nguyen, Houston, TX
Philip H. Dunn, Houston, TX
Phillip & Kathy Daley, Houston, TX
Phillip G Padgett Jr, Williamsburg, VA
Pink Holdings Co, Houston, TX
Policarpio & Patricia Cisneros, Freeport, TX
R J Kleimann, Houston, TX
R.W. Sells C/O Jacque Sells & Rita Sells, Blackwell, OK
Ra & Jorene Aycock, Lake Jackson, TX
Ralph G & Juanita L Moreno, Freeport, TX
Ralph Thompson, Houston, TX
Randall D Mosman, Dallas, TX
Randall L & Shelley T Waters, Conroe, TX
Randall Valk, Houston, TX
Randell D & Jerri L Williams, Freeport, TX
Raul & Juana Alonso, Freeport, TX
Ray F Horihan, Canton, GA
Ray Cook, Freeport, TX
Ray M Cornett, Quintana, TX
Ray M Lester, Jones Creek, TX
Raymond Donald & Eugenia Mapp, Freeport, TX
Raymond Thomas, Houston, TX
Rebecca Amanda Thomas, Lakeway, TX
Rebecca Elizabeth Rayburn, Austin, TX
Rebecca Garza Martinez, Richmond, TX
Rebecca Hall, Rosharon, TX
Rebecca J Mims, Freeport, TX
Reese Hayes Rambo, Freeport, TX
Regina S Mccoy, Freeport, TX
Renalde Mulhollan, Lake Jackson, TX
Rene Flynn, Freeport, TX
Ric Badger, Houston, TX
Richard & Sharlene Shigley, Granbury, TX
Richard A Slane, Yukon, OK
Richard D & Dianna L Linn, Katy, TX
Richard L & Dawn E Hays, Freeport, TX
Richard M & Lynn Waters, Freeport, TX
Richard R. & Wanda F. Blake Kenneth J. Chaney, Freeport, TX
Richard S & Marsha J Griffis, Hilltop Lakes, TX
Rick M & Barbra Osterman, Freeport, TX
Rick Work, Bay City, TX
Robert & Anita Tiano, Freeport, TX
Robert A Hinson, Canyon Lake, TX
Robert Aycock, Richwood, TX
Robert C & Faye L Hagner, Houston, TX
Robert D Archer, Freeport, TX
Robert D Matthews, Katy, TX
Robert E & Sherry Furlough, Kingwood, TX
Robert E Robinson, Freeport, TX
Robert Fleming, West Columbia, TX
Robert G & Sherry A Rasberry, Freeport, TX
Robert H & Kelly L Nipper, Spring, TX
Robert L & Judith Bork, Freeport, TX
Robert Lindveit, Freeport, TX
Robert M. Munson, Angleton, TX
Robert Maddison
Robert Oczowski, Pearland, TX
Robert W Spencer Jr & Ouida Spencer Capps, Houston, TX
Robert Worley, Freeport, TX
Robin P & Deborah Chapman, Pearland, TX
Robin Rio, Freeport, TX

Rockwell Alice V Trust C/O David Z. Rosensweig, Bronxville, NY
Rodney Leshler, Oyster Creek, TX
Rodney W Holder, Aquilla, TX
Roger K & Patricia Vice, Crosby, TX
Romeo F. Laurel , Atlanta, GA
Romeo Rodriguez, Freeport, TX
Romie M. Davis, Lake Jackson, TX
Ron & Carmen Bailer Living Trust C/O Ron & Carmen Bailer, Freeport, TX
Ron & Pat Thibodeaux, Freeport, TX
Ron Paggemoreller, Freeport, TX
Ronald E & Bea G Mcclung, Missouri City, TX
Ronald M & Patricia Thibodeau, Freeport, TX
Ronald Nelson Bailey, Freeport, TX
Ronald P & Suzanne B Coots, Freeport, TX
Ronald V & Maria Poggemoeller, Freeport, TX
Rosalinda R Garcia, Freeport, TX
Rose M. Winn, Freeport, TX
Roy & Donna Haley, Freeport, TX
Roy C Vanaverbeke, Houston, TX
Roy Marsh, Freeport, TX
Roy Sanchez, Pasadena, TX
Russell C. Singley, Freeport, TX
Russell Lee Estate, Houston, TX
Russell S & Elizabeth A Valles, Freeport, TX
Rusty Merrell, Nederland, TX
Sagness Girouard Jr, Freeport, TX
Sam D Bass, Sweeny, TX
Sam L. Taylor Jr., Palmetto, FL.
Sandra L Tantillo, Friendswood, TX
Sandra Tellez, Oyster Creek, TX
Sandra West Potts, Trinity, TX
Sarabeth Caldwell Waller, Rosharon, TX
Scot H & Perla M Counts, Freeport, TX
Seacrest Co. Llc C/O Jerry Verbout, Houston, TX
Shane Pirtle, Lake Jackson, TX
Sharron Stewart, Lake Jackson, TX
Shawn C & Kimberly D Burns, Spring, TX
Snapp Decision Ii, Houston, TX
Sorrell Family Ltd Prtsp, Freeport, TX
Stanley E Berkefelt, Lake Jackson, TX
Stephen & Deborah Alongis, Freeport, TX
Stephen & Lisa Vasek, Freeport, TX
Stephen & Pam Davis, Freeport, TX
Stephen B Richers, Freeport, TX
Stephen J Kovacs, Clute, TX
Stephen Perry Iii, Freeport, TX
Steve Foley, Kerrville, TX
Steve Gagnon, Clute, TX
Steven G & Vivian A Alford, Freeport, TX
Sunny Jo Dye, Freeport, TX
Suzanne Coots, Freeport, TX
Sylvia Roberts Larson, Baytown, TX
T S Clements Etal, Victoria, TX
T.S. Mccants C/O Mike Sorrell, Oyster Creek, TX
Ta V Low, Brenham, TX
Tallis V. & Lois Turner, Clute, TX
Tami D Soltz, Venice, FL
Tamsey L Mims, Pearland, TX
Ted Laws, Freeport, TX
Teddy Ray & Lynola M Schuster, Freeport, TX
Temple Street Moore Byers, Nacogdoches, TX
Teresa Cornelison, Freeport, TX
Terrence & Mary Jopplin, Spring, TX
Terry A & Phyllis D Voyles, Freeport, TX
Terry D & Mary J Spence, Freeport, TX
Terry Moore, Freeport, TX
Terry Voyler, Freeport, TX
Thanh Dinh, Round Rock, TX
Thanh Van & Quynh T. Duong, Angleton, TX
Theresa Cornelison, Freeport, TX
Thien Nguyen, Freeport, TX
Thomas Edward Lewis Etal, Leakey, TX
Thomas Grant Johnson, Houston, TX
Thomas J & Babich Shayne Yarick, Hempstead, TX
Thomas Joel Garner, Oyster Creek, TX
Timothy J. Mckinley, Houston, TX
Tobey Davenport, Freeport, TX
Tom & Linda Cressman, Freeport, TX
Tom N Leblanc Sr, Freeport, TX
Tommy J & Deborah Muston, Houston, TX
Tommy Paul & Dianna F Tutle, Southlake, TX
Tommy R. Tomblin, Brazoria, TX
Tony & Debbie Isacks, Freeport, TX
Tony Chrisman, Little Elm, TX
Trvis W & Barrett J Gibson, Houston, TX

Tyson Sowell, Houston, TX
Val P & Nancy A Hoffman, Freeport, TX
Val P. Hoffman, Freeport, TX
Van L Jensen, Freeport, TX
Venila Gladys Nichols, Freeport, TX
Vernon A & Billie Joy Martin Revocable Living Trust, Friendswood, TX
Victor Ruiz, Spring, TX
Virginia & Jamie Murray Johnson, Angleton, TX
Virginia Hall, Clute, TX
Vivian Louise Mcnally, Freeport, TX
W D & Freda P Cavin, Freeport, TX
W J White, Latexo, TX
W R & Margaret Barber, Buffalo, TX
W. David Tidholm, Houston, TX
Wade Cook, Freeport, TX
Walter F. Harris, Freeport, TX
Warren D & Barbara Hawkins, Houston, TX
Wayne & Anita Cromis, Oyster Creek, TX
Wayne A Kovar, Rosenberg, TX
Wayne Shaw, Lake Jackson, TX
Wes K & Stacey E Lincecum, Houston, TX
William Arraez, The Woodlands, TX
William B Blackwell, Freeport, TX
William B Mock, Houston, TX
William Bess, Quintana, TX
William Bryan Shaver Etal, North Zulch, TX
William Candelaria, Freeport, TX
William D & Wanda T Bennett, Auburndale, FL
William G Bounds, Freeport, TX
William Gene Mackey, Glen Rose, TX
William H. Manuel, Orange, TX
William P. & Denise L. Carter, Pearland, TX
William R Sledge, Lake Jackson, TX
William T & Richard C Kennedy, Washington, TX
Wiltshire Wiltshire, Clute, TX
Zimin Su, Missouri City, TX

APPENDIX B

Draft PSD Greenhouse Gas Emission Permit

PREVENTION OF SIGNIFICANT DETERIORATION PERMIT FOR GREENHOUSE GAS EMISSIONS ISSUED PURSUANT TO THE REQUIREMENTS AT 40 CFR § 52.21

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 6

PSD PERMIT NUMBER:	PSD-TX-1302-GHG
PERMITTEE:	Freeport LNG Development, L.P. 333 Clay Street, Suite 5050 Houston, TX 77002
FACILITY NAME:	Freeport LNG Liquefaction Project
PRETREATMENT FACILITY LOCATION:	CR 690, approximately 0.25 miles north of the intersection of CR690 and CR891 Freeport, TX 77541
LIQUEFACTION PLANT LOCATION:	1500 Lamar Street Quintana, TX 77541

Pursuant to the provisions of the Clean Air Act (CAA), Subchapter I, Part C (42 U.S.C. Section 7470, *et. Seq.*), and the Code of Federal Regulations (CFR) Title 40, Section 52.21, and the Federal Implementation Plan at 40 CFR § 52.2305 (effective May 1, 2011 and published at 76 FR 25178), the U.S. Environmental Protection Agency, Region 6 is issuing a *Prevention of Significant Deterioration* (PSD) permit to Freeport LNG Development, L.P. (Freeport LNG) for Greenhouse Gas (GHG) emissions. The Permit for the Freeport LNG Liquefaction Project applies to the construction of a natural gas liquefaction plant contiguous to Freeport LNG's existing Liquefied Natural Gas Terminal facility on Quintana Island and a natural gas pretreatment facility to be located approximately 3.5 miles from the Quintana Island Terminal, both in Brazoria County, Texas.

Freeport LNG is authorized to construct a new liquefaction plant and pretreatment facility as described herein, in accordance with the permit application (and plans submitted with the permit application), the federal PSD regulations at 40 CFR § 52.21, and other terms and conditions set forth in this PSD permit in conjunction with the corresponding Texas Commission on Environmental Quality (TCEQ) PSD permit No. PSD-TX-1302 and Nonattainment New Source Review (NNSR) permit No. N170 for the Pretreatment Facility and permit No. PSD-TX-1282 and N150 for the Liquefaction Plant. Failure to comply with any condition or term set forth in this PSD Permit may result in enforcement action pursuant to Section 113 of the Clean Air Act

(CAA). This PSD Permit does not relieve Freeport LNG of the responsibility to comply with any other applicable provisions of the CAA (including applicable implementing regulations in 40 CFR Parts 51, 52, 60, 61, 72 through 75, and 98) or other federal and state requirements (including the state PSD program that remains under approval at 40 CFR § 52.2303).

In accordance with 40 CFR §124.15(b), this PSD Permit becomes effective 30 days after the service of notice of this final decision unless review is requested on the permit pursuant to 40 CFR §124.19.

_____ _____

Wren Stenger, Director Date
Multimedia Planning and Permitting Division

DRAFT

Freeport LNG Development, L.P. (PSD-TX-1302-GHG)
Prevention of Significant Deterioration Permit
For Greenhouse Gas Emissions
Draft Permit Conditions

PROJECT DESCRIPTION

Freeport LNG is proposing to add liquefaction infrastructure to its existing Quintana Island Terminal to provide export capacity of a nominal 13.2 million tons per annum (mtpa) of liquefied natural gas (LNG), which equates to processing a nominal 2.2 billion standard cubic feet per day (BSCFD) of pipeline quality natural gas. Pipeline quality natural gas will be delivered from interconnecting intrastate pipeline systems through Freeport LNG Development's existing Stratton Ridge meter station. The gas will be pretreated in the Pretreatment Facility to remove carbon dioxide (CO_2), sulfur compounds, water, mercury, and heavy hydrocarbons. The pretreated natural gas will then be delivered to the Liquefaction Plant through Freeport LNG's existing 42-inch gas pipeline. At the Liquefaction Plant, the pretreated natural gas will be liquefied and then stored in the LNG storage tanks. LNG will be exported from the terminal by ships arriving via marine transit through the Port Freeport channel.

The Pretreatment Facility will be located approximately 3.5 miles inland to the northeast of the Quintana Island Terminal along Freeport LNG's existing 42-inch natural gas pipeline route. The Pretreatment Facility will be comprised of three natural gas pre-treatment systems, five heating medium heaters, three thermal oxidizers, a Natural Gas Liquids removal unit, an emergency ground flare system, a combustion turbine/heat recovery system, five diesel fuel-fired emergency electrical generators, one diesel fuel-fired emergency air compressor engine, one diesel fuel-fired firewater pump system, and additional electrical compression units and connecting laterals for natural gas supply to the Liquefaction Plant.

The Pretreatment Facility includes a heating medium system that is integrated with power production. The heating medium is circulated from the combustion turbine waste heat exchangers to heaters in the amine units, molecular sieve dehydration system, and heavies removal unit. Treated gas from the Pretreatment Facility will be sent via pipeline to the proposed Liquefaction Plant at the Quintana Island Terminal location.

The main components of the Liquefaction Plant will be three liquefaction trains (Train 1, Train 2, and Train 3), each capable of producing a nominal 4.4 million tons per annum (mtpa) of LNG. All three trains and their supporting facilities will be located to the southwest of the existing liquefaction storage and vaporization facilities. In addition to the three liquefaction trains, peripheral aboveground infrastructure will include an emergency ground flare, six diesel fuel-fired emergency electrical generators, one diesel fuel-fired emergency air compressor engine, an emergency firewater unit including two diesel fuel-fired firewater pump engines, an electrical substation, refrigerant and utility storage units, pipe racks and pipes, sumps and associated LNG troughs, a control room, and a maintenance building.

EQUIPMENT LIST

The following equipment is subject to this GHG PSD permit.

Pretreatment Facility Equipment

FIN	EPN	Description
CT	CT	Natural Gas-Fired General Electric 7EA Combustion Turbine (Combustion Unit). The unit has a nominal base-load gross electric power output of approximately 87 MW vented to a heat exchanger for waste heat recovery. The combustion turbine is equipped with selective catalytic reduction (SCR) exhausting through a single flue gas stack.
65B-81A 65B-81B 65B-81C 65B-81D 65B-81E	65B-81A 65B-81B 65B-81C 65B-81D 65B-81E	5 Heating Medium Heaters (Combustion Unit). Each unit has a maximum design heat input rate of 130 MMBtu/hr (HHV), and is fired with natural gas, boil off gas (BOG), or a natural gas/BOG blend. Emissions are combined into an emissions cap (HTRCAP).
AU1/TO1 AU2/TO2 AU3/TO3	TO1 TO2 TO3	3 Regenerative Thermal Oxidizers (Combustion Units).
PTFFLARE	PTFFLARE	1 Emergency Ground Flare (Combustion Units).
PTFFWP	PTFFWP	1 Fire Water Pump (Combustion Units). 660 horsepower (hp) Diesel Fuel-Fired Fire Water Pump limited to 100 hours of operation per year for non-emergency activities.
PTFEG-1 PTFEG-2 PTFEG-3 PTFEG-4 PTFEG-5	PTFEG-1 PTFEG-2 PTFEG-3 PTFEG-4 PTFEG-5	5 Emergency Generators (Combustion Units). 755 horsepower (hp) Diesel Fuel-Fired Emergency Generators limited to 50 hours of operation per year for non-emergency activities for each unit.
PTFEAC-1	PTFEAC-1	1 Emergency Air Compressor Engine (Combustion Unit). 300 horsepower (hp) Diesel Fuel-Fired engine limited to 50 hours of operation per year for non-emergency activities.
FUG-PTSF6	FUG-PTSF6	SF_6 Insulated Electrical Equipment (i.e., circuit breakers) with 978 pounds SF_6 capacity.
FUG-TREAT	FUG-TREAT	Process Fugitives.

Liquefaction Plant Equipment

FIN	EPN	Description
LIQFLARE	LIQFLARE	1 Emergency Ground Flare (Combustion Unit).
LIQFWP-1 LIQFWP-2	LIQFWP-1 LIQFWP-2	2 Fire Water Pumps (Combustion Units). 660 horsepower (hp) Diesel Fuel-Fired Fire Water Pumps limited to 100 hours of operation per year for non-emergency activities for each unit.
LIQEG-1 LIQEG-2 LIQEG-3 LIQEG-4 LIQEG-5	LIQEG-1 LIQEG-2 LIQEG-3 LIQEG-4 LIQEG-5	5 Emergency Generators (Combustion Units). 755 horsepower (hp) Diesel Fuel-Fired Emergency Generators limited to 50 hours of operation per year for non-emergency activities for each unit.
LIQEG-6	LIQEG-6	1 Emergency Generator (Combustion Unit). 400 horsepower (hp) Diesel Fuel-Fired Emergency Generator limited to 50 hours of operation per year for non-emergency activities.

FIN	EPN	Description
LIQEAC-1	LIQEAC-1	1 Emergency Air Compressor Engine (Combustion Unit). 300 horsepower (hp) Diesel Fuel-Fired Engine limited to 50 hours of operation per year for non-emergency activities for each unit.
FUG-LIQSF6	FUG-LIQSF6	SF_6 Insulated Electrical Equipment (i.e., circuit breakers) with 5,683 pounds SF_6 capacity.
FUG-LIQ	FUG-LIQ	Process Fugitives.

I. GENERAL PERMIT CONDITIONS

1) PERMIT EXPIRATION

As provided in 40 CFR §52.21(r), this PSD Permit shall become invalid if construction:

1. is not commenced (as defined in 40 CFR §52.21(b)(9)) within 18 months after the approval takes effect; or
2. is discontinued for a period of 18 months or more; or
3. is not completed within a reasonable time.

Pursuant to 40 CFR §52.21(r), EPA may extend the 18-month period upon a written satisfactory showing that an extension is justified.

2) PERMIT NOTIFICATION REQUIREMENTS

Permittee shall notify EPA Region 6 in writing or by electronic mail of the:

1. date construction is commenced, postmarked within 30 days of such date;
2. actual date of initial startup, as defined in 40 CFR §60.2, postmarked within 15 days of such date; and
3. date upon which initial performance tests will commence, in accordance with the provisions of Section V, postmarked not less than 30 days prior to such date. Notification may be provided with the submittal of the performance test protocol required pursuant to Special Condition V.C.

3) FACILITY OPERATION

At all times, including periods of startup, shutdown, and maintenance, Permittee shall, to the extent practicable, maintain and operate the facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the EPA, which may include, but is not limited to, monitoring results, review of operating maintenance procedures and inspection of the facility.

4) MALFUNCTION REPORTING

1. Permittee shall notify EPA by mail within 48 hours following the discovery of any failure of air pollution control equipment, process equipment, or of a process to operate in a normal manner, which results in an increase in GHG emissions above the allowable emission limits stated in Section II and III of this permit.
2. Within 10 days of the restoration of normal operations after any failure described in Special Condition I.4.1., Permittee shall provide a written supplement to the initial notification that includes a description of the malfunctioning equipment or abnormal operation, the date of the initial malfunction, the period of time over which emissions were increased due to the failure, the cause of the failure, the estimated resultant emissions in excess of those allowed in Section II and III, and the methods utilized to mitigate emissions and restore normal operations.
3. Compliance with this malfunction notification provision shall not excuse or otherwise constitute a defense to any violation of this permit or any law or regulation such malfunction may cause.

5) RIGHT OF ENTRY

EPA authorized representatives, upon the presentation of credentials, shall be permitted:

1. to enter the premises where the facility is located or where any records are required to be kept under the terms and conditions of this PSD Permit;
2. during normal business hours, to have access to and to copy any records required to be kept under the terms and conditions of this PSD Permit;
3. to inspect any equipment, operation, or method subject to requirements in this PSD Permit; and,
4. to sample materials and emissions from the source(s).

6) TRANSFER OF OWNERSHIP

In the event of any changes in control or ownership of the facilities to be constructed, this PSD Permit shall be binding on all subsequent owners and operators. Permittee shall notify the succeeding owner and operator of the existence of the PSD Permit and its conditions by letter; a copy of the letter shall be forwarded to EPA Region 6 within thirty days of the letter signature.

7) SEVERABILITY

The provisions of this PSD Permit are severable, and, if any provision of the PSD Permit is held invalid, the remainder of this PSD Permit shall not be affected.

8) ADHERENCE TO APPLICATION AND COMPLIANCE WITH OTHER ENVIRONMENTAL LAWS

Permittee shall construct this project in compliance with this PSD Permit, the application on which this permit is based, the TCEQ PSD Permits PSD-TX-1302 and PSD-TX-1282 and NNSR Permits N150 and N170 (when issued) and all other applicable federal, state, and local air quality regulations. This PSD permit does not release the Permittee from any liability for compliance with other applicable federal, state and local environmental laws and regulations, including the Clean Air Act.

9) ACRONYMS AND ABBREVIATIONS

API	American Petroleum Institute
BACT	Best Available Control Technology
BOG	Boil-off Gas
BSCFD	Billion Standard Cubic Feet per Day
CAA	Clean Air Act
CC	Carbon Content
CCS	Carbon Capture and Sequestration
CEMS	Continuous Emissions Monitoring System
CFR	Code of Federal Regulations
CH_4	Methane
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
CT	Combustion Turbine
DLNB	Dry Low-NO_x Burner
dscf	Dry Standard Cubic Foot
EF	Emission Factor
EPN	Emission Point Number
FIN	Facility Identification Number
Fc	Carbon Dioxide-Based Fuel Factor
FR	Federal Register
GCV	Gross Calorific Value
GHG	Greenhouse Gas
gr	Grains
GWP	Global Warming Potential
HHV	High Heating Value
hr	Hour
LAER	Lowest Achievable Emission Rate
lb	Pound
LDAR	Leak Detection and Repair
LNG	Liquid Natural Gas
MMBtu	Million British Thermal Units
MSS	Maintenance, Start-up and Shutdown
mtpa	Million Tons per Annum
NNSR	Nonattainment New Source Review
N_2O	Nitrous Oxides
NO_x	Nitrogen Oxides
NSPS	New Source Performance Standards
PSD	Prevention of Significant Deterioration
QA/QC	Quality Assurance and/or Quality Control
SCFH	Standard Cubic Feet per Hour
SCR	Selective Catalytic Reduction
SF_6	Sulfur Hexafluoride
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TPY	Tons per Year
USC	United States Code
VOC	Volatile Organic Compound

II. Annual Emission Limits

Annual emissions, in tons per year (TPY) on a 12-month, rolling total, shall not exceed the following:

Table 1. Annual Emission Limits[1]

FIN	EPN	Description	GHG Mass Basis		TPY CO_2e[2,3]	BACT Requirements
				TPY[2]		
CT	CT	Combustion Turbine/Waste Heat Recovery (Pretreatment Facility)	CO_2	561,118	561,669	738 lbs CO_2/MWh (based on gross CT energy output and equivalent energy produced) on a 365-day rolling average. See Special Condition III.C.1.
			CH_4	10.6		
			N_2O	1.06		
65B-81A 65B-81B 65B-81C 65B-81D 65B-81E	65B-81A 65B-81B 65B-81C 65B-81D 65B-81E	Heating Medium Heaters[4] (Pretreatment Facility)	CO_2	79,968	80,046	117 lb CO_2e/MMBtu (HHV) for each heater. Minimum Thermal Efficiency of 80% (LHV basis). See Special Condition III.E.1. and 2.
			CH_4	1.5		
			N_2O	0.15		
AU1/TO1	TO1	Amine Unit / Regenerative Thermal Oxidizer 1 (Pretreatment Facility)	CO_2	301,338	301,339	Good Combustion and Operating Practices. See Special Condition III.F.
			CH_4	0.05		
			N_2O	No Emission Limit Established[5]		
AU2/TO2	TO2	Amine Unit / Regenerative Thermal Oxidizer 2 (Pretreatment Facility)	CO_2	301,338	301,339	Good Combustion and Operating Practices. See Special Condition III.F.
			CH_4	0.05		
			N_2O	No Emission Limit Established[5]		
AU3/TO3	TO3	Amine Unit / Regenerative Thermal Oxidizer 3 (Pretreatment Facility)	CO_2	301,338	301,339	Good Combustion and Operating Practices. See Special Condition III.F.
			CH_4	0.05		
			N_2O	No Emission Limit Established[5]		
PTFFLARE	PTFFLARE	Ground Flare (Pretreatment Facility)	CO_2	2,208	2,212	Vent gas releases to flare limited to no more than 3 MMscf/yr on a 12-month rolling total. See Special Condition III.G.3.
			CH_4	0.06		
			N_2O	0.01		

FIN	EPN	Description	GHG Mass Basis		TPY CO_2e[2,3]	BACT Requirements
				TPY[2]		
PTFFWP	PTFFWP	Fire Water Pump (Pretreatment Facility)	CO_2	38	38	Limit operation to no more than 100 hours on a 12-month rolling total. See Special Condition III.H.2.
			CH_4	No Emission Limit Established[5]		
			N_2O	No Emission Limit Established[5]		
PTFEG-1	PTFEG-1	Emergency Generator 1 (Pretreatment Facility)	CO_2	22	22	Limit operation to no more than 50 hours on a 12-month rolling total. See Special Condition III.H.3.
			CH_4	No Emission Limit Established[5]		
			N_2O	No Emission Limit Established[5]		
PTFEG-2	PTFEG-2	Emergency Generator 2 (Pretreatment Facility)	CO_2	22	22	Limit operation to no more than 50 hours on a 12-month rolling total. See Special Condition III.H.3.
			CH_4	No Emission Limit Established[5]		
			N_2O	No Emission Limit Established[5]		
PTFEG-3	PTFEG-3	Emergency Generator 3 (Pretreatment Facility)	CO_2	22	22	Limit operation to no more than 50 hours on a 12-month rolling total. See Special Condition III.H.3.
			CH_4	No Emission Limit Established[5]		
			N_2O	No Emission Limit Established[5]		
PTFEG-4	PTFEG-4	Emergency Generator 4 (Pretreatment Facility)	CO_2	22	22	Limit operation to no more than 50 hours on a 12-month rolling total. See Special Condition III.H.3.
			CH_4	No Emission Limit Established[5]		
			N_2O	No Emission Limit Established[5]		

FIN	EPN	Description	GHG Mass Basis		TPY CO_2e[2,3]	BACT Requirements
				TPY[2]		
PTFEG-5	PTFEG-5	Emergency Generator 5 (Pretreatment Facility)	CO_2	22	22	Limit operation to no more than 50 hours on a 12-month rolling total. See Special Condition III.H.3.
			CH_4	No Emission Limit Established[5]		
			N_2O	No Emission Limit Established[5]		
PTFEAC-1	PTFEAC-1	Emergency Air Compressor Engine (Pretreatment Facility)	CO_2	9	9	Limit operation to no more than 50 hours on a 12-month rolling total. See Special Condition III.H.3.
			CH_4	No Emission Limit Established[5]		
			N_2O	No Emission Limit Established[5]		
LIQFWP-1	LFWP-1	Fire Water Pump (Liquefaction Plant)	CO_2	38	38	Limit operation to no more than 100 hours on a 12-month rolling total. See Special Condition III.H.2.
			CH_4	No Emission Limit Established[5]		
			N_2O	No Emission Limit Established[5]		
LIQFWP-2	LFWP-2	Fire Water Pump (Liquefaction Plant)	CO_2	38	38	Limit operation to no more than 100 hours on a 12-month rolling total. See Special Condition III.H.2.
			CH_4	No Emission Limit Established[5]		
			N_2O	No Emission Limit Established[5]		
LIQEG-1	LIQEG-1	Emergency Generator 1 (Liquefaction Plant)	CO_2	22	22	Limit operation to no more than 50 hours on a 12-month rolling total. See Special Condition III.H.3.
			CH_4	No Emission Limit Established[5]		
			N_2O	No Emission Limit Established[5]		

FIN	EPN	Description	GHG Mass Basis		TPY CO_2e[2,3]	BACT Requirements
				TPY[2]		
LIQEG-2	LIQEG-2	Emergency Generator 2 (Liquefaction Plant)	CO_2	22	22	Limit operation to no more than 50 hours on a 12-month rolling total. See Special Condition III.H.3.
			CH_4	No Emission Limit Established[5]		
			N_2O	No Emission Limit Established[5]		
LIQEG-3	LIQEG-3	Emergency Generator 3 (Liquefaction Plant)	CO_2	22	22	Limit operation to no more than 50 hours on a 12-month rolling total. See Special Condition III.H.3.
			CH_4	No Emission Limit Established[5]		
			N_2O	No Emission Limit Established[5]		
LIQEG-4	LIQEG-4	Emergency Generator 4 - Liquefaction (Liquefaction Plant)	CO_2	22	22	Limit operation to no more than 50 hours on a 12-month rolling total. See Special Condition III.H.3.
			CH_4	No Emission Limit Established[5]		
			N_2O	No Emission Limit Established[5]		
LIQEG-5	LIQEG-5	Emergency Generator 5 (Liquefaction Plant)	CO_2	22	22	Limit operation to no more than 50 hours on a 12-month rolling total. See Special Condition III.H.3.
			CH_4	No Emission Limit Established[5]		
			N_2O	No Emission Limit Established[5]		
LIQEG-6	LIQEG-6	Emergency Generator 6 - Liquefaction (Liquefaction Plant)	CO_2	11	11	Limit operation to no more than 50 hours on a 12-month rolling total. See Special Condition III.H.3.
			CH_4	No Emission Limit Established[5]		
			N_2O	No Emission Limit Established[5]		

FIN	EPN	Description	GHG Mass Basis		TPY CO_2e[2,3]	BACT Requirements
				TPY[2]		
LIQEAC-1	LIQEAC-1	Emergency Air Compressor Engine (Liquefaction Facility)	CO_2	9	9	Limit operation to no more than 50 hours on a 12-month rolling total. See Special Condition III.H.3.
			CH_4	No Emission Limit Established[5]		
			N_2O	No Emission Limit Established[5]		
LIQFLARE	LIQFLARE	Emergency Ground Flare (Liquefaction Plant)	CO_2	11,512	11,523	Vent gas releases to flare limited to no more than 167 MMscf/yr on a 12-month rolling total. See Special Condition III.G.4.
			CH_4	0.22		
			N_2O	0.02		
FUG-PTFSF6 FUG-LIQSF6	FUG-PTFSF6 FUG-LIQSF6	Circuit Breakers (Liquefaction Plant)	SF_6	No Emission Limit Established[6]	No Emission Limit Established[6]	Implementation of LDAR program using infrared camera. See Special Condition III.I.5.
FUG-TREAT and FUG-LIQ	FUG-TREAT and FUG-LIQ	Fugitive Process Emissions (Pretreatment and Liquefaction)	CH_4	No Emission Limit Established[7]	No Emission Limit Established[7]	Implementation of LDAR and AVO monitoring program. See Special Condition III.I.1. and 2.
Totals[8]			**CO_2**	**1,559,209**	**CO_2e 1,561,445**	
			CH_4	**74.5**		
			N_2O	**1.2**		

1. Compliance with the annual emission limits (tons per year) is based on a 12-month, rolling total.
2. The TPY emission limits specified in this table are not to be exceeded for this facility and include emissions from the facility during all operations and include MSS activities.
3. Global Warming Potentials (GWP): CH_4 = 21, N_2O = 310, SF6=23,900
4. The 5 heaters have an emissions cap.
5. Values are less than 0.01 TPY with appropriate rounding. The emission limit will be a design/work practice standard as specified in the permit.
6. SF_6 fugitive emissions from EPN FUG-PTFSF6 are estimated to be 0.002 TPY of SF_6 and 47.8 TPY of CO_2e. SF_6 fugitive emissions from EPN FUG-LIQSF6 are estimated to be 0.01 TPY of SF_6 and 239 TPY of CO_2e. The emission limit for EPNs FUG-PTSF6 and FUG-LIQSF6 will be a design/work practice standard as specified in the permit.
7. Fugitive process emissions from EPNs FUG-TREAT and FUG-LIQ are estimated to be 62 TPY of CH_4, and 1,306 TPY CO_2e. The emission limit will be a design/work practice standard as specified in the permit.
8. The total emissions for CH_4 and CO_2e include the PTE for process fugitive emissions of CH_4. Total emissions are for information only and do not constitute an emission limit.

III. SPECIAL PERMIT CONDITIONS

A. Sitewide Energy Efficiency Requirements

Permittee shall utilize only electric motor primary drivers for the Liquefaction Project. The Permittee shall construct each liquefaction train to have an accompanying natural gas pretreatment unit. Each pretreatment unit shall have the capacity, but is not limited to the capacity, to treat natural gas for one liquefaction train.

B. Combustion Turbine (EPN: CT) Work Practice Standards, Operational Requirements, and Monitoring at Pretreatment Facility:

1. Permittee shall limit fuel to the combustion turbine (CT) to pipeline quality natural gas, boil-off gas (BOG), or BOG supplemented with pipeline quality natural gas with a fuel sulfur content of up to 5 grains of sulfur per 100 dry standard cubic feet (gr S/100 dscf). The gross calorific value of the fuel shall be determined monthly by the procedures contained in 40 CFR Part 98 and records shall be maintained of the monthly fuel gross calorific value for a period of five years.
2. Natural gas quality fuels with the carbon content will be obtained by semiannual testing per 40 CFR§98.34(b)(3)(A). Upon request, Permittee shall provide a sample and/or analysis of the fuel that is fired in the combustion turbine (CT) at the time of the request, or shall allow a sample to be taken by EPA for analysis.
3. Permittee shall monitor fuel gas flow continuously; determine fuel higher heating value whene**v**er there is a fuel change or monthly, whichever is less; and calculate the total daily heat input.
4. The flow rate of the fuel combusted in the combustion turbine, identified as CT, shall be measured and recorded using an operational non-resettable elapsed flow meter.
5. Natural gas/boil-off gas flow meter shall be calibrated in accordance with 40 CFR§98.34(b)(1).
6. Flow meters shall meet the specification in 40 CFR 60 Appendix B Spec. 6.
7. All flow meters shall meet the Quality Assurance Specifications in 40 CFR Appendix F.
8. In accordance with 40 CFR Part 60, the Permittee shall ensure that all required fuel flow meters are installed, a periodic schedule for GCV fuel sampling is initiated and all certification tests are completed on or before the ear**l**ier of 90 unit operating days or 180 calendar days after the date the affected combustion unit commences commercial operation.
9. Permittee shall measure and record the energy output (MWh [based on adjusted gross CT energy output and equivalent energy produced]) on an hourly basis.
10. The emission limits established in Table 1 include emissions associated with MSS activities.

11. Permittee shall monitor and record the following parameters daily:
    a. Inlet air flow, temperature, pressure, and humidity;
    b. CT fuel input – volumetric measurement of fuel flow converted into mass (lb/hr) and energy flow (MMBtu/hr);
    c. Combustion temperature;
    d. Exhaust temperature;
    e. Gross hourly energy output (Mwh);
    f. CT plant thermal efficiency %;
    g. Gas turbine electrical output, MW;
    h. Chilled water supply and return temperatures; and
    i. Energy input to the chillers.
12. Permittee shall determine the hourly CO_2 emission rate in accordance with 40 CFR Part 98 Subpart C § 98.33(a)(3)(iii).
13. Permittee shall calculate the CH_4 and N_2O emissions on a 12-month rolling basis to be updated by the last day of the following month. Permittee shall determine compliance with the CH_4 and N_2O emissions limits contained in this section using the default CH_4 and N_2O emission factors contained in Table C-2 and equation C-8 of 40 CFR Part 98 and the HHV (for natural gas and/or boil-off gas), converted to short tons.
14. Permittee shall calculate the CO_2e emissions on a 12-month rolling basis, based on the procedures and Global Warming Potentials (GWP) contained in Greenhouse Gas Regulations, 40 CFR Part 98, Subpart A, Table A-1, as published on October 30, 2009 (74 FR 56395). The record shall be updated by the last day of the following month.

C. Combustion Turbine (EPN: CT) BACT Emission Limits at Pretreatment Facility:

1. On or after the date of initial startup, Permittee shall not discharge or cause the discharge of emissions from the Combustion Turbine /Waste Heat Recovery Units (CT) into the atmosphere in excess of 738 lbs CO_2/MWh (based on gross CT energy output and equivalent energy produced) on a 365-day rolling average. To determine this BACT emission limit, Permittee shall calculate the limit based on the measured hourly energy output (MWh [based on adjusted gross CT energy output and equivalent energy produced]) and CO_2 emissions as calculated in Special Permit Condition III.B.12. above. The calculated hourly rate is averaged daily.
2. Permittee shall not exceed a Combustion Turbine average heat rate of 5,210 Btu/kWh (LHV, adjusted gross CT energy heat rate with compliance margin) on a 12 month rolling average. To determine this limit, Permittee shall calculate the average heat rate on a hourly basis using the fuel flow rate, fuel HHV,and the measured hourly energy output (kwh [based on adjusted gross CT energy output and equivalent energy produced])). The calculated hourly heat rate is averaged monthly.

3. Within 180 days of the date of initial startup of the combustion turbine, the Permittee shall perform an initial emission test for CO_2 and use emission factors from 40 CFR Part 98. To verify compliance with the BACT emission limit, the Permittee shall calculate the limit based on the measured hourly energy output (MWh [based on adjusted gross CT energy output and equivalent energy produced]) when the CT is operating above 90% of its design capacity, and the results shall be corrected to ISO conditions (59^oF, 14.7 psia, and 67% humidity). If the CT does not meet the BACT emissions limit, the Permittee may continue operation of the CT in order to perform necessary corrective actions and to continue plant operations. Once corrective actions have been made, the Permittee will schedule a follow-on emissions test and will make appropriate notifications to the EPA.
4. On or after initial performance testing, Permittee shall use the combustion turbines, and waste heat recovery units energy efficiency processes, work practices and designs as represented in the permit application.

D. Heating Medium Heaters (EPNs: 65B-81A, 65B-81B, 65B-81C, 65B-81D, and 65B-81E) Work Practice Standards, Operational Requirements, and Monitoring at the Pretreatment Facility:

1. Heaters shall combust only pipeline quality natural gas, BOG, or a natural gas/BOG mixture.
2. Permittee shall measure and record the fuel flow rate using an operational non-resettable elapsed flow meter.
3. Permittee shall calibrate and perform a preventative a maintenance check of the fuel gas flow meters and document annually.
4. Permittee shall perform a preventative maintenance check of oxygen control analyzers and document annually.
5. Permittee shall perform maintenance of the burners, at a minimum of, annually.
6. The maximum firing rate for the heaters shall not exceed 130 MMBtu/hr (HHV) per unit.
7. The one-hour maximum firing rates shall be calculated daily to demonstrate compliance with the firing rates in Special Condition III.D.6.
8. Permittee shall install, operate, and maintain an automated air/fuel control system.
9. Permittee shall calibrate and perform preventative maintenance on the air/fuel control analyzers, at a minimum, annually.
10. The heaters must comply with the CO_2e emissions cap in Table 1.
11. Permittee shall calculate the amount of CO_2 (mass basis) emitted for the heaters in tons per year (tpy) on a 12-month rolling total based on metered fuel consumption and using the Tier III methodology in accordance with 40 CFR Part 98 Subpart C § 98.33(a)(3)(iii).
12. Permittee shall calculate the CH_4 and N_2O emissions on a 12-month rolling basis to be updated by the last day of the following month. Permittee shall determine

compliance with the CH_4 and N_2O emissions limits contained in this section using the default CH_4 and N_2O emission factors contained in Table C-2 and equation C-8 of 40 CFR Part 98 and the HHV (for natural gas and/or boil-off gas), converted to short tons.

13. Permittee shall calculate the CO_2e emissions on a 12-month rolling basis, based on the procedures and Global Warming Potentials (GWP) contained in Greenhouse Gas Regulations, 40 CFR Part 98, Subpart A, Table A-1, as published on October 30, 2009 (74 FR 56395). The record shall be updated by the last day of the following month.

E. Heating Medium Heaters (EPNs: 65B-81A, 65B-81B, 65B-81C, 65B-81D, and 65B-81E) BACT Emission Limits at Pretreatment Facility:

1. The heaters shall meet a BACT limit of 117 lb CO_2e/MMBtu for each heater on a 12-month rolling average basis.
2. The Permittee shall maintain a minimum overall thermal efficiency of 80% (LHV) or greater on a 12-month rolling average basis, calculated monthly, for the heaters (65B-81A, 65B-81B, 65B-81C, 65B-81D, and 65B-81E).
3. The heaters (65B-81A, 65B-81B, 65B-81C, 65B-81D, and 65B-81E) will be continuously monitored for exhaust temperature, input fuel temperature, and stack oxygen. Thermal efficiency for heaters will be calculated monthly from these parameters using equation G-1 from American Petroleum Institute (API) methods 560 (4^{th} ed.) Annex G.

F. Regenerative Thermal Oxidizers (EPNs: TO1, TO2, and TO3) Work Practice Standards, Operational Requirements, and Monitoring at the Pretreatment Facility

1. Each of the three natural gas pre-treatment train amine units (AU1, AU2, and AU3) shall be equipped with a regenerative thermal oxidizer (TO1, TO2, and TO3). Each regenerative thermal oxidizer shall combust low-VOC concentration waste gas from the amine units. The maximum heat input rate to each regenerative thermal oxidizer combustion burner shall not exceed 5 MMBtu/hr when firing natural gas, BOG, or a natural gas/BOG blend.
2. Each regenerative thermal oxidizer shall have an initial stack test, to verify destruction and removal efficiency (DRE) for VOC of 99% or an outlet concentration of 10 ppmv VOC, as propane, corrected to 3% O2 whichever limit is more stringent.
3. For combustion burner fuel flow shall be recorded using an operational non-resettable elapsed flow meter at each thermal oxidizer.
4. The flow rate of the fuel gas (natural gas, BOG or natural gas/BOG blend to the regenerative thermal oxidizer burner) and waste gas flow rate to each thermal oxidizer shall be measured and recorded separately using an operational non-resettable elapsed flow meter at each regenerative thermal oxidizer. Waste gas will be sampled and analyzed on a quarterly basis for composition. The sampled data will be

used to calculate GHG emissions to show compliance with the limits specified in Table 1.

5. Permitee shall calculate CO_2 emissions to show compliance with the limits specified in Table 1, on a monthly basis, using the measured waste gas flow rate and equation W-3 in 40 CFR Part 98, Subpart W [98.233(d)(2)] for the vent gas stream from the amine units.
6. Periodic maintenance shall be performed to maintain the efficiency of the regenerative thermal oxidizer at a minimum annually or as recommended by manufacturer specifications.
7. The Permittee shall maintain the combustion temperature at a minimum of 1,525 ºF (on a rolling 3-hour block average basis) at all times when processing waste gas from the amine units in the regenerative thermal oxidizer. Temperature monitoring of the regenerative thermal oxidizer will ensure proper operation. The Permittee shall install a temperature sensor with a measurement sensitivity of 5 degrees Fahrenheit or 1.0 percent of the temperature value, whichever is larger, expressed in degrees Farenheight.

G. Flares (EPN: PTFFLARE (Pretreatment Facility) and EPN: LIQFLARE (Liquefaction Plant)) Work Practice Standards, Operational Requirements, and Monitoring

1. Flares shall have a minimum destruction and removal efficiency (DRE) of 99% for methane based on flow rate and gas composition measurements as specified in 40 CFR Part 98 Subpart W § 98.233(n).
2. Flares (PTFFLARE and LIQFLARE) are intermittent use flares, not continuous process flares. Emission Units, PTFFLARE and LIQFLARE, shall only combust pilot gas as a continuous stream.
3. Both flares are pressure-assisted. BACT for the Pretreatment Flare (PTFFLARE) will be to limit maintenance startup and shutdown vent gas releases to the flare to no more than 3 MMscf/yr based on a rolling 12-month rolling total.
4. BACT for the Liquefaction Flare (LIQFLARE) will be to limit maintenance startup and shutdown vent gas releases to the flare to no more than 167 MMscf/yr based on a rolling 12-month rolling total.
5. Permittee must record the time, date, volume of gas sent to flare in cubic feet and duration of each MSS event. The records must include hourly CH_4 emission levels as measured by the in-line gas analyzer (Gas chromatograph or equivalent with volumetric gas flow rate) and the calculations based on the actual volumetric flow for the CO_2, N_2O, and CH_4 emissions during each MSS event. These records must be kept for five years following the date of each event.
6. Permittee must record the fuel heat input rate (HHV) in MMBtu/hr to the flare pilots during flare operation. The records must include hourly CH_4 emission levels as measured by the in-line gas analyzer (Gas chromatograph or equivalent with volumetric stack gas flow rate) and the calculations based on the actual heat input for

the CO_2, N_2O, and CH_4 emissions. These records must be kept for five years following the date of each event.

7. Each flare shall be designed and operated in accordance with 40 CFR 60.18 including specifications of minimum heating value of the waste gas, maximum tip velocity, and pilot flame monitoring. An infrared monitor is considered equivalent to a thermocouple for flame monitoring purposes.

H. Fire Water Pumps (EPN: PTFFWP (Pretreatment Facility) and EPN: LIQFWP-1 and LIQFWP-2 (Liquefaction Plant)) and Emergency Generators (EPNs: PTFEG-1, PTFEG-2, PTFEG-3, PTFEG-4, and PTFEG-5 (Pretreatment Facility) and EPNs: LIQEG-1, LIQEG-2, LIQEG-3, LIQEG-4 , LIQEG-5, and LIQEG-6 (Liquefaction Plant)) Emergency Air Compressors (EPN: PTFEAC-1 (Pretreatment Facility) and EPN: LIQEAC-1 (Liquefaction Plant))Work Practice Standards, Operational Requirements, and Monitoring

1. The Diesel Fired Fire Water Pumps (PTFFWP, LIQFWP-1, and LIQFWP-2), Diesel Fired Emergency Generators (PTFEG-1, PTFEG-2, PTFEG-3, PTFEG-4, PTFEG-5 LIQEG-1, LIQEG-2, LIQEG-3, LIQEG-4, LIQEG-5, and LIQEG-6), and Emergency Air Compressors (PTFEAC-1 and LIQEAC-1) are authorized to fire diesel fuel containing no more than 0.0015 percent sulfur by weight. Upon request, Permittee shall provide a sample and/or an analysis of the fuel-fired in the emission units (PTFFWP, LIQFWP-1, LIQFWP-2, PTFEG-1, PTFEG-2, PTFEG-3, PTFEG-4, PTFEG-5, LIQEG-1, LIQEG-2, LIQEG-3, LIQEG-4, LIQEG-5, LIQEG-6, PTFEAC-1, and LIQEAC-1) or shall allow a sample to be taken by EPA for analysis to demonstrate the percent sulfur of the fuel.
2. The Diesel Fired Fire Water Pumps (PTFFWP, LIQFWP-1, and LIQFWP-2) are limited to 100 hours of non-emergency operation per year, based on a rolling 12-month total, for each unit.
3. The Diesel Fired Emergency Generators (PTFEG-1, PTFEG-2, PTFEG-3, PTFEG-4, PTFEG-5 LIQEG-1, LIQEG-2, LIQEG-3, LIQEG-4, LIQEG-5, and LIQEG-6) and Emergency Air Compressors (PTFEAC-1 and LIQEAC-1) are limited to 50 hours of non-emergency operation per year, based on a rolling 12-month total, for each unit.
4. The Fire Water Pumps shall have a rating of no more than 660 hp.
5. Emergency Generators (PTFEG-1, PTFEG-2, PTFEG-3, PTFEG-4, PTFEG-5 LIQEG-1, LIQEG-2, LIQEG-3, LIQEG-4, and LIQEG-5) will have a rating of no more than 755 hp.
6. Emergency Generator LIQEG-6 will have a rating of no greater than a 400 hp .
7. Emergency Air Compressors (PTFEAC-1 and LIQEAC-1) will have a rating of no greater than 300 hp.
8. The Diesel Fired Fire Water Pumps, Diesel Fired Emergency Generators, and Emergency Air Compressors shall meet the monitoring and recordkeeping

requirements as required in 40 CFR Part 60 Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.

9. Permittee shall install and maintain an operational non-resettable elapsed run time meter for the Diesel Fired Fire Water Pumps, Diesel Fired Emergency Generators, and Emergency Air Compressors.
10. Permittee shall maintain a file of all records, data measurements, reports and documents related to the operation of the Diesel Fired Fire Water Pumps, Diesel Fired Emergency Generators, and Emergency Air Compressors including, but not limited to, the following:
    a) all records or reports pertaining to maintenance performed;
    b) for each diesel fuel oil delivery, documents from the fuel supplier certifying compliance with the fuel sulfur content limit of Special Condition III.H.1.;
    c) hours of operation; and
    d) any other information required by this permit recorded in a permanent form suitable for inspection.
11. The file must be retained for not less than five years following the date of such measurements, maintenance, reports, and/or records.
12. Compliance with the Annual Emission Limit shall be demonstrated on a 12-month total, rolling monthly, calculated in accordance with 40 CFR Part 98, Subpart C, § 98.33(a)(1)(i).

I. Fugitive Emission Sources (EPNs: FUG-TREAT, FUG-LIQ, FUG-PTFSF6, and FUG-LIQSF6) at the Pretreatment Facility and Liquefaction Plant Work Practice Standards, Operational Requirements, and Monitoring

1. The Permittee shall implement the TCEQ 28MID leak detection and repair (LDAR) program for fugitive emissions of methane.
2. The Permittee shall implement an audio/visual/olfactory (AVO) monitoring program to monitor for leaks in between instrument monitoring required by III.I.1.
3. AVO monitoring shall be performed on a weekly basis.
4. For emission unit FUG-PTSF6 and FUG-LIQSF6, SF_6 emissions shall be calculated annually (calendar year) in accordance with the mass balance approach provided in equation DD-1 of the Mandatory Greenhouse Gas Reporting rules for Electrical Transmission and Distribution Equipment Use, 40 CFR Part 98, Subpart DD.
5. The Permittee shall monitor for leaks of SF6 on a monthly basis using an infrared camera.
6. Permittee shall not exceed 19 new 163 lb (6 at the Pretreatment Facility and 13 at the Liquefaction Plant) and 27 new 132 lb (Liquefaction Plant) enclosed-pressure SF_6 circuit breakers with leak detection.
7. The Permittee shall maintain a file of all records, data measurements, reports and documents related to the fugitive emission sources including , but not limited to, the following: all records or reports pertaining to maintenance performed, all records

relating to compliance with the Monitoring and Quality Assurance and Quality Control (QA/QC) procedures outlined in 40 CFR 98.304.

J. Continuous Emissions Monitoring Systems (CEMS)

1. As an alternative to Special Conditions III.B.12., III.D.11., and III.F.5. Permittee may install a CO_2 CEMS and volumetric stack gas flow monitoring system with an automated data acquisition and handling system for measuring and recording CO_2 emissions discharged to the atmosphere, and use these values to show compliance with the annual emission limit in Table 1.
2. Permittee shall ensure that all required CO_2 monitoring system/equipment are installed and all certification tests are completed on or before the earlier of 90 unit operating days or 180 calendar days after the date the unit commences operation.
3. Permittee shall ensure compliance with the specifications and test procedures for CO_2 emission monitoring system at stationary sources, 40 CFR Part 98, or 40 CFR Part 60, Appendix B, Performance Specification numbers 1 through 9, as applicable.

IV. Recordkeeping and Reporting

1. In order to demonstrate compliance with the GHG emission limits in Table 1, the Permittee will monitor the following parameters and summarize the data on a calendar month basis.

    a. Operating hours for all affected emergency generator engines, emergency compressor engines, and firewater pump engines;
    b. The natural gas fuel and boil off gas usage rate (scf) for all combustion sources, using non-resettable elapsed fuel flow monitors; and
    c. Monthly fuel sampling for fuel gas (BOG), quarterly fuel sampling of waste gas.

2. Permittee shall implement the TCEQ 28MID leak detection and repair (LDAR) program and keep records of the monitoring results, as well as the repair and maintenance records.
3. Permittee shall maintain all records, data, measurements, reports, and documents related to the operation of the affected combustion units, including, but not limited to, the following: all records or reports pertaining to significant maintenance performed on any affected combustion unit; duration of maintenance, startup, shutdown events and the initial startup period for the affected combustion units; malfunctions that may result in excess GHG emissions; all records relating to performance tests, calibrations, checks, and monitoring of affected combustion equipment; duration of an inoperative monitoring devices and affected combustion units with the required corresponding emission data; and all other information required by this permit recorded in a permanent form suitable for inspection. The records must be retained for not less than five years following the date of such measurements, maintenance, reports, and/or records.

4. Permittee shall maintain records of all CO_2 emission certification tests and monitoring and compliance information required by this permit.
5. Permittee shall maintain records and submit a written report of all excess emissions to EPA semi-annually, except when: more frequent reporting is specifically required by an applicable subpart; or the Administrator or authorized representative, on a case-by-case basis, determines that more frequent reporting is necessary to accurately assess the compliance status of the source. The report is due on the 30th day following the end of each semi-annual period and shall include the following:

    a. Time intervals, data and magnitude of the excess emissions, the nature and cause (if known), corrective actions taken and preventive measures adopted;
    b. Applicable time and date of each period during which the monitoring equipment was inoperative (monitoring down-time);
    c. A statement in the report of a negative declaration; that is; a statement when no excess emissions occurred or when the monitoring equipment has not been inoperative, repaired or adjusted; and
    d. Any failure to conduct any required source testing, monitoring, or other compliance activities.

6. Excess emissions shall be defined as any period in which the facility emissions exceed a maximum emission limit set forth in this permit.
7. Excess emissions indicated by GHG emission source testing as required by Special Condition V or compliance monitoring shall be considered violations of the applicable emission limit for the purpose of this permit.
8. All records required by this PSD Permit shall be retained and remain accessible for not less than 5 years following the date of such measurements, maintenance, and reporting.

V. Initial Performance Testing Requirements:

A. The Permittee shall perform stack sampling and other testing to establish the actual pattern and quantities of air contaminants being emitted into the atmosphere from the stacks of the Combustion Turbine/Waste Heat Recovery Units (CT), Heating Medium Heaters (65B-81A, 65B-81B, 65B-81C, 65B-81D, and 65B-81E), and Thermal Oxidizers (TO1, TO2, and TO3) to determine the initial compliance with the CO_2 emission limits established in this permit. Sampling shall be conducted in accordance with 40 CFR § 60.8 and EPA Method 3a or 3b for the concentration of CO_2.

1. The Permittee shall multiply the CO_2 hourly average emission rate determined under maximum operating test conditions by 8,760 hours except for the five Heating Medium Heaters (65B-81A, 65B-81B, 65B-81C, 65B-81D, and 65B-81E). For the five Heating Medium Heaters (65B-81A, 65B-81B, 65B-81C, 65B-81D, and 65B-81E), a composite average CO_2 emission rate of all five heaters (based on the CO_2

hourly average emission rate determined for each heater) shall be multiplied by 26,952 hours of operation per year for all 5 heaters combined for comparison to the heaters' CO_2 emission limit (TPY) in Table 1.

2. If the above calculated CO_2 emission total does not exceed the tons per year (TPY) specified on Table 1, no compliance strategy needs to be developed.
3. If the above calculated CO_2 emission total exceeds the tons per year (TPY) specified in Table 1, the facility shall:

    a. Document the potential to exceed in the test report; and
    b. Explain within the report how the facility will assure compliance with the CO_2 emission limit listed in Table 1.

B. Within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of the facility, performance tests(s) must be conducted and a written report of the performance testing results furnished to the EPA. Additional sampling may be required by EPA.

C. Permittee shall submit a performance test protocol to EPA no later than 30 days prior to the test to allow review of the test plan and to arrange for an observer to be present at the test. The performance test shall be conducted in accordance with the submitted protocol, and any changes required by EPA.

D. Fuel sampling for emission units CT, 65B-81A, 65B-81B, 65B-81C, 65B-81D, and 65B-81E, shall be conducted in accordance with 40 CFR Part 75 and Part 98.

E. The combustion turbine shall be tested at or above 90% of maximum load operation. The permit holder shall present at the pretest meeting the manner in which stack sampling will be executed in order to demonstrate compliance with the emissions limits contained in Section II.

F. Performance tests must be conducted under such conditions to ensure representative performance of the affected facility. The owner or operator must make available to the EPA such records as may be necessary to determine the conditions of the performance tests.

G. The owner or operator must provide the EPA at least 30 days' prior notice of any performance test, except as specified under other subparts, to afford the EPA the opportunity to have an observer present and/or to attend a pre-test meeting. If there is a delay in the original test date, the facility must provide at least 7 days prior notice of the rescheduled date of the performance test.

H. The owner or operator shall provide, or cause to be provided, performance testing facilities as follows:

1. Sampling ports adequate for test methods applicable to this facility,
2. Safe sampling platform(s),
3. Safe access to sampling platform(s), and
4. Utilities for sampling and testing equipment.

I. Unless otherwise specified, each performance test shall consist of three separate runs using the applicable test method. Each run shall be conducted for the time and under the conditions

specified in the applicable standard. For purposes of determining compliance with an applicable standard, the arithmetic mean of the results of the three runs shall apply.

J. Emissions testing, as outlined above, shall be performed every five years, plus or minus 6 months, of when the previous performance test was performed, or within 180 days after the issuance of a permit renewal, whichever comes later, to verify continued performance at permitted emission limits.

VI. Agency Notifications

Permittee shall submit GHG permit applications, permit amendments, and other applicable permit information to:

Multimedia Planning and Permitting Division
EPA Region 6
1445 Ross Avenue (6 PD-R)
Dallas, TX 75202
Email: Group R6AirPermits@EPA.gov

Permittee shall submit a copy of all compliance and enforcement correspondence as required by this Approval to Construct to:

Compliance Assurance and Enforcement Division
EPA Region 6
1445 Ross Avenue (6EN)
Dallas, TX 75202

APPENDIX C

Draft HDD Monitoring and Contingency Plan

Freeport LNG

Liquefaction Project

HDD Monitoring and Contingency Plan

DRAFT

Prepared By

June 2012

TABLE OF CONTENTS

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1.0 PURPOSE AND NEED

Freeport LNG proposes to use the Horizontal Directional Drilling (HDD) method to install pipe across multiple waterbodies and wetlands as part of its Liquefaction Project (Project). Although the HDD method generally avoids or minimizes the environmental impacts on resources, the potential for impacts from an inadvertent release of drilling mud associated with this crossing technique still exists.

The purpose of this document is to establish procedures for addressing potential impacts associated with inadvertent releases or "frac-outs" of drilling mud during the HDD process. In addition, this document establishes the criteria by which Freeport LNG will determine when a proposed HDD is unsuccessful and must be abandoned.

2.0 DRILLING BASICS

The HDD method is a technically advanced process involving specialized equipment and skilled operators. The primary environmental risk associated with this crossing method comes from the potential for inadvertent release of drilling mud. The selection and supervision of the drilling contractor will be the responsibility of Freeport LNG.

Minimal, consistent loss of drilling mud typically occurs during the drilling process when layers of loose sand, gravel, or fractured rock are encountered and drilling mud fills voids in the material. However, a significant loss of returning drilling mud and a concomitant reduction in drilling pressure indicates that seepage is occurring outside of the hole.

3.0 DRILLING MUD AND DRILLING MUD SYSTEM

The directional drilling process uses drilling mud consisting primarily of water and bentonite, a naturally occurring clay. Drilling mud removes the cuttings from the borehole, stabilizes the walls of the borehole and acts as a coolant and lubricant to the drill bit during the drilling process. The drilling mud mixture consists of 1 to 5 percent bentonite clay and from 0 to 40 percent inert solids from the borehole cuttings, with the remainder being water.

The drilling mud is prepared in the mixing tank using both new and clean recycled drilling mud. The mud is pumped at rates of 200 gallons per minute (gpm) to 1,000 gpm through the center of the drill pipe to the drilling tools. Return flow is through the annulus created between the wall of the drilled hole and the drill pipe. During pilot hole drilling, the cuttings are returned to a small excavation at the entry point called the entry pit. From the entry pit, the returned mud is pumped to the mud processing equipment. Typically, shaker screens, desanders, desilters and centrifuges process and remove increasingly finer cuttings from the drilling mud. The cleaned mud is recycled to the mixing tank for reuse in the borehole. The cuttings removed by the cleaning process are disposed of at a site approved to accept this type of material.

4.0 DRILLING MUD RELEASE

4.1 Prevention

HDD is a pipeline installation method typically used to avoid congested areas and/or disturbance of sensitive surface features, including waterbodies and wetlands. HDD does, however, present a remote potential for surface disturbance through inadvertent drilling mud releases. Drilling mud releases are typically caused by blockage of the return flow path around the drill pipe where pressurization of the drilling mud rises above the containment capability of the overburden soil material. Pressurized drilling mud follows the path of least resistance, which may result in the drilling mud flowing to the ground surface should the annulus around the drill pipe become plugged. Releases may follow fractures in bedrock or other voids in the strata that allow the mud to surface.

4.1.1 Suitable Material and Adequate Overburden

Prevention of drilling mud seepage is a major consideration in determining the profile of the HDD crossing. The primary factors in selecting the pipeline crossing profile include the type of soil and rock in the geological material and the depth of cover material. Cohesive soils, such as clays, dense sands and competent rock are considered ideal materials for horizontal drilling. The depth of adequate overburden is also considered. A minimum depth of cover of 25 feet in competent soils is required to provide a margin of safety against drilling mud seepage.

The areas that present the highest potential for drilling mud seepage are the drill entry and exit points where the overburden depth is minimal. At both the entry and exit points, above ground containment pits can be constructed with berms to collect and provide temporary storage for the inadvertently released drilling mud or seepage until it can be pumped back into the drilling system.

4.1.2 Pipeline Geometry

The geometry of the pipeline profile can slightly affect the potential for drilling mud seepage. In a profile that forces the pipe to make compound or excessively tight radius turns, key-seating of the drill pipe may develop, blocking the return flow to surface, allowing downhole pressures to build up, thereby increasing the potential for drilling mud seepage. The profiles for Freeport LNG's pipeline crossings minimize this potential, with a smooth, deep-seated trajectories affording maximum cover.

4.1.3 Responsibility of Drilling Contractor

The drilling contractor is responsible for execution of the HDD, including actions for detecting and controlling drilling mud seepage. Freeport LNG will closely supervise the progress and actions of the drilling contractor.

4.2 Detection and Monitoring Procedures

To determine if an advertent release has occurred, HDD activities will be monitored constantly on this project, either by the Contractor, Construction Inspector, Environmental Inspector (EI), or any combination of the three. Monitoring procedures and associated activities will include:

- Inspection along the drill path;
- Continuous examination of drilling mud pressure gauges and return flows to the surface pits;
- Monitoring of drilling status information regarding drilling conditions and drill profile alignments;
- If a release occurs in a wetland or waterbody:
  - containment of the drilling mud where practicable;
  - continued inspection to determine any potential for movement of released drilling mud within the wetland or waterbody;
  - collection of drilling mud returns at the location for future analysis, as required; and
  - photographic documentation and other documentation of the release by the EI (Freeport LNG will keep photographs of release events on record).

.

5.0 NOTIFICATION PROCEDURES

If monitoring indicates a release is occurring or has occurred, the Contractor will begin containment immediately while the Construction Inspector or EI will notify Freeport LNG's construction management personnel immediately.

Freeport LNG will notify the appropriate agencies immediately upon discovery of an inadvertent wetland or waterbody release, detailing the location and nature of the release, corrective actions being taken, and whether the release poses any threat to public health and safety.

6.0 CORRECTIVE ACTION

The greatest potential for drilling mud seepage is during drill entry and exit, where the overburden is reduced for entry and exit of drilling tools at the low approach angle. Drilling mud seepage containment is incorporated into contingency planning for the pipeline crossings. The proposed entry or exit locations are generally located in upland areas where drilling mud seepage can be readily detected and contained. To isolate and contain potential drilling mud seepage, an aboveground containment pit will be constructed between the entrance and exit points and the feature boundary. Straw bales or silt fencing may also be used to further reinforce the berm.

The Contractor will have equipment and materials available on site to contain and control drilling mud seepage in upland areas. Such equipment and materials will include hand tools, backhoes or small bulldozers, lumber for temporary shoring, portable pumps, sand bags, straw bales, and silt fencing.

Freeport LNG will address an inadvertent release immediately upon discovery. The following measures will be implemented to minimize or prevent further release, contain the release, and clean up the affected area:

Upland Release:

- The Contractor will determine and implement any modifications to the drilling technique or composition of drilling mud (e.g., thickening of mud by increasing bentonite content, temporary lowering of the downhole pressures) to minimize or prevent further releases of drilling mud.
- Freeport LNG will oversee the placement of containment structures at the affected area to prevent migration of the release.
- If the amount of the release is large enough to allow collection, the drilling mud will be collected and returned to either the drilling operations or a disposal site by hose or tanker.
- If the amount of the release is not large enough to allow collection, the released drilling mud will be swept, shoveled, or mixed with sand and temporarily left in place to dry. Steps will be taken to prevent drilling mud or silt-laden water from flowing into a wetland or waterbody.
- If public health and safety are threatened by an inadvertent release, drilling operations will be shut down until the threat is eliminated.

Waterbody or Wetland Release:

- If a release occurs within a waterbody or wetland, Freeport LNG will inform the appropriate agency as soon as possible whether or not the release can be corrected without incurring additional environmental impact. If necessary, drilling operations will be reduced or suspended to assess the extent of the release and to implement corrective actions.
- If the release is a single-point release, accessible with a hose and truck, the Contractor will attempt to 'cap' the release, if possible, by placing a section of pipe over the release to contain the mud within the pipe section. With a larger release, the Contractor may attempt to place a water-filled bladder around the release in order to isolate it from the waterbody or wetland prior to removal. After the release is contained, the mud will be pumped into trucks and reused or disposed of at an appropriate facility.
- If public health and safety are threatened, drilling mud circulation pumps will be turned off. This measure will be taken as a last resort because of the potential for drill hole collapse resulting from loss of down-hole pressure.
- If monitoring indicates that the intake water quality at downstream user locations is impacted to the extent that it is no longer suitable for treatment, alternative water sources (i.e., trucked or bottled water) will be provided to impacted users.
- Freeport LNG will assist agencies with any sampling they may require.

Uncontrollable Release:

- If an inadvertent release of drilling mud exceeds that which can be contained and controlled either because of volume or rate, HDD activities will cease. An evaluation of the probable cause of the release and the stage of the drill will be done. Based on the evaluation, the measures described in the following paragraphs will be implemented.

  Depending on the current stage of the installation, the HDD contractor may choose to plug the hole near the fracture with heavyweight material (i.e., sawdust, nut shells, bentonite pellets, or other commercially available non-toxic product). If the inadvertent release of drilling mud occurs while drilling the pilot hole, the HDD contractor may choose to back out of the hole by a predetermined distance and then create a new hole by drilling out of the original hole. Therefore, Procedures 1 or 2 listed below could occur in either order.

  1. Plug the fissures/fracture.

     a) Pump sealers such as sawdust, nutshells, bentonite pellets, or other commercially available non-toxic products into the drill hole;
     b) Let set for an appropriate period of time (dependent upon sealant used); and
     c) Resume HDD activities.

  2. If a fissure/fracture cannot be plugged, then, if practical:

     a) Remove drill pipe from the existing drill hole to a point where a new drill path can be attempted by drilling out of the existing hole and creating a new hole. The original hole will be abandoned and filled with bentonite and cuttings. The cuttings that are returned to the hole should only be equal to those removed from the hole. The return should not be under high pressure and therefore additional releases would not be anticipated.
     b) Resume HDD activities.

  3. If the original drill path cannot be utilized:

     a) Abandon the original drill hole by pumping bentonite and cuttings downhole, then seal the top 5 vertical feet with grout. Grouting abandoned drill holes is an industry standard practice and serves to prevent the abandoned hole from disrupting groundwater flow.
     b) Move the drill rig to a new, adjacent location.
     c) Verify that the new, adjacent location meets the requirements of all applicable project permits and approvals. If the new, adjacent location does not meet the requirements of all applicable project

permits and approvals, operations will cease until new permits and approvals are received.

d) Design an alternative alignment for the redrill.

e) Begin HDD redrill activities.

- If all HDD attempts fail, then the crossing will be constructed using an alternative method after all necessary permits and approvals have been received. Failure is defined in Section 7.0.

7.0 DEFINITION OF HDD FAILURE AND ABANDONMENT CRITERIA

Freeport LNG considers the failure criteria described below as sufficient reason to abandon the HDD process and install the crossing using an approved alternative method.

Pilot Hole Step Failure

- The HDD installation method will be considered a failure if there are two unsuccessful attempts at completing the pilot hole. If this happens, the HDD contractor will demobilize its equipment from the site after approval from Freeport LNG.

Hole Opening Step Failure

- The HDD installation method will be considered a failure if there is one unsuccessful attempt at opening the hole to the required diameter, as long as the failure does not include losing parts of the hole opening tool, or loss of the entire hole opening tool downhole. The HDD contractor will then be allowed 7 working days to attempt to retrieve the missing tool or parts from the hole and continue the hole opening process. If failure occurs, the HDD contractor will demobilize its equipment from the site after approval from Freeport LNG.

Pullback Step Failure

- The HDD installation method will be considered a failure if there is one unsuccessful attempt at completing the pullback, unless the pipe can be removed from the hole. In the latter case, a second attempt will be made after the hole has been reopened and reconditioned with any necessary hole opening passes as determined jointly by the HDD contractor and Freeport LNG. If failure occurs, the HDD contractor will demobilize its equipment from the site after approval from Freeport LNG.

Mechanical Breakdown Failure

- The HDD installation method will be considered a failure if, at any point during the HDD, the HDD contractor has a major mechanical breakdown and after either repairing or replacing the broken drilling rig or vital ancillary equipment, the drill

pipe, hole opening tool, or pipeline cannot be rotated or pulled. If failure occurs, the HDD contractor will demobilize its equipment from the site after approval from Freeport LNG.

8.0 FREEPORT LNG/AGENCY APPROVAL FOR HDD ABANDONMENT

Freeport LNG will provide on-site inspection during the HDD process to keep adequate documentation, daily progress reports, as-built information, etc., and will describe the events leading up to the HDD failure. Freeport LNG will submit this documentation to the appropriate agencies notifying them of the HDD failure and Freeport LNG's schedule for implementing the approved alternate crossing method as described in Section 9.0. The HDD contractor will not demobilize until Freeport LNG's approval has been received. The alternative crossing method will not be implemented until Freeport LNG has received confirmation that the FERC and U.S. Army Corps of Engineers (COE) have received the documentation of HDD failure.

9.0 HDD CONTINGENCY

If HDD failure occurs, Freeport LNG will construct the proposed pipeline facilities across both wetland/waterbody complexes using the open cut trenching method that is described in Freeport LNG's project-specific Wetland and Waterbody Construction and Mitigation Procedures and is the approved method for crossings outside of the designated HDD areas. Push-pull/float installation will be used where hydrological conditions and sufficient pipeline length make this approach feasible.

Freeport LNG will ensure that has obtained the necessary authorizations from the appropriate federal (FERC/COE) and state agencies (Railroad Commission of Texas) prior to the implementation of any alternative crossing methods.

APPENDIX D

Water and Wetland Delineation Maps



Figure D-1

Freeport LNG - Liquefaction Project

Waterbodies and Wetlands at the Quintana Island Terminal Site - Field Delineation Map

Brazoria County, Texas

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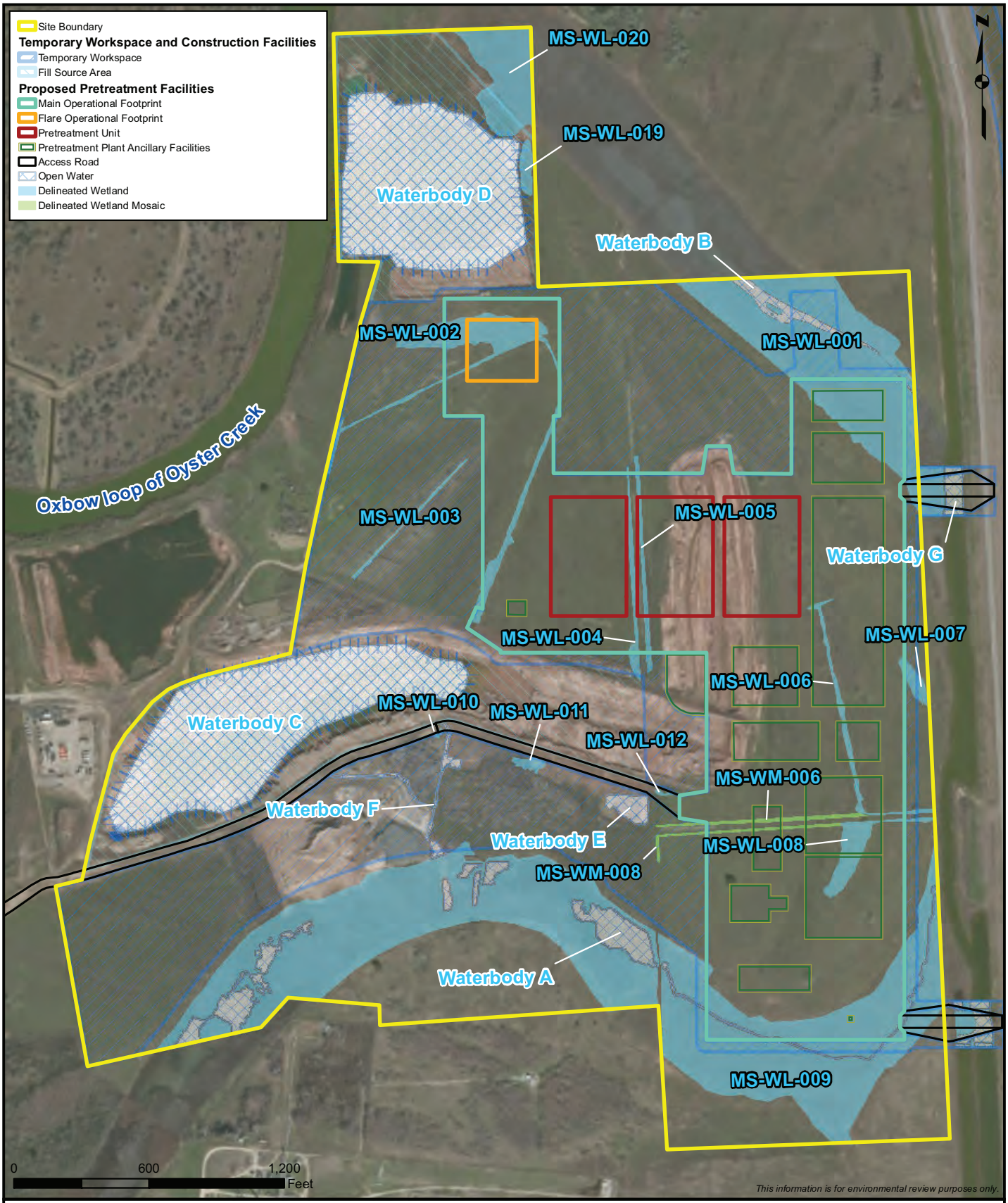


Figure D-2

Freeport LNG - Liquefaction Project

Waterbodies and Wetlands at the Pretreatment Plant Site - Field Delineation Map

Brazoria County, Texas

M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2013\03\RR_Revisions_FRE_RR_2_3_2_LiqProj_Pretreat_Water_Wetlands.mxd	1:7,200	REVISED: 03/25/2013	DRAWN BY: JEBAKKEN

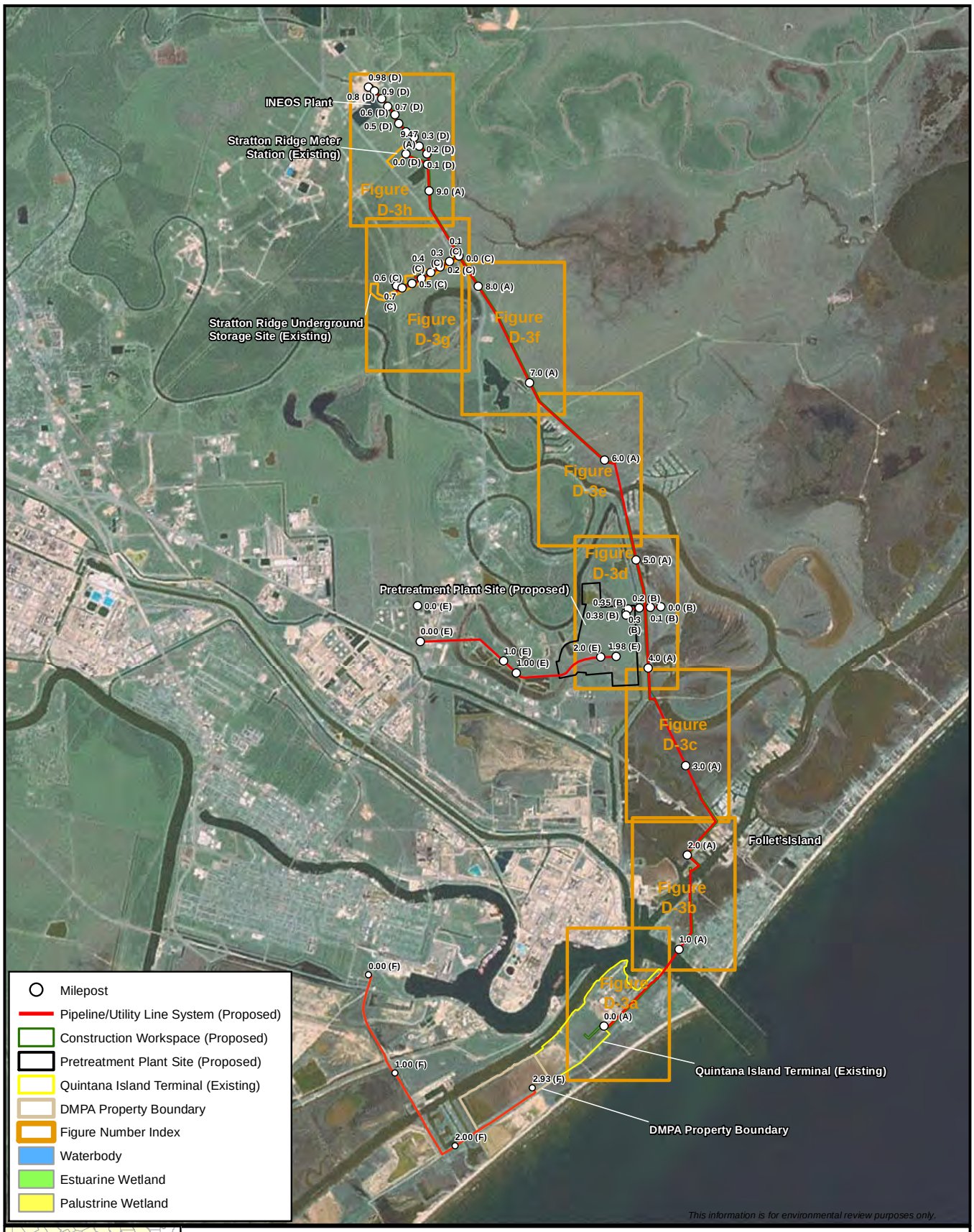




Figure D-3

Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - Field Delineation Map
Brazoria County, Texas

N

0 0.5 1 Miles

FILE: M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2013\05\reformatted_RRs_FRE_RR_4_2_2_3_NGL_Liquefaction_Facilities_Water_Wetlands_Overview.mxd | REVISED: 05/08/2013 | SCALE: 1:80,000 DRAWN BY: JEBAKKEN



Figure D-3a

Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - Field Delineation Map
MP 0.0(A) to MP 0.8(A) MP 0.0(F) to MP 2.93(F)
Brazoria County, Texas

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Figure D-3b

Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - Field Delineation Map
MP 0.7(A) to MP 2.4(A)
Brazoria County, Texas

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Figure D-3c

Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - Field Delineation Map
MP 2.4(A) to MP 3.9(A)
Brazoria County, Texas

FILE: M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2013\05\reformatted_RRs_FRE_RR_4_2_2_3_LiqProj_Facilities_All_Water_Wetlands_MapSet.mxd | REVISED: 05/06/2013 | SCALE: 1:10,000 DRAWN BY: JEBAKKEN

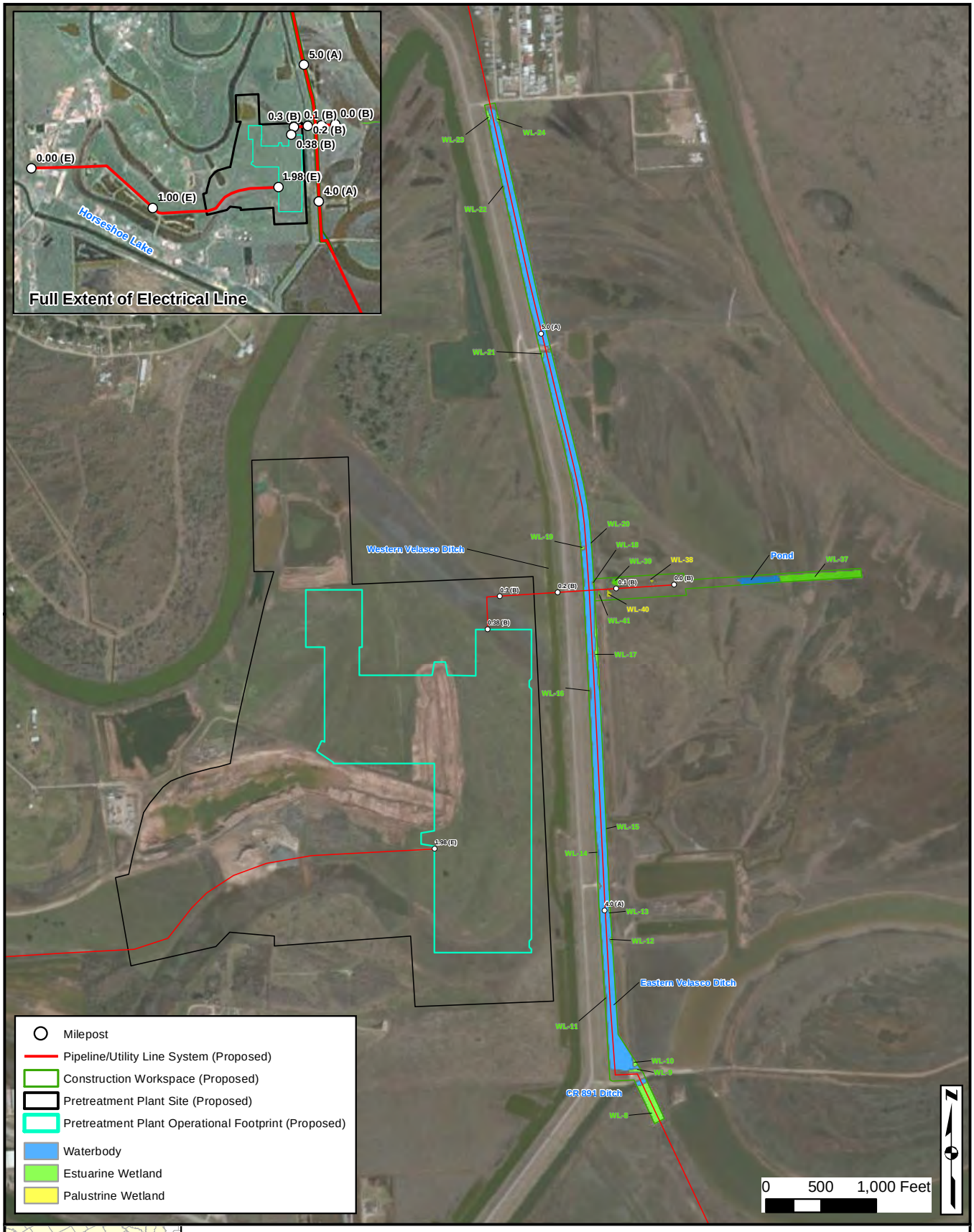


Figure D-3d

Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - Field Delineation Map
MP 3.5(A) to MP 5.5(A) MP 0.0(B) to MP 0.38(B) MP 0.0(E) to MP 1.98(E)
Brazoria County, Texas

FILE: M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2013\05\reformatted_RRs_FRE_RR_4_2_2_3_LiqProj_Facilities_All_Water_Wetlands_MapSet.mxd | REVISED: 05/06/2013 | SCALE: 1:63,360 DRAWN BY: JEBAKKEN



Figure D-3e
Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - Field Delineation Map
MP 5.2(A) to MP 6.8(A)
Brazoria County, Texas

FILE: M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2013\05\reformatted_RRs_FRE_RR_4_2_2_3_LiqProj_Facilities_All_Water_Wetlands_MapSet.mxd | REVISED: 05/06/2013 | SCALE: 1:10,000 DRAWN BY: JEBAKKEN



Figure D-3f

Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - Field Delineation Map
MP 6.6(A) to MP 8.2(A)
Brazoria County, Texas

FILE: M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2013\05\reformatted_RRs_FRE_RR_4_2_2_3_LiqProj_Facilities_All_Water_Wetlands_MapSet.mxd | REVISED: 05/06/2013 | SCALE: 1:10,000 DRAWN BY: JEBAKKEN



Figure D-3g

Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - Field Delineation Map
MP 8.2(A) to MP 8.7(A) MP 0.0(C) to MP 0.72(C)
Brazoria County, Texas

FILE: M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2013\05\reformatted_RRs_FRE_RR_4_2_2_3_LiqProj_Facilities_All_Water_Wetlands_MapSet.mxd | REVISED: 05/06/2013 | SCALE: 1:10,000 DRAWN BY: JEBAKKEN



Figure D-3h

Freeport LNG - Liquefaction Project
Waterbodies and Wetlands on the Pipeline/Utility Line System - Field Delineation Map
MP 8.7(A) to MP 9.47(A) MP 0.0(D) to 0.98(D)
Brazoria County, Texas

FILE: M:\Clients\D-F\FRE\Liquefaction_ArcGIS\2013\05\reformatted_RRs_FRE_RR_4_2_2_3_LiqProj_Facilities_All_Water_Wetlands_MapSet.mxd | REVISED: 05/06/2013 | SCALE: 1:10,000 DRAWN BY: JEBAKKEN

APPENDIX E

Visual Impact Study Figures



Existing View



Proposed View

Figure E-1. Existing and Proposed Views from Unnamed Beach Road Looking Northwest

Freeport LNG

Phase II and Liquefaction Project Facilities at and Adjacent to Quintana Island Terminal

South end of unnamed beach road looking Northwest

Viewpoint Location
Proposed Facilities Boundary
Proposed Facilities Operational Footprint



Easting Position:	**3147105**
Northing Position:	**13539263.2**
Elevation of Viewpoint Position (ft):	**6.3**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**November 24, 2012 at 12:01 pm**
Orientation of View:	**NW**
Horizontal Field of View:	**124°**
Vertical Field of View:	**55°**

NOTES:

Viewpoint locations have been precision surveyed by:
Doyle & Wachtstetter
121 Commerce Street, Clute, Texas

Projection/Zone/Datum:
State Plane Co-ordinate System, Texas South Central (NAD 83)

Elevations are above Mean Sea Level (NAVD 88)

Units are in feet unless otherwise stated

Photosimulation Created Using TrueView™ Technology (Patent No.: US 8,184,906 B2)

Provided by

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Figure E-2 Proposed View
Enlargement Area of Figure E-1



Existing View



Proposed View

Figure E-3. Existing and Proposed View of Central Area of 806c Looking Northeast (Ground Level)

Freeport LNG

Viewpoint 07
Northern end of 806c
Looking North East

Viewpoint Location
Site Boundary



Easting Position:	3140396.79
Northing Position:	13537277.09
Elevation of Viewpoint Position (ft):	25.51
Date of Photography:	April 29, 2013 at 5:51 pm
Orientation of View:	NE
Horizontal Field of View:	124°
Vertical Field of View:	55°

NOTES:

Viewpoint locations have been precision surveyed by:
Doyle & Wachtstetter
121 Commerce Street, Clute, Texas

Projection/Zone/Datum:
State Plane Co-ordinate System, Texas South Central (NAD 83)

Elevations are above Mean Sea Level (NAVD 88)

Units are in feet unless otherwise stated

Photosimulation Created Using
TrueView™ Technology
(Patent No.: US 8,184,906 B2)

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Figure E-4 Northern end of 806c - Looking North East **- Proposed View (Ground Level)**
Enlargement Area of Figure E-3



Existing View



Proposed View

Figure E-5. Existing and Proposed Views of Central Area of 806c Looking Northeast (Elevated)

Freeport LNG

Central area of 806c
Looking North East

Viewpoint Location
Site Boundary



Easting Position:	**3140639.4**
Northing Position:	**13536859.57**
Elevation of Viewpoint Position (ft):	**25.87**
Date of Photography:	**April 29, 2013 at 5:28 pm**
Orientation of View:	**NE**
Horizontal Field of View:	**124°**
Vertical Field of View:	**55°**

NOTES:

Viewpoint locations have been precision surveyed by:
Doyle & Wachtstetter
131 Commerce Street, Clute, Texas

Projection/Zone/Datum:
State Plane Co-ordinate System, Texas South Central (NAD 83)

Elevations are above Mean Sea Level (NAVD 88)

Units are in feet unless otherwise stated

Photosimulation Created Using
TrueView™ Technology
(Patent No.: US 8,184,906 B2)

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Figure E-6. Central area of 806c - Looking North East **- Proposed View (Elevated)**
Enlargement Area of Figure E-5



Existing



Proposed

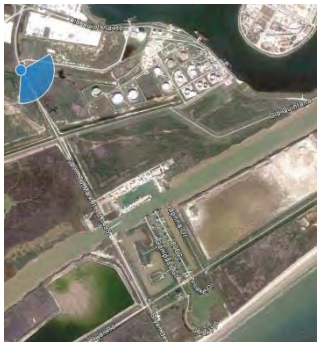




Figure E-7. Existing and Proposed Nighttime Views for Viewpoint 01 Farm to Market Route 1495, Looking Southeast

TRC

12/17/2013





Existing



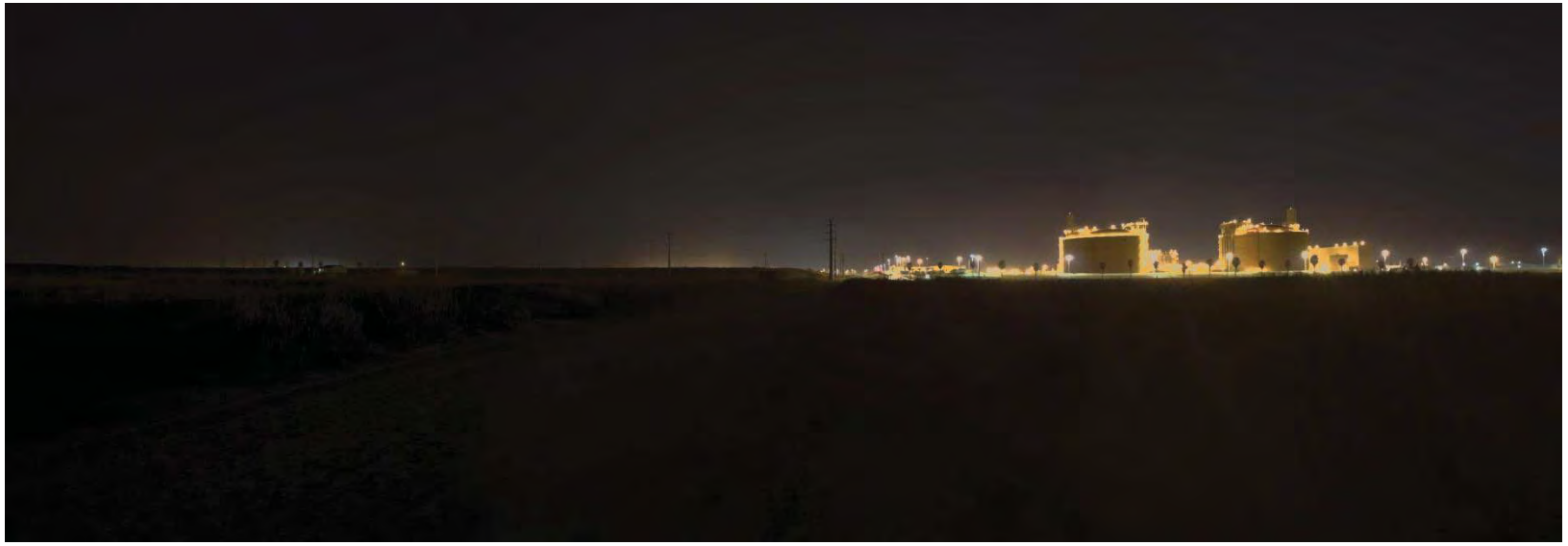


Proposed

Figure E-8. Existing and Proposed Nighttime Views for Viewpoint 03, Bryan Beach Road, Looking Northeast

TRC

12/17/2013





Existing





Proposed

Figure E-9. Existing and Proposed Nighttime Views for Viewpoint 05
South End of Unnamed Beach Road , Looking Northwest

TRC

12/17/2013



Existing View



Proposed View

Figure E-10. Existing and Proposed Views - County Road 230 (Stringfellow Road) Looking East

Freeport LNG

Liquefaction Project Facilities at the Pretreatment Plant Site

County Road 230
(Stringfellow Road)
looking East

Viewpoint Location
Proposed Facilities Boundary
Proposed Facilities Operational Footprint



Easting Position:	**3144983.6**
Northing Position:	**13560027.2**
Elevation of Viewpoint Position (ft):	**3.2**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**November 22, 2012 at 11:59 am**
Orientation of View:	**E**
Horizontal Field of View:	**124°**
Vertical Field of View:	**55°**

NOTES:

Viewpoint locations have been precision surveyed by:
Doyle & Wachtstetter
131 Commerce Street, Clute, Texas

Projection/Zone/Datum:
State Plane Co-ordinate System, Texas South Central (NAD 83)

Elevations are above Mean Sea Level (NAVD 88)

Units are in feet unless otherwise stated

Photosimulation Created Using
TrueView™ Technology
(Patent No.: US 8,184,906 B2)

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Figure E-11 County Road 230 (Stringfellow Road) looking East **- Proposed View**
Enlargement Area of Figure E-10.

APPENDIX F

Air Quality Appendix

APPENDIX F

AIR QUALITY APPENDIX

Methodologies for Air Dispersion Modeling, Estimating Operational Vessel Emissions, Modeling Cumulative $PM_{2.5}$ Impacts, and Comparing Refrigeration Compressor Options

This appendix describes the methodologies used to:

- Perform air dispersion modeling of the Freeport LNG Project's stationary source emissions.
- Estimate of the emissions of NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, VOC, and GHG from the LNG carriers, tugs and escort vessels within the moored safety zone as well as those within Texas waters.
- Perform multi-source air dispersion modeling of the $PM_{2.5}$ emissions from the Freeport LNG Project, as well as LNG carriers, tugs and escort vessels within the moored safety zone as well as those within Texas waters.
- Compare the indirect emissions resulting from planned electric motor-driven refrigeration compressors to the direct emissions from hypothetical on-site natural gas-fired combustion turbine-driven refrigeration compressors.

Air Dispersion Modeling of Stationary Source Emissions

The refined modeling used an air quality computer model called AERMOD. The EPA describes AERMOD as, *"A steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain."*

The first step was to define the Project's emissions inventory. The pollutant sources listed below, with the modeled pollutant(s) emitted by each source shown in parentheses.

- Liquefaction Plant – Onsite Facilities
  - Six emergency generators (CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$)
  - One emergency air compressor (CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$)
  - Two firewater pumps (CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$)
  - Liquefaction Plant flare (CO and NO_2) and flare pilots (CO and NO_2)
- Pretreatment Plant – Onsite Facilities
  - Five process heaters (CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$)
  - Three thermal oxidizers (CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$,)
  - One combustion turbine (CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$)

- Lube oil vent (PM_{10}, $PM_{2.5}$, and VOC emissions)
- Five emergency generators (CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$)
- One emergency air compressor (CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$)
- One firewater pump (CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$)
- Pretreatment Plant flare and flare pilots (CO and NO_2)

The second step was to evaluate the emission sources with respect to their proximity to structures in the vicinity to determine if stack discharges might be drawn into the turbulent wakes of nearby structures. Building dimensions and locations and stack parameters were inputs Building Profile Input Program with Plume Rise Model Enhancements (BPIP-PRIME) to identify the dominant structures and generate building downwash input data for the dispersion model.

The third step was to define the receptor grid. For PSD and NNSR modeling, ambient air starts at the Project's fence line or other physical barrier to public access. The dispersion model's grid covers a region extending from the Project's fenceline to at least 10 km beyond the Project sources. A "tight grid" with 25-meter spacing was used close to the Project's fenceline. The grid becomes coarser at increasing distances, reaching 1 km at its most distant extent.

The fourth step was to obtain and process meteorological data. Meteorological data sets for the years 2006 through 2010 were obtained from TCEQ. These data are based on surface observations taken from the Angleton Brazoria Airport, and upper air observations taken from Lake Charles, Louisiana. TCEQ pre-processed these data with the AERMET program using parameters representative of Brazoria County.

The fifth step was to perform a Significance Analysis in which each maximum predicted offsite concentration resulting from operation of the Project's facilities are compared to its respective significant impact level (SIL). Note that there are currently no SILs for CO, and the PSD increment limits are uses in lieu of the SILs. If a pollutant's "single source" impact for specific averaging period is less than the corresponding SIL, no further analysis needed. Each pollutant was modeled for a range of operating scenarios. As shown in Table F-1, the predicted impacts for PM_{10}, NO_2, CO, and SO_2 are below the applicable SILs and increment levels. The $PM_{2.5}$ predicted impacts exceed the applicable SILs. Therefore, the multi-source refined modeling is required for this pollutant.

Table F-1

Air Dispersion Modeling Summary

Pollutant and Averaging Time	Pollutant Concentration (µg/m^3)							
	Modeling Significant Impact Level	PSD Class II Increment Standard	NAAQS	Single-Source Modeling Results	Background a/	Multi-Source Modeling Results	Multi-Source Modeling Results Result + Background	PSD Class II Modeling Results Result
CO								
8-hour	---	500	10,300	325.3	1,069	e/	e/	e/
1-hour	---	2,000	40,000	550.3	1.476	e/	e/	e/

Table F-1

Air Dispersion Modeling Summary

Pollutant and Averaging Time	Pollutant Concentration (µg/m^3)							
	Modeling Significant Impact Level	PSD Class II Increment Standard	NAAQS	Single-Source Modeling Results	Background a/	Multi-Source Modeling Results	Multi-Source Modeling Results Result + Background	PSD Class II Modeling Results Result
NO_2								
1-hour	7.5	---	188	4.64	37.8	e/	e/	e/
Annual	1	25	100	0.49	14.3	e/	e/	e/
$PM_{2.5}$								
Annual	0.3	4	12 c/	0.88	9.3	2.35	11.65	0.89
24-hour	1.2	9	35 c/	4.95	20.7	10.63	31.33	4.88
PM_{10}								
Annual	1	17	d/	0.88	---	e/	e/	e/
24-hour	5	30	150	4.95	41	e/	e/	e/
SO_2								
1-hour	7.9	---	196	4.34	55.1	e/	e/	e/
3-hour	25	512	1,300	3.00	36.8	e/	e/	e/

a/ From Table 4.9.1-2
b/ PSD Air Dispersion Modeling Report, enclosure to letter from L.M. Tonery (Fulbright & Jaworski) to K.D. Bose (FERC), July 23, 2013, Table 14-2
c/ Remanded back to Court on 1/22/13, but not precluded from being used
d/ Revoked
e/ The predicted impact from screening modeling is less than the modeling significant impact level. Therefore, multi-source and PSD Class II modeling are not required.
ppm = parts per million
µg/m^3 = micrograms per cubic meter.

The sixth step was to establish the radius of influence (ROI) for the $PM_{2.5}$ multi-source analysis. The ROI is the farthest distance from the center of the proposed emissions source to the receptor where modeled ground-level concentrations are equal to or less than the applicable SIL. Because two facilities (*i.e.,* Pretreatment and Liquefaction Facilities) are included in the same modeling runs, the distance to the ROI was measured from the center of the facility with the greatest of emissions (*i.e.,* the Pretreatment Plant). This distance is 1.8 km.

The seventh step was to compile the multi-source $PM_{2.5}$ emissions inventory. The inventory of offsite sources was obtained from the Texas Point Source Database (PSDB). Stationary sources located with 51.8 km of the Pretreatment Plant were selected, based on the 1.8 km ROI the plus 50 km, and supplemented using additional data obtained from TCEQ.

The eighth step was to run AERMOD with the Pretreatment Plant, Liquefaction Plant, and the offsite $PM_{2.5}$ inventory sources operating simultaneously using each year (2006 through 2010) of meteorological data. For each averaging period (*i.e.,* 24-hour and annual) background concentrations are added to offsite maximum predicted impacts, and the sum compared to the relevant NAAQS. As is shown in Table D-1, the $PM_{2.5}$ maximum predicted 24-hour and annual impacts plus background concentration sums are less than the applicable NAAQS. For each

averaging period, the maximum offsite predicted combined impact of the Project's facilities and offsite sources is less than the applicable increment standard.

The ninth step was to compile the offsite inventory for $PM_{2.5}$ PSD Class II increment analysis. USEPA established the major source baseline date as October 20, 2010 for $PM_{2.5}$ increment. Major sources located within the ROI plus 50 km of the Pretreatment Plant and permitted after April 20, 2009 (18 month before the major source baseline date) were included in the offsite inventory of increment-consuming sources. TCEQ considers the submittal date of the Project's PSD application, December 20, 2011, as the minor source baseline date. Minor sources located within the 12 km of the Pretreatment Plant and permitted after June 16, 2009 (approximately 18 month before the minor source baseline date) were included in the offsite inventory of increment-consuming sources.

The tenth step was to conduct the $PM_{2.5}$ PSD Class II increment analysis. The Pretreatment Plant, Liquefaction Plant, and the inventory of offsite $PM_{2.5}$ increment-consuming sources operating were modeled simultaneously with AERMOD using each year (2006 through 2010) of meteorological data. The predicted impacts are less than the PSD Class II increment standards.

The refined modeling protocol for the Texas PSD and NNSR permit was reviewed by TCEQ personal and by FERC staff. It was determined by the TCEQ that operational marine emissions would not be included as stationary sources in the model. Subsequently, FERC staff determined that these emissions should be evaluated in the cumulative impact model.

Vessel Emissions

At the request of FERC, in December 2013 Freeport LNG submitted the estimates of the emissions of NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, VOC, and GHG from the existing LNG ships, tugs and escort vessels. These analyses did not properly account for all approved vessel emissions from import or export of LNG from the Quintana Island terminal, and were based on 200 LNG carrier calls per year. Therefore, in January 2014 FERC revised the emission calculations to better characterize the expected operations using the methodology described in U. S. Environmental Protection Agency Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009. The following was assumed:

- A typical LNG carrier vessel will have an LNG capacity of 180,000 m^3.
- There will be 400 LNG carrier calls per year. Each call will entail 3.7 hours cruise, reduced speed zone (RSZ), and maneuvering operations as well as 23 hours of hotelling.
- A typical LNG carrier's main propulsion system will utilize boilers and steam turbines with a rated total maximum output of 32,500 hp. The boilers will fire 97% boil-off gas (BOG) and 3% fuel oil with 0.1% by weight sulfur. The boilers will operate at 50%, 15%, 15%, and 10% loads during cruise, RSZ, maneuvering, and hotelling operations, respectively.
- A typical LNG carrier will utilize reciprocating internal combustion auxiliary engines with a rated total maximum output of 8,125 hp. The auxiliary engines will fire marine diesel oil with 0.1% by weight sulfur. The auxiliary engines will operate at 17%, 27%,

45%, and 22% loads during cruise, RSZ, maneuvering, and hotelling operations, respectively.

- Four tug vessels will be employed on the round trip to escort each carrier through the reduced speed zone to and from the loading area. One tug will remain with the carrier while it is moored at the dock.
- Each tug vessels will be equipped with two 2,065 hp main propulsion engines and two 134 hp auxiliary engines. The engines will fire diesel oil. The main propulsion engines will operate at 100% and 25% loads during RSZ and hotelling operations, respectively. The auxiliary engines will operate at 31% loads during RSZ, maneuvering, and hotelling operations.
- The emission factors listed in Table F-2 were used to calculate vessel emissions.

Table F-2

Vessel Emission Factors (g/hp-hr)

Pollutant	LNG Carrier Main Propulsion Boilers / Steam Turbines		LNG Carrier Auxiliary Engines		Tug Engines Marine Diesel Oil	
	Boil-off Gas	Marine Diesel Oil	Boil-off Gas	Marine Diesel Oil	Main Propulsion	Auxiliary
NO_x	0.45	1.49	8.17	10.37	7.31	7.31
CO	0.38	0.15	3.41	0.82	1.86	1.12
PM_{10}	0.034	0.13	0.032	0.13	0.19	0.19
$PM_{2.5}$	0.034	0.11	0.032	0.13	0.19	0.19
VOC	0.025	0.075	0.60	0.30	0.20	0.20
SO_2	0.027	0.43	0.018	0.31	0.10	0.10
CO_2	544	688	350	508	515	515
CH_4	0.01	0.027	1.80	0.0015	0.067	0.067
N_2O	0.01	0.06	-	0.06	0.0015	0.0015

Vessel Modeling Methodology

FERC also requested that Freeport LNG perform cumulative modeling of the Project's $PM_{2.5}$ emissions plus the $PM_{2.5}$ emissions from aforementioned vessel operations. As part of the New Source Review (NSR) air permit application, Freeport LNG performed refined multi-source air dispersion modeling of the Project's stationary air emission sources plus influential stationary sources in the vicinity of the Project. The modeling protocol and report were reviewed and approved by TCEQ. This modeling did not include emissions from LNG carrier and tug vessels, as these are out of the scope for NSR. Therefore, Freeport LNG revised its NSR modeling inputs to include the vessel emissions, and ran the dispersion model. This entailed:

- Repeat the Significance Analysis (step 5 above), but include the vessel emissions. This identified five additional receptors with impacts above the $PM_{2.5}$ SILs.
- Repeat the Refined Multi-source Analysis (step 8 above) with the Pretreatment Plant, Liquefaction Plant, and the offsite $PM_{2.5}$ inventory sources operating simultaneously

using each year (2006 through 2010) of meteorological data, but add the vessel emissions and five additional receptors.

In December 2013 Freeport LNG submitted to FERC results showing that maximum predicted offsite impacts of the $PM_{2.5}$ emission from operation of the Project's stationary sources, nearby influential sources, and vessels, plus the background concentrations (31.2 $\mu g/m^3$ 24-hour average and 11.7 $\mu g/m^3$ annual average), would not exceed the applicable National Ambient Air Quality Standards (NAAQS) (35 $\mu g/m^3$ 24-hour average and 12 $\mu g/m^3$ annual average).

As discussed previously, Freeport LNG December 2013 analysis did not properly account for all the reasonably expected vessel emissions. Using these erroneous vessel emission rates, the $PM_{2.5}$ maximum predicted offsite impacts plus background concentrations were 89% to 98% of the 24-hour average and annual average NAAQS. Therefore, FERC decided to redo the air dispersion modeling using the corrected vessel emissions

FERC obtained from Freeport LNG the input files for December 2013 modeling of the Project's stationary sources, nearby influential sources, and vessels. As a first step, FERC ran AERMOD to benchmark the December 2013 analyses, and successfully reproduced their results for both the $PM_{2.5}$ 24-hour average and annual average impacts for both the Significance Analysis and the Refined Multi-source Analysis. The December 2013 input files were then revised with the corrected vessel emission rates (retaining same source inventories, source parameters, source groups, receptor arrays, meteorology, and AERMOD model version). This is referred to as the "January 2014 analysis".

Modeling with the increased vessel emission resulted in modest increases (4 and 0.02 $\mu g/m^3$ for 24-hour and annual averaging periods, respectively) of the predicted impacts of Project stationary source plus vessel emissions. However, the significant impact area (i.e., the area for which impacts are calculated for the multi-source modeling) substantially increased. In other words, it became necessary to include in the multi-source analysis receptors not considered in the December 2013 multi-source analysis, including receptors in the vicinity of the Liquefaction Plant.

As shown in Table F-3, the multi-source runs did not demonstrate compliance for either averaging time (24-hour and annual), due to the significant receptors adjacent to the Liquefaction Plant. These receptors were outside the impact area for the December 2013 submittal. Since the significance runs predict only modest increases in ambient impacts due to the increased vessel emissions, these large impacts predicts by the revised multi-source modeling are due to sources which are not part of the Freeport LNG Project.

Table F-3

$PM_{2.5}$ Predicted Cumulative Impacts

Averaging Period	Model Runs	$PM_{2.5}$ Concentration (ug/m^3)			
		Multi-Source Maximum Predicted	Background	Multi-Source Maximum Predicted + Background	NAAQS
24 hour	December 2013 Analysis a/	10.5	20.7	31.2	35
24 hour	January 2014 Analysis b/	228.3	20.7	249	35

Annual	December 2013 Analysis a/	2.4	9.3	11.7	12
Annual	January 2014 Analysis b/	5.5	9.3	14.8	12

a/ Submitted by FLNG, based on 200 LNG carrier calls per year
b/ Performed by FERC, based on 400 LNG carrier calls per year

Estimates of Emissions from Electric Motor-Driven to Combustion Turbine-Driven Refrigeration Compressors

Table F-4 compares the indirect air emissions from the proposed electric motor drives for the refrigeration compressors to the direct emissions that would result from hypothetical use of combustion turbines for the refrigeration compressors.

Table F-4

Comparison of Indirect Emissions Resulting from Planned Electric Motor-Driven Refrigeration Compressors and Direct Emissions from Hypothetical On-Site Natural Gas-Fired Combustion Turbine-Driven Refrigeration Compressors

Indirect Emission from Electric Motor - Driven Compressors - Powered From Grid

Process	Emissions (lb/MW-hr)					
	CO_2	CH_4	N_2O	CO_2e[5]	NO_x	SO_2
Generation[1,2]	1,218.2	1.69E-02	1.41E-02	1,222.8	0.653	2.248
Transmission[3,4]	73.1	1.01E-03	8.44E-04	73.4	0.039	0.135
Total	1,291.3	1.79E-02	1.49E-02	1,296.2	0.692	2.383

Direct Emissions from Compressors Powered by On-Site Combustion Turbines

Solar Titan 130 Combustion Turbine - Heat Rate, Natural Gas Firing	
Btu/hp-hr, Lower Heating Value (LHV)[6,7]	7,025
Btu/hp-hr, Higher Heating Value (HHV)	7,806
Btu/kw-hr, HHV	10,467
MMBtu/MW-hr, HHV	10.467

Units	Estimated On-site Combustion Turbine Emissions					
	CO_2	CH_4	N_2O	CO_2e[5]	NO_x	SO_2
lb/MMBtu[8]	116.9[9]	8.60E-03	3.00E-03	118.0	0.092[10]	3.40E-03
lb/MW-hr	1,223.6	9.00E-02	3.14E-02	1,235.2	0.96	3.56E-02

	Estimated On-Site Combustion Turbine Direct Emissions Divided by Electric Motor Indirect Emissions					
	CO_2	CH_4	N_2O	CO_2e	NO_x	SO_2
Ratio	0.95	5.04	2.11	0.95	1.39	0.015

References

1. http://www.epa.gov/cleanenergy/energy-resources/egrid/
2. eGRID ninth edition with year 2010 data (Version 1.0), Region ERCOT-All.
3. The US Energy Information Administration estimates that national electricity transmission and distribution losses average 6% of the electricity that is transmitted and distributed in the United States each year.
4. http://www.eia.gov/tools/faqs/faq.cfm?id=105&t=3
5. The GWP of CO_2, CH_4, and N_2O are 1, 25, and 298; see 40 CFR 98 Subpart A Table A-1.
6. http://mysolar.cat.com/cda/files/126849/7/ds130md.pdf
7. This vendor-supplied heat rate does not account for parasitic losses resulting from ancillary equipment, degradation of heat rate resulting from part-load operation and equipment wear and tear, or indirect emissions associated with natural gas transmission.
8. AP42, Fifth Edition (4/00), Tables 3.1-1 and 3.1-2a, except as noted. Natural gas-fired combustion turbine with water injection.
9. 40 CFR 98 Subpart C Tables C-1.
10. Typical Best Available Control Technology / Lowest Achievable Emission Rate (BACT/LEAR) for compressor station combustion turbine [25 parts per million by volume, dry basis, corrected to 15 percent oxygen (ppmvd @ 15% O_2)].

APPENDIX G

Major Recent or Proposed Developments in Brazoria County

Table G-1

Freeport LNG – Liquefaction Project and Phase II Developments Cumulative Impacts Analysis (Environmental Impacts)
Major Recent or Proposed Developments in Brazoria County

Sponsor/Project & Location	Distance from Terminal (miles)	Project Timeframe		ENVIRONMENTAL IMPACT EVALUATION						
		Const. Start-up	In- Service	Wetlands	Waterbodies	Threatened & Endangered Species	EFH	Air	Noise	Water Quality
INDUSTRIAL DEVELOPMENTS										
Manufacturing/Chemical Production										
BASF – Ammonium Sulfate Crystallizer Freeport – Existing Plant Site	7	2012	2012	No impacts (per NWI)	No impacts (per NWI)	No impacts (at existing industrial plant)	No impacts (no estuarine/ marine habitat)	Unknown	Profile unknown	No in-stream construction impacts assumed Operational discharge impacts (if any) unknown
Chevron Phillips - Two Plastic Resin-Producing Facilities Old Ocean at SH 35 / FM 524	27	2014	2017	No impacts (per NWI)	No impacts (per NWI)	No impacts (at existing industrial plant)	No impacts (no estuarine/ marine habitat)	Unknown	Profile unknown	No in-stream construction impacts assumed Operational discharge Impacts (if any) unknown
Cyanco – Sodium Cyanide Plant Chocolate Bayou	22	Not known	2012	No impacts (per NWI)	No impacts (per NWI)	No impacts (at existing industrial plant)	No impacts (no estuarine/ marine habitat)	Unknown	Profile unknown	No in-stream construction impacts assumed Operational discharge impacts (if any) unknown
Dow - Chlorine Plant Freeport – Existing Plant B	5	2011	2013	No impacts (per NWI)	No impacts (per NWI)	No impacts (at existing industrial plant)	No impacts (no estuarine/ marine habitat)	Unknown	Profile unknown	No in-stream construction impacts assumed Operational discharge impacts (if any) unknown
Dow - Propane Dehydrogenation Plant Freeport – Existing Oyster Creek Plant	4	2011	2015	No impacts (per NWI)	No impacts (per NWI)	No impacts (at existing industrial plant)	No impacts (no estuarine/ marine habitat)	Unknown	Profile unknown	No in-stream construction impacts assumed Operational discharge impacts (if any) unknown
Dow – Ethylene Plant Freeport – Existing Plant B	5	2013	2017	No impacts (per NWI)	No impacts (per NWI)	No impacts (at existing industrial plant)	No impacts (no estuarine/ marine habitat)	Unknown	Profile unknown	No in-stream construction impacts assumed Operational discharge impacts (if any) unknown
Dow – AgroSciences Plant Existing Oyster Creek Plant	4	Not known	2015	No impacts (per NWI)	No impacts (per NWI)	No impacts (at existing industrial plant)	No impacts (no estuarine/ marine habitat)	Unknown	Profile Unknown	No in-stream construction impacts assumed Operational discharge impacts (if any) unknown
Ineos – Cracking Furnace Existing Chocolate Bayou Plant	22	2012	2013	No impacts (per BA)	No impacts (per BA)	BA for PSD GHG Permit – no impacts	No impacts (no estuarine/ marine habitat)	Unknown	No impact beyond site boundary (per BA)	No construction or operational impacts (per BA)

Table G-1

Freeport LNG – Liquefaction Project and Phase II Developments Cumulative Impacts Analysis (Environmental Impacts)
Major Recent or Proposed Developments in Brazoria County

Sponsor/Project & Location	Distance from Terminal (miles)	Project Timeframe		ENVIRONMENTAL IMPACT EVALUATION						
		Const. Start-up	In- Service	Wetlands	Waterbodies	Threatened & Endangered Species	EFH	Air	Noise	Water Quality
Shin-Etsu –Silicon Production Plant Freeport Existing Plant	3	2013	2014	No impacts	No impacts	No impacts	No impacts (no estuarine/ marine habitat)	Unknown	No in-stream construction impacts assumed Operational discharge Impacts (if any) unknown	Unchanged from current industrial use – existing plant site
PORT DEVLEOPMENTS										
Port Freeport & Local interests -Non-Federal Channel Widening Project Freeport Harbor Channel	Adjacent to Terminal and in Gulf of Mexico	2013	2018	No adverse effect on wetlands *per se* (USACE, 2012 3.9 acres loss of scrub-shrub vegetation, beach, tidal mud flats (USACE, 2012)	6.1 miles of FHC widened from 400' up to 600' (USACE, 2012) 2.9 million $yds^{3,}$ of clay/silt dredged; 300,000 yds^3 silty sand dredged (USACE, 2012)	May affect, but not likely to adversely affect, piping plover, 2 injury or mortality sea turtle takes, 32 non-injurious sea turtle takes allowed per NOAA Fisheries Biological Opinion (USACE, 2012)	Project footprint crosses EFH but effects not documented	NOx exceedance; coordination regarding SIP compliance is ongoing (COE, 2012) It is anticipated that the increase in NOx and VOC emissions will be conformant with the SIP.	No adverse effects (USACE, 2012)	Groundwater – No adverse effects (USACE, 2012) Surface water – No adverse effects (USACE, 2012)
Port Freeport & USACE – Federal Channel Deepening Project Freeport Harbor Channel	Adjacent to Terminal and In Gulf of Mexico	2015	2021	39 acres emergent wetlands loss at spoil placement site Mitigated by 3 acre pond w/ plantings & 12-acre protected/ enhanced forest (USACE, 2012)	17.3 million yds^3 of dredged material generated (USACE, 2012 176 million yds^3 of additional dredged material generated by maintenance over 50 years (USACE, 2012	Likely to affect sea turtles during dredging; may affect; not likely to adversely affect piping plover (USACE, 2012)	No adverse effect (USACE, 2012)	NOx exceedances (COE, 2012) It is anticipated that the increase in NOx and VOC emissions would be conformant with the SIP.	No adverse effects (USACE, 2012)	GW – No adverse effects (EIS 2012) SW – No adverse effects (USACE, 2012)
Port Velasco Terminal Development Freeport – existing Port property	1	2008	2016	6 acres (NWI) 16 acres mitigated for 2-acre loss assoc. w/ Berth 7	New 2,400' berth – dredging impacts	Not known	No adverse effect assumed based on Channel Deepening Project conclusion	Unknown	Not known	No adverse effect assumed based on Channel Deepening Project conclusion

Table G-1

Freeport LNG – Liquefaction Project and Phase II Developments Cumulative Impacts Analysis (Environmental Impacts)
Major Recent or Proposed Developments in Brazoria County

Sponsor/Project & Location	Distance from Terminal (miles)	Project Timeframe		ENVIRONMENTAL IMPACT EVALUATION						
		Const. Start-up	In- Service	Wetlands	Waterbodies	Threatened & Endangered Species	EFH	Air	Noise	Water Quality
PIPELINE DEVLOPMENTS										
Enterprise -48.9 mile, 24-inch NGL pipeline Alvin and Mont Belvieu (~2 miles in Brazoria County)	34	2012	2012	Assume temporary impacts and/or type conversion during trenching – not quantified	Assume temporary impacts during trenching – not quantified	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
Kinder Morgan/ Phillips 66 - 27-mile, 12-inch Sweeny Lateral - Crude Oil/Condensate Pipeline Southwards to Phillips 66 Sweeny refinery	27	2012	2014	Assume temporary impacts and/or type conversion during trenching – not quantified	Assume temporary impacts during trenching – not quantified	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
Seaway (Enterprise & Enbridge) - 500- mile, 30-inch Seaway Crude Oil Pipeline Jones Creek northwards to Cushing, Oklahoma	6	2012	2014	Assume temporary impacts and/or type conversion during trenching – not quantified	Assume temporary impacts during trenching – not quantified	Not known	Not known	Unknown	Not known	Not known
Seaway (Enterprise & Enbridge) 65-mile, 36-inch Crude Oil Extension Pipeline Jones Creek northeastwards to southeast Houston	6	2012	2014	Assume temporary impacts and/or type conversion during trenching – not quantified	Assume temporary impacts during trenching – not quantified	Not known	Not known	Unknown	Not known	Not known
OIL & GAS FIELD DEVELOPMENTS										
Suemar – 1 new well Chevron Unit - 12 miles southeast of Angleton	9	2012	2012	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known	Not known	Unknown	Not known	Not known

Table G-1

Freeport LNG – Liquefaction Project and Phase II Developments Cumulative Impacts Analysis (Environmental Impacts)
Major Recent or Proposed Developments in Brazoria County

Sponsor/Project & Location	Distance from Terminal (miles)	Project Timeframe		ENVIRONMENTAL IMPACT EVALUATION						
		Const. Start-up	In- Service	Wetlands	Waterbodies	Threatened & Endangered Species	EFH	Air	Noise	Water Quality
Denbury – 31 new/reentered/ recompleted wells West Hastings Unit - between Pearland & Alvin	38	2012	2012	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
Maverick – 18 new wells Wisdom, Groce A/B Units - 5 miles southeast of Damon	32	2012	2012	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
Hilcorp – 4 new/ recompleted wells Old Ocean Unit - Sweeny	24	2012	2012	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
Jetta - 3 new wells Phillips & Abrams Units - 2.0 miles north of West Columbia	26	2012	2012	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
Chalker - 6 new wells Bennett Estate - 2.5 miles northeast of Danbury	23	2012	2012	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
LINC Gulf Coast Petroleum – 3 new/recompleted wells Welch - 12.0 miles east of Angleton	15	2012	2012	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known

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Freeport LNG – Liquefaction Project and Phase II Developments Cumulative Impacts Analysis (Environmental Impacts)
Major Recent or Proposed Developments in Brazoria County

Sponsor/Project & Location	Distance from Terminal (miles)	Project Timeframe		ENVIRONMENTAL IMPACT EVALUATION						
		Const. Start-up	In- Service	Wetlands	Waterbodies	Threatened & Endangered Species	EFH	Air	Noise	Water Quality
Texas Standard Oil – 1 new well HRI - 3.2 miles west of Liverpool	25	2012	2012	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
Sandalwood – 2 new wells Charles Duke Unit - 5.1 miles southwest of Alvin	28	2012	2012	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
Quantum - 1 new ell Old - 6.7 miles southeast of Alvin	30	2012	2012	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
Hall-Houston – 1 new well S.T. 310 - LN/2 NE/4 - 10.5 miles southeast of Freeport	11	2012	2012	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
Cobra – 1 new well Astro - 7.3 miles northwest of Rosharon	37	2012	2012	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
Houston Energy – 1 new well Powell - 5.3 miles northwest of Brazoria	23	2012	2012	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known

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Freeport LNG – Liquefaction Project and Phase II Developments Cumulative Impacts Analysis (Environmental Impacts)
Major Recent or Proposed Developments in Brazoria County

Sponsor/Project & Location	Distance from Terminal (miles)	Project Timeframe		ENVIRONMENTAL IMPACT EVALUATION						
		Const. Start-up	In- Service	Wetlands	Waterbodies	Threatened & Endangered Species	EFH	Air	Noise	Water Quality
Sage Energy – 1 new well Ramsay State Prison Farm – B -3.0 miles west of Bonney	29	2012	2012	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known – assumed minor, if any, based on well pad siting flexibility for new wells	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
LAND & AIR TRANSPORTATION FIELD DEVELOPMENTS										
Brazoria County/Port Freeport - Grade Separation at Intersection of FM 1495 and SH 36 Freeport	1.3	Initial design - 2011	2014	~30 acres PEM wetlands fringing intersection (per NWI)	Not known	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
TxDOT - Toll-way development on SH 288 Pearland	46	By 2016	By 2016	Not known	Not known	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
TxDOT – SH288 improvements Lake Jackson/ Clute	6	Not known	2012	Not known	Not known	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
TxDOT – General road improvements – 23 currently active projects Brazoria County	-	Not known	Not known	Not known	Not known	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
Brazoria County w/ State and Federal Funding - Texas Gulf Coast Regional Airport Expansion 5 miles south of Angleton	14	2012	2013	No impact (per NWI)	No impact (per NWI)	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
COMMERCIAL DEVELOPMENTS										
Kelsey-Seybold – New Admin Building Pearland	45	2012	2013	No impact (per NWI)	No impact (per NWI)	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
Ref-Chem, LP – New Office Building Pearland	45	2012	Not known	Not known	Not known	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
Angleton/Danbury Medical Center – New Medical Pavilion Angleton	18	2012	Not known	No impact (per NWI)	No impact (per NWI)	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known

Table G-1

Freeport LNG – Liquefaction Project and Phase II Developments Cumulative Impacts Analysis (Environmental Impacts)
Major Recent or Proposed Developments in Brazoria County

Sponsor/Project & Location	Distance from Terminal (miles)	Project Timeframe		ENVIRONMENTAL IMPACT EVALUATION						
		Const. Start-up	In- Service	Wetlands	Waterbodies	Threatened & Endangered Species	EFH	Air	Noise	Water Quality
RESIDENTIAL DEVELOPMENTS										
Aplin Homes - Oyster Bend Subdivision – 250 New Houses Lake Jackson	10	2013+	Not known	Not known	Not known	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
Aplin Homes – Northwoods Estates Subdivision – 120 New Houses	12	2013+	Not known	Not known	Not known	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
Cresco – Alden Lakes Master Planned Community – 1,800 New Houses	12	2013+	Phased over 15 years	Not known	Not known	Not known	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
MISCELLANEOUS DEVELOPMENTS										
Lake Jackson - Downtown revitalization Lake Jackson	11	2011	2012	No impact	No impact	No impact	None (no marine/ estuarine habitat)	Unknown	Not known	Not known
City of Surfside - Walking Trail Surfside Beach	?	2012	2014	Not known	Not known	Not known	Not known	Unknown	Not known	No impact anticipated based on project scope
GLO/ Coastal Impact Assessment Program - Surfside Beach re- nourishment Surfside Beach	2	2012	2012	Not known	Open water conversion to beach	Not known	Not known	Unknown	Not known	No impact anticipated based on project scope

Table G-2

Freeport LNG – Liquefaction Project and Phase II Developments Cumulative Impacts Analysis (Socioeconomic Impacts)
Major Recent or Proposed Developments in Brazoria County

Sponsor/Project & Location	Distance from Terminal (miles)	Project Timeframe		SOCIOECONOMIC IMPACT EVALUATION						
		Const. Start-up	In- Service	Land Use	Visual Impacts	Traffic / Roads	Housing	Public Services	Water Supply	New Jobs
INDUSTRIAL DEVELOPMENTS										
Manufacturing/Chemical Production										
Airgas Carbonic CO_2 Production Plant Alvin	40	2013	2013/2014	Potential change from open land to industrial land	Unknown	No significant impacts – based on low worker numbers	No significant impacts anticipated – based on low worker numbers	No significant impacts anticipated – based on low worker numbers	No significant impacts anticipated	10 (construction) 14 (operation)
Artland Louisiana & Performance Contractors – Pipe Fabrication Facility Rosharon	27	2013	2014	Potential change from open land to industrial land	Unknown	No significant impacts – based on low worker numbers	Temporary housing required for up to 60 construction workers Permanent housing required for up to 45 operational workers	No significant impacts anticipated	No significant impacts anticipated	60 (construction) 45 (operation)
Ascend Performance Materials – Propane Dehydrogenation Plant Chocolate Bayou – Existing Plant Site	22	2013	2015	Unchanged from current industrial use – existing plant site	At existing industrial plant – no material change to view-shed	Construction traffic impacts assumed localized in Chocolate Bayou SH35/ FM 2917 area	Temporary housing required for up to 1,500 construction workers; Permanent housing required for up to 100 operational workers	No over-burden on existing emergency services anticipated – project at existing plant	No significant impacts anticipated	1,500 (construction) 100 (operation)
BASF – Ammonium Sulfate Crystallizer Freeport – Existing Plant Site	7	2014	2016	Unchanged from current industrial use – existing plant site	At existing industrial plant – no material change to view-shed	Construction traffic impacts assumed low based on worker numbers and ready access to SH 288	Temporary housing required for up to 20 construction workers	No over-burden on existing emergency services anticipated – project at existing plant	Process water supplied from Brazos River	20 (construction)
BASF – Emulsion Polymers Plant Freeport Existing Plant Site	7	2013	2014	Unchanged from current industrial use – existing plant site	At existing industrial plant – no material change to view-shed	Construction traffic impacts assumed low based on worker numbers and ready access to SH 288	Temporary housing required for up to 200 construction workers Permanent housing required for up to 20 operational workers	No over-burden on existing emergency services anticipated – project at existing plant	Process water supplied from Brazos River	200 (construction) 20 (operation)
Chevron Phillips - Two Plastic Resin-Producing Facilities Old Ocean at SH 35 / FM 524	27	2014	2017	Unchanged from current industrial use – existing plant site	At existing industrial plant – no material change to view-shed	Construction traffic impacts assumed localized in Old Ocean / Sweeny / SH35 area	Temporary housing required for up to 1,000 construction workers Permanent housing required for up to 92 operational workers	No over-burden on existing emergency services anticipated – project at existing plant	Process water supplied from San Bernard River	1,000 (construction) 92 (operation)

Table G-2

Freeport LNG – Liquefaction Project and Phase II Developments Cumulative Impacts Analysis (Socioeconomic Impacts)
Major Recent or Proposed Developments in Brazoria County

Sponsor/Project & Location	Distance from Terminal (miles)	Project Timeframe		SOCIOECONOMIC IMPACT EVALUATION						
		Const. Start-up	In- Service	Land Use	Visual Impacts	Traffic / Roads	Housing	Public Services	Water Supply	New Jobs
Cyanco – Sodium Cyanide Plant Chocolate Bayou	22	Unknown	2012	Unchanged from current industrial use – existing plant site	At existing industrial plant – no material change to view-shed	Construction traffic impacts assumed localized in Chocolate Bayou / FM 2917 / FM 2004 area	Permanent housing required for up to 20 operational workers	No over-burden on existing emergency services anticipated – project at existing plant	Process water supplied from Gulf Coast Water Authority canal	20 (operation)
Dow - Chlorine Plant Freeport – Existing Plant B	5	2011	2013	Unchanged from current industrial use – existing plant site	At existing industrial plant – no material change to view-shed	Construction traffic impacts anticipated in Freeport area based on number of workers	Temporary housing required for up to 1,000 construction workers Permanent housing required for up to 50 operational workers	No over-burden on existing emergency services anticipated – project at existing plant	Process water supplied from Brazos River	1,000 (construction) 50 (operation)
Dow - Propane Dehydrogenation Plant Freeport – Existing Oyster Creek Plant	4	2013	2015	Unchanged from current industrial use – existing plant site	At existing industrial plant – no material change to view-shed	Construction traffic impacts anticipated in Freeport area based on number of workers	Temporary housing required for up to 1,500 construction workers Permanent housing required for up to 120 operational workers	No over-burden on existing emergency services anticipated – project at existing plant	Process water supplied from Brazos River	1,300 (construction) 120 (operation)
Dow – Ethylene Plant Freeport – Existing Plant B	5	2014	2017	Unchanged from current industrial use – existing plant site	At existing industrial plant – no material change to view-shed	Construction traffic impacts anticipated in Freeport area based on number of workers	Temporary housing required for up to 2,000 construction workers Permanent housing required for up to 150 operational workers	No over-burden on existing emergency services anticipated – project at existing plant	Process water supplied from Brazos River	2,000 (construction) 150 (operation)
Dow – AgroSciences Plant Existing Oyster Creek Plant	4	2013	2014	Unchanged from current industrial use – existing plant site	At existing industrial plant – no material change to view-shed	Construction traffic impacts anticipated in Freeport area based on number of workers	Temporary housing required for up to 150 construction workers Permanent housing required for up to 100 operational workers	No over-burden on existing emergency services anticipated – project at existing plant	Process water supplied from Brazos River	150 (construction) 10 (operation)
Dow – Performance Plastic Plants (Alpha & Beta) Freeport – Existing Plant A	1	2015	Alpha 2016 Beta 2017	Unchanged from current industrial use – existing plant site	At existing industrial plant – no material change to view-shed	Construction traffic impacts anticipated in Freeport area based on number of workers	Temporary housing required for up to 2,000 construction workers Permanent housing required for up to 100 operational workers	No over-burden on existing emergency services anticipated – project at existing plant	Process water supplied from Brazos River	2,000 (construction) 100 (operation)

Table G-2

Freeport LNG – Liquefaction Project and Phase II Developments Cumulative Impacts Analysis (Socioeconomic Impacts)
Major Recent or Proposed Developments in Brazoria County

Sponsor/Project & Location	Distance from Terminal (miles)	Project Timeframe		SOCIOECONOMIC IMPACT EVALUATION						
		Const. Start-up	In- Service	Land Use	Visual Impacts	Traffic / Roads	Housing	Public Services	Water Supply	New Jobs
Idem-Itsu Kosan Co. & Mitsui Co. – Linear Alpha Olefins Unit Dow Freeport – Existing Plant A	1	2014	2016	Unchanged from current industrial use – existing plant site	At existing industrial plant – no material change to view-shed	Construction traffic impacts anticipated in Freeport area based on number of workers	Temporary housing required for up to 2,200 construction workers	No over-burden on existing emergency services anticipated – project at existing plant	Process water supplied from Brazos River	2,200 (construction)
Ineos – Cracking Furnace Existing Chocolate Bayou Plant	22	2012	2013	Unchanged from current industrial use – existing plant site	At existing industrial plant – no material change to view-shed	Traffic impacts assumed localized in Chocolate Bayou / FM 2917/ FM 2004 area	No housing requirements identified	No over-burden on existing emergency services anticipated – project at existing plant	Process water supplied from GCWA canal – 0.5 % increase in water use above current levels (per BA)	5 (operation)
Phillips 66 – LPG Export Terminal Freeport – Existing Plant Site	1	2016	Unknown	Unchanged from current industrial use – existing plant site	At existing industrial plant – no material change to view-shed	Construction traffic impacts anticipated in Freeport area	No housing requirements identified	No over-burden on existing emergency services anticipated – project at existing plant	Unknown	Unknown
Phillips 66 – NGL Fractionator	27	2014	2015	Unchanged from current industrial use – existing plant site	At existing industrial plant – no material change to view-shed	Construction traffic impacts assumed localized in Old Ocean / Sweeny / SH35 area	Temporary housing required for up to 300 construction workers Permanent housing required for up to 25 operational workers	No over-burden on existing emergency services anticipated – project at existing plant	Unknown	200 - 300 (construction) 25 (operation)
Sabar Power Services – Electrical Equipment Fabrication Facility Iowa Colony	36	2013	2013	Potential change from open land to industrial land	Unknown	Traffic impacts assumed low based on worker numbers	Permanent housing required for up to 40 operational workers	No over-burden on existing emergency services anticipated	Unknown	40 (operation)
Shin-Etsu –Silicon Production Plant Freeport Existing Plant	3	2013	2014	At existing industrial plant – no material change to view- shed	Construction traffic impacts assumed low based on worker numbers and ready access to SH 332	Temporary housing required for up to 80 construction workers Permanent housing required for up to15 operational workers	No over-burden on existing emergency services anticipated – project at existing plant	Process water supplied from Brazos River	80 (construction) 15 (operation)	

Table G-2

Freeport LNG – Liquefaction Project and Phase II Developments Cumulative Impacts Analysis (Socioeconomic Impacts)
Major Recent or Proposed Developments in Brazoria County

Sponsor/Project & Location	Distance from Terminal (miles)	Project Timeframe		SOCIOECONOMIC IMPACT EVALUATION						
		Const. Start-up	In- Service	Land Use	Visual Impacts	Traffic / Roads	Housing	Public Services	Water Supply	New Jobs
City of Sweeny – Industrial Park (including Phillips 66 Admin Building & Apache Oil Admin Building and Tank Farm	26	2014	Unknown	Potential change from open land to industrial land	Unknown	Traffic impacts assumed low based on worker numbers	No housing requirements identified	No over-burden on existing emergency services anticipated – project at existing plant	Unknown	10 (operation) – Phillips 66
Sweeny										
Mitsubishi Heavy Industries – Manufacturing Site	46	2013/14	2014	Potential change from open land to industrial land	Unknown	Traffic impacts assumed low based on ready access to major roads/highways	Permanent housing required for up to 100 operational workers	No over-burden on existing emergency services anticipated – project at existing plant	Unknown	100 (operation)
Pearland										
PORT DEVLEOPMENTS										
Port Freeport & Local interests -Non-Federal Channel Widening Project	Adjacent to terminal and in Gulf of Mexico	2013	2018	3.9 acres of shoreline converted to open water	No significant impacts anticipated	No significant impacts anticipated	No significant impacts anticipated	No significant impacts anticipated	No significant impacts anticipated	Limited to offshore dredging – worker numbers unknown
Freeport Harbor Channel										
Port Freeport & USACE – Federal Channel Deepening Project	Adjacent to terminal and In Gulf of Mexico	2015	2021	No change in land use	No significant impacts anticipated	No significant impacts anticipated	No significant impacts anticipated	No significant impacts anticipated	No significant impacts anticipated	Limited to offshore dredging – worker numbers unknown
Freeport Harbor Channel										
Port Velasco Terminal Development	1	2008	2016	Unchanged – existing port site	No significant impacts – within existing port setting	Un-quantified increase in road and rail traffic anticipated	No significant impacts anticipated	No significant impacts anticipated	No significant impacts anticipated	Unknown
Freeport – existing Port property										
PIPELINE DEVELOPMENTS										
Dow - 2.3-mile, 30-inch hydrogen pipeline	4	2012	2012	No change in land use anticipated	No significant impacts anticipated	No significant impacts anticipated	No significant impacts anticipated	No significant impacts anticipated	No significant impacts anticipated	Unknown
Freeport - between Plant B & Oyster Creek Plant										
Enterprise -48.9 mile, 24-inch NGL pipeline	34	2012	2012	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Alvin and Mont Belvieu (~2 miles in Brazoria County)										

Table G-2

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Major Recent or Proposed Developments in Brazoria County

Sponsor/Project & Location	Distance from Terminal (miles)	Project Timeframe		SOCIOECONOMIC IMPACT EVALUATION						
		Const. Start-up	In- Service	Land Use	Visual Impacts	Traffic / Roads	Housing	Public Services	Water Supply	New Jobs
Kinder Morgan/ Phillips 66 - 27-mile, 12-inch Sweeny Lateral - Crude Oil/Condensate Pipeline Southwards to Phillips 66 Sweeny refinery	27	2013	2014	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Seaway (Enterprise & Enbridge) - 500- mile, 30-inch Seaway Crude Oil Pipeline Jones Creek northwards to Cushing, Oklahoma	6	2012	2014	Unknown Crosses Justin Hurst WMA by HDD	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Seaway (Enterprise & Enbridge) 65-mile, 36-inch Crude Oil Extension Pipeline Jones Creek northeastwards to southeast Houston	6	2012	2014	Unknown Crosses Justin Hurst WMA by HDD	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
OIL & GAS FIELD DEVELOPMENTS										
Suemar – 1 new well Chevron Unit - 12 miles southeast of Angleton	9	2012	2012	Minor land use change at new well pad sites, but in existing oil field	No significant long-term visual impacts – in existing oil field	No significant impacts – based on low worker numbers	No significant impacts – small drilling crews & typically locally based	No significant impacts – relatively low worker numbers	Unknown	Assumed small drilling crew and no permanent on-site workers
Denbury – 78 new/reentered/ recompleted wells West Hastings Unit - between Pearland & Alvin	38	2012	2013	Minor land use change at new well pad sites, but in existing oil field	No significant long-term visual impacts – in existing oil field	No significant impacts – based on low worker numbers	No significant impacts – small drilling crews & typically locally based	No significant impacts – relatively low worker numbers	Unknown	Assumed small drilling crew and no permanent on-site workers
Maverick – 18 new wells Wisdom, Groce A/B Units - 5 miles southeast of Damon	32	2012	2012	Minor land use change at new well pad sites, but in existing oil field	No significant long-term visual impacts – in existing oil field	No significant impacts – based on low worker numbers	No significant impacts – small drilling crews & typically locally based	No significant impacts – relatively low worker numbers	Unknown	Assumed small drilling crew and no permanent on-site workers
Hilcorp – 10 new/ recompleted wells Old Ocean Unit - Sweeny	24	2012	2013	Minor land use change at new well pad sites, but in existing oil field	No significant long-term visual impacts – in existing oil field	No significant impacts – based on low worker numbers	No significant impacts – small drilling crews & typically locally based	No significant impacts – relatively low worker numbers	Unknown	Assumed small drilling crew and no permanent on site workers -

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		Const. Start-up	In- Service	Land Use	Visual Impacts	Traffic / Roads	Housing	Public Services	Water Supply	New Jobs
Jetta - 3 new wells Phillips & Abrams Units - 2.0 miles north of West Columbia	26	2012	2012	Minor land use change at new well pad sites, but in existing oil field	No significant long-term visual impacts – in existing oil field	No significant impacts – based on low worker numbers	No significant impacts – small drilling crews & typically locally based	No significant impacts – relatively low worker numbers	Unknown	Assumed small drilling crew and no permanent on-site workers
Chalker - 6 new wells Bennett Estate - 2.5 miles northeast of Danbury	23	2012	2012	Minor land use change at new well pad sites, but in existing oil field	No significant long-term visual impacts – in existing oil field	No significant impacts – based on low worker numbers	No significant impacts – small drilling crews & typically locally based	No significant impacts – relatively low worker numbers	Unknown	Assumed small drilling crew and no permanent on-site workers
LINC Gulf Coast Petroleum – 7 new/recompleted wells Welch - 12.0 miles east of Angleton	15	2012	2013	Minor land use change at new well pad sites, but in existing oil field	No significant long-term visual impacts – in existing oil field	No significant impacts – based on low worker numbers	No significant impacts – small drilling crews & typically locally based	No significant impacts – relatively low worker numbers	Unknown	Assumed small drilling crew and no permanent on-site workers
Texas Standard Oil – 4 new wells HRI - 3.2 miles west of Liverpool	25	2012	2013	Minor land use change at new well pad sites, but in existing oil field	No significant long-term visual impacts – in existing oil field	No significant impacts – based on low worker numbers	No significant impacts – small drilling crews & typically locally based	No significant impacts – relatively low worker numbers	Unknown	Assumed small drilling crew and no permanent on-site workers
Sandalwood – 2 new wells Charles Duke Unit - 5.1 miles southwest of Alvin	28	2012	2012	Minor land use change at new well pad sites, but in existing oil field	No significant long-term visual impacts – in existing oil field	No significant impacts – based on low worker numbers	No significant impacts – small drilling crews & typically locally based	No significant impacts – relatively low worker numbers	Unknown	Assumed small drilling crew and no permanent on-site workers
Quantum - 1 new well Old - 6.7 miles southeast of Alvin	30	2012	2012	Minor land use change at new well pad sites, but in existing oil field	No significant long-term visual impacts – in existing oil field	No significant impacts – based on low worker numbers	No significant impacts – small drilling crews & typically locally based	No significant impacts – relatively low worker numbers	Unknown	Assumed small drilling crew and no permanent on-site workers
Hall-Houston – 1 new well S.T. 310 - LN/2 NE/4 - 10.5 miles southeast of Freeport	11	2012	2012	Minor land use change at new well pad sites, but in existing oil field	No significant long-term visual impacts – in existing oil field	No significant impacts – based on low worker numbers	No significant impacts – small drilling crews & typically locally based	No significant impacts – relatively low worker numbers	Unknown	Assumed small drilling crew and no permanent on-site workers
Cobra – 1 new well Astro - 7.3 miles northwest of Rosharon	37	2012	2012	Minor land use change at new well pad sites, but in existing oil field	No significant long-term visual impacts – in existing oil field	No significant impacts – based on low worker numbers	No significant impacts – small drilling crews & typically locally based	No significant impacts – relatively low worker numbers	Unknown	Assumed small drilling crew and no permanent on-site workers
Houston Energy – 1 new well Powell - 5.3 miles northwest of Brazoria	23	2012	2012	Minor land use change at new well pad sites, but in existing oil field	No significant long-term visual impacts – in existing oil field	No significant impacts – based on low worker numbers	No significant impacts – small drilling crews & typically locally based	No significant impacts – relatively low worker numbers	Unknown	Assumed small drilling crew and no permanent on-site workers

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Sponsor/Project & Location	Distance from Terminal (miles)	Project Timeframe		SOCIOECONOMIC IMPACT EVALUATION						
		Const. Start-up	In- Service	Land Use	Visual Impacts	Traffic / Roads	Housing	Public Services	Water Supply	New Jobs
Sage Energy – 1 new well Ramsay State Prison Farm – B -3.0 miles west of Bonney	29	2012	2012	Minor land use change at new well pad sites, but in existing oil field	No significant long-term visual impacts – in existing oil field	No significant impacts – based on low worker numbers	No significant impacts – small drilling crews & typically locally based	No significant impacts – relatively low worker numbers	Unknown	Assumed small drilling crew and no permanent on-site workers
Various companies – 37 new/reentered/ recompleted wells Other units to those identified above	-	2012	2013	Minor land use change at new well pad sites, but in existing oil field	No significant long-term visual impacts – in existing oil fields	No significant impacts – based on low worker numbers	No significant impacts – small drilling crews & typically locally based	No significant impacts – relatively low worker numbers	Unknown	Assumed small drilling crew and no permanent on-site workers
LAND & AIR TRANSPORTATION FIELD DEVLEOPMENTS										
Brazoria County/Port Freeport - Grade Separation at Intersection of FM 1495 and SH 36 Freeport	1.3	Initial design - 2011	2014	Minor loss of open space for road right-of-way	Elevated road section would change view - shed but in industrial setting with no residential views	Temporary traffic restrictions during construction – improved traffic flow when complete	No significant impacts – relatively low worker numbers	No significant impacts – relatively low worker numbers	No significant impacts	Unknown
TxDOT - Toll-way development on SH 288 Pearland	46	2015	2017	Use of existing open median on SH288 for additional lanes	Toll booths & additional traffic lanes would change local view-shed	Temporary traffic restrictions during construction – improved traffic flow when complete	Unknown	Unknown	No significant impacts	Unknown
TxDOT – SH288 improvements Lake Jackson/ Clute	6	2010	2012	No significant change	Elevated road section has changed viewshed	Significant improvement in traffic flow through Clute & Lake Jackson	No significant impacts	Improved mobility for emergency vehicles	No significant impacts	Unknown (but project complete)
TxDOT – General road improvements – 23 currently active projects Brazoria County	-	2012	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Brazoria County w/ State and Federal Funding - Texas Gulf Coast Regional Airport Expansion 5 miles south of Angleton	14	2012	2013	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

Table G-2

Freeport LNG – Liquefaction Project and Phase II Developments Cumulative Impacts Analysis (Socioeconomic Impacts)
Major Recent or Proposed Developments in Brazoria County

Sponsor/Project & Location	Distance from Terminal (miles)	Project Timeframe		SOCIOECONOMIC IMPACT EVALUATION						
		Const. Start-up	In- Service	Land Use	Visual Impacts	Traffic / Roads	Housing	Public Services	Water Supply	New Jobs
COMMERCIAL DEVELOPMENTS										
Kelsey-Seybold – New Admin Building Pearland	45	2012	2014	4 acres open land converted to commercial use for office building	4-story office building in commercial setting	No change in existing traffic patterns anticipated	Unknown	Unknown	Unknown	800
Ref-Chem, LP – New Office Building Pearland	45	2012	2013	1 acre open land converted to commercial use for office building	Office building in commercial setting	No change in existing traffic patterns anticipated	Unknown	Unknown	Unknown	100 (operation)
Angleton/Danbury Medical Center – New Medical Pavilion Angleton	18	2012	Unknown	Open land on existing hospital site would be developed for building	Adjacent to existing hospital	No change in existing traffic patterns anticipated	Unknown	Unknown	Unknown	Unknown
HCA Gulf Coast – New Hospital Pearland	45	2013	2014	Open land will be developed in mixed use area	Hospital building in mixed use setting	No change in existing traffic patterns anticipated	Unknown	Unknown	Unknown	288 (operation)
Dow – New Office Building Lake Jackson	11	2014	2014	Open land will be developed in mixed use area	Office building in mixed use setting	No change in existing traffic patterns anticipated	Unknown	Unknown	Unknown	1,200 (operation)
RESIDENTIAL DEVELOPMENTS										
Aplin Homes - Oyster Bend Subdivision – 250 New Houses Lake Jackson	10	2013+	Unknown	Conversion from open land to residential	Unknown	Unknown	Increased housing availability	Unknown	Increased residential demand	None - no overlap in construction worker needs anticipated
Aplin Homes – Northwoods Estates Subdivision – 120 New Houses	12	2013+	Unknown	Conversion from open land to residential	Unknown	Unknown	Increased housing availability	Unknown	Increased residential demand	None - no overlap in construction worker needs anticipated
Cresco – Alden Lakes Master Planned Community – 1,800 New Houses	12	2013+	Phased over 15 years	Conversion from open land to residential	Unknown	Unknown	Increased housing availability	Unknown	Increased residential demand	None - no overlap in construction worker needs anticipated
Alden Subdivision – New Houses Angleton	14	2013+`	Unknown	Conversion from open land to residential	Unknown	Unknown	Increased housing availability	Unknown	Increased residential demand	None - no overlap in construction worker needs anticipated
Audubon Woods III- 60 New Houses Richwood	11	2012/13	Unknown	Conversion from open land to residential	Unknown	Unknown	Increased housing availability	Unknown	Increased residential demand	None - no overlap in construction worker needs anticipated

Table G-2

Freeport LNG – Liquefaction Project and Phase II Developments Cumulative Impacts Analysis (Socioeconomic Impacts)
Major Recent or Proposed Developments in Brazoria County

Sponsor/Project & Location	Distance from Terminal (miles)	Project Timeframe		SOCIOECONOMIC IMPACT EVALUATION						
		Const. Start-up	In- Service	Land Use	Visual Impacts	Traffic / Roads	Housing	Public Services	Water Supply	New Jobs
College Park – 71 New Houses Clute	9	2013	Unknown	Conversion from open land to residential	Unknown	Unknown	Increased housing availability	Unknown	Increased residential demand	None - no overlap in construction worker needs anticipated
Ponoma – Planned Community – 2,100 lots Manvel	37	2013	2023	Conversion from open land to residential	Unknown	Unknown	Increased housing availability	Unknown	Increased residential demand	None - no overlap in construction worker needs anticipated
Lakewood – 650 New Houses Manvel	38	2013	Unknown	Conversion from open land to residential	Unknown	Unknown	Increased housing availability	Unknown	Increased residential demand	None - no overlap in construction worker needs anticipated
Bluewater Lakes – 300 New Houses Manvel	38	2013	Unknown	Conversion from open land to residential	Unknown	Unknown	Increased housing availability	Unknown	Increased residential demand	None - no overlap in construction worker needs anticipated
Newport Lakeside Estates – 200 New Houses Manvel	41	2013	Unknown	Conversion from open land to residential	Unknown	Unknown	Increased housing availability	Unknown	Increased residential demand	None - no overlap in construction worker needs anticipated
MISCELLANEOUS DEVELOPMENTS										
Lake Jackson - Downtown revitalization Lake Jackson	11	2011	2013+	Unchanged	Improved aesthetics	Traffic flow improved	Unknown	Improved	Unknown	Unknown
City of Surfside - Walking Trail Surfside Beach	?	2012	2014	Unknown	Will improve local aesthetics	Unknown	Unknown	Unknown	Unknown	Unknown
GLO/ Coastal Impact Assessment Program - Surfside Beach re-nourishment	2	2012	2012	Open water conversion to beach	Restoration would improve beach aesthetics	Unknown	Unknown	No impact anticipated based on project scope	No impact anticipated based on project scope	Unknown
OVERALL CUMULATIVE IMPACTS ASSOCIATED WITH LIQUEFACTION PROJECT:				None	None - all developments are spatially dis-contiguous and do not have any collective effect on individual view-sheds	Additive impact only - potential for increased traffic congestion in Port Freeport area.	Additive impact only – potential for increased short- term housing demand during construction.	Additive impact only – potential for increased school enrollment where construction workers' families relocate to area	Additive impact only - Freeport LNG projects and concurrent industrial and residential developments would Increase regional water supply demand	Additive impact only -Projects in southern Brazoria County would create 9,950 construction jobs and 625 permanent jobs Concurrent construction may create competition for jobs

APPENDIX H

References

APPENDIX H
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APPENDIX I

Traffic Management Plan

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Transportation Management Plan

Freeport LNG Liquefaction and Phase II Modification Projects
FERC Docket Nos. CP12-29-000 and CP12-509-000
Brazoria County, Texas

APRIL 2014

Prepared By:

Freeport LNG Development, L.P.

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Acronyms and Definitions

BOG	boil-off gas
CFR	Code of Federal Regulations
Commission	Federal Energy Regulatory Commission
CR	County Road
DMPA	dredged material placement area
Dow	Dow Chemical Company
EPC	Engineering, Procurement, and Construction
ER	Environmental Report
FERC	Federal Energy Regulatory Commission
FHC	Freeport Harbor Channel
FM	Farm-to-Market
Freeport LNG	Freeport LNG Development, L.P., Freeport LNG Expansion, L.P., and FLNG Liquefaction, LLC
Greater Houston	Houston-Sugar Land-Baytown Metropolitan Statistical Area
HDD	horizontal direction drill *or* horizontal directional drilling
Houston MSA	Houston-Sugar Land-Baytown Metropolitan Statistical Area
ICW	Intracoastal Waterway
ISD	Independent School District
LNG	liquefied natural gas
LOS	Level of Service
MSA	Metropolitan Statistical Area
mtpa	million tonnes per annum
NGL	Natural Gas Liquids
Quintana Island Terminal	existing LNG terminal on Quintana Island near Freeport, Texas
RV	recreational vehicle
SH	State Highway
Terminal	existing LNG terminal on Quintana Island near Freeport, Texas
TDCJ	Texas Department of Criminal Justice
TxDOT	Texas Department of Transportation
Liquefaction Facilities	The Freeport LNG liquefaction facilities on Quintana Island, Texas
Phase I Terminal Facilities	The existing regasification terminal (Terminal) on Quintana Island
Phase II Facilities	Authorized but not as yet constructed regasification facilities on Quintana Island (a portion of these to be constructed during Liquefaction Project, i.e. LNG storage tank 3)

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Phase II Modification Project	Facilities associated with Phase II Facilities that have changed and were reassessed by FERC within the Environmental Impact Statement along with the Liquefaction Project
Plan	The Freeport LNG Project Transportation Management Plan
Liquefaction Project	The total of all proposed facilities to be constructed including both the Liquefaction, Phase II, and Phase II Modification projects
TWIC	Transportation Worker Identification Card
LNG	Liquefied Natural Gas
Dock 2	Part of the Phase II Modification Project
QRL	Quad Random Lengths
DRL	Double Random Lengths
EPC	Engineering, Procurement, and Construction
FLNG	Freeport LNG
ZC/JV	Main EPC Contractor for the Liquefaction Project
Sheriff's Department	Brazoria County Sheriff's Department
DPS	Texas Department of Public Safety
Velasco Drainage District	Local agency that maintains drainage and storm protection structures within the Project area
OEP	(FERC) Office of Energy Projects
Seaway	Seaway Dredged Material Placement Area leased from Port Freeport to be used as laydown
Traffic Control Measures	Traffic control measures will consist of locally or TxDOT or USDOT approved control measures. Appropriate measures will be selected for each situation encountered during construction in coordination with local and state agencies.

Valid Project Identification Each individual mobilizing to any of the Freeport LNG Liquefaction Project work areas (including project management and administration staff) will be provide a valid project identification (photo, name, company affiliation, etc.) as well as other applicable credentials FERC Environmental Training, TWIC, etc.

Valid Entrance Pass A valid entrance pass will be provided to all vehicles frequenting the Freeport LNG construction site(s). The pass will consist of a windshield label, tag, or dashboard placard identifying the company and site(s) for which the pass is valid.

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1 Introduction

Freeport LNG project Transportation Management Plan ("Plan") details specific measures to be implemented for the transport of personnel, equipment, permanent plant equipment and materials safely to each of the project work sites. Included but not limited to the identification of off-site vehicle parking areas, alternative worker transportation methods, traffic control measures including traffic control personnel, construction and public safety control measures, pedestrian safety measures, and delivery hours. This Plan covers all aspects of the construction activities for the Freeport LNG Liquefaction and Phase II Modification Projects (Project).Contractor will develop a Traffic Control Plan for their specific job site(s). These Traffic Control Plans will support and provide further detail to the Freeport LNG Project Transportation Management Plan.

For the Phase I and Phase II Projects, Freeport LNG developed specific traffic and logistical transportation plans for construction deliveries involving overweight loads. These same plans will be adapted for the Liquefaction Project, with respect to deliveries at the Terminal site, the Pretreatment Plant site, and along the Pipeline/Utility Line System. Modifications to the existing plans will involve input and review by equipment and material suppliers, TxDOT, state and local law enforcement agencies, Brazoria County, the Town of Quintana, the City of Oyster Creek, and other local authorities. The plans will comply with state and county permitting requirements and will contain specific routing information and delivery timelines.

Freeport LNG will have the following construction sites. The Plan takes into account the differences between each site as well as the requirements related to the construction phases. These three construction sites encompass the Liquefaction Project herein called "Project".

- Liquefaction and Phase II Modification Facilities on Quintana Island
- Pretreatment Facilities near the City of Oyster Creek
- Pipeline and Utility Line Rights of Way and Ancillary Areas

Freeport LNG's overriding objective is to safely and effectively manage the transportation of personnel, equipment and materials.

1.1 Purpose

The purpose of the Plan is to define the requirements and procedures that the Construction Contractors and Freeport LNG will adhere to during construction of the Project.

1.2 Scope

The Plan is applicable to all construction sites through all phases of construction from initial mobilization for temporary facilities, site preparation, etc. through commissioning and startup.

Freeport LNG has developed a Plan that details specific measures that will be used to transport materials and construction workers safely to and from the project work sites. The Plan identifies

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off-site vehicle parking areas, alternative worker transportation methods including buses and/or barges, traffic control measures, pedestrian safety measures, traffic control personnel, and construction and delivery hours.

1.3 Responsibilities

It shall be the responsibility of the Freeport LNG Project Director through the FLNG General Construction Manager to assure that each aspect of the Plan is implemented by the Construction Contractors and stringently followed by all Freeport LNG personnel and those of the Construction Contractors, subcontractors, equipment and material vendors and logistic companies.

2 Project Description

The Environmental Impact Statement describes in detail the components making up the Freeport LNG Liquefaction and Phase II Modification Projects. Some of the proposed Liquefaction Project facilities will be located at and adjacent to the existing Terminal on Quintana Island and some will be located beyond Quintana Island. The major Project components are summarized below according to location.

Quintana Island Terminal Site

- Liquefaction Plant - consisting of three propane pre-cooled mixed refrigerant trains, each capable of producing a nominal 4.4 mtpa of LNG, along with ancillary support facilities and infrastructure.
- Construction dock on the Intracoastal Waterway ("ICW") - to handle waterborne deliveries of equipment and material during construction.
- Aggregate dock on the ICW – to handle waterborne deliveries of sand, aggregate and other bulk materials for soil amendment and concrete batch plant operations.
- A second marine berth (Dock 2) – to handle transfer of LNG between LNG storage tanks and LNG ships.
- A third LNG storage tank (LNG Tank T-3) – to store LNG for transfer to LNG ships.

Pretreatment Plant Site

- Natural gas Pretreatment Plant located about 2.5 miles north of the Terminal site.

Pipeline/Utility Line System

- Several pipelines (BOG, natural gas, NGL, nitrogen) and utility lines (electric, fiber optic, water) that collectively form a route system between the Terminal, the Pretreatment Plant, Freeport LNG's Stratton Ridge meter station, Freeport LNG's Stratton Ridge underground gas storage facility, and interconnects with other industrial entities.

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Most of the Liquefaction Project facilities are under the FERC's jurisdiction; the only "non-jurisdictional" facilities are the NGL pipeline, the nitrogen pipeline, and the utility lines (electric, fiber optic, water), together with their associated appurtenances. Of the non-jurisdictional facilities, the only ones that do not share construction workspace and an operational footprint with jurisdictional facilities are the segment of the Liquefaction Plant's electric line that lies outside the plant's operational footprint, the segment of the Pretreatment Plant's electric line that lies outside the plant's operational footprint, and those segments of the nitrogen pipeline, water line, and fiber optic system located north of the Pretreatment Plant. Those segments of the nitrogen pipeline and fiber optic system that are located within the Terminal fenceline are still considered non-jurisdictional, even though they are on the "Terminal site".

The proposed Liquefaction Project facilities are illustrated in the series of figures contained in Appendix A, as described below.

Figure 2.1-1 shows the regional location and configuration of the facilities on an aerial map. A more detailed layout of the Terminal facilities is provided in Figure 2.1-2 (aerial map); a more detailed layout of the Pretreatment Plant is provided in Figures 2.1-3 (aerial map). The Pipeline/Utility Line System is depicted on the aerial route sheets in Figure 2.1-4(a-h).

Figures 2.1-5 and 2.1-6 illustrate workspace layouts for the Terminal facilities and the Pretreatment Plant, respectively. Figure 2.1-7 depicts an off-site storage and laydown area for the Terminal facilities.

The main components of the Liquefaction Plant at and adjacent to the Terminal site will be three liquefaction trains ("Train 1", "Train 2", and "Train 3"). All three trains and their supporting facilities will be located west of the existing Phase I storage and vaporization facilities. Development of liquefaction infrastructure will necessitate some integration with the existing Phase I facilities and proposed Phase II facilities, including utility support systems, pipe connections, and the third LNG storage tank.

Operational integration and functionality of the Liquefaction Plant and the Pretreatment Plant will require various pipeline and utility line connections between the Liquefaction Plant, the Pretreatment Plant, Freeport LNG Development's Stratton Ridge meter station, Freeport LNG Development's Stratton Ridge underground storage facility, and two other industrial entities - Air Liquide's nitrogen pipeline system and INEOS Group Limited's ("INEOS"") Plant - in the Stratton Ridge area. The Pipeline/Utility Line System maximizes collocation with Freeport LNG Development's existing 42-inch-diameter send-out gas pipeline and includes two short gas interconnect pipelines, a nitrogen pipeline, a BOG pipeline, an NGL pipeline, two electric lines, a water line, and a fiber optic cable system.

Three EPC contractors will execute construction activities in three different areas of the project. The Main EPC Contractor will be in charge of constructing the Liquefaction Facilities, Pretreatment Facilities, Tank 3, and the two new construction docks. A Marine Contractor will manage and construct the second LNG loading dock (Dock 2). A third Contractor (Pipeline EPC) will manage and construct the pipelines and utility lines as described herein.

The Project construction schedule is sequenced on a train-by-train basis over a five year timeframe. Following Commission issuance of authorization to construct, Project management personnel and initial

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site preparation workers will mobilize to the site. Construction and start-up of the initial liquefaction train (Train 1) will be completed in approximately 36 months, with each of the two additional trains (Trains 2 and 3) scheduled for sequential completion at 6- to 9-month intervals thereafter (i.e., full completion of all three trains is scheduled to occur within an approximate 48- to 54-month timeframe). Freeport LNG expects the first train will be completed and ready to commence LNG exports in November 2018.

Construction and commissioning of the Pretreatment Plant will be completed in approximately 48 months on a similar completion schedule as the liquefaction trains, whereas the Pipeline/Utility Line System will be constructed and commissioned in 12 to 18 months and occur ahead of the completion of liquefaction and pretreatment facilities. The construction schedule for the three pretreatment units will be staggered to coincide with the construction schedule for the three liquefaction trains: each liquefaction train and its corresponding pretreatment unit will be constructed concurrently within the same approximate 48- to 54-month timeframe.

3 Regional and Local Transportation Setting

The regional locations of Freeport LNG Development's existing Quintana Island Terminal, send-out pipeline, Stratton Ridge underground storage site, and Stratton Ridge meter station are illustrated in Figure 2.1-1.

3.1 Airports

Houston's two major international airports, George Bush Intercontinental and William P. Hobby are the closest airports to provide regularly scheduled passenger services. The Texas Gulf Coast Regional Airport, located between Lake Jackson and Angleton approximately 20 miles north of the Quintana Island Terminal and 12 miles northwest of the Pretreatment Plant site, serves local industry through chartered services but no regularly scheduled passenger flights are offered. Burlington Northern Santa Fe Railroad and Union Pacific Railroad operate in Brazoria County. Union Pacific Railroad provides an on-site rail network for commodities entering and leaving Port Freeport. Figure 3.1-1 shows the Project location with respect to the Houston-Galveston-Brazoria Region and location of airports mentioned herein.

3.2 Waterways and Port Facilities

The Brazosport area is served by an extensive Intracoastal Waterway ("ICW") system that includes over 1,700 miles of navigable inland waters. The ICW separates Quintana Island from the mainland and, along with the FHC, provides direct maritime access to the Terminal site. The Freeport Harbor Channel connects Port Freeport and other port facilities with the ICW and the Gulf of Mexico. The major waterways are depicted on Figure 3.2-1.

The major local port facility is Port Freeport, which is located in Foreign Trade Zone No. 149 and handles close to 30 million tons of cargo per year. Top trading partners are Brazil, China, Colombia, Costa Rica, Cuba, Dominican Republic, Guatemala, Honduras, India, Iraq, Mexico, Nigeria, Saudi Arabia, and Venezuela. Top import commodities are aggregate, chemicals, clothing, crude oil, foods, paper goods, resins, and windmill parts. Top export commodities are automobiles, chemicals, clothing, foods (fruit), paper goods, resins, and rice. Local industrial facilities, including those of BASF, Dole, Dow, and

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Phillips Petroleum, rely heavily on Port Freeport for imports and exports. In 2010, Port Freeport ranked as the 16th port in the U.S. for foreign tonnage and the 27th port in the U.S. for total tonnage. Vessel calls, including barge/tug calls, approximate 3,000 per year (Port Freeport, 2012).

3.3 Roadways and Access Roads to Facilities

State Highway ("SH") 288 is the primary land route connecting the Brazosport area with Greater Houston, approximately 50 miles to the north. Farm-to-Market ("FM") Route 523 runs north-south between the cities of Angleton, Oyster Creek, and Freeport. SH 36 trends northwest then north between the City of Freeport and SH 59, southwest of Houston. Figure 3.3-1 identifies roads, highways, and airports in the regional project area.

Figure 3.3-1 shows the location of the main roadways encompassing the Project along with the Project components. Roadways directly used in the project area include:

Quintana Liquefaction Site Area

- SH 288
- SH 36
- FM 1495
- CR 723
- Lamar Street (Town of Quintana)
- Holley Street (Town of Quintana)
- Eighth Street (Town of Quintana)
- Second Street (Town of Quintana)

Pretreatment Site Area near City of Oyster Creek

- FM 523
- SH 332
- CR 230 (Jeffers Road)
- CR 690 (Levee Road)
- CR 891

Pipelines and Utility Line Areas

- Holley Street (Town of Quintana)
- Thunder Road (Village of Surfside Beach)
- Canal Drive (Village of Surfside Beach)
- Casco Road (Freeport/Bridge Harbor)
- CR 891
- CR 690
- CR 792
- FM 523

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- CR 227
- Fort Velasco Drive (Village of Surfside Beach)
- Tarpon Lane (Freeport/Bridge Harbor)
- Crab Road (Village of Surfside Beach)
- Galleywax Way (Turtle Cove)
- Canal Drive (Village of Surfside Beach)

3.4 Regional Emergency Services

The Brazoria County Sheriff's Department is located in Angleton, 21 road miles from the Quintana Island Terminal site and 17 road miles from the Pretreatment Plant site. In addition, many of the local municipalities, including the cities of Freeport and Oyster Creek, maintain their own police departments. The Freeport Fire Department and the Oyster Creek Volunteer Fire Department provide fire protection services in the Project area. The U.S. Coast Guard's Station Freeport, which is located in Surfside across the FHC from the Terminal, serves the Gulf Coast in search and rescue, law enforcement, and other missions. Emergency services, including medical, fire, and law enforcement, are available through the "911" service.

4 Construction Materials and Equipment Deliveries

Three major Texas ports (Freeport, Houston, and La Porte) are potential regional debarkation points for materials and equipment arriving from other locations via barge or rail. These locations will serve as off-site warehouse and lay down areas for receiving, inventory, staging, and subsequent delivery.

Although more than one of the three major ports may be utilized, the basic methodology and approach to shipping will be similar in each case. Cargo will be transported via truck or barge from the debarkation points directly to the construction sites (Terminal Site, Pretreatment Plant site, and Pipeline/Utility Line System) or indirectly through shipments from the Port of Houston and/or Port La Porte to Port Freeport and then to the construction sites. The road distances from the Port of Houston and Port La Porte to Port Freeport are approximately 68 and 76 miles, respectively. Equipment and materials may also be trucked directly to the construction sites from factories, warehouses, or other points of origin.

Delivery of materials and equipment to the Quintana Island Terminal site during construction will be accomplished by two primary methods:

- Most major pieces of equipment (e.g., compressors, vessels) and large volume bulk materials (e.g., aggregate, structural steel) will be barged to the job site and off-loaded at the Terminal's existing construction dock and/or new construction dock; and

- Local supplies of construction consumables and smaller volume freighted materials will be transported to the job site by truck.

The existing construction dock is located on the south shore of the ICW adjacent to the Phase I process area; the new construction dock will also be located on the south shore of the ICW, approximately 0.3 miles further west in the vicinity of the Terminal Warehouse and Shop Building. At each construction

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dock, barges will be tied up to the spud breasting barge (unloading barge). If loaded barges arrive ahead of schedule, they will be moored in the existing berthing area on the east side of the Terminal site until they can be moved into position for unloading. Freeport LNG estimates that 10 to 12 barge visits per week for 20 to 30 weeks will occur during facility construction.

Road transportation of materials and equipment to the Terminal site will generate at least 10 to 12 deliveries via tandem truck per day during construction, with a peak of at least 60 to 80 trips per day during the most active period. A similar number of trips by small, two-axle trucks are anticipated. Freeport LNG intends to limit truck deliveries to the extent practicable, to minimize any negative impacts that a high trucking volume would have on Town of Quintana residents and to accommodate local weight restrictions on the FM 1495 Bridge, CR 723, and Lamar Street.

Direct deliveries of materials and equipment to the Pretreatment Plant site and Pipeline/Utility Line System construction areas will be by truck. Road transportation of materials and equipment to the Pretreatment Plant site will generate a similar of deliveries via tandem truck per day during construction as the Terminal site described above, with a similar peak during the most active period. As at the Terminal site, a similar number of trips by small, two-axle trucks can be expected.

Road transportation of materials and equipment for the Pipeline/Utility Line System will be transitory and will revolve predominantly around pipe deliveries and deliveries associated with horizontal directional drilling ("HDD"). This will result in approximately 130 to 150 tandem truck deliveries to various points along the system. As with construction of the Phase I send-out pipeline, a large percentage of pipeline welding will occur adjacent to CR 891 and the eastern Velasco Ditch. This will be the main area for truck deliveries of pipe joints and HDD-associated deliveries.

4.1 Road Traffic Patterns

Quintana Island and the area of Freeport close to the Terminal site, as well as the Brazosport region generally, are accustomed to notable fluctuations in road traffic flows. Brazosport is characterized by a mix of traffic associated with industrial, construction, shipping, and recreational/tourism activities. Some local petrochemical and industrial complexes experience large daily inflows and outflows of vehicles during work shift turnarounds and construction projects. Port Freeport experiences large increases in road traffic when ships are being unloaded and commodities transported out of the area. Recreational and tourist traffic patterns vary seasonally, with most activity taking place at weekends and during special events.

Characteristic traffic conditions on any given roadway system are typically measured and categorized according to "Level of Service" ("LOS"), which is a rating system used in traffic engineering to measure the effectiveness of the operating conditions of roadways and intersections. Each level is used to describe traffic flow in terms of delay experienced by motorists. Several variables impact the quality of traffic flow, including speed, travel time, vehicular delays, traffic interruptions, and the freedom to maneuver. Freeport LNG conducted a traffic impact study to assess the LOS for project area roadways and intersections and to provide proposed mitigation measures to reduce congestion at these intersections.

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As shown in Table 4.1-1, there are six LOS levels ranging from "A" to "F". Level A is defined as being ideal flow conditions with little or no delay, whereas Level F is defined as conditions where extreme delays may be encountered. The LOS at signalized intersections is reported as the average delay of all approaches, whereas the highest approach delay is reported as the LOS at un-signalized intersections. When conducting an LOS analysis, an acceptable peak hour LOS is typically defined and intersections that operate below this LOS for any peak hour may require temporary or permanent mitigation measures.

TABLE 4.1-1

Freeport LNG Liquefaction Project
Level of Service Descriptions for Road Traffic Conditions

Level of Service	Description	Speed (miles per hour)	Flow (vehicles per hour per lane)	Density (vehicles per mile)
A	Traffic flows at or above the posted speed limit and all motorists have complete mobility between lanes. These conditions frequently occur in rural areas and may occur late at night in urban areas,	Over 60	Under 700	Under 12
B	Slightly congested, with some impingement of maneuverability. Two motorists might be forced to drive side by side, limiting lane changes.	57-60	700-1,100	12-20
C	Ability to pass or change lanes is not assured. Most experienced drivers are comfortable, and posted speed is maintained, but roads are close to capacity. This is often the target LOS for urban highways.	54-57	1,100-1,550	20-30
D	Typical of an urban highway during commuting hours. Speeds are somewhat reduced, motorists are hemmed in by other cars and trucks. It is a common goal for local urban streets during peak commuting hours.	46-54	1,550-1,850	30-42
E	Flow becomes irregular and speed varies rapidly, but rarely reaches the posted limit. On highways this is consistent with a road over its designed capacity. LOS E is a common standard in larger urban areas, where some roadway congestion is inevitable.	30-46	1,850-2,000	42-67
F	Flow is forced; every vehicle moves in lockstep with the vehicle in front of it, with frequent drops in speed to nearly zero mph. A road for which the travel time cannot be predicted. Facilities operating at LOS F generally have more demand than capacity.	Under 30	Unstable	67-Maximum

Notes

Sources: Victoria Transport Policy Institute, 2011
Wikipedia, 2012

Based on LOS standards, Freeport LNG modeled existing traffic flow patterns in the Liquefaction Project area and any changes in these patterns that might be anticipated during facility construction and operation. Modeling was performed for two construction years - 2015 and 2018 - and incorporated known planned and on-going construction projects (e.g., Dow ethylene plant) in the Brazosport area.

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According to the modeling, peak construction activities at the Terminal site (Liquefaction Project and Phase II Modification Project combined) will result in Level F for FM Route 1495/Gulf Boulevard, eastbound SH 288/SH 36 & West 2nd Street, and SH 36/FM Route 1495 from March 2017 until December 2018 (21 months in total).

Outside of peak commuting periods, the LOS on area roadways is normally Level B or C; during peak commuting periods, construction workers entering and leaving the Terminal site's off-site parking area near the SH 36/FM Route 1495 intersection would temporarily elevate the local traffic to Level F during the peak construction period. This LOS would return to Level B or C as workers park their private vehicles and are bussed to the Terminal site at the start of the workday and after they leave the parking area and disperse into the wider Brazosport road system at the end of the workday.

Once construction is complete, traffic operations are expected to return to Level B or C during facility operation. Therefore, mitigation strategies should be temporary in nature. Because the congestion will occur during peak commuting periods, and at other times of the day project activities will have little or no traffic impacts, mitigation strategies could include uniformed traffic control or a temporary traffic signal at the SH 36/FM Route 1495 intersection. The use of uniformed traffic control would relieve congestion during the peak commuting hours and allow the SH 36/FM Route 1495 intersection to operate with its existing control during all other hours of the day. A temporary traffic signal would also offer some congestion relief during peak commuting hours; however, the ability to respond to real-time traffic conditions would be limited. In addition, over the course of construction, area drivers may become accustomed to the temporary traffic signal and may want it to remain after construction is complete, even though a signal may not be warranted.

Congestion is also anticipated to occur at other intersections in Freeport, due to the influx of commuting traffic from surrounding communities. Mitigation strategies at some of the other intersections will likely be more permanent in nature, such as the addition of traffic signals or auxiliary lanes to increase capacity for specific movements. For example, the intersection of FM Route 1495/Gulf Boulevard is anticipated to operate at Level F. Due to the unique layout of this intersection, using uniformed traffic control to provide relief during the peak commuting hours would be challenging. In addition, a temporary traffic signal would be difficult to implement due to the intersection configuration. For these reasons, this intersection may require geometrical modification and installation of a permanent traffic signal.

During construction of the Pretreatment Plant, a majority of workers are anticipated to use SH 332 to travel to the project site. Due to the large influx of traffic on this route, the SH 332/FM Route 523 and SH 332/CR 690 intersections are projected to operate at the elevated LOS, Level F, during peak hours from November 2014 until May 2016 (19 months in total). In the case of SH 332/FM Route 523, Level F conditions are predicted to occur only in the afternoon, whereas for SH 332/CR 690, Level F conditions are predicted to occur both in the morning and afternoon.

The SH 332/FM Route 523 intersection is currently signalized and would require additional left-turn lanes in order to operate at Level D or better during construction. The addition of a temporary traffic signal or the use of uniformed traffic control at the intersection of SH 332/CR 690 could improve

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operations. Level F is anticipated to occur for a few months during project construction. Once construction is complete, traffic operations are expected to return to Level B or C during facility operation. The use of uniformed traffic control would relieve congestion during the peak commuting hours and allow the SH 332/FM Route 523 intersection to operate with its existing control during all other hours of the day.

LOS results presented herein were used to develop mitigation (e.g. off-duty law enforcement, traffic controls, lights, flaggers, and agency coordination opportunities) at intersections and roadways exhibiting problematic service levels.

During operation of the facilities, any numerical increase in road vehicles associated with the addition of approximately 163 full-time operational and maintenance personnel is not expected to have any discernible effect on traffic flows on Quintana Island or elsewhere.

5 Site-Specific Traffic Management Planning

To better describe the construction traffic for the Liquefaction and Phase II Modification Project including Liquefaction Facilities on Quintana Island and Pretreatment Facilities near Oyster Creek, the Project Plan has been separated into construction sites and activity phases i.e., temporary facilities development (phase 1), site preparation (phase 2), piling/foundations (phase 3), structures/mechanical equipment erection (phase 4), and commissioning and startup (phase 5). Each of these phases exhibits a unique set of traffic impacts and transportation and traffic control requirements.

As the pipeline/utility line construction is mobile and covers numerous locations, the sequencing of its construction activities (and therefore its traffic management) is different and addressed separately.

Following Commission issuance of authorization to construct, Project management personnel and initial site preparation workers will mobilize to the site. Construction and start-up of the initial liquefaction train (Train 1) will be completed in approximately 36 months, with each of the two additional trains (Trains 2 and 3) scheduled for sequential completion at 6- to 9-month intervals thereafter (i.e., full completion of all three trains is scheduled to occur within an approximate 48- to 54-month timeframe). Freeport LNG expects the first train will be completed and ready to commence LNG exports in November 2018.

Construction and commissioning of the Pretreatment Plant will be completed in approximately 48 months on a similar completion schedule as the liquefaction trains, whereas the Pipeline/Utility Line System will be constructed and commissioned in 12 to 18 months and occur ahead of the completion of liquefaction and pretreatment facilities. The construction schedule for the three pretreatment units will be staggered to coincide with the construction schedule for the three liquefaction trains: each liquefaction train and its corresponding pretreatment unit will be constructed concurrently within the same approximate 48- to 54-month timeframe.

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Traffic management planning will occur in concert with the construction schedule and staffing counts (both contractor and owner) and will mobilize and demobilize from the sites accordingly. Operations and maintenance personnel as well as vendor representatives and commissioning and startup personnel will mobilize and demobilize as this phase transitions into normal facility operations.

Project traffic management personnel both Freeport LNG project management team (PMT) staff as well as project management and trained staff from each of the three EPC contractors that will provide direct traffic control on a site-specific basis as well as coordinated management of traffic on a project basis. EPC logistics coordinators from each of the three contractors and their subcontractors, EPC project management team, and staff for deploying signage, controlling traffic, and managing traffic flows for short or longer term needs. EPC project management team will be supported by the Freeport LNG in coordinating with local agencies and monitoring the overall implementation of this Plan.

5.1 Quintana Island Liquefaction and Phase II Modification Facilities

Quintana Island is reached from the mainland and the City of Freeport by FM Route 1495, also known as Navigation Boulevard. Major roads connecting to FM Route 1495 in the Freeport area are SH 36 and FM Route 523. The Quintana Island Terminal site is approached by turning left (east) from FM Route 1495 onto County Road ("CR") 723, which becomes Lamar Street parallel to and just south of the ICW.

Construction traffic will access the Liquefaction Plant site directly through two proposed new entrances on Lamar Street, both of which will traverse the dredged material placement area ("DMPA") levee directly south of the plant footprint. The Liquefaction Plant site may also be accessed through the Terminal's existing contractor entrance located further east on Lamar Street. Construction traffic associated with the temporary workspace located east of the Phase I process area will utilize the existing entrance on Holley Street, located adjacent to the Phase I berthing dock. These access points will be coordinated with the Town of Quintana and the Velasco Drainage District. Once at the site, construction traffic will utilize existing and new plant roads. A single off-site parking area was identified for the Liquefaction Facilities location. This parking area is on Port Freeport property adjacent to FM 1495. Off-site parking to support the activities at the Liquefaction facilities on Quintana Island are represented in Figure 5.2-1 in the ER of the August 31, 2012 application.

5.1.1 Phase 1 - Temporary Facilities Development

According to Figure 5.1-1 (Work Schedule Graph), approximately 150 workers along with contractor and owner management personnel will occupy the Liquefaction site during Phase 1. The Temporary Facilities Development phase requires a limited number of personnel for site preparation and installation of construction management infrastructure consisting of concrete slabs for contractor and owner offices, temporary power right of way, equipment maintenance shops, vehicle parking area, and fuel storage. Site preparation equipment, dozers, graders and associated equipment will be transported to site on equipment flatbed trailers. This equipment will stay on-site for the duration of this period. Construction materials, prefabricated office

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structures, power generators, ablution units, etc. will be delivered to site on semi-trailers. Likewise, these facilities will remain on-site for the duration of the construction period. The above deliveries will access the job site from SHs 288 or 36 via the FM 1495 bridge over the ICW to CR 723. As these loads will be within the state highway codes for size and weight limit, no special traffic management is planned for the above routing until they reach the entrance to Quintana Island job site. During this phase for each intersection adjacent to the job site, Project traffic management personnel will be stationed at the each site entrance to ensure the vehicles turning requirements do not impair other vehicular traffic i.e. Quintana Island residents and visitors will be advised and cautioned when these semi-trailer deliveries cross lanes to access the site. These intersections will also have TxDOT approved caution lights and signage advising motorists that trucks may enter and exit the job site. Other deliveries, principally single axle vehicles, will follow the same entrance route.

During this phase personnel transport will be by individual private vehicles and parking for all vehicles would be at a designated on-site parking area. Although Freeport LNG will encourage carpooling, it is expected that during the morning start of work and evening leaving work there would be an increase in traffic entering and leaving the job site. However during those periods, Freeport LNG Project traffic management personnel would be on duty to ensure safe and clear passage.

While on site personnel will be required to wear reflective vests or equivalent to ensure visibility. Designated parking and vehicle access routes will be established to maintain a separation between vehicular and pedestrian traffic circulation.

5.1.2 Phase 2 - Site Preparation

Figure 5.1-1 shows that number of construction workers will increase from 200 to 400 over the course of along with minor increases in contractor and owner management personnel will occur during Phase 2. The Site Preparation phase will require more equipment, personnel and consumables. However for the most part the equipment once delivered will stay on-site for an extended duration to the completion of all site preparation, mainly soil stabilization work.

Routing for deliveries will be the same as that in Section 5.1.1 and the same control measures will be in place. Although there will be an increase in the number of personnel it will not be sufficient to implement the planned personnel busing policy.

Freeport LNG anticipates an increase in vehicular traffic across Lamar Street between the project work site and the planned laydown consisting principally of trucks loaded with stabilized soil. Although the volume of traffic would not be substantial or continuous Freeport, recognizes this as a traffic safety and control issue.

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5.1.3 Phase 3 Piling and Equipment Foundation

The number of construction workers will steadily increase to approximately 1,100 over the course of phase 3 along with additional increases in contractor and owner management personnel. The mix of equipment for this stage changes but, as in phase 2, once the equipment is delivered it remains on site-for an extended period. As a consequence of this increase of workers and site management personnel offsite vehicle parking will be implemented with the majority of the construction personnel bussed to and from the project site. In concert with its' EPC Contractor, Freeport LNG considered several locations for project parking and although a former project parking was reported to be have been selected due to a value requirement of maintaining a safe and secure area Freeport LNG Construction Contractor selected an alternate site. Project parking will be established at a prepared area adjacent to SH 36/FM 1495 with access via Cherry St and W 9th St. Project buses would leave the parking and enter SH 288 then continue on FM 1495 to the Quintana project site.

Traffic management personnel and cautionary signs will be maintained at the project site entrances and will be implemented at the off-site parking.

One aspect of this phase is a high demand for concrete which would have been delivered from concrete batch preparation plants and trucked to the job site. To mitigate the impact these concrete delivery vehicles would have on traffic circulation to the Island and on the island Freeport LNG plans to establish concrete batch plants on site. Concrete basic materials, sand, aggregate and cement will be delivered to the Quintana site on barges and off-loaded at the new aggregate dock that Freeport LNG plans to construct on the north side of the project boundary along the Intracoastal Waterway (ICW) and stockpiled on site. With this mitigation not only are the concrete delivery vehicles removed from the road traffic calculation but also the material delivery vehicles and consequently do not interfere with Lamar St. traffic circulation.

5.1.4 Phase 4 - Structural and Equipment Construction

The number of construction workers will rapidly increase to approximately 1,800 over the 21 month period of phase 4 with approximately the same number of contractor and owner management personnel. Transportation requirements at this phase will be principally for personnel who will arrive on site via project busing and personal vehicles. Although Freeport LNG will implement with the Construction Contractor and Sub-contractors an employee busing policy there might be an increase in the numbers of vehicles arriving in the morning and leaving in the evening due simply because there would be substantially more personnel on site. This increase and possible impact on local residents movements will be mitigated by adjusting the work start and stop times outside of the normal traffic movements.

To relieve traffic congestion on the roads through Freeport and on the FM 1495 bridge over the ICW leading to the liquefaction plant due to equipment and material deliveries as well as to

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reduce the impact on residents and Island visitors, Freeport LNG plans to construct a construction equipment unloading dock on the north side of the project boundary on the ICW. Freeport LNG plans to have all major pieces of equipment as well a substantial portion of the construction materials to arrive by ICW barges and unload their cargos on the new construction dock. From this unloading point equipment will be transported directly to their foundations using internal project roads and erected. However there will be a substantial amount of permanent plant equipment that will require storage prior to being installed. This equipment will be stored in laydown yards located on the seaway area on the south side of Lamar Street opposite the project site. These materials would be transported to the laydown yard on the internal road network and across Lamar Street.

5.1.5 Phase 5 - Commissioning and Startup

The number of construction workers will rapidly decrease during commissioning and startup from 1,800 in phase 4 to an average of 350 over the course of phase 5. During this period the number of contractor and owner management personnel will begin to decrease and full-time operator and maintenance personnel will be housed on-site. At this phase the transportation requirement will be employee busing and personal vehicles with the infrequent material delivery. Despite the reduction in traffic circulation all previously established transportation controls and mitigations remain in place.

5.1.6 Site Access Control

Freeport LNG project access management and control plan covers the following points of entry; liquefaction construction site, new construction dock area, construction zones within the existing Regasification Terminal (brownfield construction), existing LNG ship loading dock and the new LNG ship loading dock. Each access point has its own specific requirements as described below

Liquefaction construction site - There will be two points of entry for the construction site and Seaway laydown area. Access will be directly from Lamar Street to the project construction site or to the seaway material laydown storage area. Construction site access point will be manned 24/7 by project security. Seaway site access point will be manned during work hours. Personnel will require to carry a valid project identification badge and all vehicles will have to have either a valid pass for a single entry e.g. delivery trucks or a multi-day pass e.g. individual project vehicles. Access to either the construction site or seaway storage area via the Lamar Street Bridge will not be controlled as personnel and vehicles access would have been controlled at the first point of entry.

New construction dock - Entry point will be the existing Freeport LNG regasification terminal entrance. Currently this entrance requires personnel to have a Transportation Workers Identification Credential (TWIC) certification and personal vehicles are not permitted access. For purposes of the new construction dock work as well as the 3rd LNG storage tank access control

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will be modified to require valid project identification for individuals and vehicles. Security personnel will man this access point and control entry and exit. Existing security fencing will be modified to restrict access to the Freeport LNG terminal areas and these modifications will be reviewed and approved by the appropriate authorities. Personnel accessing the new construction dock area by water e.g. barge, tugboat or other work boat will require a valid project identification certification badge. Post construction of the dock, access to the project work site will be via an internal road consequently project plant equipment and material deliveries off loaded at the construction dock will be transported to the site or the seaway storage and laydown would use the project internal road network and would not require additional access control.

Project work within the existing facility - A secure access point will be established for security control and clearance for personnel and equipment needing to enter the Freeport LNG regasification terminal. Personnel entering through this point will require a TWIC certification badge and vehicles entering will require valid access certification. This access point and the procedures will be reviewed and approved by appropriate authorities and compliance with these procedures will be regularly audited.

Project work on the existing LNG ship loading dock - This is a secure area and as such will be fenced off from the access route to the project work on the new LNG ship loading dock. Access will require a TWIC certification badge and vehicles will have to have a prior approved permit. The access point is gated and will remain closed except for periods of construction activity. During those periods the gate will be manned. Personnel working on the dock arriving by boat will require TWIC certification card and their status will be routinely verified.

New LNG loading dock - Freeport LNG plans to establish a new entry point from Lamar Street. Regasification security fencing will be modified according to approved drawings to assure continuing security of the facility. This entry point will be gated and manned during the work hours and gate locked during off work hours.

5.2 Pretreatment Facility near City of Oyster Creek

The Pretreatment Plant site is located on the west side of CR 690 (Levee Road), approximately 0.7 mile north of the intersection of CR 690 and SH 332. The site is regionally situated about 0.5 mile east of the nearest development in the City of Oyster Creek and about 3.5 miles northeast of downtown Freeport. Current road access to the site property is provided by two roads:

- a private haulage road that runs for approximately 0.6 mile between an entrance on SH 332 (located about 0.9 mile southeast of the SH 332/FM Route 523 intersection) and the west side of Freeport LNG's property (located to the northeast of the intersection); and

- CR 230, which runs for approximately 1.3 miles between an intersection with FM Route 523 to an intersection with the above-referenced haulage road adjacent to and west of Freeport LNG's property.

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Both of the roads described above provide access through a common entrance location on the west side of Freeport LNG's property. Access to construction workspace will require improvement to the existing section of the haulage road that continues through the property and construction of a new section. In addition to access from the west side of the property, Freeport LNG proposes to construct two access roads between the east side of the Pretreatment Plant's operational footprint and CR 690. Once at the site, construction traffic will utilize new and modified plant roads, which will be designed and retained for plant operation. Site access points will be coordinated with the City of Freeport and the City of Oyster Creek.

5.2.1 Phase 1 - Temporary Facilities Development

Temporary facilities development only requires a limited number of personnel on site for site preparation of, office location concrete slabs, utility right of way, equipment maintenance shops, and vehicle parking area and fuel storage. Site preparation equipment, dozers, graders and associated equipment will be transported to site on equipment flatbed trailers. This equipment will stay on site for the duration of this period. Construction materials, prefabricated office structures, power generators, ablution units, etc. will be delivered to site on semi-trailers. Likewise, these facilities will remain on site for the duration of the construction period. The above deliveries will access the job site from SH 332. As these loads will be within the state highway codes no special traffic management is planned for the above routing until they reach the entrance to Freeport LNG project site. At that point Freeport LNG project traffic management personnel will be stationed at the site entrance to ensure the vehicles turning requirements do not impair other vehicular traffic. Personal vehicles will also enter the site at this entrance as the project parking lot is located on site.

5.2.2 Phase 2 - Site Preparation

Site preparation will require more equipment, personnel and consumables. However for the most part the equipment once delivered will stay on site for an extended duration to the completion of all site preparation e.g. soil stabilization work. Routing for personnel and deliveries will be the same as in phase 1 and the same control measures would be in place.

Personal vehicle transportation traffic control measures would be in place during the morning arrivals and evening leaving to ensure a safe and efficient transit.

There will be an increase in truck traffic during this phase of the Project throughout the workday and for that entry and exiting from the job site to SH 332 would be monitored.

5.2.3 Phase 3 - Piling and Foundations

The mix of equipment for this stage changes but as in the previous case once the equipment is delivered it remains on site for an extended period.

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One aspect of this phase is a high demand for concrete which would have been delivered from concrete batch preparation plants and trucked to the job site. As proposed for the Liquefaction site on Quintana, to mitigate the impact these concrete delivery vehicles would have on the local traffic Freeport LNG project will install a concrete batch plant at the PTF site. This eliminates the need for concrete delivery vehicles but there will be material deliveries of sand, aggregate and cement. Previously established traffic management control measures at the SH 332 entrance would be continued to ensure safe and efficient transit.

5.2.4 Phase 4 - Structures and Equipment Construction

This phase will see an increase in personal vehicle circulation and an increase in equipment deliveries.

Established transportation management control measures will be maintained. Equipment deliveries will arrive at site via routes through Freeport to the project entrance on SH 332. For the most part of these deliveries there is no requirement for convoy or large load traffic advice and control. However some equipment will be transported on barges on the ICW.

These deliveries will be off loaded at an established ICW dock near the SH 332 Bridge to Surfside. This location is convenient to the PTF project worksite as the large equipment trailers have an unimpeded i.e. no extreme turns, access on to SH 332. There is an expectation that some deliveries e.g. vessels and columns will require special traffic control. Although each may have unique aspects which will be studied and mitigated there are previously establish standards to follow. These transits from the barge to the site will be managed by a heavy load transport specialist contractor. They would be responsible for managing the movement and coordination with local authorities. Due to the number of industrial complexes in the Freeport area the local capabilities for heavy load management and logistical coordination is well established

5.2.5 Phase 5 - Commissioning, and Startup

At this phase the transportation requirement will be employee's personal vehicles and material delivery. During the project's construction two permanent plant entrances will be established off the CR 690 and the SH 332 entrance will be maintained but gated for large load deliveries. Initially Freeport LNG may have traffic control personnel during peak use hours but eventually these entrances will not require special monitoring or control.

5.2.6 Site Access Control

Freeport LNG project access management and control plan covers the following points of entry; project construction site entrance on SH 332 and two entrances on CR 690.

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Each of these entrances will be gated and manned and will have the following requirements. As the project progresses entrances on CR 690 will have electronic gate pass equipment i.e. card swipe, so that regular employees may enter the facility during off hours.

- Personnel must have valid project identification.
- Personal vehicles must have a valid entrance pass
- Delivery vehicles must have a valid entrance pass.

5.3 Pipelines and Utility Lines

In general, Freeport LNG will use conventional construction techniques for buried pipelines and will follow the requirements set forth in the FERC's Plan and Procedures, with any project-specific modifications made as necessary. Construction specifications will also require adherence to Freeport LNG's SWPPP for construction stormwater discharges, SPCC Plan, BMPs, and plans and procedures for unique construction techniques (e.g., HDD).

As described in the following paragraphs, conventional construction typically involves the following sequential activities:

- Right-of-way surveying;
- Clearing and grading;
- Trenching;
- Stringing, welding, and installation;
- Backfilling and grade restoration;
- Hydrostatic testing and tie-ins; and
- Cleanup and restoration.

Access to the Pipeline/Utility Line System construction areas beyond Quintana Island will be via the existing local roadway network in Surfside Beach, CR 690 (Levee Road) and CR 792 (Suggs Road) in the Oyster Creek area, and FM Route 523 in the Stratton Ridge area. Access is also available at several of the road crossing locations identified in Table 5.3-1

TABLE 5.3-1

Freeport LNG Liquefaction Project
Road/Railroad Crossing Locations and Methods for Pipeline/Utility Line System Construction

Road Name	Milepost	Proposed Crossing Method	Pipelines/Utility Lines
FERC Jurisdictional and Non-Jurisdictional Facilities			
Entrance to ExxonMobil Facility	0.23(A)	Bore	BOG, Nitrogen, Fiber Optic
Entrance to Terminal Site	0.68(A)	HDD	BOG, Nitrogen, Fiber Optic
Thunder Road	1.18(A)	Bore	BOG, Nitrogen, Fiber Optic
Canal Drive	1.54(A)	Bore	BOG, Nitrogen, Fiber Optic

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SH 332 (Ramp)	2.30(A)	Bore	BOG, Nitrogen, Fiber Optic
SH 332	2.33(A)	Bore	BOG, Nitrogen, Fiber Optic
SH 332 (Ramp)	2.35(A)	Bore	BOG, Nitrogen, Fiber Optic
CR 891 (Cone Island Road)	3.67(A)	Bore	BOG, Nitrogen, Fiber Optic
FERC Non-Jurisdictional Facilities			
Galleywax Way	5.41(A)	Bore	NGL, Nitrogen, Water, Fiber Optic
CR 792 (Suggs Road)	5.85(A)	HDD	NGL, Nitrogen, Water, Fiber Optic
Private Driveway	6.24(A)	Open Cut	NGL, Nitrogen, Water, Fiber Optic
Private Road	6.76(A)	Open Cut	NGL, Nitrogen, Water, Fiber Optic
Private Driveway	7.95(A)	Open Cut	NGL, Nitrogen, Water, Fiber Optic
Abandoned Railroad	9.46(A)	Bore	Fiber Optic
Abandoned Railroad	0.22(D)	Bore	NGL, Fiber Optic
CR 227	0.33(D)	Bore	NGL, Fiber Optic
CR 690 (Levee Road)	0.15(B)	HDD	Gas Inflow, Gas Outflow, BOG, NGL, Nitrogen, Water, Fiber Optic
FM Route 523	0.04(C)	Bore	Nitrogen, Water, Fiber Optic
FM Route 523	0.15(E)	Overhead	Electric Line
Private Road (West Access Road to Pretreatment Plant)	1.07(E)	Overhead	Electric Line

Notes

CR	County Road
FM	Farm-to-Market
HDD	Horizontal Directional Drill
SH	State Highway

5.3.1 Directional Drills

Freeport LNG project requires a pipeline right of way from the PTF site to the existing north south pipeline between Stratton Ridge metering station and the Quintana Island Regasification Terminal. For this the project will use horizontal directional drill technology to execute the crossings listed in Table 5.3-2.

TABLE 5.3-2

Freeport LNG Liquefaction Project
HDD Crossing Locations for Underground Pipeline/Utility Line System Construction

Feature Name	Milepost		Crossing Length (Feet)	Pipelines/Utility Lines
	Start	End		
FERC Jurisdictional and Non-Jurisdictional Facilities				
FHC	0.67(A)	1.14(A)	2,448	BOG, Nitrogen, Fiber Optic
ICW	1.55(A)	1.76(A)	1,108	BOG, Nitrogen, Fiber Optic
Emergent Wetland	2.70(A)	3.62(A)	4,837	BOG, Nitrogen, Fiber Optic

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Velasco Levee Eastern Velasco Ditch Western Velasco Ditch CR 690	0.00(B)	0.33(B)	1,725	Gas Inflow, Gas Outflow, BOG, NGL, Nitrogen, Water, Fiber Optic
FERC Non-Jurisdictional Facilities				
Galleywax Way Oyster Creek CR 792	5.34(A)	5.90(A)	2,990	NGL, Nitrogen, Water, Fiber Optic
		Total:	13,108	

Notes

CR	County Road
FHC	Freeport Harbor Channel
ICW	Intracoastal Waterway

Equipment required for this work will be brought to site on semi-trailers off loaded and remain on site for the duration of the work.

Personnel and deliveries will access the work site from CR 690 with parking established nearby the directional drilling rig and on the opposite side of CR 690 for the pipeline section pulling. Although there will not be a significant number of vehicles entering or leaving CR 690 Freeport transportation management plan requires monitoring and traffic control to ensure safe and efficient transit.

Access control at each location will be presentation of a valid project identification badge.

5.3.2 Pipeline Right of Way between Oyster Creek to Quintana Island

Freeport LNG project requires the installation of a three new pipelines and fiber optic cables between the PTF and Quintana Island. These installations will follow the right-of-way of the existing 42” gas pipeline previously installed for the regasification project.

Equipment and personnel will move along the pipeline right-of-way as required to prepare the trench, install the pipe and cables then backfill the trench.

Due to this movement along the right of way area access and parking will be at the activity points. Although at road crossings the right of way will be bored under the road Freeport LNG will monitor the accesses required on each side and will establish traffic management controls appropriate to the location with coordination and full compliance to and with the local authorities.

To complete the tie-in to the Quintana Island liquefaction plant Freeport LNG may have to close a road that crosses the right of way. During this time Freeport LNG will have in place a bypass and traffic management to reduce any inconvenience.

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The majority of line pipe deliveries will arrive by barge to the Casco Road facility. Pipeline pipe will be 42-inch diameter and will come in Quad Random Lengths (QRL) and Double Random Lengths (DRL). QRL pipe is 72 to 80 feet long. For pipeline segments requiring a concrete weight coating, pipe will be furnished in Double Random Lengths (DRL) 32 to 40 feet long. Each joint of weight-coated pipe will have a concrete coating with approximately 5 to 6 inches of concrete cast on the pipe. QRL and DRL 8, 12, and 42-inch pipeline pipe will be inventoried at the Casco Road facility. Sufficient quantities will be maintained to meet pipeline construction needs, but not overwhelm the storage space available at the Casco Road facility. This will also have the effect of spreading barge deliveries out over time and mitigate high levels of pipe barge traffic over a short time period. Pipe stored at Casco Road will be loaded on to specially built pipeline transportation truck trailers. These trucks will only carry as much pipe as can be safely transported and meet highway road weight limits. For pipe transports that exceed either normal length limits; the necessary permits or permissions will be received. Pipe will begin arriving by barge in January 2016 and continue through May 2016. Pipeline truck transports between the Casco Road facility and the pipeline rights-of-way will begin in January 2016 and continue through July 2016.

The pipeline storage location on Casco Road is located on the pipeline route at about Mile Post 2. As the total length of the pipeline is only 9 miles, pipe haul distances are relatively short. The following roads with be used for transporting pipe:

For 42-inch pipe installed on Quintana Island:

All pipe will be QRL. Approximately 4,000 feet of pipe will be required. Pipe will be transported by truck and trailer from Casco Road via SH 332, FM 523, FM 1495, and CR 723 to the worksite on Quintana Island. Two 42-inch QRL joints of pipe will be transported per truckload. Approximately 25 deliveries will be made.

For 42-inch pipe installed in Surfside:

Pipe will be QRL for the HDD under the ICW and concrete weight coated DRL for pipe between Brazos River Harbor Channel HDD entry and ICW HDD exit. Approximately 3,400 feet of pipe will be required. Pipe will be transported by truck and trailer from Casco Road via SH 332 Bridge to Fort Velasco Drive to Crab Road and Thunder Road in Surfside. Only one joint of concrete weight coated DRL pipe will transported per truckload. Two joints of QRL pipe may be transported per truckload. Approximately 55 truck deliveries will be required.

For 42-inch pipe installed along Casco Road and Tarpon Lane:

Pipe will be QRL and concrete weight coated DRL. Approximately 5,000 feet will be required. Pipe will be transported by truck and trailer from Casco Road to Tarpon Lane. Concrete weight coated pipe installed along Casco Road will be constructed via the Push Ditch Method. This

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pipe will be fabricated at the Casco Road facility and worksite and will not require truck transport. Pipe installed along Tarpon Lane and under Highway 332 will be QRL or concrete weight coated DRL. Approximately 50 truck deliveries of pipe will make the short trip along Casco Road and Tarpon Lane.

For 42-inch pipe installed in Marsh and along County Road 690 and VDD Levee to Oyster Creek and Galleywax Way:

Pipe will be QRL and concrete weight coated DRL. Approximately 13,000 feet will be required. Pipe will be transported by truck and trailer from Casco Road via Highway 332 and County Road 690 to the worksites at County Road 891 and near Galleywax Way. Pipe will be QRL and concrete weight coated DRL. Approximately 230 truckloads of pipe will make the short two-mile trip from Casco Road to these worksites.

For 42-inch pipe installed across Oyster Creek and along CR 792 and FM 523 to the end of pipeline at Stratton Ridge Meter Station.

Pipe will be QRL. Approximately 18,000 feet will be required. Pipe will be transported by truck and trailer from Casco Road via Highway 332, FM 523, and CR 792. Pipe will be QRL and approximately 115 truckloads will be required.

During the construction of pipeline installed in the Borrow Ditch and parallel to CR 690, two Marsh access roads and CR 891 will require temporary closure. CR 891 is a semi-improved road. This short dead-end road receives occasional use by area anglers. The closure of this road will be approximately 10 to 12 weeks during the 1st and 2nd Quarter of 2016. The road will be re-opened at the completion of pipeline construction. The other two access roads across the Borrow Ditch do not appear to be used, although one goes to a gate and barbwire fence enclosure. These two roads will be closed the same period as County Road 891. Freeport LNG will make appropriate arrangements with parties affected by these temporary closings.

Pipeline construction activity in south end of the town of Surfside will take place over a 6 to 8 week period during the 2nd Quarter, 2016. One street, Thunder Road near Militia Drive may be temporarily closed. However, this closure will not block residences and alternative streets can easily provide access to the infrequent vehicle traffic on this section of the island.

Pipeline construction activity on Quintana Island and in the City of Quintana will be confined to the north side of Holley Street and along the toe of the Wave Barrier Protection Levee. The construction will take place over a 4 to 6 week period during the late 2nd Quarter, 2016. No streets will be closed by the construction work, although Holley Street ROW will be impacted.

All other roads traveled by the public will be fully open during construction operations. All pipeline construction equipment moved via public roads to or between work sites will be escorted with flagmen and escort vehicles as required to ensure the public's safety. At worksites

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along the pipeline route, construction equipment, men, and materials will be confined to the construction workspace ROW. Except for CR 891, pipeline construction workspace ROW does not include public roads.

5.3.3 Plan-Pipeline tie-ins at Stratton Ridge Meter Station

Completion of the pipeline requires modification of the tie-ins at the Freeport LNG Stratton Ridge metering station located along FM 523 at the intersection with CR 227. Traffic management at the intersection will not be required as the number and types of vehicles required for the completion work are common work vehicles and the intersection is well marked with no visual limitations. Personnel transport will be by private vehicles and parking will be provided within the metering station area.

5.3.4 Pipeline Right-of-Way and HDD site Access Control

Access to pipeline right-of-way will be controlled by the EPC contractor and their security subcontractor. Valid project identification and vehicle passes will be required consistent with other Liquefaction Project sites. The metering station is fenced and access controlled by electronic swipe card gate. Consequently personnel and equipment will be required to have a valid pass.

6 Agency and Stakeholder Coordination

Freeport LNG has conducted preliminary coordination with TxDOT and the Brazoria County Engineering Department on anticipated road and bridge usage, weight limits, proposed highway projects within the county, road improvements, and road damage. During the coordination meeting, it was decided that, prior to use of state or county roads and bridges by heavy haul/overweight vehicles, an assessment of the condition of these assets would be conducted and the results agreed upon as baseline conditions. Any repairs required from Freeport LNG's use beyond those identified in the established baseline will be paid for by Freeport LNG. Likewise, any improvements to roadways resulting from a project-specific need associated with the Liquefaction Project will be funded by Freeport LNG. Freeport LNG and the EPC contractor will continue to coordinate with TxDOT and the Brazoria County Engineering Department on various issues associated with road and bridge use in Brazoria County.

Subsequent to the meeting described above (April 24, 2014) Freeport LNG and its main Contractor for the Liquefaction and Pretreatment facilities met with officials of TxDOT Brazoria Area Office and Brazoria County Engineer's Office to discuss existing traffic patterns and congestion and projected impacts during construction of the Liquefaction Project. Mitigation measures were discussed for alleviating construction-related impacts to the extent practicable. This Plan was also discussed during the meeting. Appendix B provides the agenda, minutes of the meeting, and sign-in sheet for the April 24, 2014 coordination meeting.

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Prior to the commencement of construction of the Liquefaction and Pretreatment facilities, Freeport LNG will meet with the agencies and stakeholders responsible for traffic control and management in Brazoria County to update the April 24, 2014 discussion as well as update our information on the status of road, bridge, and highway projects during the construction period. We will also carry out the pre-construction survey of roads and bridges discussed above to document and assess their condition and review this with TxDOT and Brazoria County.

Prior to the commencement of construction of the meter station, pipeline, horizontal directional drill (HDD) sites and pipeline push sites Freeport LNG and its pipeline contractor will meet with TxDOT and Brazoria County to ensure the regulatory and safety requirements of all agencies having jurisdiction of roadways and waterways are met.

7 Plan Updates and Revisions

The Plan will be updated as needed when new or changed information becomes available or known. A Revision Log will be added to document to document and track revisions.

8 References

Atkins North America. 2012. Freeport LNG Liquefaction Project Traffic Impact Study, Freeport LNG Development, L.P. November 2012.

Federal Energy Regulatory Commission. March 2014. Freeport LNG Liquefaction Project/Phase II Modification Project - Draft Environmental Impact Statement. Docket Nos. CP12-509-000 and CP12-29-000.

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Federal Energy Regulatory Commission. July 2005. Freeport LNG Project - Environmental Assessment (Modification of Authorized Send-out Pipeline Diameter). Docket No. CP03-75-000.

Federal Energy Regulatory Commission. June 2006. Freeport LNG Phase II Project - Environmental Assessment. Docket No. CP05-361-000.

Freeport LNG Development, L.P. 2012. Application for Authorization Under Section 3 of the Natural Gas Act in Brazoria County Texas – Environmental Report. August 31, 2012.

APPENDIX J

Evacuation Plan

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Resident and Visitor Evacuation Plan – Quintana Island

Freeport LNG Liquefaction and Phase II Modification Projects
FERC Docket Nos. CP12-29-000 and CP12-509-000
Brazoria County, Texas

MAY 2014

Prepared By:
Freeport LNG Development, L.P.

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SECTION IV EMERGENCY RESPONSE PROCEDURES - PUBLIC

4.1 Public Response

Overall, the LNG industry has an excellent safety record compared to refineries and other petrochemical plants. As of 2008, worldwide, there are 23 LNG export (liquefaction) terminals, 58 import (regasification) terminals, and 224 LNG ships, altogether handling approximately 168 million metric tons of LNG every year. LNG has been safely delivered across the ocean for over 40 years. In that time there have been over 45,000 LNG carrier voyages, covering more than 100 million miles, without any major accidents or safety problems either in port or on the high seas. The LNG industry has met stringent standards set by countries such as the U.S., Japan, Australia, and the European nations.

The experience of the LNG industry demonstrates that normal operating hazards are manageable. No LNG-related deaths or serious accidents have occurred in the United States since the accident in Cleveland, Ohio in 1944. West and Mannan of Texas A&M University concluded in their paper *LNG Safety Practice & Regulation: From 1944 East Ohio Tragedy to Today's Safety Record* that "The worldwide LNG industry has compiled an enviable safety record based on the diligent industry safety analysis and the development of appropriate industrial safety regulations and standards."

The over 40 years of experience without significant incidents caused by LNG at liquefaction facilities, on LNG carriers, and at regasification facilities reflects the industry's commitment to safety and safe engineering and operations.

The Consortium for Energy Efficiency (CEE) briefing paper, *LNG Safety and Security*, provides details on and evaluates safety and security measures that are currently in use and under consideration, actions by industry and government to ensure safety and security, and industry technologies under development that will reduce the effect of LNG facilities on local communities. The major conclusion reached in that briefing paper is that the LNG industry has an excellent safety record. This strong safety record is a result of several factors. First, the industry has technically and operationally evolved to ensure safe and secure operations. Technical and operational advances include everything from the engineering that underlies LNG facilities, to the operational procedures, to the technical competency of personnel. Second, the physical and chemical properties of LNG are such that risks and hazards are well understood and incorporated into the technology and operations.

Standards, codes and regulations that apply to the LNG industry further ensure safety. While the U.S. possesses its own regulatory requirements for LNG operators, the U.S. has benefited from the evolving international standards and codes that regulate the industry. Four elements that provide multiple layers of protection both for the safety of LNG industry workers and the safety of communities that surround LNG facilities ensure the excellent safety record of the industry. **Primary containment** is the first and most important requirement for containing LNG. This first layer of protection involves the use of appropriate materials for LNG facilities as well as the proper engineering design of storage tanks onshore, on LNG ships and elsewhere. **Secondary containment** ensures that if leaks or spills occur at the onshore LNG facility, the LNG can be fully contained and isolated from the public. **Safeguard systems** offer a third layer of protection. The goals of safeguard systems are to minimize the frequency and size of LNG releases both onshore and offshore and prevent harm from potential associated hazards, such as fire. For this level of safety protection, LNG operations use technologies such as high level

alarms and multiple back-up safety systems, which include Emergency Shutdown systems. Emergency Shutdown systems identify problems and shut off operations in the event certain specified fault conditions or equipment failures transpire. Emergency Shutdown systems are designed to prevent or limit significantly the amount of LNG and LNG vapor that may be released. Fire and gas detection and firefighting systems all combine to limit potential effects if a release occurs. The LNG facility or ship operator will then take action to establish necessary operating procedures, training, emergency response systems and regular maintenance, which will protect people, property and the environment from a release. Finally, LNG facility designs are required by regulation to maintain **separation distances from** separate land-based facilities, communities and other public areas. Moving safety zones are also required around LNG ships to reduce the chance of collisions with other ships.

As part of the increased safety and security aspects of the Freeport LNG Terminal, coordination with local emergency response organizations is a critical component to the planning and operations of the Terminal. The local emergency response network (***through the 911 services***) maintains a well-organized system for responding to a wide range of incidences in an integrated area of residential, tourist, commercial/industrial, and petrochemical activities on land and water.

The actions taken by the emergency response agencies to control and protect the public during an emergency event depends greatly on the magnitude and extent of the incident, the weather conditions (wind direction and speed, temperature, humidity, etc.), number of people and their location with respect to the incident, and other factors. Typical evacuation distances for particular incidents include a half-mile radius for a vapor release and a 1-mile radius for a fire. Emergency personnel may modify these distances. When released into an unconfined space or into the atmosphere, LNG is not explosive. Events resulting from even large releases of methane vapors are relatively short-lived.

The USCG responds to marine emergencies and will aid and join the Incident Command Team, when applicable. The USCG provided Freeport LNG with a plan for the safe evacuation of Station Freeport personnel and equipment in the event of an incident at the Freeport LNG Terminal dock that would pose a threat to USCG personnel or assets. If the USCG plan is implemented, personnel would evacuate to, muster at, and redeploy from Stahlman Park on Surfside Beach. Using Stahlman Park as a base of operation, Coast Guard personnel would then respond to incidents.

Response actions vary depending on the extent and location of an incident. Response may be in the form of:

- No Action
- Shelter-in-Place
- Temporary Relocation
- Partial or Temporary Evacuation
- Full Evacuation
- Notify Local Industrial Sites Via CAER Line

When the Terminal may control an incident within the boundaries of the Terminal, the Terminal will not require action from the public or outside emergency responders. When an incident has a reasonable likelihood of escalating and moving beyond the boundaries of the terminal, 911 will be notified and the Emergency Response Plan and Incident Command System will be initiated.

Depending on wind direction and the potential magnitude of the incident, a typical response would be to recommend shelter-in-place procedures to the public. If further escalation of the incident is likely, emergency responders may initiate either a temporary relocation or partial evacuation of the public to beyond a half-mile or one-mile radius surrounding the incident. In the unlikely event that an incident requires a larger radial evacuation, response agencies may organize a full evacuation of the public from the Town of Quintana and surrounding areas, taking into account the factors related to the incident.

4.2 Definition of Emergency Scenario – Magnitude and Extent of Evacuation Required

4.2.1 Hazard Models Completed

As demonstrated by the very conservative hazards modeling submitted in this proceeding by Freeport and as reflected in the DEIS prepared by the Commission staff at pages 4-174 through 4-186, in the unlikely event of an incident at the plant, there would be no hazard to the public. The hazards modeled are very conservative and in no event demonstrate any danger to Island residents or visitors. In the summertime, the prevailing wind is south and southeast on Quintana Island which means that beachgoers and others on the Island would be located upwind of any potential releases. In almost all cases the best response to an issue at the Terminal would be to shelter or hold in place rather than evacuate the Island. Nonetheless, Freeport has updated its Emergency Response Plan and will again provide a copy to all Quintana Island residents.

4.3 Emergency Evacuation Plan Terminology

Incident/Emergency Requiring Evacuation – an incident or emergency of a magnitude and/or extent that would potentially imperil the public (defined as residents and visitors on Quintana Island at the time and duration of the incident) that would prompt the Incident Commander to call for an evacuation of portions or all of Quintana Island through the available communication methods described in Section 4.4 and elsewhere in the ERP.

Quintana Island – Quintana Island as defined by the bounds of all areas of the town of Quintana, open areas on the island, Quintana Beach, Quintana Island County Park, and the jetty southeast of Quintana Island County Park. This definition does not include Bryan Beach or points westward from FM 1495 at the intersection of the beach area.

Quintana Island Adjacent Areas – Quintana Island Adjacent Areas are defined as those areas surrounding Quintana Island (as described above) that may be used during an evacuation or involved in an evacuation as defined by the magnitude of a given emergency and prevailing weather conditions at the direction of the Incident Commander.

Quintana Beach – Quintana Beach lies south of the full extent of all the Freeport LNG facilities (i.e. LNG Unloading Docks, Existing Vaporization Area, and Proposed Liquefaction Facilities) at varying distances but generally less than 0.5 miles from the center of the process units or LNG ship to the occupied portion of the beach.

Bryan Beach – Bryan Beach lies south and west of the Freeport LNG facilities approximately 0.8 miles from the Liquefaction Ground Flare to the entrance to the beach on FM 1495.

High Use Season – May 15 to September 15 of each year. This four month period covers the time of year that attracts most beachgoers to the Texas coast and covers weekdays, weekends,

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and the holidays of Memorial Day, July 4th, and Labor Day with potentially large numbers of visitors to Quintana Island.

Low Use Season – September 16 through May 14 of each year. This 8 month period covers the time of year with reduced beach activity.

Potential Evacuee Numbers for Given Areas of Quintana Island – Potential numbers of evacuees are highly dependent on the circumstances at the time of any given emergency (day of week, season, magnitude, weather conditions, etc.). The area(s) to be evacuated, number of evacuees, method(s) of evacuation, and applicable assembly points and pick-up points therefore will be determined through coordination between the Town of Quintana's Emergency Management Coordinator and Incident Commander or his designee. Post-construction the Quintana Island residents are estimated to number approximately 50 individuals. Visitors on Quintana Island are estimated for the Brazoria County Quintana Island Park at 300 (High Use) and 50 (Low Use Season) and 400 (High Use Season) to 50 (Low Use Season) on Quintana Beach. Totals for High/Low Use Seasons are 700/100. Total Quintana Island potential evacuees (entire area) are 650 and 150 for High and Low Use Seasons, respectively.

CAER – Community Awareness and Emergency Response (CAER) is a national network of local non-profit public benefit corporation of public emergency response agencies, local government officials and facilities and businesses that use, store, handle, produce or transport hazardous materials. Brazosport Industrial CAER is a program that provides information to the community in the event an emergency should occur from one of the surrounding industries. CAER deals with internal safety precautions as well as emergency response plans for the community and stresses two-way communication between the public and industry. This program and its efforts greatly reduce the probability of a major chemical emergency due to the fact that the community and industry are prepared. Quintana Island is equipped with a CAER siren as well as access to CAER notifications and updates on area emergencies (see Section 4.4).

Emergency Response Plan – Freeport LNG developed an Emergency Response Plan according to guidance supplied by FERC prior to implementing Phase I (Condition # 69) and has updated this Plan for subsequent projects (i.e. Phase II, BOG Reliquefaction/Trucking, and Liquefaction and Phase II Modification Projects[1]. Please see the Revision Record at the front of the current ERP.

Emergency Shut Down – An automatic system of shut downs that stop segments of, entire systems, or the entire terminal should an emergency occur. These ESDs can also be tripped manually by Terminal personnel. The ESD system is fully described in Section 3.2 of the ERP.

Evacuation Methods – Methods of evacuation typically include personal vehicles, marine vessels, aircraft (helicopter), emergency vehicles, etc. These methods are dependent on the type of emergency and the conditions within the area during an emergency. At the direction of the Town of Quintana's Emergency Management Coordinator and Incident Commander or his designee, residents and visitors will be advised of evacuation methods available.

[1] The Liquefaction and Phase II Modification Projects will submit an updated Emergency Response Plan pursuant to DEIS mitigation measures 26 and 27.

Evacuation Points[2] – Available land-based and water-based points identified around Quintana Island that (at the direction of the Town of Quintana's Emergency Management Coordinator and Incident Commander or his designee) can be used to interface evacuees with emergency response transports. Evacuation points should be used only after assessing the magnitude of the incident and associated weather conditions and preferably at the direction of the Town of Quintana Emergency Response Coordinator or the Incident Command establish for the incident.

NIMS – The coordinated system Freeport LNG uses to organize, manage, and coordinate incident management with area, state, and national agencies and organizations to provide response to emergencies. National Incident Management System is a comprehensive, national approach to incident management. NIMS provides the template for incident management, regardless of cause, size, location, or complexity and is applicable at all jurisdictional levels and across functional disciplines.

Benefits of NIMS

- Standardized approach to incident management that is scalable and flexible
- Enhanced cooperation and interoperability among responders
- Comprehensive all-hazards preparedness
- Efficient resource coordination among jurisdictions or organizations
- Reflects best practices and lessons learned

NIMS is used by all the local, county, state, and federal agencies involved in our facilities and others to respond to numerous different emergencies. Freeport LNG has two NIMS certified Incident Command Instructors in site as well as 26 employees that are trained to NIMS levels 300 and 400.

NIMS is an important part of Freeport LNG's response network. It provides an organized, structured approach to responding to emergencies employing individuals trained and practiced in emergency response from Freeport LNG staff, first responders, and state and federal agencies with regulatory and safety oversight for the facilities.

Freeport has conducted quarterly drills each year since implementing NIMS in 2010. These drills involve area industry representatives, NIMS coordinators, FLNG staff, and Quintana Town Council members, the Mayor, and the Quintana Emergency Management Coordinator (are included). Added to this are three high angle rescue drills and several table top exercises some of which have been attended by Quintana Emergency Management Coordinator and Mayor.

On-Site Incident Command Center – The control room at Freeport's Quintana Island Terminal. This will act as the OSICC until a decision is made by incident command to relocate to the Administration Building or the Remote Incident Command Center.

Remote Incident Command Center – An alternate (off-site) command center to house incident command during an emergency event if conditions require. This is currently the Port Freeport command center on FM 1495 in Freeport.

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[2] **NOTE – Selection of Assembly Points, Marine Pick-Up Points, Sheltered Assembly Points, and Non-Sheltered Assembly Points are HIGHLY DEPENDENT on the type and magnitude of the emergency and the prevailing weather conditions at the time of the incident. Residents should use one or more of the Public Information Plan notification methods outlined in Section 4.2 of the ERP and/or the direction of the Emergency Management Coordinator for Quintana Island or Incident Command established for the incident.**

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Freeport Harbor Channel Seasonal Tidal Amplitude – Tidal range in Freeport is typically 2.5 feet and is influenced seasonally and by wind driven tides. The Incident Commander or his designee will assess the effect of tide levels as part of the weather assessment of the emergency prior to choosing and communicating locations for marine pick-up or directing the public to use Quintana Beach as an egress off the Island. Tidal amplitude is generally between 1.5 and 2.5 feet during summer months (May – September).

Weather Condition – Wind direction is south and southeast for most of the months from May through September in Brazoria County. Dispersion of any vapors in an event during summer months would occur across the Intracoastal Waterway and into relatively unpopulated areas. As LNG and natural gas vapors are lighter than air, these would gain altitude and disperse rapidly given the summertime wind direction. Refrigerants are managed stay on-site based on the dispersion models identified in the EIS.

4.4 Public Notification

In the event of an LNG Terminal incident or an LNG ship incident that requires evacuation of the public, Freeport LNG's Public Information Plan will be activated.

The Public Information Plan will be utilized to notify citizens and marine traffic that could be impacted by an event, in one of several ways:

- CAER Alarm – A CAER alarm is along CR 723 between the two sections of the Town of Quintana. This alarm is new and replaced the old CAER alarm at Town Hall.
- Marine Radio Broadcasts – If there is an incident on a vessel in transit, the vessel master or assigned pilot may issue marine broadcasts on Channel 16, informing waterway users of the incident. Once the USCG Sector Houston-Galveston Command Center is notified, they will assist in making necessary broadcasts to mariners.
- Local Law Enforcement/Emergency Response – Brazoria County Emergency Management and the Freeport Police Department and/or the Freeport Fire Department will be notified by telephone of any event at the Terminal and may be requested to assist in the control of traffic along roadways around and on Quintana Island and Terminal.
- Industry – The Brazosport Industrial CAER network will be notified by telephone call to the local CAER coordinator, who will then notify other industries in the area. CAER will notify all companies according to the CAER grid map and the affected areas. CAER sirens are present at Surfside Beach City Hall and Quintana Island. The telephone number for the CAER line is (979) 238-CAER (2237), and the CAER Radio Station is 1610 AM. The CAER Telephone Alert System is operated by FirstCall.
- Emergency Alert System Broadcasts – Emergency public notification transpires on KTRH-AM 740 and KUHF-FM 88.7. Additional public information will be disseminated to the media, public and other stakeholders via the Freeport LNG website, the Town of Quintana's The Blackboard system, and the NewsRouter service.
- Additionally the Town of Quintana has an internal public notification system in-place to alert their citizens in the event of an emergency called "The Blackboard". The Mayor and Quintana's Emergency Management Coordinator along with the Mayor Pro-tem respond immediately with public notifications and information on response procedures.

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4.5 Public Evacuation Procedures

In order to provide a rapid evacuation of the areas adjacent to the Terminal and along the vessel transit route, or in an event that would cause the FM 1495 bridge to be blocked, the 911 system would be used to order such evacuation. When the Incident Commander determines that an emergency situation endangers the adjacent property tenants or the vessel transit route, they will direct the Administrative Supervisor to make timely notifications. Emergency response organizations such as the USCG, state and local law enforcement agencies (city, county and state police), and local emergency preparedness committee will be notified. Limited direct telephone notification could occur to notify local industrial sites.

Any evacuation order must also consider evacuation of adjacent waterways. Immediate notification to the Sector Houston-Galveston Command Center must be made for any incident with a potential impact to a waterway. Once the Sector Houston-Galveston Command Center has been notified, they will assist in determining the waterways impacted, the necessary marine broadcasts, and the necessary safety zones and/or waterway restrictions.

The Incident Commander will request the Liaison Officer to contact all required local and county agencies (police, sheriff, Brazoria County Emergency Response, Brazosport Industrial CAER). Information provided to these agencies should include the type of the threat imposed (vapor cloud, etc.) and expected duration of the threat. The Freeport Police and the mayor of Quintana Island will make a determination regarding an evacuation of the public on Quintana Island.

If a public evacuation is ordered, local police, sheriff deputies, State police, and other emergency agencies will be dispatched to the affected area and the government agencies involved will notify the public of the evacuation. Further information regarding housing and other public services is available in each agency's own individual emergency response plans.

Based on the assessment of the On-Scene Commander, several potential responses or a combination of responses can be used to manage small, medium, and large crowds that may be on Quintana Island at the onset of an emergency. The ERP addresses In-Terminal emergencies that do not extend beyond the Terminal boundaries.

The next level of response to an event outside the boundaries of the Terminal would be to Shelter-In-Place (households) or Hold-In-Place (visitors/beachgoers). This would take place through the mechanisms already in place and described in the ERP.

Evacuations from areas east of the Liquefaction facilities would use marine and air pickup points as determined by the Incident Commander. Air pick up points are identified as any open areas on the island east of the Liquefaction facilities that are safe to land a helicopter and be accessible to evacuees. The available marine evacuations points east of the Liquefaction facilities are listed in Tables 4.4-1, 4.4-2, and 4.4-3.

Evacuations from areas west of the Liquefaction facilities would use the FM 1495 bridge, a marine pickup point, and helicopter accesses where available as determined by the Incident Commander. Air pick up points are identified as any open areas on the island west of the Liquefaction facilities that are safe to land a helicopter and be accessible to evacuees. The available marine evacuations points west of the Liquefaction facilities are listed in Tables 4.4-1, 4.4-2, and 4.4-3.

The following responses would take place using land routes off the island using FM 1495. This alternative would take place along with restricting public access across the FM 1495 bridge to reduce further congestion onto the island. Evacuations by vehicle would occur sequentially from most affected areas to least affected areas. Non-affected areas and individuals would be held-in-place to accommodate evacuating individuals. The FM 1495 (including the bridge) would likely be designated “one-way only” outbound from the island and (where accessible) the designated Hurricane Route lanes would be utilized.

Initially evacuation may consist of temporarily relocating people into non-affected areas on the island. This would be by personal vehicle, Freeport LNG company vehicles, local law enforcement, or by foot (beach goers). Temporary relocation would be for short distances and would be effective even for large crowds at the fringes of the effects of an incident. Temporarily relocating individuals would also open up areas for affected area evacuees to be brought.

The following responses would take place along with restricting public access across the FM 1495 bridge to reduce further congestion onto the island. Evacuations by vehicle would occur sequentially from most affected areas to least affected areas. Non-affected areas and individuals would be held-in-place to accommodate evacuating individuals. The FM 1495 (including the bridge) would likely be designated “one-way only” outbound from the island and (where accessible) the designated Hurricane Route lanes would be utilized.

Evacuation could be limited to a given area and smaller number of affected individuals. For example, this could be accomplished for only the beach area directly south of the Terminal or only the Quintana Island County Park area based on the assessment of the On-Scene Commander.

A partial evacuation of larger areas could be completed depending on the extent of the emergency and the need to accommodate emergency response personnel. In this scenario, individuals would be instructed to drive to or would be relocated to non-affected areas of the island until such time as they are allowed to return or evacuated to off-island locations.
Based on the results of hazards modeling presented in the draft EIS for the Liquefaction Project a full evacuation of either Quintana Island is unlikely and even less likely to affect Bryan Beach. However, this could be accomplished by sequentially relocating individuals in non-affected areas to open space for evacuees for affected areas.

In the event that marine evacuation is required, locations for marine evacuations are highly dependent on specific conditions of the incident mentioned earlier. Selection of marine evacuation points will be designated by the On-Scene Commander based on these conditions and in communication with Coast Guard, the Brazoria County Sheriff’s Office, and other available crafts being mobilized to the site.

In the event that air evacuations are made, landing site(s) selections will be designated by the On-Scene Commander based on the conditions and in communication with Coast Guard, the Brazoria County Sheriff’s Office, and other available aircraft being mobilized to the site.

4.6 Available Evacuation Routes

Pursuant to FERC Condition 68 of the Order Issuing Authorization, Freeport LNG in conjunction with the Local Emergency Planning Committee, Industrial Group, and town officials, developed emergency evacuation routes/methods for the areas of Quintana Island and the Village of

Surfside Beach that are within transient hazard zones. These routes/methods were filed with and approved by the FERC Director of Office of Energy Projects. Evacuation routes include land and water thoroughfares, and also address the evacuation of the area adjacent to the Freeport Harbor Channel (i.e. Vessel Transit Route). Freeport LNG, in consultation with AcuTech and USCG personnel, prepared an emergency response and evacuation plan for USCG review and clearance. (**Appendix H of the ERP)**.

Assembly areas for temporary relocation and/or partial evacuations include Quintana Beach County Park, the Administration Building at the Freeport LNG Terminal, FM 1495 at its intersection with Quintana Beach, and the north ends of Compass Court and Deep Sea Drive in the Bryan Beach Subdivision. An assembly area is also available on the north side of the FM 1495 bridge near the intersection with State Highway 36 at the Port Freeport lay-down yard. On Surfside, Stahlman Park is the primary assembly point during any evacuation and/or relocation. (**Appendix O of the ERP**)

In the event of a marine evacuation, marine pick-up points are highly dependent upon the location and magnitude of the incident, the existing and anticipated weather conditions, and the resident and transient population located in the area. The Freeport Fire/Police Department, the USCG, the Texas Department of Public Safety and any other government or private service entities will assemble vessels for a marine evacuation. On Surfside, Stahlman Park is the primary assembly point for a marine evacuation.

Based on a FERC Engineering Information Request dated July 10, 2009, concerning the Truck Unloading Project under CP03-75-004 and CP05-361-002, Freeport LNG coordinated several meetings to discuss evacuation zones for potential LNG truck incidents at varied locations along the route to the Freeport LNG Terminal on Quintana Island. The Town of Quintana Mayor, the Town of Quintana's Emergency Management Coordinator, the Freeport Fire Chief, the USCG, and Freeport LNG staff held meetings on August 4, 2009 and August 26, 2009 to discuss the FERC Engineering Information Request and to develop a unified response plan for an LNG truck incident occurring along the 1.5-mile transit route to Freeport LNG's Terminal on Quintana Island. For each evacuation zone, the meeting attendees defined the maximum number of people that would need to evacuate (considering the highest seasonal usage of that area), and identified corresponding Assembly Area(s) and Marine Pick-Up Point(s)[3].

Based on a FERC Environmental Information Request date May 9, 2014, FERC staff asked that Freeport LNG provide an updated evacuation plan for the residents and visitors of Quintana Island in the event of an emergency at the Terminal (ship docks, Liquefaction Plant, and existing vaporization facilities) that describes both the use of the existing bridge, and alternative water based evacuation route(s) including details on where such a vessel(s) would dock, how the residents/visitors would be alerted, how they would access the evacuation point(s) during both high and low tide, and communication protocols.

[3] **NOTE – Selection of Assembly Points, Marine Pick-Up Points, Sheltered Assembly Points, and Non-Sheltered Assembly Points are HIGHLY DEPENDENT on the type and magnitude of the emergency and the prevailing weather conditions at the time of the incident. Residents should use one or more of the Public Information Plan notification methods outlined in Section 4.2 of the ERP and/or the direction of the Emergency Response Coordinator for Quintana Island or Incident Command established for the incident.**

Freeport LNG has addressed evacuation of beach areas south of the facilities (Zones 5, 6, and 7) even though prevailing winds from the south and southeast during mid-May, June, July, August, and mid-September are blowing away from these areas to the north and northwest.

Table 4.4-1 summarizes the information on each of the evacuation zones discussed in the two meetings and the May 9, 2014 EIR.

Table 4.4-1. Identified Evacuation Zones and Corresponding Assembly Areas and Marine Pick-Up Points – Quintana Island

Identified Evacuation Zone	Max. Evacuees	Corresponding Assembly Area(s)	Corresponding Marine Pick-Up Point(s)
Evacuation Zones West of the Liquefaction Facilities			
Zone 1. Base of FM 1495 Bridge	50	1. Beach area at end of FM 1495 2. Quintana Beach County Park 3. Administration Building at Freeport LNG Terminal 4. Gate 10 at the Freeport LNG Terminal	1. Intracoastal Waterway north end of Compass Court or Deep Sea Drive 2. Construction Dock at Freeport LNG Terminal 3. Dock 1 at Freeport LNG Terminal 4. Mooring Slip at the former Zeus dock
Zone 2. Town of Quintana Bridge on County Road 723	50	1. Across FM 1495 Bridge 2. Beach area at end of FM 1495 Bridge 3. Quintana Beach County Park 4. Administration Building at Freeport LNG Terminal	1. Intracoastal Waterway north end of Compass Court or Deep Sea Drive 2. Construction Dock at Freeport LNG Terminal
Evacuation Zones East and West of the Liquefaction Facilities			
Zone 3. Quintana Bridge on CR 723 to Cortez Street in the Town of Quintana	25	1. Across FM 1495 Bridge 2. Beach area at end of FM 1495 Bridge	1. Construction Dock at Freeport LNG Terminal
Evacuation Zones East of the Liquefaction Facilities			
Zone 4. Cortez Street to Gate 1 Entrance to Freeport LNG terminal (1500 Lamar Street)	25	1. Quintana Beach and travel east or west 2. Quintana Beach County Park 3. Quintana Beach County Park 4. Gate 10 at the Freeport LNG Terminal	1. Construction Dock at Freeport LNG Terminal 2. Dock 1 at Freeport LNG Terminal 3. Mooring Slip at the former Zeus dock
Zone 5. Beach area directly south of the Liquefaction Facilities	100	1. Across FM 1495 Bridge 2. Beach area at end of FM 1495 Bridge 3. Quintana Beach County Park 4. Administration Building at Freeport LNG Terminal	1. Intracoastal Waterway north end of Compass Court or Deep Sea Drive 2. Construction Dock at Freeport LNG Terminal

Zone 6. Beach area directly south of Dock 1	325	1. Across FM 1495 Bridge 2. Beach area at end of FM 1495 Bridge 3. Administration Building at Freeport LNG Terminal	1. Intracoastal Waterway north end of Compass Court or Deep Sea Drive 2. Dock 1 at Freeport LNG Terminal 4. Mooring Slip at the former Zeus dock
Zone 7 Beach area directly south of the existing vaporization area	175	1. Across FM 1495 Bridge 2. Beach area at end of FM 1495 Bridge 3. Quintana Beach County Park 4. Administration Building at Freeport LNG Terminal	1. Intracoastal Waterway north end of Compass Court or Deep Sea Drive 2. Dock 1 at Freeport LNG Terminal 3. Mooring Slip at the former Zeus dock

In its July 10, 2009 Environmental Information Request, FERC also asked that Freeport LNG indicate the location and allowable occupancy of each building or covered area to be used as an assembly point shelter on Quintana Island. Table 4.4-2 summarizes the location and allowable occupancy of each building or covered area to be used as an assembly point shelter. Table 4.4-3 summarizes the location and capacity of each unsheltered assembly area to be used as an assembly point.

Table 4.4-2. Allowable Occupancy of Sheltered Assembly Areas – Quintana Island Facilities

Sheltered Assembly Areas	Location	Allowable Occupancy
Sheltered Assembly Areas East of the Liquefaction Facilities		
Administration Building at Freeport LNG Terminal (If Freeport LNG deems it is safe to use as an Assembly Area)	Entrance is at 1500 Lamar Street, Quintana	50 (est.)
Quintana Beach County Park	East end of Quintana Island; Entrance is at Burnett Street and 5th Street	250-300 (estimate by Park staff)

Table 4.4-3. Estimated Capacity and Location of Unsheltered Assembly Areas – Quintana Island

Unsheltered Assembly Areas	Location	Estimated Capacity
Unsheltered Assembly Areas East of the Liquefaction Facilities		
Beach at end of FM 1495	Open Beach Area south of FM 1495 bridge at beach (Note: Unsheltered Assembly Point)	0-1,500+
Across FM 1495 Bridge	North on FM 1495 across Intracoastal Waterway and assemble at Port Freeport parking area	300
North end of Compass Court or Deep Sea Drive at Intracoastal Waterway	Unsheltered Assembly Point for Marine Pick-up	50 – 60 (combination of both streets)

Unsheltered Assembly Areas East of the Liquefaction Facilities		
Quintana Beach County Park	East end of Quintana Island; Entrance is at Burnett Street and 5th Street	250-300 (estimate by Park staff)

Table 4.4-4 summarizes the attributes of the marine pick-up points that may be used in the event of an evacuation of the portions of the island.

Table 4.4-4. Attributes of the Identified Marine Pick-Up Points – Quintana Island

Zone	Max. Evacuees	Attributes		
		Dock	High/Low Tidal Accessible	Staging Area Accommodations
Attributes of Identified Pick-Up Points West of the Liquefaction Plant				
Zone 1. Intracoastal Waterway north end of Compass Court or Deep Sea Drive	50	Yes	Yes	Yes – space for about 20 to 30 vehicles
Attributes of Identified Pick-Up Points East of the Liquefaction Plant				
Zone 2. Construction Dock at Freeport LNG Terminal	250	Yes	Yes	Yes – parking at various locations in or near the Terminal
Zone 3. Dock 1 at Freeport LNG Terminal	250	No	Yes	Yes – parking at various locations in or near the Terminal
Zone 4. Mooring Slip at the former Zeus dock	300	No	Yes	Yes – parking at various locations in or near the mooring dock
Zone 5. Along the Freeport Harbor Channel jetty	500 to 1000	No	Yes	Yes – parking along the beachfront and the jetty parking area.

4.6.1 Land Routes

Land Routes: (Refer to Appendix G of the ERP)

The major roads are:

- Highway 288 (North) – From the Town of Quintana, take Lamar Street to Quintana Road, to FM 1495 North, to Highway 36 West, to Highway 227 North
- Highway 36 (West) – From the Town of Quintana, take Lamar Street to Quintana Road, to FM 1495 North, to Highway 36 West
- Highway 332 (North) – From Surfside, take the Blue Water Highway to Highway 332 North, to 288 North

- Highway 227 (North) – From the Town of Quintana, take Lamar Street to Quintana Road, to FM 1495, to Highway 36 West, to Highway 227 North

An additional route is available to evacuate from Quintana Island and the Freeport LNG Terminal by traveling to Quintana Beach, then traveling down the beach to the southwest, and then to FM 1495, that later joins Highway 36 North and Highway 288 North.

4.6.2 Marine Routes (Refer to Appendix G of the ERP)

Water routes around the Freeport LNG Terminal serve as additional evacuation routes for LNG ships and small fishing and pleasure water crafts:

- Old Brazoria River channel (West and North);
- Intracoastal Waterway (West or East);
- Dow Barge Channel (North); and
- Freeport Harbor Channel to the Gulf of Mexico (South).

If needed, additional evacuations by small water craft are available from Quintana Beach and Surfside Beach.

Marine Pick-Up Points identified include the Brazos Pilots' boat dock at the north ends of Compass Court and Deep Sea Drive in the Community of Bryan Beach. The USCG will accomplish evacuations from this area. Marine vessels may access this point by utilizing the existing dock facilities and by coordinating with the Brazos Pilots Association. A second Marine Pick-Up Point is located at the original FLNG construction dock along the Intracoastal Waterway, adjacent to the Freeport LNG terminal. In the event of an evacuation, Freeport LNG personnel and emergency responders should escort evacuees through the Freeport LNG Terminal gates and transport the evacuees to the construction dock. The construction dock is accessible by water from the Intracoastal Waterway. A third Marine Pick-Up Point is located at the FLNG LNG transfer dock along Holley Street. In the event of an evacuation, Freeport LNG personnel and emergency responders should escort evacuees through the Freeport LNG Terminal berth access gate and transport the evacuees to the dock area. The dock is accessible by water from the Freeport Harbor Channel across from the U.S. Coast Guard Station Freeport. Another available Marine Pick-Up Point is located at the "Old Zeus Slip" which is deep-water craft accessible located on the east end of Quintana off 2nd Street, directly on the main Port Freeport entrance channel. The Freeport Harbor Channel jetty is also accessible by boat and would available for use as an elongated evacuation point. The USCG will accomplish an evacuation from this area. (**See Appendix O of the ERP**)

4.6.3 Vessel Transit Route (Refer to Appendices H & I)

Evacuation of the Vessel Transit Route is similar to an evacuation by land or water from areas adjacent to the Freeport Harbor Channel on Quintana Island or Surfside Beach.

4.7 References

Federal Energy Regulatory Commission (FERC). 2004. Final Environmental Impact Statement – Freeport LNG Project. Docket No. CP03-75-000. FERC/EIS – 0164. Issued May 28, 2004.

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Federal Energy Regulatory Commission (FERC). 2006. Environmental Assessment – Freeport LNG Phase II Project. Docket No. CP05-361-000. Issued June 21, 2006.

Federal Energy Regulatory Commission (FERC). 2009. Environmental Assessment – Freeport LNG Export Project and BOG/Truck Project. Docket Nos. CP03-75-003, CP03-75-004, CP05-361-001, and CP05-361-002. Issued March 13, 2009.

Federal Energy Regulatory Commission (FERC). 2014. Draft Environmental Impact Statement – Freeport LNG Project. Docket Nos. CP12-509-000 and CP12-29-000. FERC/EIS – 0250D. Issued March 14, 2004.

APPENDIX K

List of Preparers

Appendix K
List of Preparers

The following presents the names of individuals who prepared and/or reviewed this draft EIS and their area or areas of responsibility.

Table I-1 Preparers/Reviewers for FERC		
Name	**Education**	**Responsibility**
Tomasi, Eric	B.S., Aerospace Engineering, 1994, Boston University	FERC Project Manager – Air Quality, Noise, Socioeconomics, Land Use, Cumulative Impacts, Alternatives
Allen, Christine	B.S., Marine Biology, 2005, University of North Carolina, Wilmington	Water Resources
Busch, Steven	M.E., Environmental Engineering, 2003, University of Maryland, College Park B.S., Mechanical Engineering, 1999, University of Maryland, College Park	LNG Reliability & Safety – Liquefaction Project
Cefalu, Janine	Masters of Environmental Studies, 2005, The Evergreen State College B.A., International Relations, 1996, San Francisco State University	Wildlife, Vegetation, Threatened & Endangered Species
Ferree, Heather	M.S., Mechanical Engineering, 2002, Pennsylvania State University B.S., Mechanical Engineering, 2006, Pennsylvania State University	LNG Reliability & Safety – Liquefaction Project
Friedman, Paul	M.A., History, 1980 University of California, Santa Barbara B.A., Anthropology and History, 1976, University of California, Santa Barbara	Cultural Resources
Glaze, James	B.S., Geology, 1975, California Lutheran University	Geology, Geologic Hazards
Silvera, Liliana	B.S., Chemical Engineering, 2003, University of Maryland -College Park	LNG Reliability & Safety – Liquefaction Project
White, Sentho	M.S., Environmental Engineering, 2001, Johns Hopkins University B.S., Civil Engineering, 2000, Georgia Institute of Technology	LNG Reliability & Safety – Phase II Modification Project
Preparers/Reviewers for TRC		
Name	**Education**	**Responsibility**
Brandt, Jeffrey	M.A., Environmental Studies, 1997, Brown University B.S., Industrial Engineering, 1984, Worcester Polytechnic Institute	TRC Project Manager – Alternatives, Land Use, Cumulative
Niles, Ryan	B.A., Geological Sciences, 2001, State University of New York, College at Geneseo	Geology and Soils

Table I-1 Preparers/Reviewers for FERC		
Name	**Education**	**Responsibility**
Walker, Jaime	B.S., Conservation Biology, 2009, SUNY College of Environmental Science and Forestry	Water Resources
Saxton, Elizabeth	M.E.M., Environmental Studies Industrial Ecology, 1998, School of Forestry and Environmental Studies, Yale University, New Haven, Connecticut B.A., Majors: Biology and Sociology, 1990, University of Richmond, VA	Deputy Project Manager, Wildlife, Vegetation, Threatened & Endangered Species
Slayton, Adam	B.S., Physics, 1998, University of Maine, Orono	Socioeconomics
Webb, Paul	A.B.D. (Ph.D. coursework), 1983-1989, Anthropology, Southern Illinois University B.A., Anthropology, 1979, University of Georgia	Cultural Resources
Thomas, Brian	Ph.D., Anthropology, 1995, State University of New York at Binghamton M.A., Anthropology, 1991, Wake Forest University B.A., History and Philosophy, 1983, Wofford College	Cultural Resources
Fennel, Patrick	M.E., Environmental Engineering, 1997, University of Hartford M.S., Civil Engineering, 1977, University of Illinois at Urbana B.S., Civil Engineering, 1975, University of Missouri at Columbia	Air Quality
Newman, Michael	B.S., Chemical Engineering, 2001, University of Connecticut	Air Modeling
Agresti, Anthony	B.A., Meteorology, 1984, Kean College of New Jersey	Noise
Preparers/Reviewers for Bachman Consulting Structural Engineers		
Bachman, Robert R.E.	M.S., Structural Engineering, 1968, University of California at Berkeley B.S., Civil Engineering, 1967,University of California at Berkeley	Geologic Conditions, Hazards, Structural Engineering
Preparers/Reviewers for Group Delta Consultants, Inc.		
Bhushan, Kul	Ph.D., Geotechnical Engineering, 1970, Duke University M.S., Highway Engineering, 1963,Panjab University, Chandigarh, India B.S., Civil Engineering, 1962,Panjab University, Chandigarh, India	Subcontractor - Geologic Conditions, Hazards, Geotechnical Engineering

APPENDIX L

Comments and Responses

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FEDERAL GOVERNMENT COMMENTS

F1 – United States Department of the Interior

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United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
1001 Indian School Road NW, Suite 348
Albuquerque, New Mexico 87104

TAKE PRIDE IN AMERICA

ER 14/0153
File 9043.1

April 29, 2014

VIA ELECTRONIC MAIL ONLY

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Subject: NO COMMENT; Review of Draft Environmental Impact Statement (DEIS) for the Proposed Phase II Modification and Liquefaction Projects (Collectively Referred to as Freeport LNG); FERC Nos. CP12-509-000 and CP12-29-000; Brazoria County, Texas

Dear Ms. Bose:

F1-1 The U.S. Department of the Interior has reviewed the Federal Energy Regulatory Commission's (FERC) Draft Environmental Impact Statement (EIS) for the Proposed Phase II Modification and Liquefaction Projects (Collectively Referred to as Freeport LNG). In this regard we have NO COMMENT.

Sincerely,

Stephen Spencer, Ph.D.
Regional Environmental Officer

1

F1-1: Comment acknowledged.

F2 – United States Environmental Protection Agency – Page 1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

May 5, 2014

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

RE: Draft Environmental Impact Statement (DEIS) for Freeport LNG Liquefaction Project Phase II Modification in Brazoria County, Texas

Dear Ms. Bose:

In accordance with our responsibilities under Section 309 of the Clean Air Act (CAA), the National Environmental Policy Act (NEPA), and the Council on Environmental Quality (CEQ) regulations for implementing NEPA, the U.S. Environmental Protection Agency (EPA) regional office in Dallas, Texas has completed its review of the Federal Energy Regulatory Commission (FERC) DEIS for Freeport LNG Liquefaction Project Phase II Modification in Brazoria County, Texas. The proposed Phase II Modification Project includes modification to the previously authorized LNG vessel berthing dock, LNG transfer pipelines, LNG unloading arms, and the access road system. The Liquefaction Plant would consist of three propane pre-cooled mixed refrigerant liquefaction trains which are each capable of producing 4.4 million metric tons per annum for export.

F2-1 Based on our review, we have rated the DEIS as "Environmental Concerns and Insufficient Information" (EC-2). Additional information on EPA's rating system can be found at http://www.epa.gov/compliance/nepa/comments/ratings.html. Our rating is based on the need for additional analysis regarding environmental justice and surrounding communities, indirect effects, and wetlands. We have enclosed detailed comments that identify our concerns and recommendations for additional analysis in the Final EIS (FEIS).

EPA appreciates the opportunity to review the DEIS. Please note that a copy of this letter will be published on our website, http://www.epa.gov/compliance/nepa/eisdata.html, in order to fulfill our responsibility under Section 309 of the CAA to inform the public of our views on the proposed Federal action. Please send our office one copy of the FEIS when it is filed using our *e-NEPA Electronic Filing System* (http://www.epa.gov/compliance/nepa/submiteis/index.html).

2

F2-1: Comment acknowledged. See responses to EPA's letter below and with respect to detailed comments attached to EPA's letter.

F2 – United States Environmental Protection Agency – Page 2

If you have any questions or concerns, please contact Rhonda Smith or Kimeka Price of my staff at (214) 665-8006 or (214) 665-7438 or via email at smith.rhonda@epa.gov or price.kimeka@epa.gov respectively for assistance.

Sincerely,

John Blevins
Director
Compliance Assurance and
Enforcement Division

Enclosure

3

F2 – United States Environmental Protection Agency – Page 3

DETAILED COMMENTS
ON THE
FEDERAL ENERGY REGULATORY COMMISSION
DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR
FREEPORT LNG LIQUEFACTION PROJECT
PHASE II MODIFICATION
IN BRAZORIA CONUTY, TEXAS

The following comments are offered for FERC's consideration in preparation of the FEIS:

Environmental Justice and Surrounding Communities

The DEIS does not provide consistent analysis on surrounding communities to determine if low-income or minority populations will be impacted by this project. For example, on page 4-131, the DEIS states "[a]s shown in table 4.8.7-1, in terms of minority representation, the communities in the immediate vicinity of the proposed project do not show any fundamental characteristics that would differentiate them from Brazoria County or the State of Texas as a whole." This statement appears to be inaccurate since Table 4.8.7-1 shows the City of Freeport has a 59.9% Hispanic population and Table 4.8.7-2 shows populations within 0.5 miles of the liquefaction plant has a 32.9% - 63.4% minority population. The data in these tables do not support the statement on page 4-131.

Also, according to Table 4.8.7-1, the town of Quintana has a minority population of 0%. However, the publicly-available EPA EJView[1] tool indicates that the town of Quintana has a minority population of 53%.

F2-2

Recommendations:

- The FEIS should accurately determine whether minority and low-income populations are present that have the potential to be affected by the proposed project. The FEIS should include a map showing environmental justice populations near the proposed project so that stakeholders can easily understand their proximity.

- As potential environmental justice populations are identified, the FEIS should evaluate whether there are disproportionate high and adverse human health or environmental impacts on these populations and develop measures to address those impacts. EPA recommends that the FEIS use the methods outlined in the Council on Environmental Quality's guidance (*"Environmental Justice: Guidance under the National Environmental Policy Act," December 1977*)[2].

[1] EJView at http://epamap14.epa.gov/ejmap/entry.html
[2] *Environmental Justice: Guidance under the National Environmental Policy Act (December 1977) at* http://energy.gov/nepa/downloads/environmental-justice-guidance-under-nepa

4

F2-2: See section 4.8.7.

Indirect Effects

F2-3 In addition to considering the direct impacts of a proposed action, NEPA requires that agencies also consider indirect effects where there is a reasonably close causal relationship between the action and the environmental effect. We recommend that the FEIS consider the extent to which it is reasonably foreseeable that the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the potential increased production of natural gas. We recommend that the FEIS quantify all GHG emissions associated with the project, including those emissions associated with production, transportation and combustion of the natural gas. As with all analyses of indirect effects, we recommend that FERC establish reasonable spatial and temporal boundaries for the analysis of GHG emissions.

Wetlands

F2-4 While the DEIS references Freeport LNG's Compensatory Wetland Mitigation Plan, the plan is not included in the DEIS. The DEIS also indicates that updates to the Plan are being made in coordination with the US Army Corps of Engineers. We request that the final Plan be included in the FEIS and incorporated in the Record of Decision.

Other Associated Plans

F2-5 The DEIS references the Stormwater Pollution Prevention Plan and Spill Prevention, Control and Countermeasure plans; however, these plans are not included in the DEIS.

Recommendation:

- The FEIS should incorporate the associated plans, including copies of or identifying accessible locations, for evaluation.

5

F2-3: See Sections 4.11 and 4.1.2

F2-4: See section 4.3.5.

F2-5: See footnote #10 in section 2.4.1.3 for E-library link to SPCC Plan. The SWPPP will be developed as required for the NPDES Permit by Freeport LNG prior to filing the NOI.

F2 – United States Environmental Protection Agency – Page 5

DETAILED COMMENTS
ON THE
FEDERAL ENERGY REGULATORY COMMISSION
ADMINISTRATIVE FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR
FREEPORT LNG LIQUEFACTION PROJECT
PHASE II MODIFICATION
IN BRAZORIA CONUTY, TEXAS

Environmental Justice and Surrounding Communities

F2-6

The Administrative Final EIS does not include changes in response to our Draft EIS comment recommending clarification of the presence of environmental justice populations in Freeport and Quintana. Since you did not provide us the "response to comments" appendix, we are unclear why you did not address this comment.

On page 115, visual impacts on landowners near the pretreatment plant are discussed. The terminology "insignificance" is linked to the number of people affected rather than the actual impacts, mitigation for those impacts, and nearly landowners whose viewshed or property value may be affected. The reduction in the number of people does not lessen or eliminate the potential impacts that they might experience due to the project.

F2-7

On page 122, the potential buy out of Quintana residents are discussed. FERC needs to provide details of the buy-out and expand this information to determine whether all, some, or none of the residents accepted this offer. If some residents remain, then the concerns we highlighted in the DEIS are still in effect.

Indirect Effects

F2-8

The Administrative Final EIS does not include changes in response to our Draft EIS comment recommending consideration of the proposed project's potential indirect effects, including the potential for increased domestic production of natural gas and the indirect GHG emissions associated with production, transportation, and combustion of the gas transported. Since you did not provide us the "response to comments" appendix, we are unclear why you did not address this comment.

F2-6: See section 4.8.7.

F2-7: See section 4.8.2.1.

F2-8: See section 4.12.1.

TRANSCRIPT COMMENTS

T1 – Freeport LNG Transcript from Public Meeting

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Freeport LNG Development, L.P. Docket Nos. CP-509-000
FLNG Liquefaction, LLC CP-29-000
FLNG Liquefaction 2, LLC
FLNG Liquefaction 3, LLC

PUBLIC HEARING

RE: DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED PHASE II MODIFICATION AND LIQUEFACTION PROJECTS

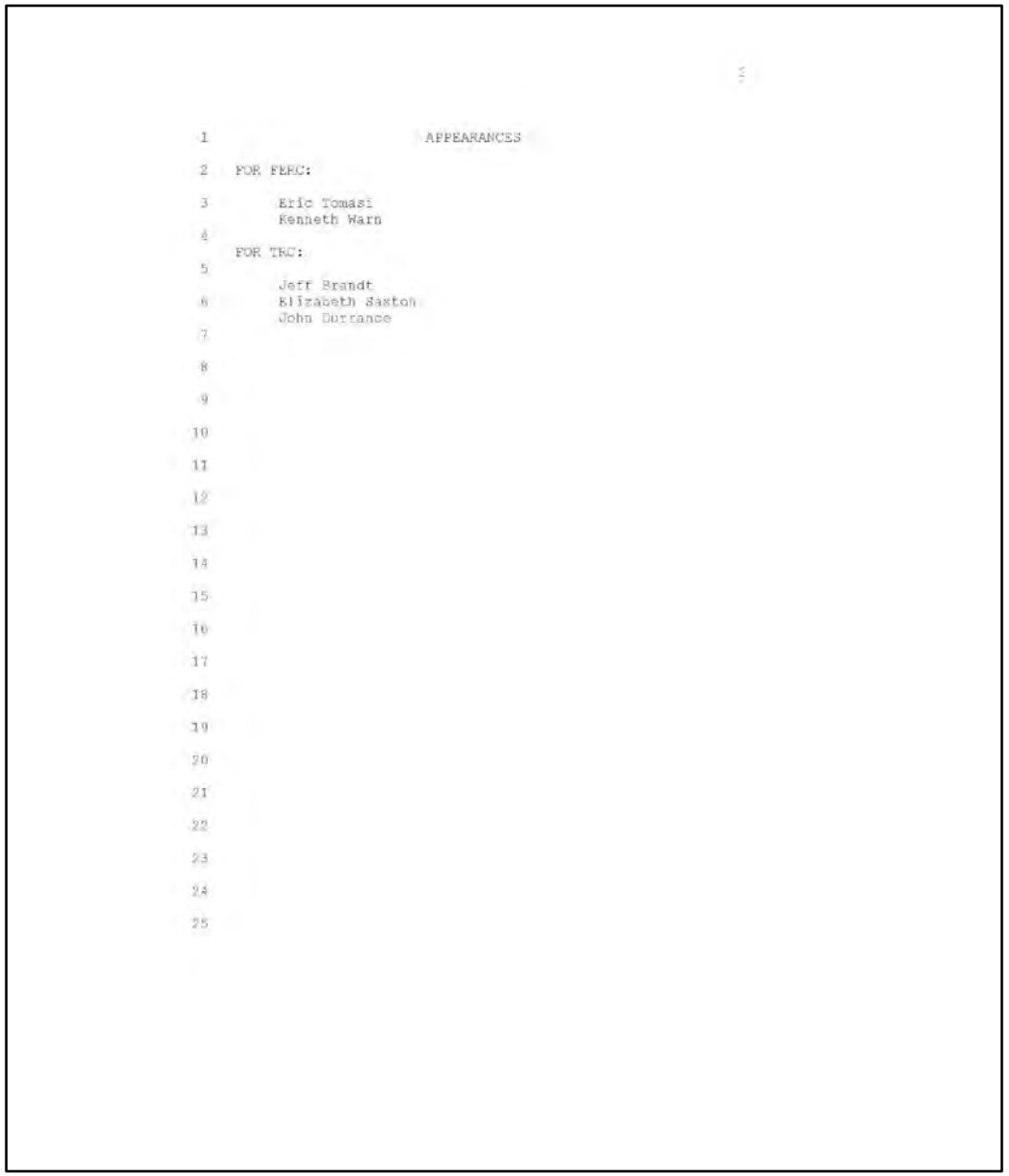
APRIL 16, 2014

PUBLIC HEARING RE: DRAFT EIS FOR PROPOSED PHASE II MODIFICATION AND LIQUEFACTION PROJECTS was held on April 16, 2014 from 6:35 p.m. to 9:18 p.m., before Susan T. Baker, CSR, RDR, Certified Shorthand Reporter in and for the State of Texas, reported by computerized stenotype machine at the Lake Jackson Civic Center, 333 Highway 332 East, Lake Jackson, Texas, 77566.

7

TRANSCRIPT COMMENTS

T1 – Freeport LNG Transcript from Public Meeting



APPEARANCES

FOR FERC:

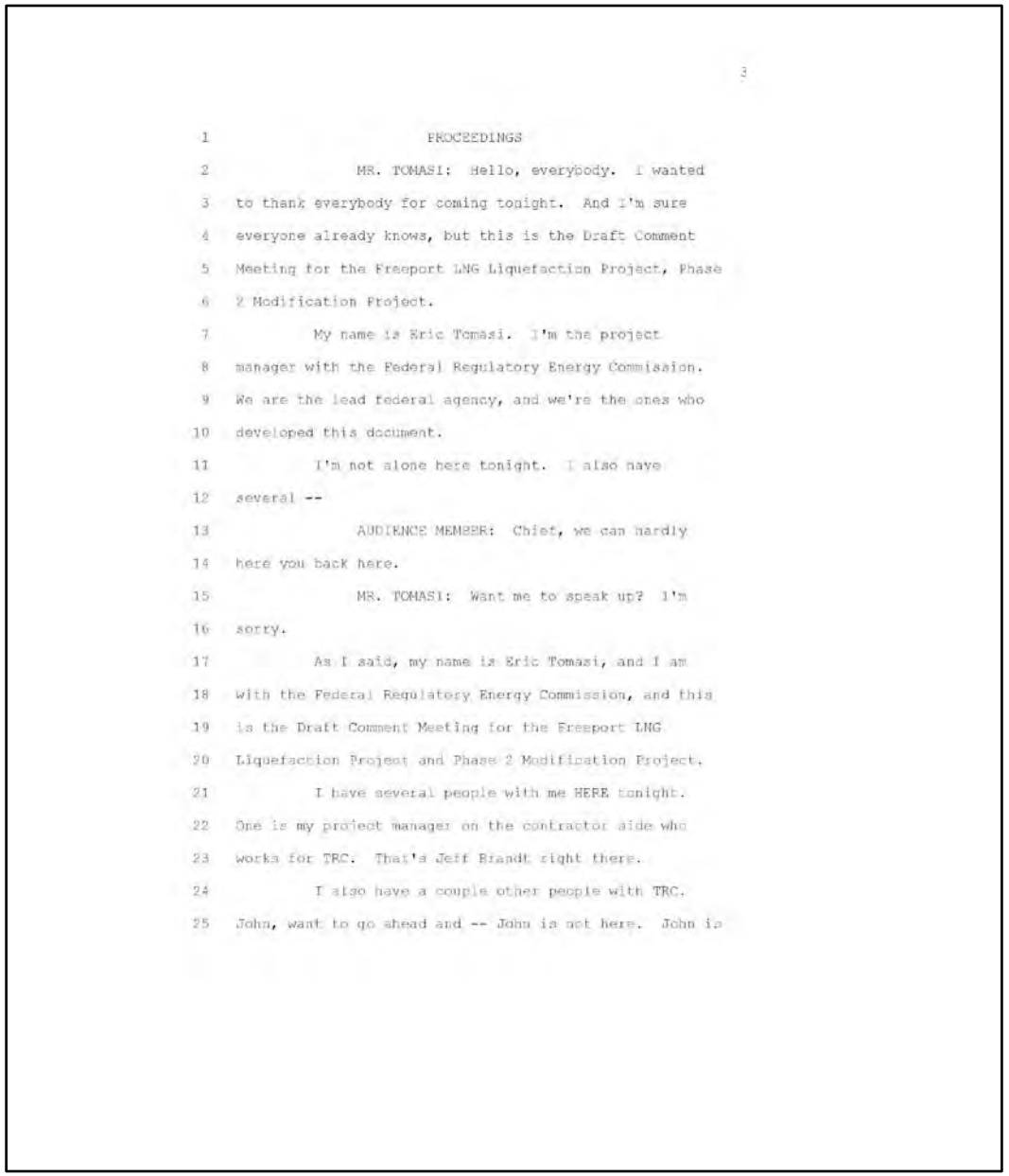
Eric Tomasi
Kenneth Warn

FOR TRC:

Jeff Brandt
Elizabeth Saxton
John Durrance

TRANSCRIPT COMMENTS

T1 – Freeport LNG Transcript from Public Meeting



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PROCEEDINGS

MR. TOMASI: Hello, everybody. I wanted to thank everybody for coming tonight. And I'm sure everyone already knows, but this is the Draft Comment Meeting for the Freeport LNG Liquefaction Project, Phase 2 Modification Project.

My name is Eric Tomasi. I'm the project manager with the Federal Regulatory Energy Commisaion. We are the lead federal agency, and we're the ones who developed this document.

I'm not alone here tonight. I also have several --

AUDIENCE MEMBER: Chief, we can hardly here you back here.

MR. TOMASI: Want me to speak up? I'm sorry.

As I said, my name is Eric Tomasi, and I am with the Federal Regulatory Energy Commission, and this is the Draft Comment Meeting for the Freeport LNG Liquefaction Project and Phase 2 Modification Project.

I have several people with me HERE tonight. One is my project manager on the contractor side who works for TRC. That's Jeff Brandt right there.

I also have a couple other people with TRC. John, want to go ahead and -- John is not here. John is

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TRANSCRIPT COMMENTS

T1 – Freeport LNG Transcript from Public Meeting

in the back. John and Elizabeth Saxton, right there. And we have Ken Warn here, also with FERC.

Now, tonight -- the purpose of tonight's meeting is, again, to get comments from the public on this document. Effectively, we want to hear from you on what you think of this document, be it good, be it bad. That's our purpose here tonight.

This project has been going on for some time. The application was filed by Freeport August 31st of -- the end of August in 2012 and this document came out on March 14th of this year. The comment period ends on March 5th -- sorry, not March, May 5th of this year. Now tonight, just to give you an idea of how this is going to progress, I'm going to go ahead and tell you a little bit more about the document and how things are going to go with FERC and the process, then I'm going to invite people to come up and speak and give their comments on this document.

Now that this document's out and we're at this meeting, where are we going to go from here? As I said, the project is pretty much in its -- in its -- near its mid to end phase of basically going through our review process.

This -- as I say, this is just a draft document. There will be a final document, the Final

TRANSCRIPT COMMENTS

T1 – Freeport LNG Transcript from Public Meeting

Environmental Impact Statement. We have a scheduling notice that states that that will be issued on June 16th, 2014 of this year.

Now, Freeport has asked -- has indicated, I should apecity, that they want to start construction in August of this year. You know, there is -- there is a possibility for the Commission to vote on this at their July 17th commission meeting. So that's -- that's the way the process is going to work out from now until then.

Now, to explain to you what this document is and what it isn't. This is not a decision document. This document is our recommendations, the staff of FERC's recommendations to the Commissioners on what we think it would -- on what -- the environmental impact of this project, and we include in this document mitigation to minimize it to the extent practicable.

Okay? So this in no way is a done deal, or the final document may not look like this at all. A lot of -- that's one of the reasons why we're here tonight, is to get an idea from you of what might improve this document. Okay?

Now, a lot of people put a lot of work in this document, and we really want to hear from you and understand what your concerns are.

TRANSCRIPT COMMENTS

T1 – Freeport LNG Transcript from Public Meeting7

Now, I've heard from a lot of members of the community, you know, over the past couple years to really get a good feel of what your concerns are, and I feel that we -- we did a good job addressing a lot of your concerns.

Now, obviously, you know, that's my opinion. That's the document that I put out. I'm going to stand behind it, but that's why, you know, we came down here to hear from you.

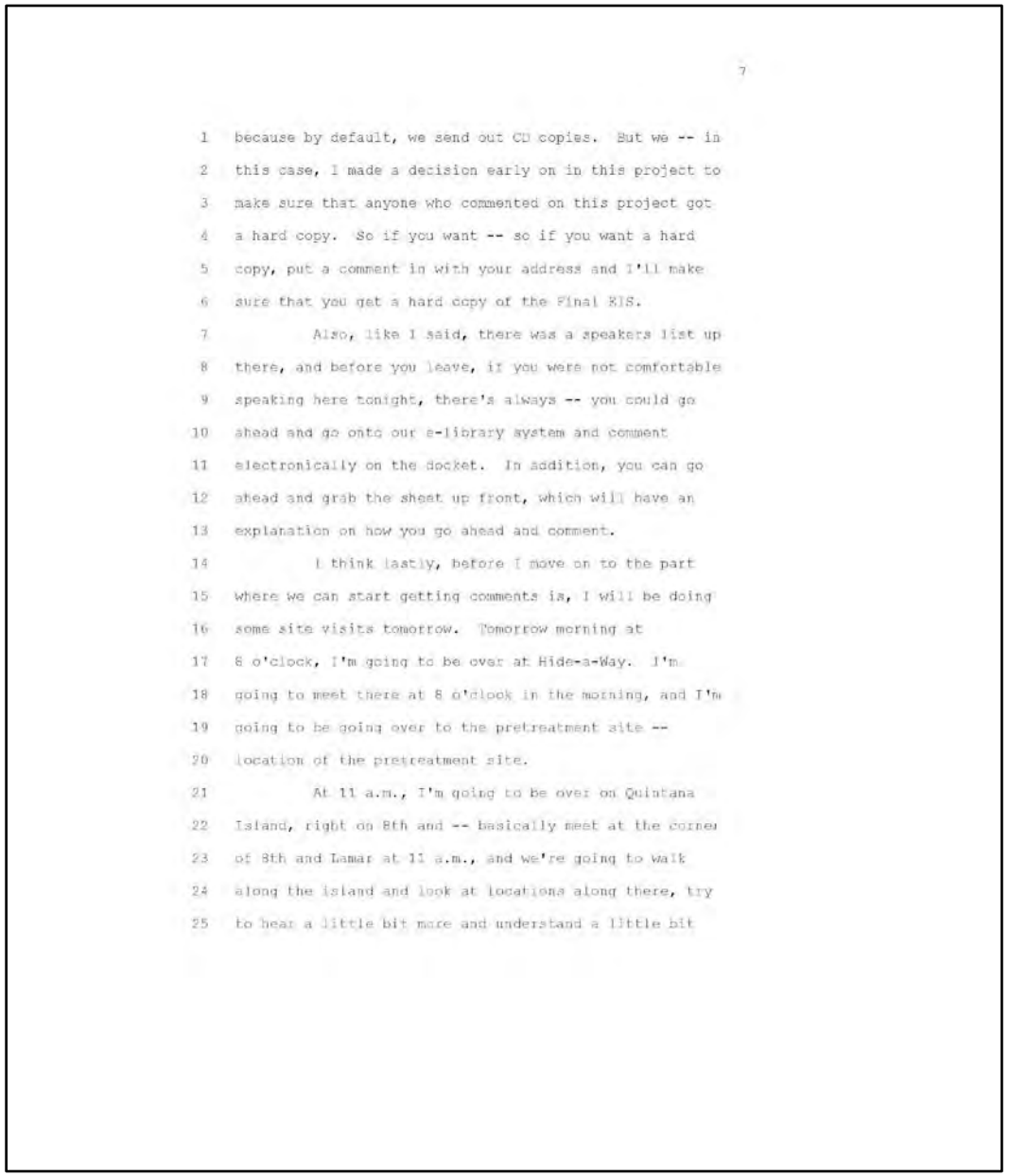
So there will be -- after the speakers, there will be a time for question and answers. And if this -- if the meeting goes on, you know, up to about 8 o'clock, I will be calling a break at about 8 p.m. for about 10 or 15 minutes to let everybody go to the bathroom, rest up and we can continue onward.

Now, when you guys came in, you guys probably saw all the documents in the front. I wanted to reiterate again that if you guys have not received a Draft EIS either in CD or hard copy form, please come up to the front table before you leave tonight to make sure you get your name on the mailing list so you do get the Final EIS.

Also I would appreciate, and it would help you, I'm sure, if you wanted to indicate on there whether you wanted a hard copy or whether you're okay with a CD,

TRANSCRIPT COMMENTS

T1 – Freeport LNG Transcript from Public Meeting



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because by default, we send out CD copies. But we -- in this case, I made a decision early on in this project to make sure that anyone who commented on this project got a hard copy. So if you want -- so if you want a hard copy, put a comment in with your address and I'll make sure that you get a hard copy of the Final EIS.

Also, like I said, there was a speakers list up there, and before you leave, if you were not comfortable speaking here tonight, there's always -- you could go ahead and go onto our e-library system and comment electronically on the docket. In addition, you can go ahead and grab the sheet up front, which will have an explanation on how you go ahead and comment.

I think lastly, before I move on to the part where we can start getting comments is, I will be doing some site visits tomorrow. Tomorrow morning at 8 o'clock, I'm going to be over at Hide-a-Way. I'm going to meet there at 8 o'clock in the morning, and I'm going to be going over to the pretreatment site -- location of the pretreatment site.

At 11 a.m., I'm going to be over on Quintana Island, right on 8th and -- basically meet at the corner of 8th and Lamar at 11 a.m., and we're going to walk along the island and look at locations along there, try to hear a little bit more and understand a little bit

TRANSCRIPT COMMENTS

T1 – Freeport LNG Transcript from Public Meeting

more about people's concerns.

Now, you know, we do have a court reporter tonight. You probably see her in the front. When people -- when you come up to go ahead and give your comments, please state your name clearly and spell it so she can get it into the record properly.

Also, just to be cordial to everybody who wants to speak, please put your phones on vibrate so we're not interrupting when people are trying to speak.

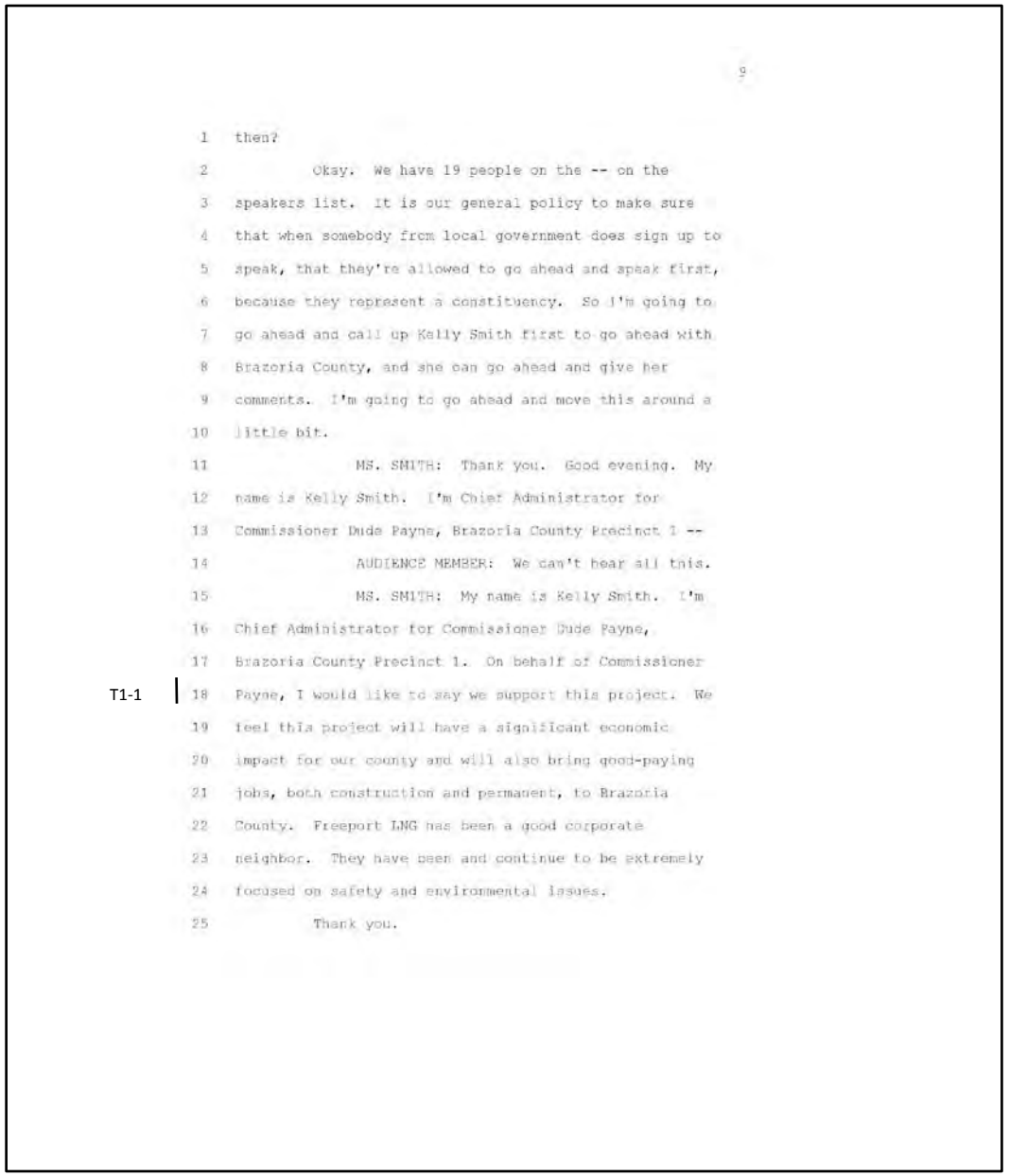
Lastly, try not to interrupt other speakers. Everyone -- I want to make sure that everyone has their opportunity to speak, and I will stay here as long as it takes to make sure that everybody gets the opportunity to speak.

Right now, we have a good amount of speakers -- a good number of speakers on the list right now. So I believe right now, I would like to try to see whether you could limit your comments to 4 minutes per person so we can get through -- get through the list initially. You can always come back up later. You know, I just want to make sure that everybody gets the opportunity to speak, because right now, just going through the list right now, we'll be here for about an hour and a half before -- before everybody finishes speaking.

So with that, can I get the speakers list,

TRANSCRIPT COMMENTS

T1 – Freeport LNG Transcript from Public Meeting



then?

Okay. We have 19 people on the -- on the speakers list. It is our general policy to make sure that when somebody from local government does sign up to speak, that they're allowed to go ahead and speak first, because they represent a constituency. So I'm going to go ahead and call up Kelly Smith first to go ahead with Brazoria County, and she can go ahead and give her comments. I'm going to go ahead and move this around a little bit.

MS. SMITH: Thank you. Good evening. My name is Kelly Smith. I'm Chief Administrator for Commissioner Dude Payne, Brazoria County Precinct 1 --

AUDIENCE MEMBER: We can't hear all this.

MS. SMITH: My name is Kelly Smith. I'm Chief Administrator for Commissioner Dude Payne, Brazoria County Precinct 1. On behalf of Commissioner Payne, I would like to say we support this project. We feel this project will have a significant economic impact for our county and will also bring good-paying jobs, both construction and permanent, to Brazoria County. Freeport LNG has been a good corporate neighbor. They have been and continue to be extremely focused on safety and environmental issues.

Thank you.

T1-1

T1-1: Comment acknowledged.

TRANSCRIPT COMMENTS

T1– Freeport LNG Transcript from Public Meeting

MR. TOMASI: Thank you very much. I'd like to speak -- I'd like to go ahead and call up Teresa Cornelison.

MS. CORNELISON: I'm Teresa Cornelison. Do you want me to spell it?

MR. TOMASI: Please.

MS. CORNELISON: T-E-R-E-S-A. C-O-R-N-E-L-I-S-O-N.

I am a resident on Quintana. Not too happy with that book. It seems like you did more research on the birds and the fish than the residents. I am less than 1,500 feet from the dock. As late as -- as late as Thanksgiving, there was a ship in. It was very loud. I contacted LNG. One kept telling me it was real quiet, and Robert called me the next morning and said, yes, it was loud and, you know, apologized for it.

T1-2 So if they can't control the noise and the vibration on what they have now, they shouldn't have another ship in.

T1-3 The dust that it says in the book how much -- on the EIS, how much dust is going to be there, I have grandchildren that come and visit, I have a leukemia survivor daughter that comes and visits. So all of that health and safety, it's already too much of a risk. They shouldn't have another -- we shouldn't have more

T1-2: Vessel backing noise is addressed in section 4.11.2 of the EIS.

T1-3: As noted in section 4.11.1.2, Freeport LNG would employ proven construction practices, such as water sprays and dust suppressants, to control fugitive dust emissions during construction. We do acknowledge that dust would have an impact on residents of Quintana Island.

TRANSCRIPT COMMENTS

T1 – Freeport LNG Transcript from Public Meeting

risk.

I'll let somebody else speak, thanks.

MR. TOMASI: Thanks very much, Teresa. The next person, Miss Susan Massey?

MS. MASSEY: I am Susan Massey. I'm going to have Diana read this for me.

AUDIENCE MEMBER: This comment is from Susan Massey, M-A-S-S-E-Y, homeowner in Oyster Creek Estates.

"I have been battling throat cancer 5 times over the span of 18 years. And in 2004, they had to take my voicebox out, so I'm now a neck breather. What that means is that I no longer breathe through my nose like most people. I breathe through a hole in my neck. This has taken away my sense of smell.

"As a neck breather, I am very concerned with the close proximity of the FLNG plant that will be constructed if they get their permit.

"The prevailing winds are my concern, because as the crow flies, I believe we are less than two miles from the proposed plant. My fear is that since I cannot smell and there are no air monitors or warning systems, what do I do if there is a leak? As a neck breather, I can't put on a face mask. Also, my husband and I are about to retire, which is why we bought a home in Oyster

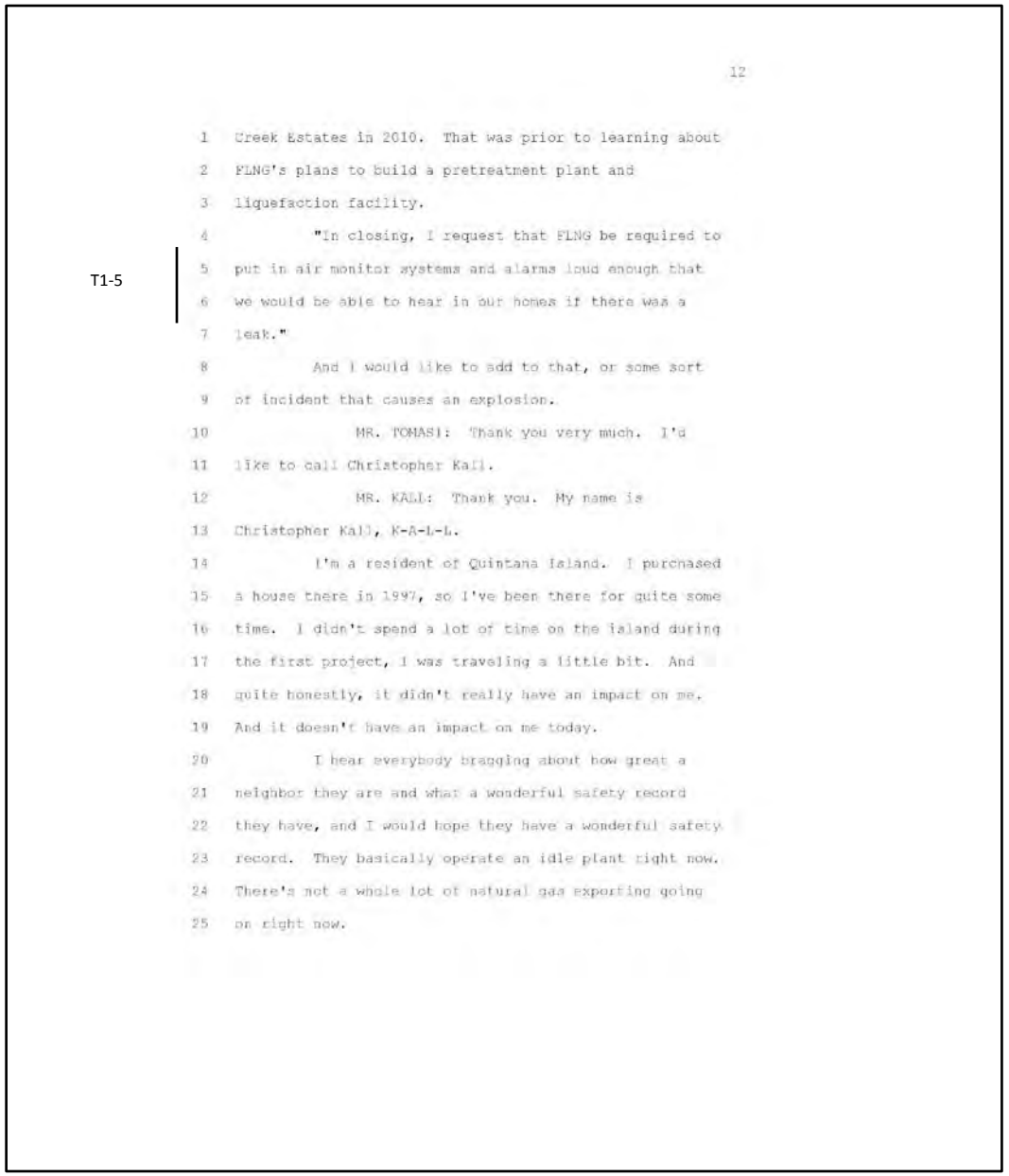
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T1-4

T1-4: Safety issues and controls are addressed in section 4.10.2. Air monitoring is addressed in section 4.11.1.

TRANSCRIPT COMMENTS

T1 – Freeport LNG Transcript from Public Meeting



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Creek Estates in 2010. That was prior to learning about FLNG's plans to build a pretreatment plant and liquefaction facility.

"In closing, I request that FLNG be required to put in air monitor systems and alarms loud enough that we would be able to hear in our homes if there was a leak."

T1-5

And I would like to add to that, or some sort of incident that causes an explosion.

MR. TOMASI: Thank you very much. I'd like to call Christopher Kall.

MR. KALL: Thank you. My name is Christopher Kall, K-A-L-L.

I'm a resident of Quintana Island. I purchased a house there in 1997, so I've been there for quite some time. I didn't spend a lot of time on the island during the first project, I was traveling a little bit. And quite honestly, it didn't really have an impact on me. And it doesn't have an impact on me today.

I hear everybody bragging about how great a neighbor they are and what a wonderful safety record they have, and I would hope they have a wonderful safety record. They basically operate an idle plant right now. There's not a whole lot of natural gas exporting going on right now.

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T1-5: The facility has been designed, and would be required, to comply with local, state and federal (NAAQS) health based and other air regulations. In addition, as noted in response T1-4, public safety is reviewed as part of our analysis, and safety and warning systems would be required to be in place before the LNG facility would become operational.

TRANSCRIPT COMMENTS

T1 – Freeport LNG Transcript from Public Meeting

So it's -- it does concern me that we're looking at their safety record with what's going on there now -- even though they did have one release -- and using that to determine how this next plant that's going to be significantly more congested and busy is going to be run.

I've got many concerns. Obviously, safety is one of them. We've only got one way on and one way off of the island. We're about to bring 4,000 construction workers onto that island. I don't -- I don't see how that's going to work. It's going to have a horrible impact on my quality of life.

And the people -- and I did -- I have been appointed to city council, so I am speaking for some other people as well. It's going to affect us greatly, and I don't think -- I don't see how we're going to be able to mitigate that.

We were offered $5,000 a year to put up with this nuisance. That came in lieu -- that, and purchasing houses, came in lieu of some mitigation items that we brought to their attention that we were kicking around, like raising the berm to help mitigate the sight pollution, the noise pollution, the air pollution.

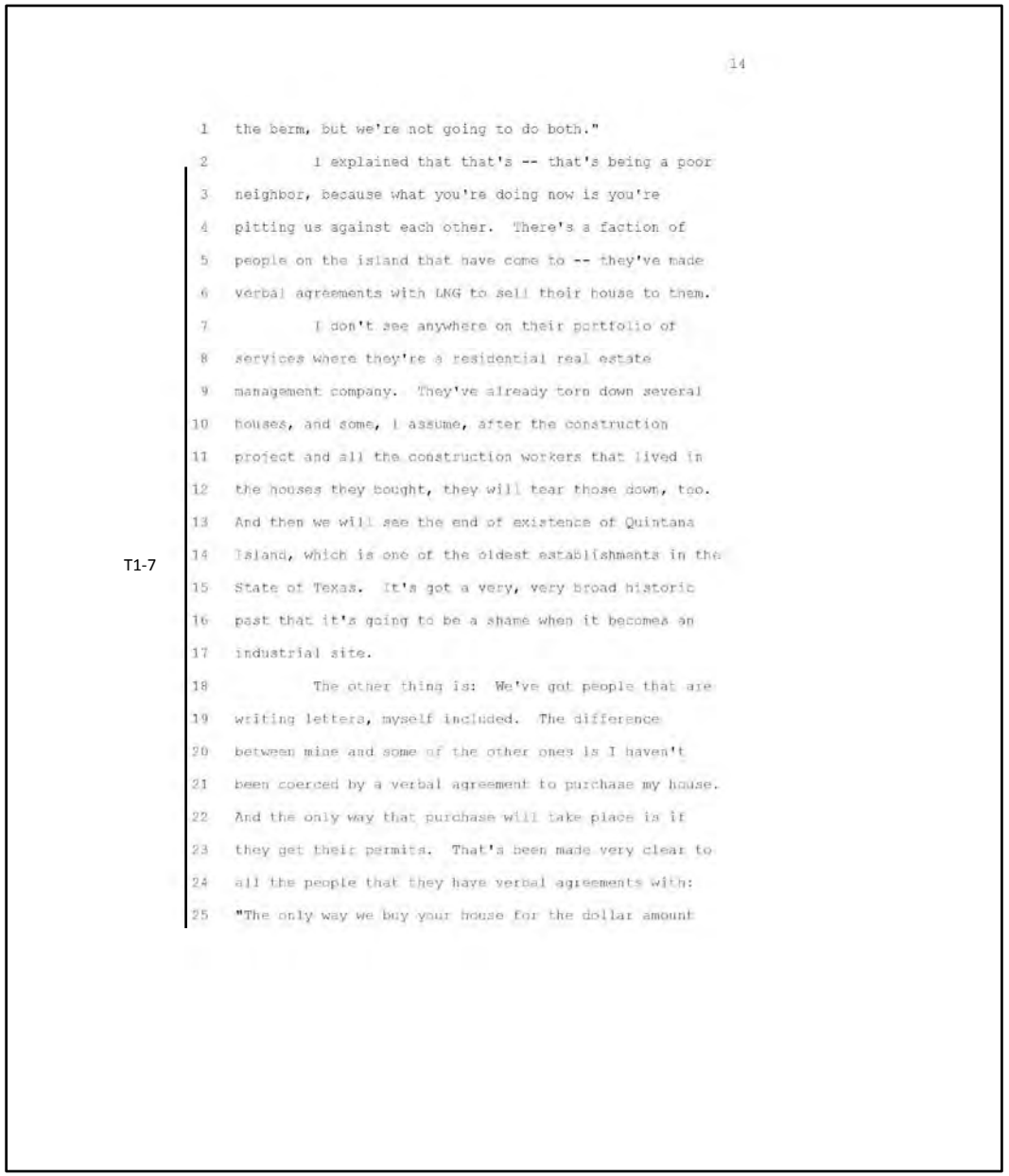
And we were told, "No, we're not doing that. We're either going to buy your house or we will raise

T1-6

T1-6: See response to T1-4.

TRANSCRIPT COMMENTS

T1 – Freeport LNG Transcript from Public Meeting



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the berm, but we're not going to do both."

I explained that that's -- that's being a poor neighbor, because what you're doing now is you're pitting us against each other. There's a faction of people on the island that have come to -- they've made verbal agreements with LNG to sell their house to them.

I don't see anywhere on their portfolio of services where they're a residential real estate management company. They've already torn down several houses, and some, I assume, after the construction project and all the construction workers that lived in the houses they bought, they will tear those down, too. And then we will see the end of existence of Quintana Island, which is one of the oldest establishments in the State of Texas. It's got a very, very broad historic past that it's going to be a shame when it becomes an industrial site.

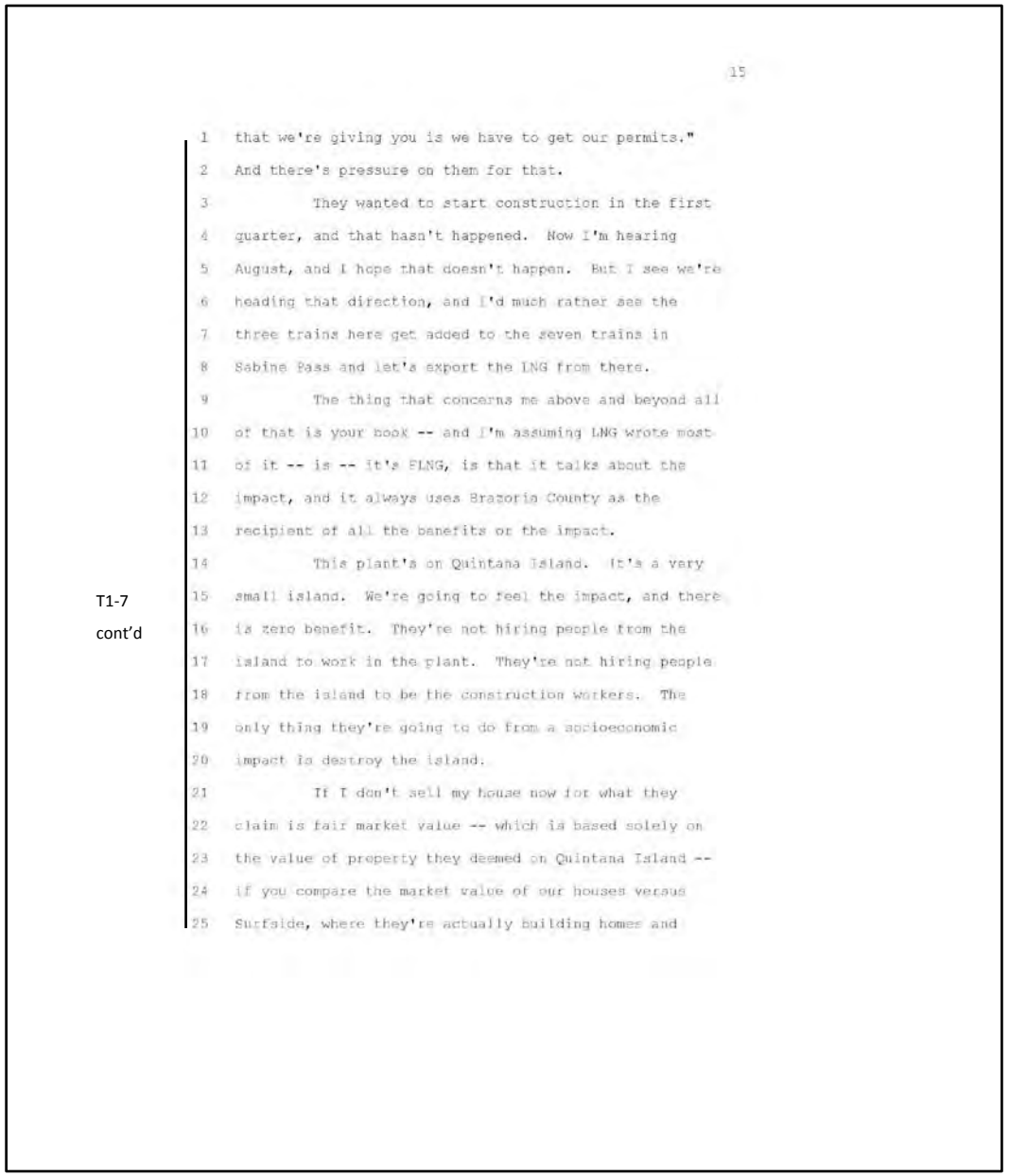
The other thing is: We've got people that are writing letters, myself included. The difference between mine and some of the other ones is I haven't been coerced by a verbal agreement to purchase my house. And the only way that purchase will take place is if they get their permits. That's been made very clear to all the people that they have verbal agreements with: "The only way we buy your house for the dollar amount

T1-7

T1-7: Comment acknowledged.

TRANSCRIPT COMMENTS

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that we're giving you is we have to get our permits." And there's pressure on them for that.

They wanted to start construction in the first quarter, and that hasn't happened. Now I'm hearing August, and I hope that doesn't happen. But I see we're heading that direction, and I'd much rather see the three trains here get added to the seven trains in Sabine Pass and let's export the LNG from there.

The thing that concerns me above and beyond all of that is your book -- and I'm assuming LNG wrote most of it -- is -- it's FLNG, is that it talks about the impact, and it always uses Brazoria County as the recipient of all the benefits or the impact.

This plant's on Quintana Island. It's a very small island. We're going to feel the impact, and there is zero benefit. They're not hiring people from the island to work in the plant. They're not hiring people from the island to be the construction workers. The only thing they're going to do from a socioeconomic impact is destroy the island.

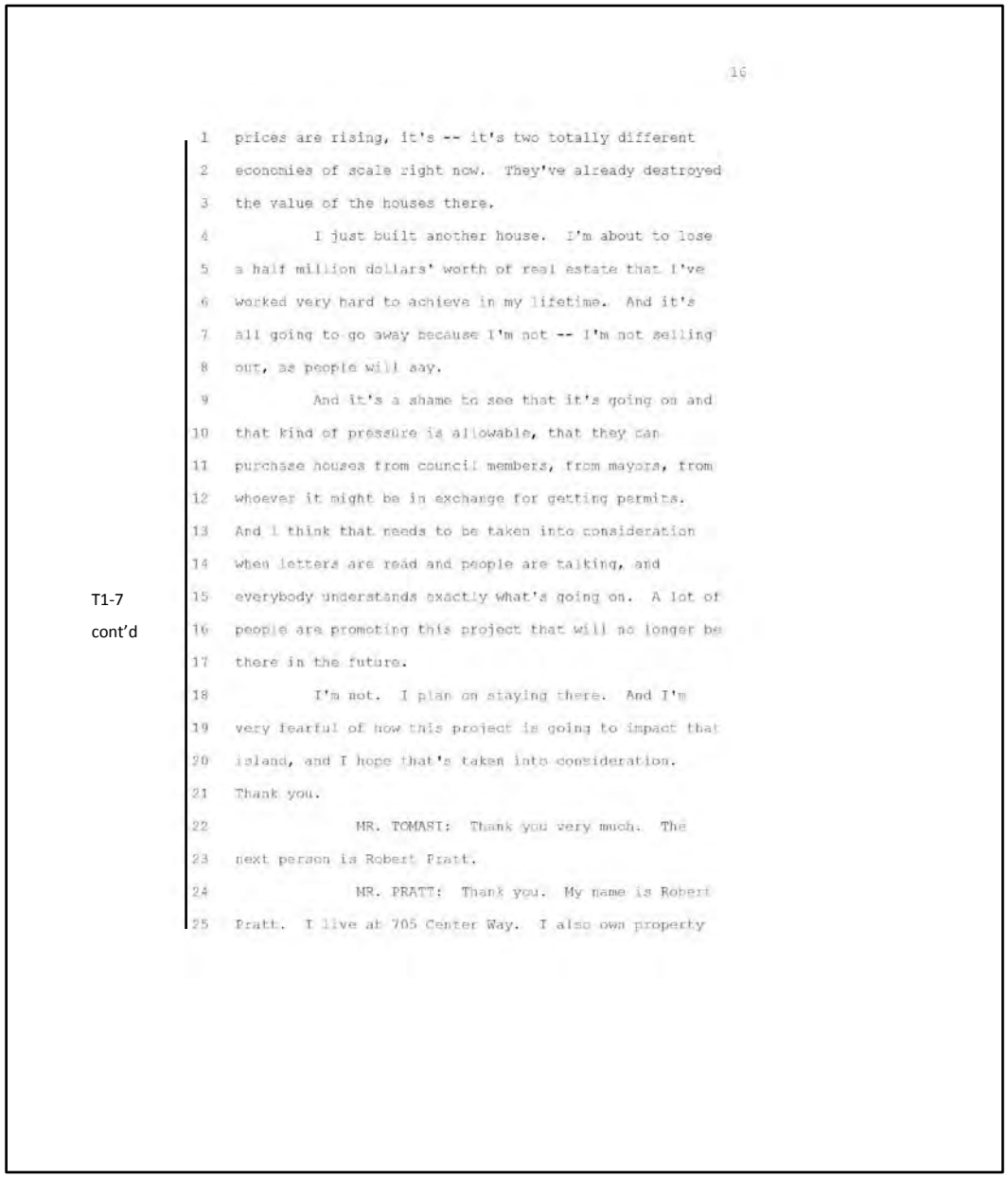
If I don't sell my house now for what they claim is fair market value -- which is based solely on the value of property they deemed on Quintana Island -- if you compare the market value of our houses versus Surfside, where they're actually building homes and

T1-7 cont'd

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TRANSCRIPT COMMENTS

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prices are rising, it's -- it's two totally different economies of scale right now. They've already destroyed the value of the houses there.

I just built another house. I'm about to lose a half million dollars' worth of real estate that I've worked very hard to achieve in my lifetime. And it's all going to go away because I'm not -- I'm not selling out, as people will say.

And it's a shame to see that it's going on and that kind of pressure is allowable, that they can purchase houses from council members, from mayors, from whoever it might be in exchange for getting permits. And I think that needs to be taken into consideration when letters are read and people are talking, and everybody understands exactly what's going on. A lot of people are promoting this project that will no longer be there in the future.

I'm not. I plan on staying there. And I'm very fearful of how this project is going to impact that island, and I hope that's taken into consideration. Thank you.

MR. TOMASI: Thank you very much. The next person is Robert Pratt.

MR. PRATT: Thank you. My name is Robert Pratt. I live at 705 Center Way. I also own property

T1-7 cont'd

TRANSCRIPT COMMENTS

T1 – Freeport LNG Transcript from Public Meeting

and plan to retire at 320 Galloway in Turtle Cove.

As you explained in the beginning, this is a lot of book. This is a lot of information. I cannot possibly address the points I want to do in 4 minutes, so if you want me to go to a certain point and stop and then come back, I'll be happy to do that.

MR. TOMASI: (Nodding.)

MR. PRATT: Okay. I really feel for the folks out at Quintana. I realize what has happened to them, and I understand that they expect it's going to get worse. I'm not here to talk about the export facility. I'm here to talk about the pretreatment facility.

T1-8

This pretreatment facility is going to, in a very easy fashion, ruin far more lives than the export facility on Quintana.

There are more people in my small subdivision of Turtle Cove than there are in the whole island. Ride-a-Way is three times the size of my subdivision, Oyster Creek Estates, the community of Oyster Creek and other areas there, we're looking at somewhere in the neighborhood of 1,100 to 1,200 residences. This is far more impact than what's happening out on Quintana. I'm sorry for those folks.

A little bit about myself. I am 35 years in

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T1-8: Commenter's opposition to the Project is noted.

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the petrochemical industry. I am not a chemical engineer, although some people seem to think I am because I talk about processes a lot. I'm an I&T specialist in the project management of these huge facilities. I know how they work. My job is to power, instrument and control them.

I know a lot about how they work because I built them. I'm building one right now that's referenced in this document.

One of the things I noticed in here, it's not a point I'm going to address, but it -- it is a concern to me: The air quality is going to be addressed by some other folks, but the thing that concerns me in the document is there's a lot of talk about whether we're -- whether the discussion is going to be in regards to 49 CFR 192 or 49 CFR 193.

The entire duration of this effort that has been going on to try to deal with FLNG, they continue to talk to us about a pipeline, how safe pipelines are, how wonderful pipelines are, how we don't have to worry about pipelines. And I have repeatedly explained I'm not worried about the pipeline. I've pumped a lot of stuff into pipelines. I feel very secure with pipelines.

But I also know very clearly that when that

T1-9

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T1-9: Comment acknowledged.

TRANSCRIPT COMMENTS

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T1-9

T1-10

pipeline hits the property limit and it goes into that pretreatment facility, there's going to be a steak break change (phonetic). It's going to become a processing unit. It's not going to be covered by 193, because 193 specifically states that 2001 B 2, this does not apply to pretreatment facilities.

All the numbers that I'm sure FLNG has provided to you for their fugitive emissions, I have no earthly idea what they could have based those on. If they use pipeline quality valves, Double Seal bolt tight, Enviroseal valves, sure, the numbers are going to be really low. If they go hire a chemical company, a chemical place that builds them to come build the plant, they're not going to build it with pipeline-quality valves. It's going to be general industry valving. The leakage rates are going to be higher, the emission numbers are not going to be correct in here, so I'll let them worry about that.

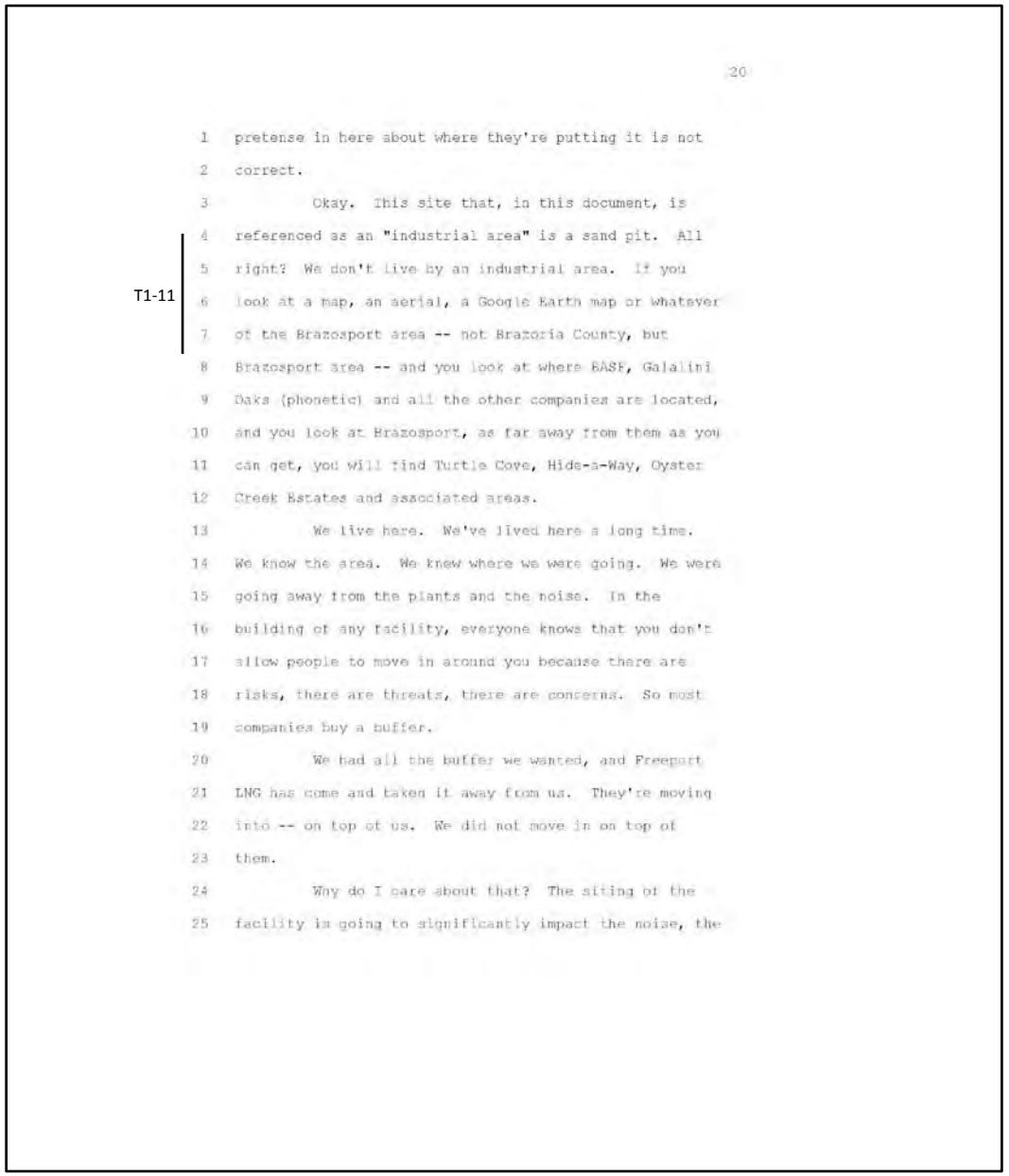
The first one I'd like to address is the siting of the pretreatment facility. I understand that FLNG has had a lot of trouble finding a place to put this. It would have been great if it would have been able to go out somewhere in the middle of nowhere where it had no impact on a lot of people. They've had to go through a variety of hurdles to try to pick a spot. But the

T1-9: The Pretreatment Plant portion of the project is covered under 49 CFR 192 and is being addressed as part of the review of the entire Freeport LNG Projects.

T1-10: See response to T1-5.

TRANSCRIPT COMMENTS

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pretense in here about where they're putting it is not correct.

Okay. This site that, in this document, is referenced as an "industrial area" is a sand pit. All right? We don't live by an industrial area. If you look at a map, an aerial, a Google Earth map or whatever of the Brazosport area -- not Brazoria County, but Brazosport area -- and you look at where BASF, Galalini Oaks (phonetic) and all the other companies are located, and you look at Brazosport, as far away from them as you can get, you will find Turtle Cove, Hide-a-Way, Oyster Creek Estates and associated areas.

We live here. We've lived here a long time. We know the area. We knew where we were going. We were going away from the plants and the noise. In the building of any facility, everyone knows that you don't allow people to move in around you because there are risks, there are threats, there are concerns. So most companies buy a buffer.

We had all the buffer we wanted, and Freeport LNG has come and taken it away from us. They're moving into -- on top of us. We did not move in on top of them.

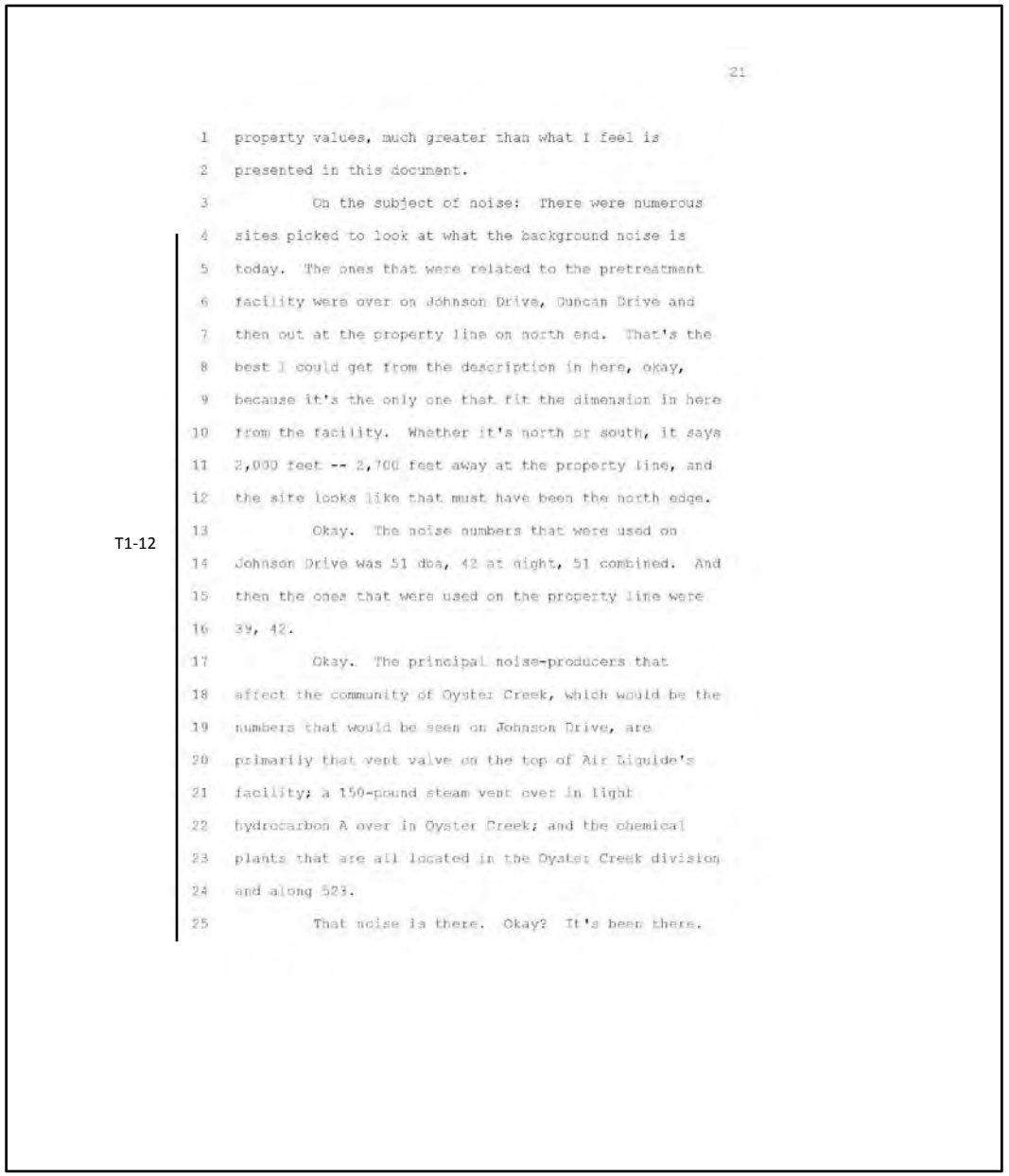
Why do I care about that? The siting of the facility is going to significantly impact the noise, the

T1-11

T1-11: The Pretreatment Plant site is characterized in the EIS as a "commercial area".

TRANSCRIPT COMMENTS

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property values, much greater than what I feel is presented in this document.

On the subject of noise: There were numerous sites picked to look at what the background noise is today. The ones that were related to the pretreatment facility were over on Johnson Drive, Duncan Drive and then out at the property line on north end. That's the best I could get from the description in here, okay, because it's the only one that fit the dimension in here from the facility. Whether it's north or south, it says 2,000 feet -- 2,700 feet away at the property line, and the site looks like that must have been the north edge.

T1-12

Okay. The noise numbers that were used on Johnson Drive was 51 dba, 42 at night, 51 combined. And then the ones that were used on the property line were 39, 42.

Okay. The principal noise-producers that affect the community of Oyster Creek, which would be the numbers that would be seen on Johnson Drive, are primarily that vent valve on the top of Air Liquide's facility; a 150-pound steam vent over in light hydrocarbon A over in Oyster Creek; and the chemical plants that are all located in the Oyster Creek division and along 523.

That noise is there. Okay? It's been there.

T1-12: Noise impacts to the residents near the treatment plant are detailed in section 4.11.2.

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I don't hear it. I don't hear it because I live cross-wind, twice as far away as the numbers that are reflected here for the Johnson Drive. If you looked at the numbers that were reported, the property line shows 39, 42, very nice numbers. I'm even further away than that.

Okay. So in here, the noise increase was reflected against site 3, which is the one over on Johnson Drive with a background number of 51, and the noise from the pretreatment facility is only going to increase it to, you know, 56. So it's a 4.6 increase. Well, you know, people that don't understand sound measurement, it doesn't sound like much.

4.6 increase in sound level, well, if they made it to 6, it would be one and a half times the amount of noise. Okay? That would be in a place that's already noisy.

We're in a place that is not noisy. When I stand -- sit on my deck, if the wind is wrong, I can hear that vent valve over there. Most of the time, what I hear on my deck is the surf down at Surfside, the birds out in the yard, the fish popping in the canal; and during the middle of the day, I got to admit there's a boat yard over there, they got a vent fan running. But they turn it off. They start up about 8, 9 o'clock

T1-12 cont'd

TRANSCRIPT COMMENTS

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in the morning; they turn it off about 5. We don't have to listen to it continuously.

Because of -- let me finish the noise, and then I'll stop, okay? Because of the fact that we are already much quieter, the location that this pretreatment facility is going to go to is much closer to us, the impact and the noise change for us is going it be far greater than this 4.6 number. It could probably go easily to 10 dba increase, which is doubling the sound level.

T1-12 cont'd

Doubling the sound level at our homes, at our recreation place, at our place of solitude that we chose to be away from the noise is not friendly and not acceptable to those of us who live out there. So I'll stop at noise and come back later. Thank you.

MR. TOMASI: Thank you. Thank you. Next is Louise Stohr, Stohr?

MS. STOHR: My name is Louise Stohr. It's S-T-O-H-R.

When I moved to this area about 30-some-odd years ago, my husband and I were looking for a place that was quiet that we could spend our aging years, and we bought in Turtle Cove. And that's been 28 years ago. I've made it my home, and it's also a place where I work. I work outside, and my thoughts are for my

TRANSCRIPT COMMENTS

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grandchildren, who will probably get my home. What are they going to have to put up with with this Freeport LNG plant just right down the road? The levy is -- they're going to have roads off the levy. They're going to have traffic. When you get -- the plant is shutting down like at 5 o'clock, and you've got the beach traffic on 332, they may decide to go past our house, and that just makes more traffic on the levy.

T1-13

I don't want to see it come. And I'm sure there's plenty of other places for it to go. Why does it have to be in a populated area? That's my question. If they -- from what I understand, they could build on 523 down where they have the other plant. The pipeline goes way down there. There's not -- and not only that, we get a south wind during the summer. They're just south of us, so we're going to get the sound and we're going to get the smell even more than what's normal, because during the wintertime, we get the north wind and we get the smell of the dump.

So I don't know. I just -- I think we ought to really try to get it not being built there. Thank you.

MR. TOMASI: Thank you very much. Next is Mr. Harold Doty.

MR. DOTY: Hello. Can you hear me all right? My name is Harold Doty. That's D-O-T-Y. And I

T1-13: Traffic issues are discussed in sections 4.8.5 and 4.12.4 of the EIS.

TRANSCRIPT COMMENTS

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filed as an intervenor in this case and have been asking questions for several years ever since they started the pre-filing process.

I know that I've probably made a lot of people a little bit nervous with some of the questions I've asked, because my primary concern is for the safety of our residents in Quintana after the facility was built.

And originally, they planned to build this facility on the north end of the island in the industrial district in the pre-filing. Now, they say they don't have enough space, but I don't know whether that's a matter of greed or what, but they said the reason that they want to build on top of the dredge spoils that were recently placed there by the Port Authority is because that would provide them with enough space to build their plant.

Well, the Environmental Impact Statement also states that alternative sites were considered, but it doesn't mention any. So I guess they didn't consider, to begin with, any -- the original placement in the actual industrial district, which is behind a large berm that's already built. In the first phase of their plant, they built a very large dike all the way down, across the end into where the ships come in. And where they were planning to build to begin with wouldn't

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really have been much of a problem for the residents of our town. We wouldn't see much of it, we wouldn't hear much of it, and if they have an explosion -- you know, God help us -- we wouldn't get blown up. Our houses would be okay because of that dike.

When they've decided to move it up on top of those dredge spoils, they're trying to do something that I believe has never been done before. I have never, ever heard of a chemical process plant being built on top of silt and dredge spoils, and I've worked -- I guess I need a little background here.

I'm a professional chemical engineer. I went to Cornell University so that I could learn how to design these sorts of plants. So when I ask questions about the safety in here, I'm really serious about this. It's questions that I have to answer in my ordinary work every day. And I have some real big concerns about what they're planning to do when they're wanting to put this plant on top of the dredge spoils and not build a berm.

The berm that's around the dredge spoils is made of dredge material. That's -- that's the reason why it would be much cheaper for them to just buy everybody out than it is to actually make the plant safe for the residents at Quintana.

And I wouldn't disagree with them. That's

T1-14

T1-14: As noted in section 2.4.1.1, the proposed Liquefaction Plant footprint and adjacent laydown areas would require significant site improvements including clearing, grubbing, soil stabilization, backfilling, and grading activities, "some cutting and filling would be required to smooth out topographic irregularities and an average two-foot depth or 528,000 yd^3 of additional fill material (clay top soil) would be needed. In addition, the section of the former DMPA outside of the existing terminal site would require considerable improvement and stabilization to provide a load bearing surface for crane access and construction. The techniques used to improve the soils would be similar to those adopted during Phase I facility construction. Various stabilizers may be added, including hydrated lime, Portland cement, fly ash, and other admixtures. Where needed, appropriate geotextiles and aggregate materials (e.g., gravel and crushed stone) would be used to level and finish laydown and operational areas.

TRANSCRIPT COMMENTS

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right. It is cheaper. Is it the right thing to do? I don't think so.

I heard Quintana referred to as one of the oldest towns in Texas. I think that I should state right now that Quintana is the oldest town in Texas. It was founded in 1532. That's 40 years after Columbus. There's been people living there continuously ever since.

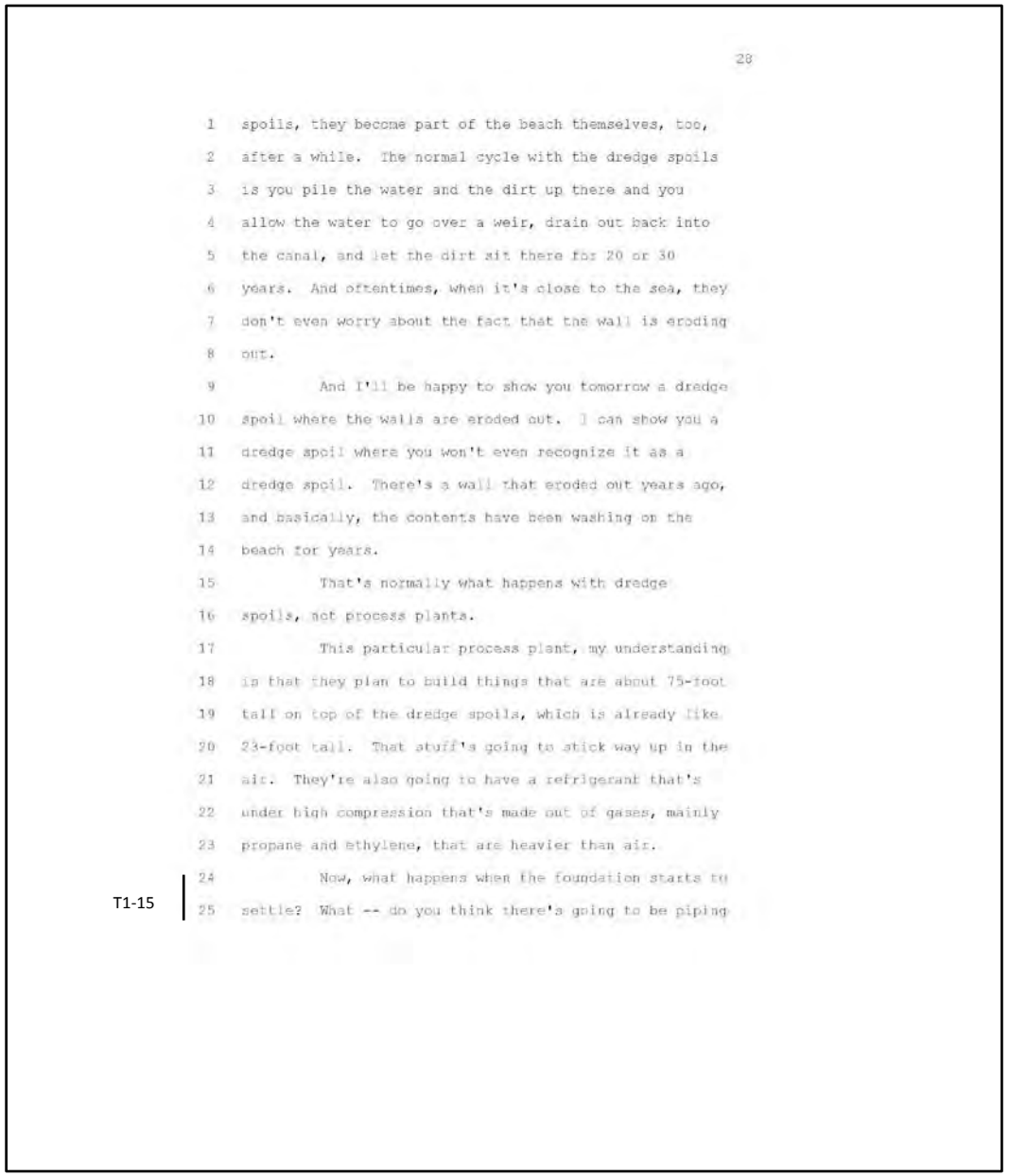
Now, I really have a problem with allowing the town to just disappear. I mean, it doesn't matter that there's only a few of us out there to begin with. It is a really hard place to replace. I mean, the fact that we have so few people means that our beaches are very clear and uncluttered. They're very natural. We pride ourselves on a natural beach.

Since Hurricane Ike -- I don't know if you heard much about it; you're from quite a ways off -- but it made some pretty severe erosion all along the beach front. Our beach actually is about 400 yards wider today than it was right after the hurricane. The reason for that is because we did nothing. We allow the seaweed to wash in, we allow the seaweed to catch the sand, the sand builds up, it becomes a beach. No problem.

I wonder what -- normally, with these dredge

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spoils, they become part of the beach themselves, too, after a while. The normal cycle with the dredge spoils is you pile the water and the dirt up there and you allow the water to go over a weir, drain out back into the canal, and let the dirt sit there for 20 or 30 years. And oftentimes, when it's close to the sea, they don't even worry about the fact that the wall is eroding out.

And I'll be happy to show you tomorrow a dredge spoil where the walls are eroded out. I can show you a dredge spoil where you won't even recognize it as a dredge spoil. There's a wall that eroded out years ago, and basically, the contents have been washing on the beach for years.

That's normally what happens with dredge spoils, not process plants.

This particular process plant, my understanding is that they plan to build things that are about 75-foot tall on top of the dredge spoils, which is already like 23-foot tall. That stuff's going to stick way up in the air. They're also going to have a refrigerant that's under high compression that's made out of gases, mainly propane and ethylene, that are heavier than air.

Now, what happens when the foundation starts to settle? What -- do you think there's going to be piping

T1-15

T1-15: See response to TI-14

TRANSCRIPT COMMENTS

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T1-16 cont'd

stresses on these compressors? It's almost certain that something will happen and there will be a leak.

I have made comments on that because they made some pretty astounding claims in this -- one of the documents that they filed. This report from Gexcon (phonetic) 13P65586. We have drawings in here showing the gas releases that drift to the vapor fences -- the vapor barrier fences, which my understanding is, it's a hurricane fence 20-foot tall with a tarp on it. However, there's a flare right in the middle of the cloud, but mysteriously, these clouds doesn't go anywhere near the flare. They go all around it but they don't touch it.

T1-16

I asked that question. I mean, I filed a question, and the question was carefully avoided in the response. They did not respond. They just said, "Oh, well, the cloud is only half of the flammable vapor limit," was their response. And when you kindly took my questions and turned it around and asked them, "Okay. What are your plans for this?" And that, unfortunately, has been the way it has been for us all along.

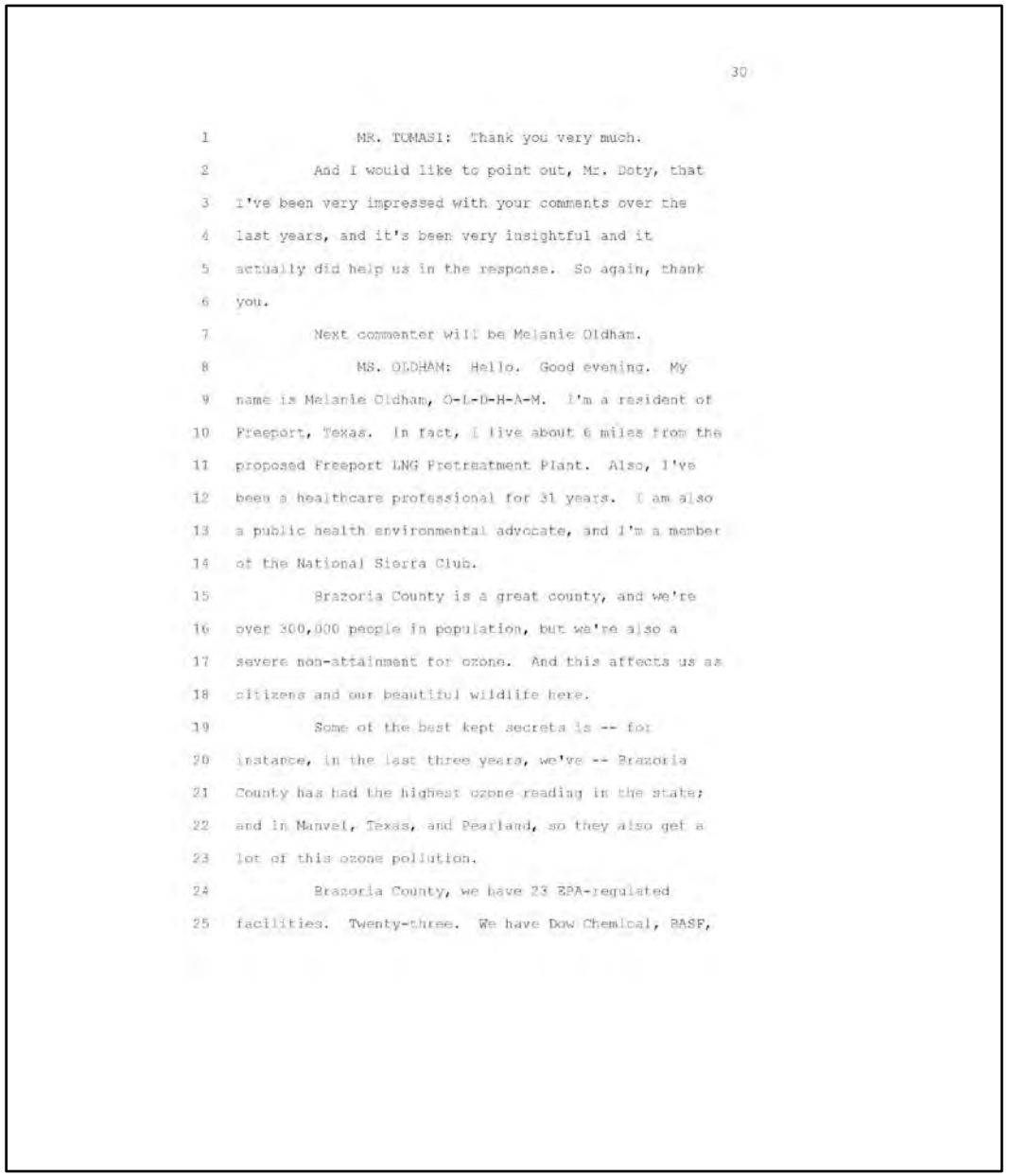
MR. TOMASI: Do you have a -- you're significantly over your time. Do you mind coming back afterwards and continuing your comments?

MR. DOTY: Sure.

T-16: The FERC recognizes that estimating the dispersion of the vapor cloud is an important step in addressing potential hazards. Methods for controlling spills or releases are discussed in section 4.10.5 for the facilities at the terminal and in section 4.10.6 for the Pretreatment Plant. The FERC has also recommended that Freeport provide detailed drawing and calculations to verify the total volume of the Propane Collection Area B impoundment prior to the end of the EIS comment period.

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MR. TOMASI: Thank you very much.

And I would like to point out, Mr. Doty, that I've been very impressed with your comments over the last years, and it's been very insightful and it actually did help us in the response. So again, thank you.

Next commenter will be Melanie Oldham.

MS. OLDHAM: Hello. Good evening. My name is Melanie Oldham, O-L-D-H-A-M. I'm a resident of Freeport, Texas. In fact, I live about 6 miles from the proposed Freeport LNG Pretreatment Plant. Also, I've been a healthcare professional for 31 years. I am also a public health environmental advocate, and I'm a member of the National Sierra Club.

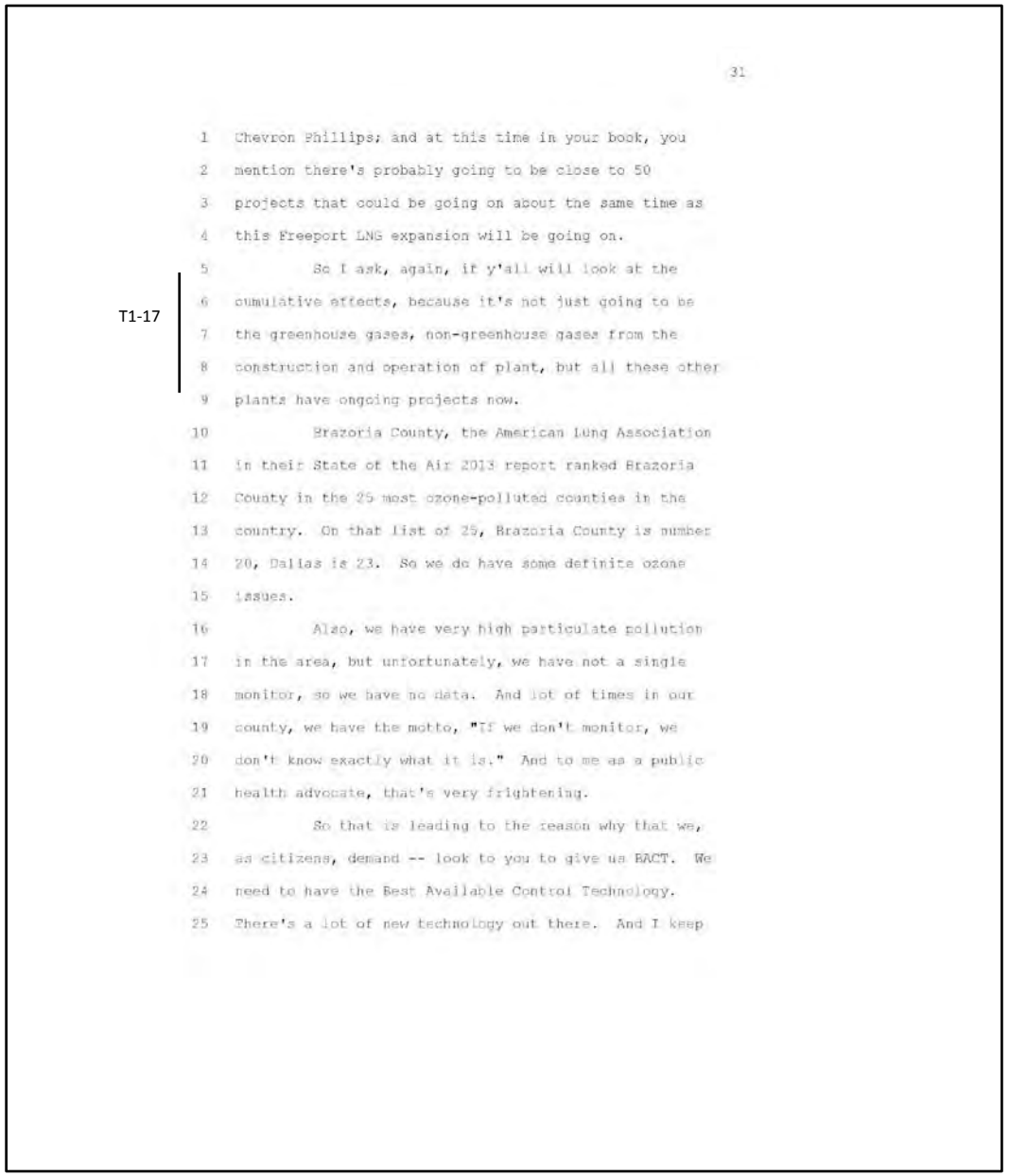
Brazoria County is a great county, and we're over 300,000 people in population, but we're also a severe non-attainment for ozone. And this affects us as citizens and our beautiful wildlife here.

Some of the best kept secrets is -- for instance, in the last three years, we've -- Brazoria County has had the highest ozone reading in the state; and in Manvel, Texas, and Pearland, so they also get a lot of this ozone pollution.

Brazoria County, we have 23 EPA-regulated facilities. Twenty-three. We have Dow Chemical, BASF,

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Chevron Phillips; and at this time in your book, you mention there's probably going to be close to 50 projects that could be going on about the same time as this Freeport LNG expansion will be going on.

So I ask, again, if y'all will look at the cumulative effects, because it's not just going to be the greenhouse gases, non-greenhouse gases from the construction and operation of plant, but all these other plants have ongoing projects now.

Brazoria County, the American Lung Association in their State of the Air 2013 report ranked Brazoria County in the 25 most ozone-polluted counties in the country. On that list of 25, Brazoria County is number 20, Dallas is 23. So we do have some definite ozone issues.

Also, we have very high particulate pollution in the area, but unfortunately, we have not a single monitor, so we have no data. And lot of times in our county, we have the motto, "If we don't monitor, we don't know exactly what it is." And to me as a public health advocate, that's very frightening.

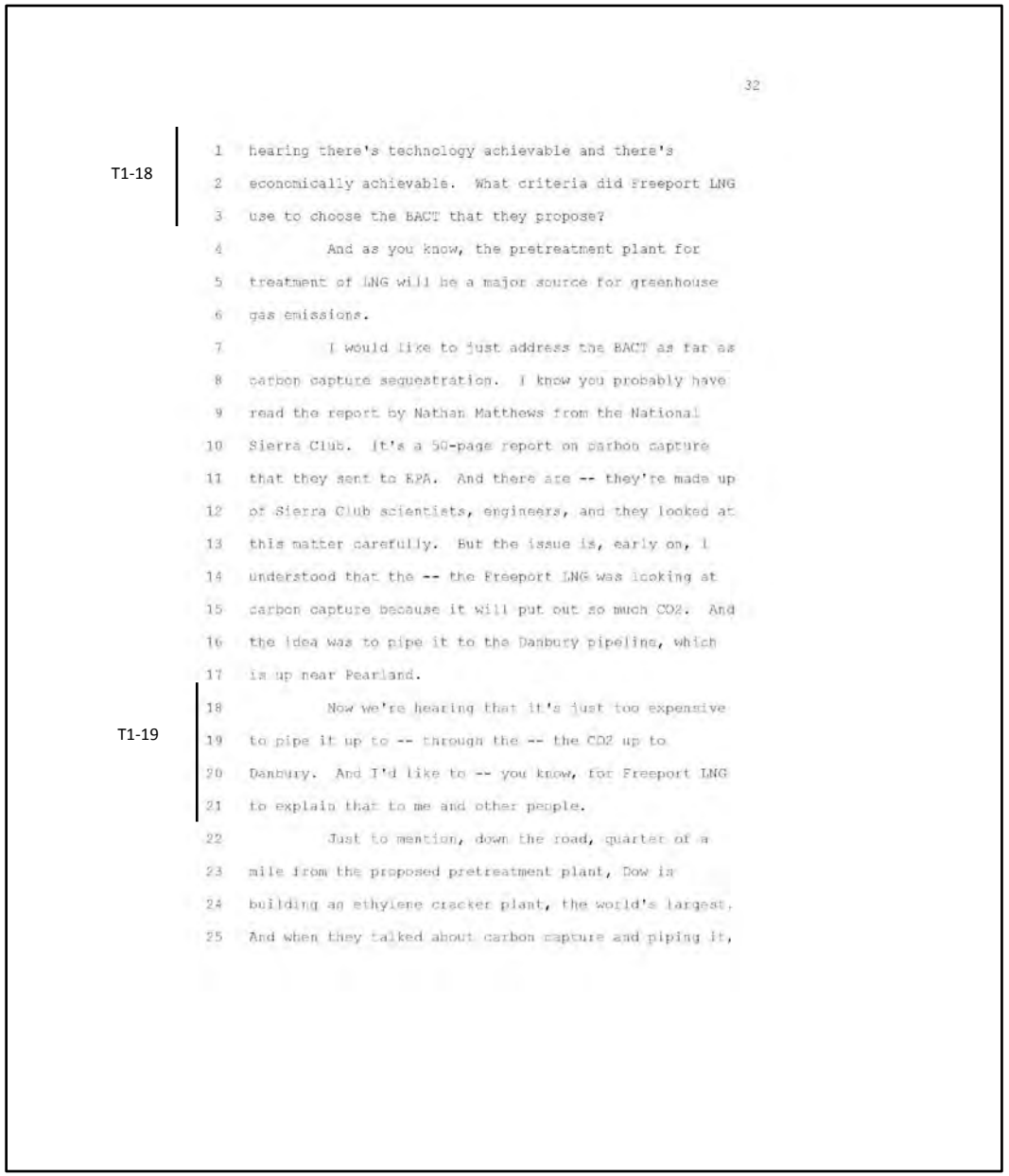
So that is leading to the reason why that we, as citizens, demand -- look to you to give us BACT. We need to have the Best Available Control Technology. There's a lot of new technology out there. And I keep

T1-17

T1-17: Section 4.12 discussed other projects in the area and cumulative impacts.

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T1-18

hearing there's technology achievable and there's economically achievable. What criteria did Freeport LNG use to choose the BACT that they propose?

And as you know, the pretreatment plant for treatment of LNG will be a major source for greenhouse gas emissions.

I would like to just address the BACT as far as carbon capture sequestration. I know you probably have read the report by Nathan Matthews from the National Sierra Club. It's a 50-page report on carbon capture that they sent to EPA. And there are -- they're made up of Sierra Club scientists, engineers, and they looked at this matter carefully. But the issue is, early on, I understood that the -- the Freeport LNG was looking at carbon capture because it will put out so much CO2. And the idea was to pipe it to the Danbury pipeline, which is up near Pearland.

T1-19

Now we're hearing that it's just too expensive to pipe it up to -- through the -- the CO2 up to Danbury. And I'd like to -- you know, for Freeport LNG to explain that to me and other people.

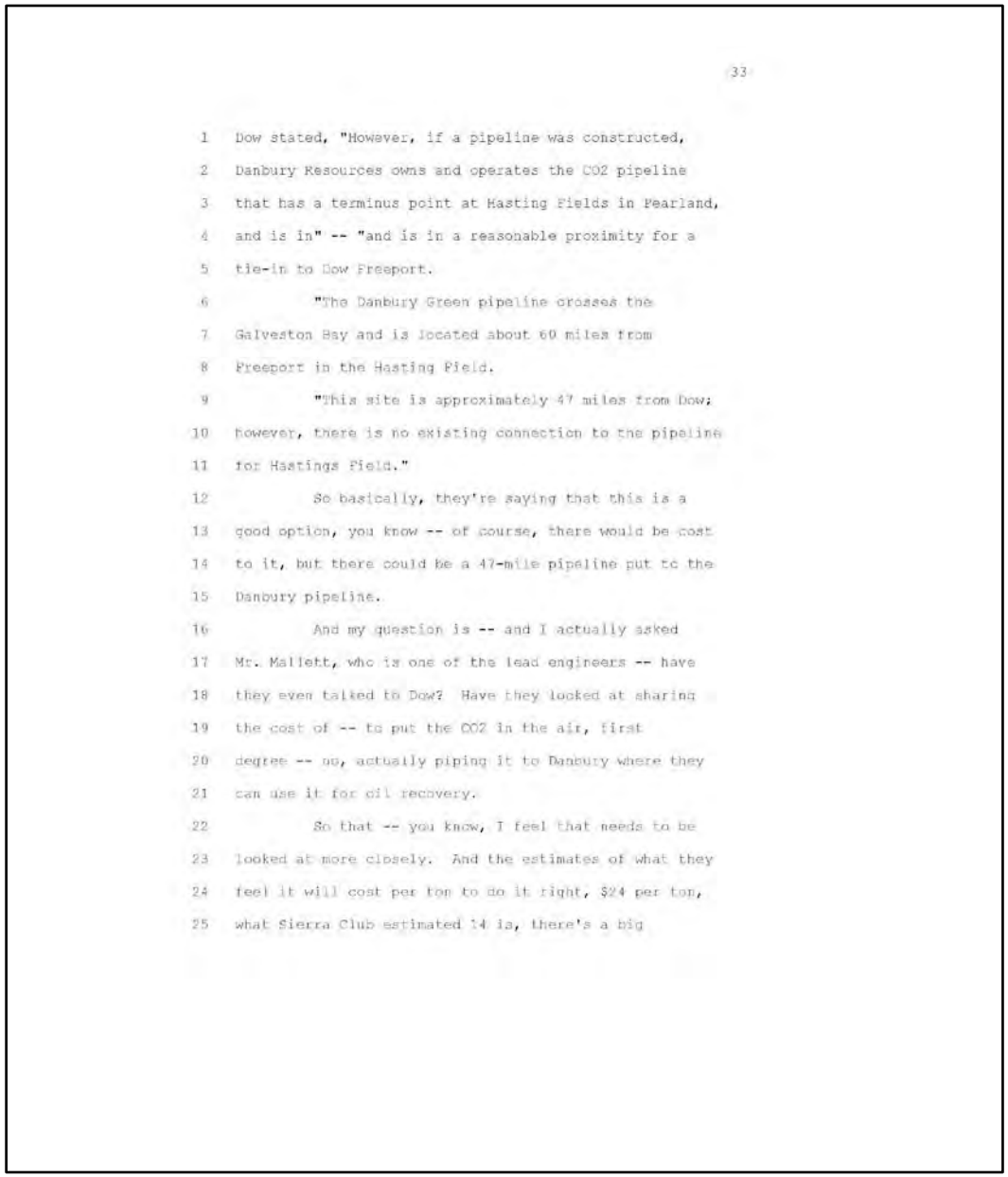
Just to mention, down the road, quarter of a mile from the proposed pretreatment plant, Dow is building an ethylene cracker plant, the world's largest. And when they talked about carbon capture and piping it,

T1-18: Air emissions from the operation of the Liquefaction Plant, and Pretreatment Plant stationary sources would be minimized by using electric-powered equipment, high-efficiency equipment, state of the art emission controls, burning natural gas, and using proper maintenance and operating procedures. In addition, Freeport LNG would obtain air quality permits from the USEPA and the TCEQ for the Liquefaction Plant and the Pretreatment Plant and would be required to operate in compliance with any conditions established in its air permits.

T1-19: Section 4.12.4 discusses GHG emissions and climate change.

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Dow stated, "However, if a pipeline was constructed, Danbury Resources owns and operates the CO2 pipeline that has a terminus point at Hasting Fields in Pearland, and is in" -- "and is in a reasonable proximity for a tie-in to Dow Freeport.

"The Danbury Green pipeline crosses the Galveston Bay and is located about 60 miles from Freeport in the Hasting Field.

"This site is approximately 47 miles from Dow; however, there is no existing connection to the pipeline for Hastings Field."

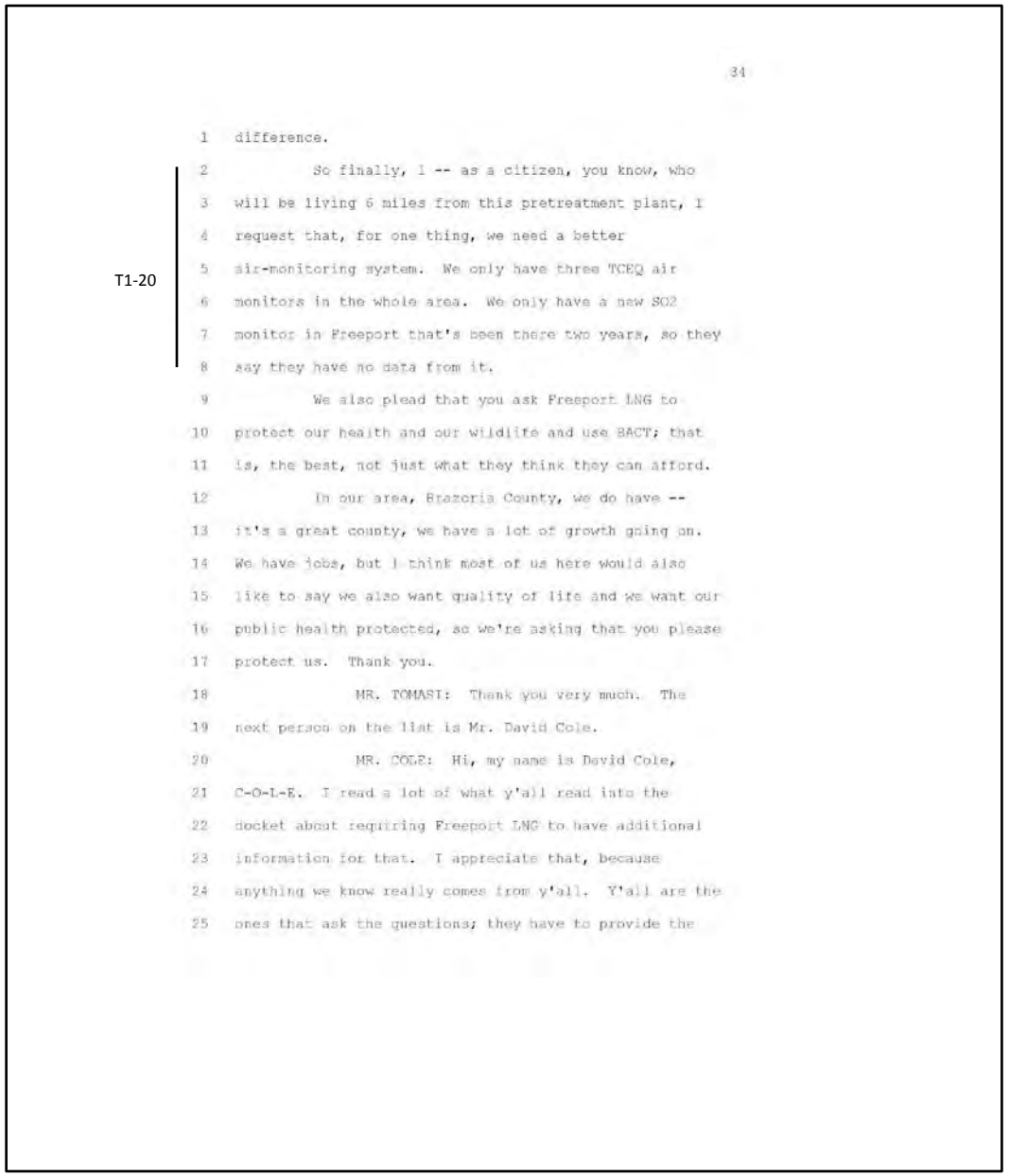
So basically, they're saying that this is a good option, you know -- of course, there would be cost to it, but there could be a 47-mile pipeline put to the Danbury pipeline.

And my question is -- and I actually asked Mr. Mallett, who is one of the lead engineers -- have they even talked to Dow? Have they looked at sharing the cost of -- to put the CO2 in the air, first degree -- no, actually piping it to Danbury where they can use it for oil recovery.

So that -- you know, I feel that needs to be looked at more closely. And the estimates of what they feel it will cost per ton to do it right, $24 per ton, what Sierra Club estimated 14 is, there's a big

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difference.

So finally, I -- as a citizen, you know, who will be living 6 miles from this pretreatment plant, I request that, for one thing, we need a better air-monitoring system. We only have three TCEQ air monitors in the whole area. We only have a new SO2 monitor in Freeport that's been there two years, so they say they have no data from it.

We also plead that you ask Freeport LNG to protect our health and our wildlife and use BACT; that is, the best, not just what they think they can afford.

In our area, Brazoria County, we do have -- it's a great county, we have a lot of growth going on. We have jobs, but I think most of us here would also like to say we also want quality of life and we want our public health protected, so we're asking that you please protect us. Thank you.

MR. TOMASI: Thank you very much. The next person on the list is Mr. David Cole.

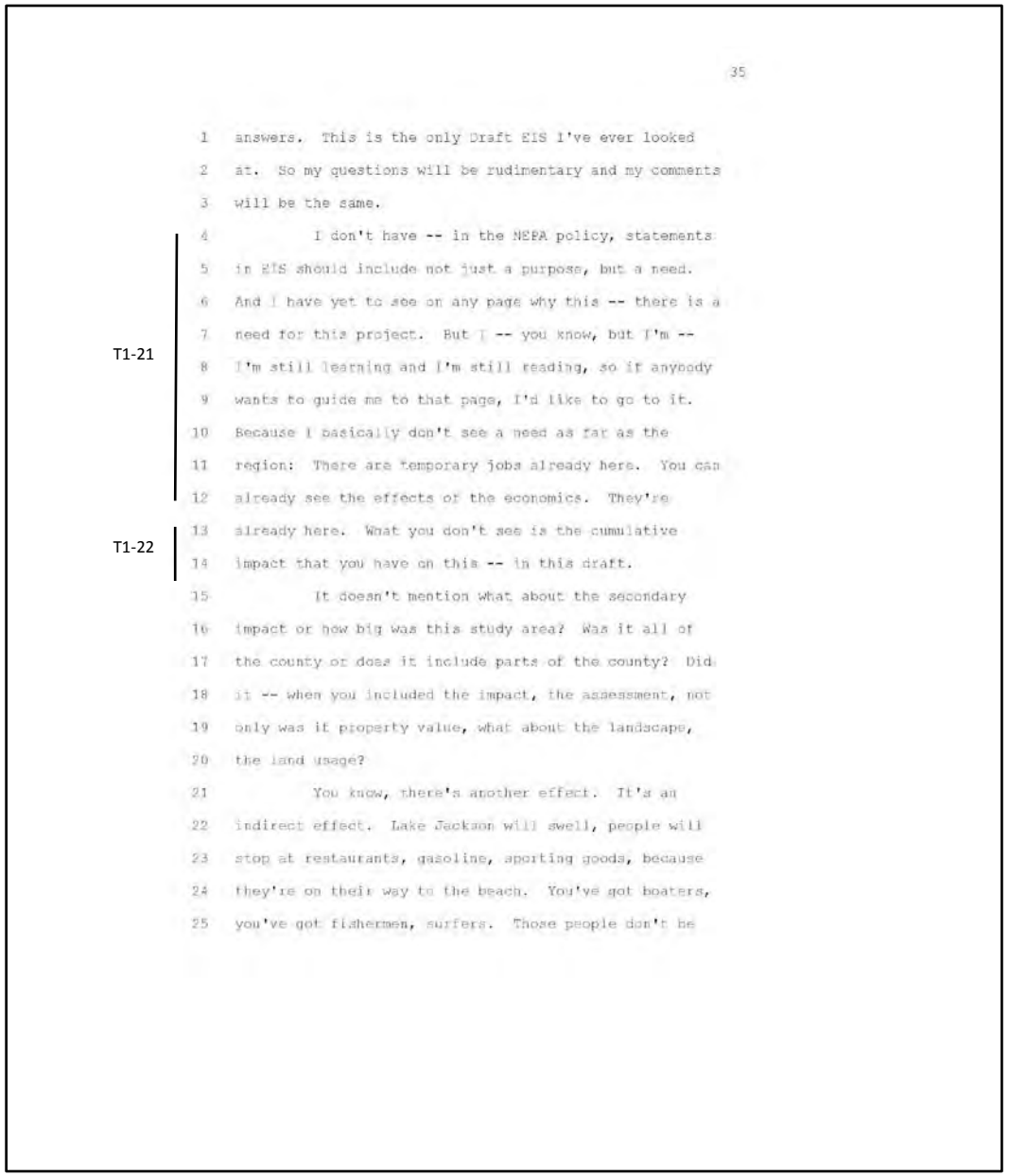
MR. COLE: Hi, my name is David Cole, C-O-L-E. I read a lot of what y'all read into the docket about requiring Freeport LNG to have additional information for that. I appreciate that, because anything we know really comes from y'all. Y'all are the ones that ask the questions; they have to provide the

T1-20

T1-20: See response to T1-18.

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answers. This is the only Draft EIS I've ever looked at. So my questions will be rudimentary and my comments will be the same.

I don't have -- in the NEPA policy, statements in EIS should include not just a purpose, but a need. And I have yet to see on any page why this -- there is a need for this project. But I -- you know, but I'm -- I'm still learning and I'm still reading, so if anybody wants to guide me to that page, I'd like to go to it. Because I basically don't see a need as far as the region: There are temporary jobs already here. You can already see the effects of the economics. They're already here. What you don't see is the cumulative impact that you have on this -- in this draft.

It doesn't mention what about the secondary impact or how big was this study area? Was it all of the county or does it include parts of the county? Did it -- when you included the impact, the assessment, not only was it property value, what about the landscape, the land usage?

You know, there's another effect. It's an indirect effect. Lake Jackson will swell, people will stop at restaurants, gasoline, sporting goods, because they're on their way to the beach. You've got boaters, you've got fishermen, surfers. Those people don't be

T1-21

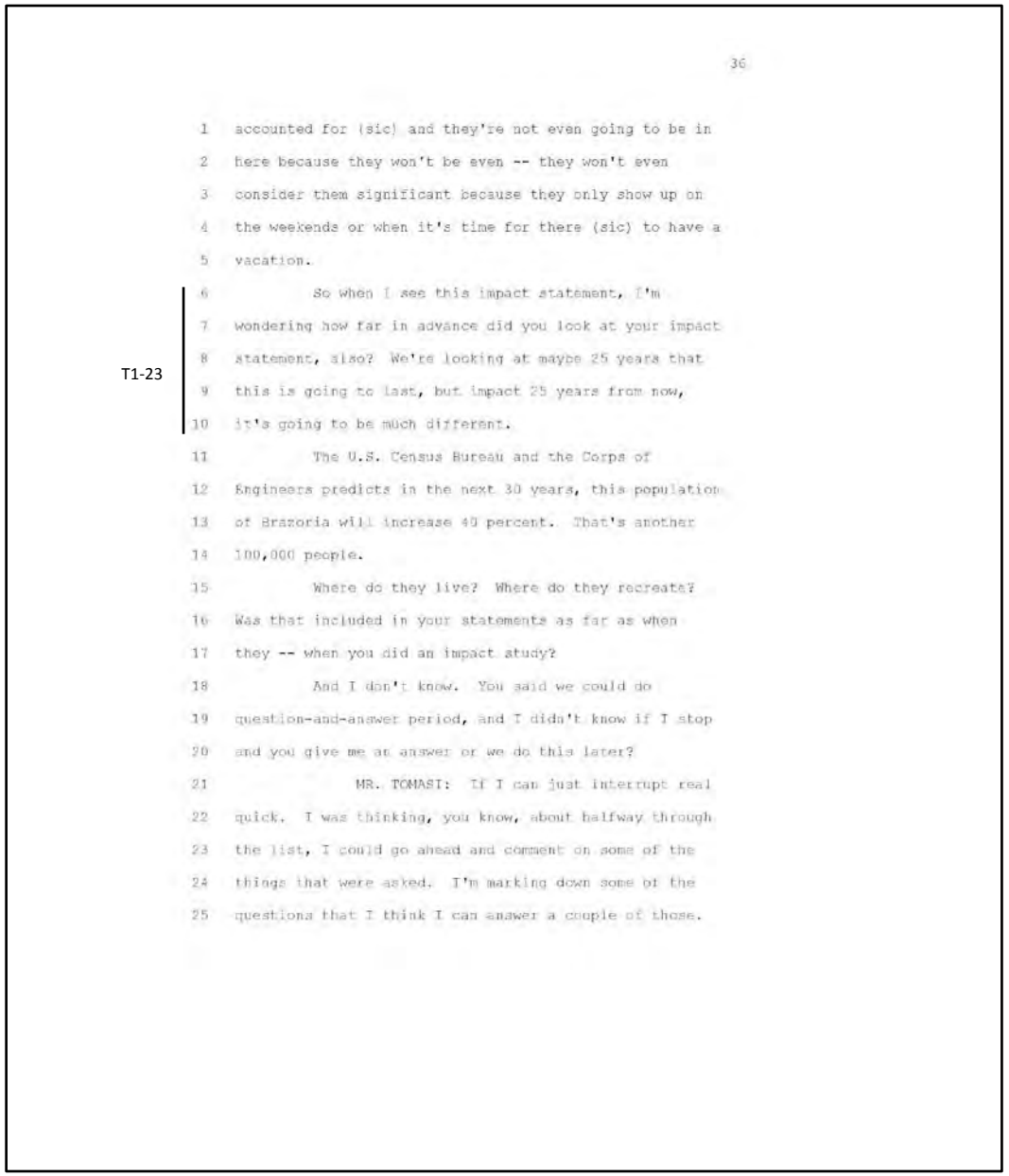
T1-22

T1-21: The EIS is not intended to be a determination of Project need. It is the duty and authority of the FERC's Commissioners to determine if the Project is in the public's convenience and necessity during its evaluation and review, prior to authorization. Applicants propose projects and present their objectives, and the FERC reviews those proposals, including producing an environmental document to satisfy NEPA. The CEQ regulations for implementing NEPA (at 40 CFR 1502.13) only require that the EIS "briefly specify the underlying purpose and need to which the agency is responding…". The Commission will more fully consider the need for the Project when making its decision on whether or not to authorize the Project.

T1-22: See T1-17.

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accounted for (sic) and they're not even going to be in here because they won't be even -- they won't even consider them significant because they only show up on the weekends or when it's time for there (sic) to have a vacation.

So when I see this impact statement, I'm wondering how far in advance did you look at your impact statement, also? We're looking at maybe 25 years that this is going to last, but impact 25 years from now, it's going to be much different.

The U.S. Census Bureau and the Corps of Engineers predicts in the next 30 years, this population of Brazoria will increase 40 percent. That's another 100,000 people.

Where do they live? Where do they recreate? Was that included in your statements as far as when they -- when you did an impact study?

And I don't know. You said we could do question-and-answer period, and I didn't know if I stop and you give me an answer or we do this later?

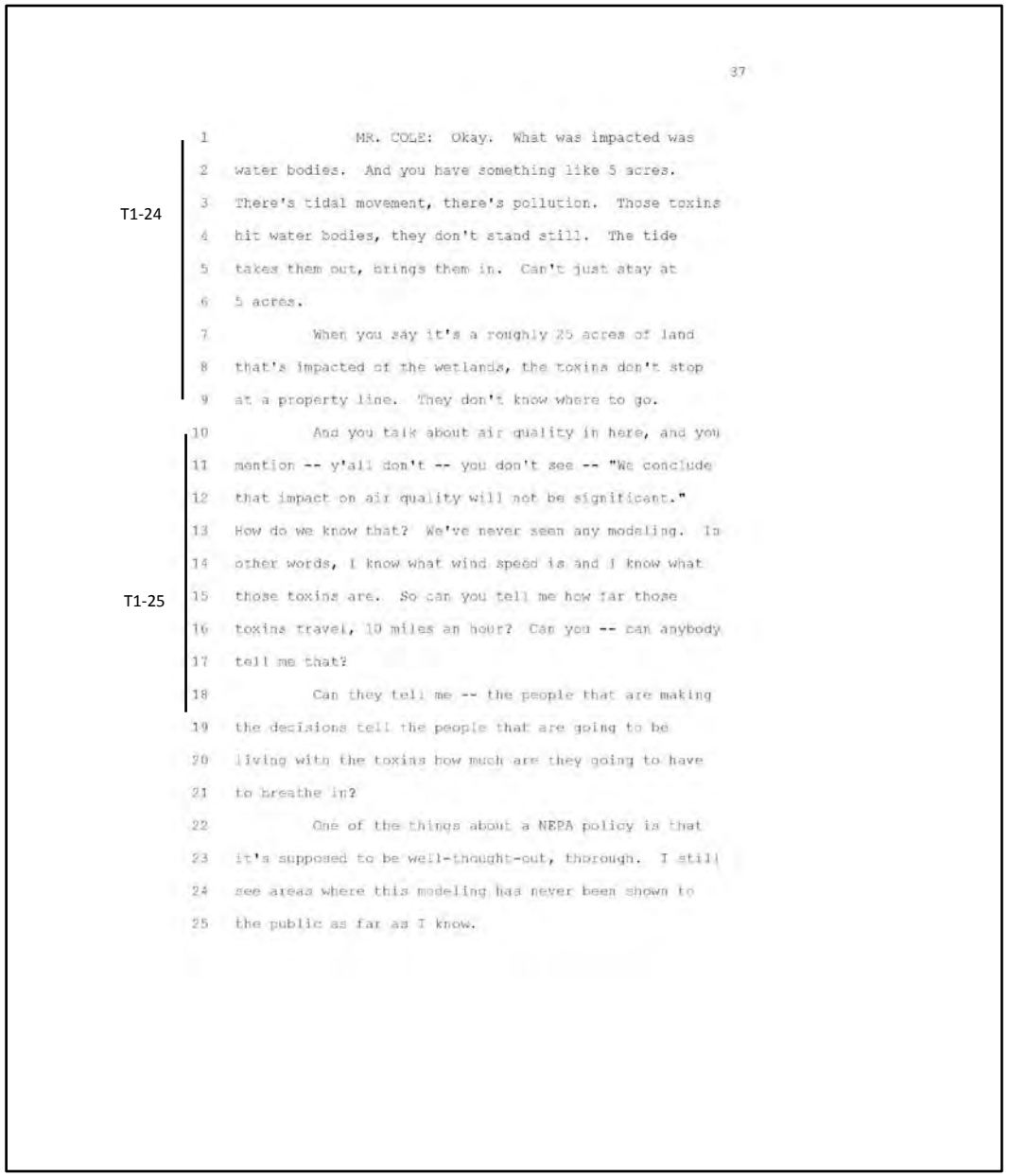
MR. TOMASI: If I can just interrupt real quick. I was thinking, you know, about halfway through the list, I could go ahead and comment on some of the things that were asked. I'm marking down some of the questions that I think I can answer a couple of those.

T1-23

T1-23: The EIS considers impacts that could occur over the entire life of the facility to the extent possible.

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MR. COLE: Okay. What was impacted was water bodies. And you have something like 5 acres. There's tidal movement, there's pollution. Those toxins hit water bodies, they don't stand still. The tide takes them out, brings them in. Can't just stay at 5 acres.

When you say it's a roughly 25 acres of land that's impacted of the wetlands, the toxins don't stop at a property line. They don't know where to go.

And you talk about air quality in here, and you mention -- y'all don't -- you don't see -- "We conclude that impact on air quality will not be significant." How do we know that? We've never seen any modeling. In other words, I know what wind speed is and I know what those toxins are. So can you tell me how far those toxins travel, 10 miles an hour? Can you -- can anybody tell me that?

Can they tell me -- the people that are making the decisions tell the people that are going to be living with the toxins how much are they going to have to breathe in?

One of the things about a NEPA policy is that it's supposed to be well-thought-out, thorough. I still see areas where this modeling has never been shown to the public as far as I know.

T1-24

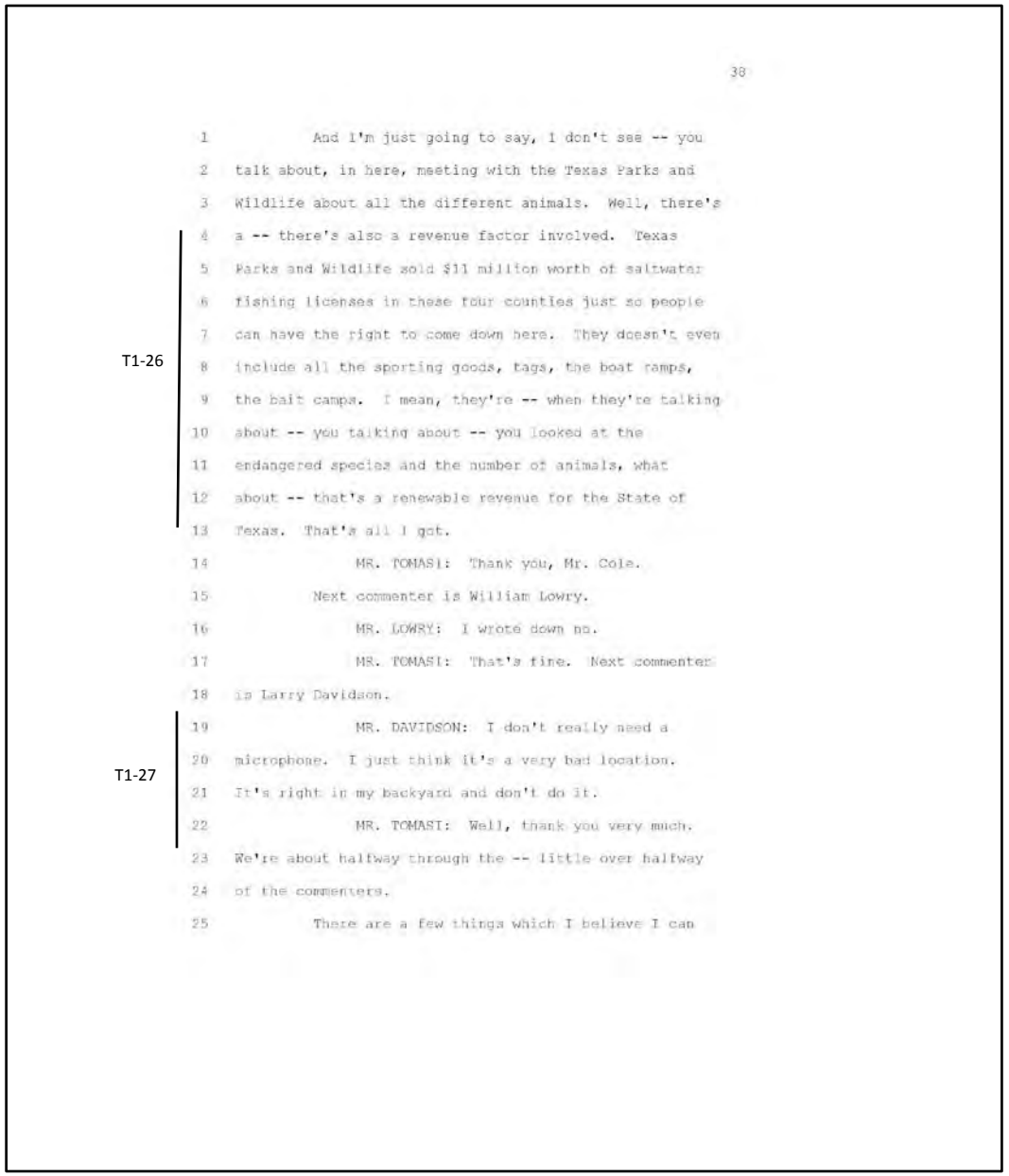
T1-25

T1-24: Under Section 402 of the Clean Water Act Freeport would be required to acquire industrial storm water permits and storm water constructions permits. Freeport LNG would also be required to adhere to the requirements of a Stormwater Pollution and Prevention Plan (SWPPP Plan) and its SPCC Plan to ensure the avoidance of indirect impacts from stormwater runoff and or accidental spills on the wetlands. Freeport LNG would also provide compensatory mitigation for wetlands in accordance with the USACE regulatory requirements. With the avoidance measures identified and our recommended condition for compensatory wetland replacement, we concluded that the impacts on wetlands due to construction and operation of the Projects would not be significant.

T1-25: See response to T1-10.

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And I'm just going to say, I don't see -- you talk about, in here, meeting with the Texas Parks and Wildlife about all the different animals. Well, there's a -- there's also a revenue factor involved. Texas Parks and Wildlife sold $11 million worth of saltwater fishing licenses in these four counties just so people can have the right to come down here. They doesn't even include all the sporting goods, tags, the boat ramps, the bait camps. I mean, they're -- when they're talking about -- you talking about -- you looked at the endangered species and the number of animals, what about -- that's a renewable revenue for the State of Texas. That's all I got.

T1-26

MR. TOMASI: Thank you, Mr. Cole.

Next commenter is William Lowry.

MR. LOWRY: I wrote down no.

MR. TOMASI: That's fine. Next commenter is Larry Davidson.

MR. DAVIDSON: I don't really need a microphone. I just think it's a very bad location. It's right in my backyard and don't do it.

T1-27

MR. TOMASI: Well, thank you very much. We're about halfway through the -- little over halfway of the commenters.

There are a few things which I believe I can

T1-26: Section 4.7.2.1 addresses impacts to recreational activity in the area. Based on our review, we do not anticipate that the Freeport LNG projects would have any noticeable impact on recreation resources in the vicinity.

T1-27: Comment acknowledged.

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discuss a little bit to -- maybe "clear up" may not be the best term, but to answer at least a couple of concerns that people had.

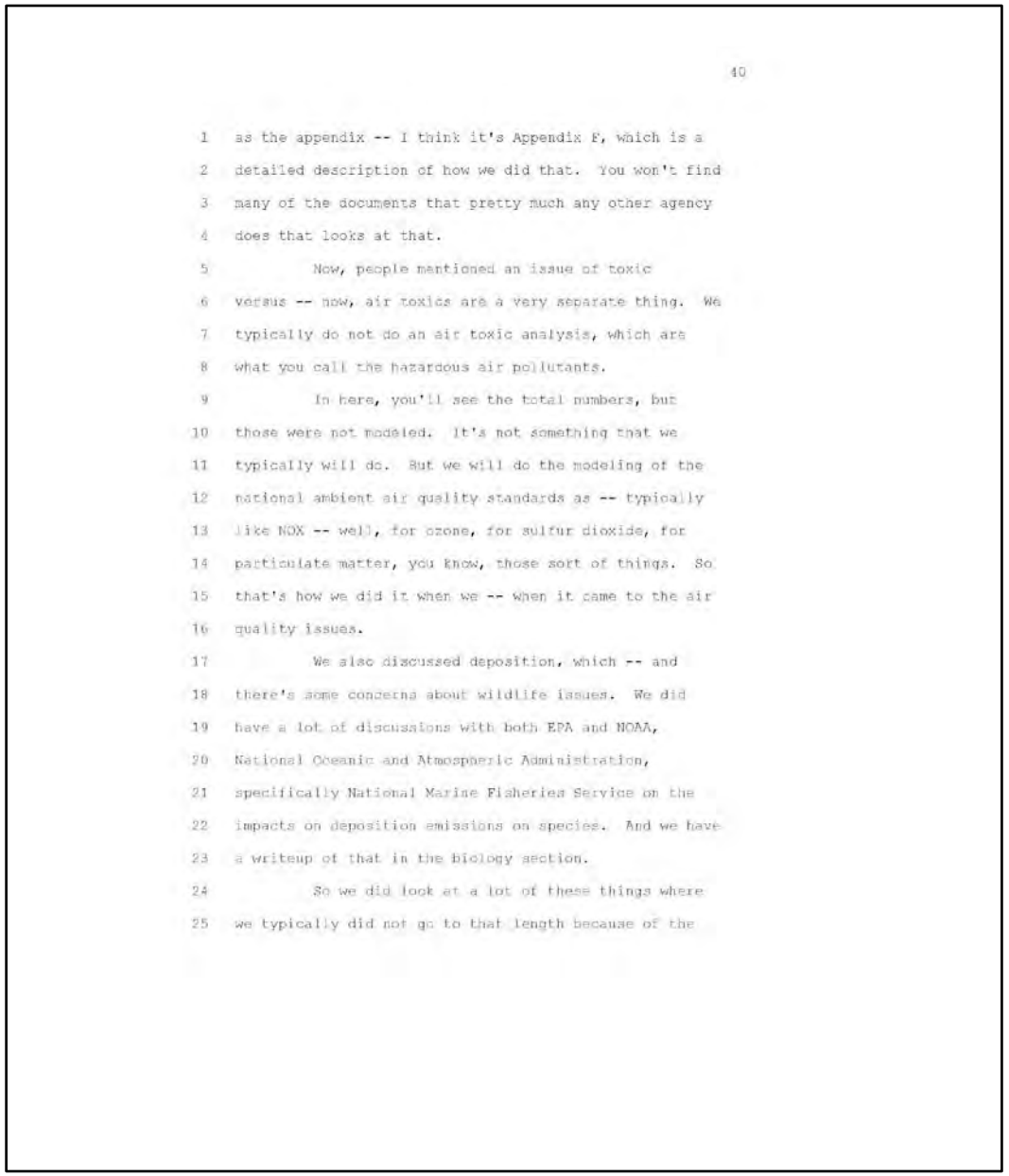
One of the -- we heard a couple times; people had also commented during the scoping process -- what I mean by "scoping," I mean the process when we came down before and had a couple of meetings about air quality issues, specifically wanting additional monitoring.

Typically, air monitoring is done by the EPA and for the state. You know, we don't have a lot of authority to require air monitoring. That's why, when we went ahead and did do the air analysis -- and I'll talk about that a little bit here -- we actually did go probably farther than anybody else usually does for these sort of projects.

The State of Texas, in their PSD permit for the combined facilities, required an air quality modeling for the national ambient air quality standards. We used that modeling, but we also added in the ship emissions, which we also looked at the ship emissions that the company gave us and decided that they didn't meet the EPA's current guidelines. So we redid the ship emissions, recalculated them and used those additional ship emissions in our model, which we included in it -- in the document, both in the air quality section as well

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as the appendix -- I think it's Appendix F, which is a detailed description of how we did that. You won't find many of the documents that pretty much any other agency does that looks at that.

Now, people mentioned an issue of toxic versus -- now, air toxics are a very separate thing. We typically do not do an air toxic analysis, which are what you call the hazardous air pollutants.

In here, you'll see the total numbers, but those were not modeled. It's not something that we typically will do. But we will do the modeling of the national ambient air quality standards as -- typically like NOX -- well, for ozone, for sulfur dioxide, for particulate matter, you know, those sort of things. So that's how we did it when we -- when it came to the air quality issues.

We also discussed deposition, which -- and there's some concerns about wildlife issues. We did have a lot of discussions with both EPA and NOAA, National Oceanic and Atmospheric Administration, specifically National Marine Fisheries Service on the impacts on deposition emissions on species. And we have a writeup of that in the biology section.

So we did look at a lot of these things where we typically did not go to that length because of the

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concerns that the public had. Now, obviously, you know, there seems to be a lot more concern, so keep your comments coming and we can decide what more we could look at here.

There's another question. I think it was Mr. -- maybe it was Mr. Doty, Harold -- question about need. Now, I think I described this when I was down here last time, and it's laid out a little bit in the section 1.

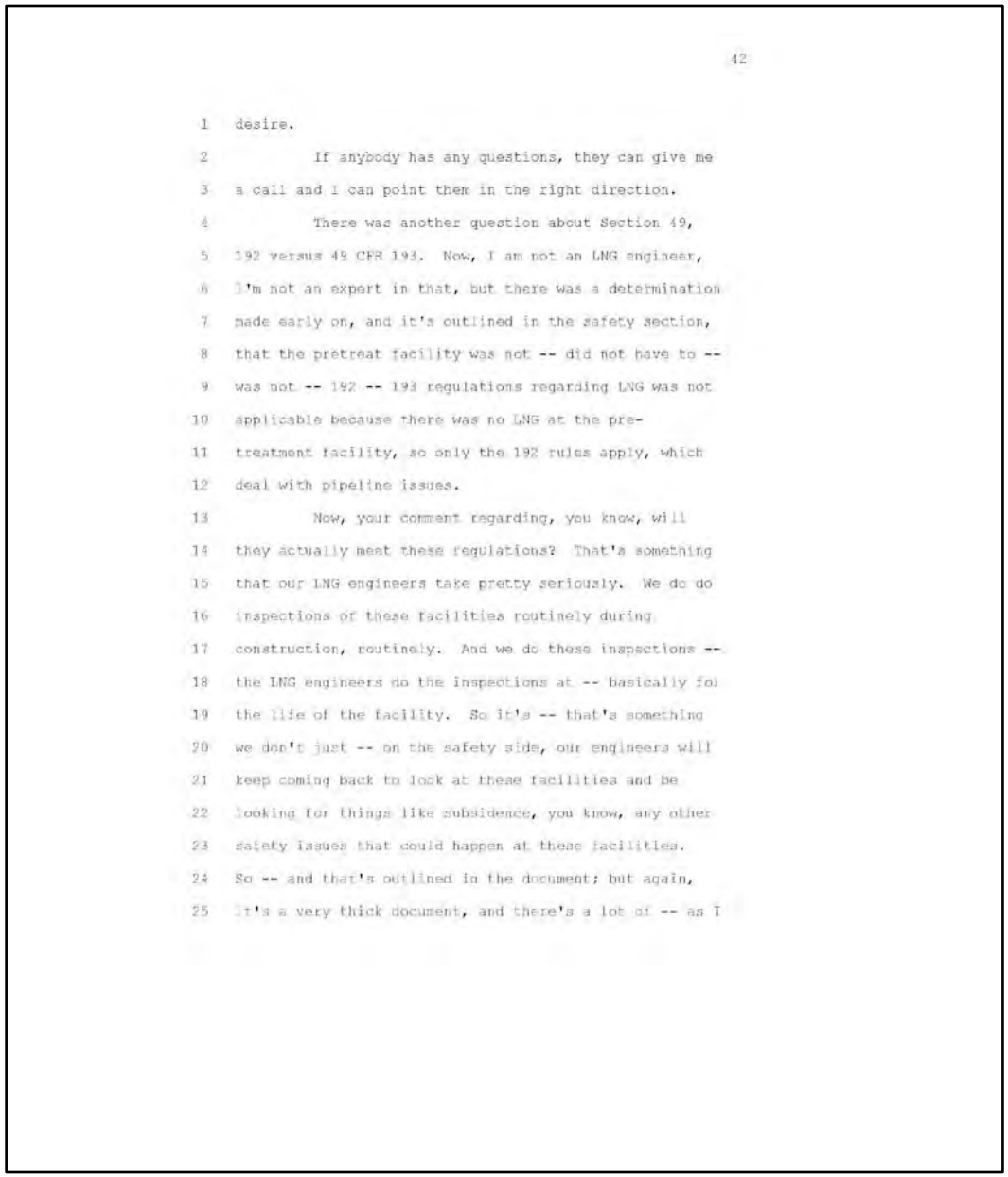
Now, when it comes to the overall project, we are delegated authority to the siting by the Department of Energy. The Department of Energy does what's called a commodity determination. They decide whether the actual -- the LNG is in the economic interest of the United States to be exported.

So we effectively defer that decision to the Department of Energy, and we did the analysis for the purpose and for the siting itself, to look at the impacts of that, of the project. So that might have been a little bit of the confusion.

Now, you know, if anyone has any concerns about, well, what does that analysis entail for the Department of Energy? We do have the docket number in there for the Department of Energy's determinations, which you could go ahead and read through if you so

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desire.

If anybody has any questions, they can give me a call and I can point them in the right direction.

There was another question about Section 49, 192 versus 49 CFR 193. Now, I am not an LNG engineer, I'm not an expert in that, but there was a determination made early on, and it's outlined in the safety section, that the pretreat facility was not -- did not have to -- was not -- 192 -- 193 regulations regarding LNG was not applicable because there was no LNG at the pre-treatment facility, so only the 192 rules apply, which deal with pipeline issues.

Now, your comment regarding, you know, will they actually meet these regulations? That's something that our LNG engineers take pretty seriously. We do do inspections of these facilities routinely during construction, routinely. And we do these inspections -- the LNG engineers do the inspections at -- basically for the life of the facility. So it's -- that's something we don't just -- on the safety side, our engineers will keep coming back to look at these facilities and be looking for things like subsidence, you know, any other safety issues that could happen at these facilities. So -- and that's outlined in the document; but again, it's a very thick document, and there's a lot of -- as I

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put it, engineerese in the -- in some of the sections.

Now, you had some really good comments about noise, and that's something we could look at again, but I would like to stress that although we're -- we always look at, well, what is the -- what is the change in noise impact from, you know, the ambient to what is -- what the facility -- what is the anticipated noise impact?

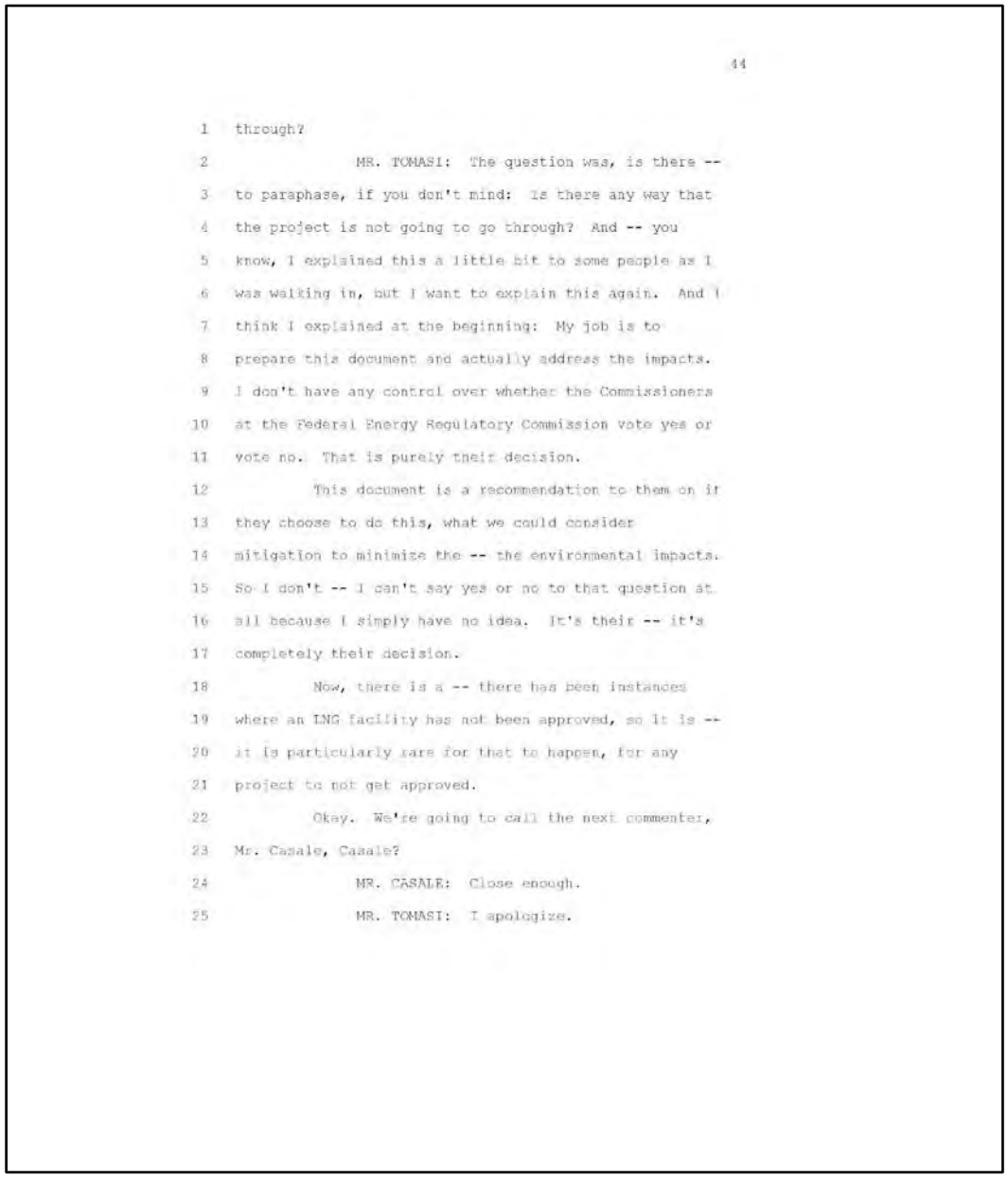
Ultimately, we are usually restricted by -- you know, going what we always go with, which is the 55 dba FLM DBA (phonetic), which is, we don't allow the facility to have an impact of more than 55 dba at homes nearby. You know, it's something that we can look at and we'll look at again, because I know there's some concerns about that, about the impact to Turtle Cove and other folks -- other houses nearby.

Okay. Seems like some of the main comments. We're going to continue the comments, and I will again -- I'll answer some more at the end. And of course, we'll have some time for question and answers as well, but I wanted to go ahead and get some answers now. I didn't want to forget some of the comments that people had.

AUDIENCE MEMBER: Is there any way, with all the speaking, that the FLNG is not going to get

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through?

MR. TOMASI: The question was, is there -- to paraphase, if you don't mind: Is there any way that the project is not going to go through? And -- you know, I explained this a little bit to some people as I was walking in, but I want to explain this again. And I think I explained at the beginning: My job is to prepare this document and actually address the impacts. I don't have any control over whether the Commissioners at the Federal Energy Regulatory Commission vote yes or vote no. That is purely their decision.

This document is a recommendation to them on if they choose to do this, what we could consider mitigation to minimize the -- the environmental impacts. So I don't -- I can't say yes or no to that question at all because I simply have no idea. It's their -- it's completely their decision.

Now, there is a -- there has been instances where an LNG facility has not been approved, so it is -- it is particularly rare for that to happen, for any project to not get approved.

Okay. We're going to call the next commenter, Mr. Casale, Casale?

MR. CASALE: Close enough.

MR. TOMASI: I apologize.

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MR. CASALE: My name is Bobby Joe Casale from the Bridge Harbor Subdivision. Have you guys heard about the Bridge Harbor subdivision, by any chance? If you haven't, that's okay. Bridge Harbor is one of -- maybe one of the elite subdivisions just south of the proposed plant off the levy road. They've got a multi-million-dollar facility there for boats. It's a residential area, also, okay. I've had lived there since about 1982, and I've had a lot of experience with dealing with chemical plants and barge-cleaning facilities and so on for a long period of time.

Anyway, today, one of the major problems that we have is notification. If it wasn't for Melanie back here, I would not know of this meeting today. And I've represented lot of people down there for many, many years.

Jeff Pynes, our -- our city manager in Freeport, if it wasn't for Melanie, he wouldn't know about it. He represents 10,000 people, okay? So we need to have -- for the future, if we use the news media, this meeting should have been announced several days ago, and we'd probably have another hundred people in here, at least, okay? Very important. We've got to notify our individual --

MR. TOMASI: I'm going to take a second to

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actually respond to that. This was, you know, we -- this document went out to -- I put it in every single news media I could find in the local area, made sure to get copy of this document to everyone -- every single member of the Council of Quintana Island, the Mayor of Freeport, pretty much every basically local counsel members or anything that I could find. I wanted to make sure everybody got it.

Now, for some reason, if we missed people. I apologize. My intention was to make sure that anyone who could possibly be interested in this would be getting it.

I mean, we did send it to the local press, but I did not get a single -- I got very few inquiries. It was all mainly national press, got the only inquiries. We did not get a single local inquiry at all, even though it was sent to them.

So again, I apologize if you felt we were not giving you enough information. Typically, though, the actual notice is usually only about a half a mile in diameter. Now, for this project, we went out -- we went actually much further than that, and we included everyone who was -- was within a half mile of any of the alternative sites, and also even people that were outside. And I made sure to make sure everybody like in

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separate subdivisions, even though they're outside the radius, we made sure it went to them as well.

So, again, I want to apologize. I did not realize you didn't get notification.

MR. CASALE: You don't have to apologize, believe me. Many people, probably 90 percent, wouldn't understand what's in that document if you give it them. It takes a pro to appreciate and have the knowledge to understand that.

But anyway, in general, this would be an impact with the whole area, Lake Jackson, you know -- maybe not Angleton unless you had a big upset, okay? But in the future, if you can, you know, contact the local news media and make sure that we're, you know, apprised of whatever is going on way ahead of time, not the last minute, okay?

One other thing about safety. I did concur with everything that everyone has said, okay, but anyway, last summer, we had a -- a certain incident on the beach of Surfside, okay, whereby law enforcement had to remove maybe 10,000 people -- or whatever, but a whole lot of people -- okay? But anyway, the problem we have, the only exit from Surfside would be Galveston, which is a paid toll, one-lane exit going from -- to Galveston to Houston.

T1-28

T1-28: The ERP plan is addressed in section 4.10.7 and 4.8.3.1 of the EIS.

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Okay. So if you have a major upset at the corner of 332 and the Levy Road, we would be in trouble. Okay? We're talking about, you know, many thousands of people over a weekend going to Surfside.

So going back again, location, you know, is real important. I know y'all have -- not y'all, but LNG had a previous proposed location which was totally wrong. The County approved it. Totally wrong. Then they just moved out down the street, which is no better than the previous location. Okay?

So anyway, safety again, monitoring is very important. Without that, we know nothing. It's like a newspaper: We can get all the education we need in the world, but if you can't share it, you might as well dump it down the toilet, okay? So notification.

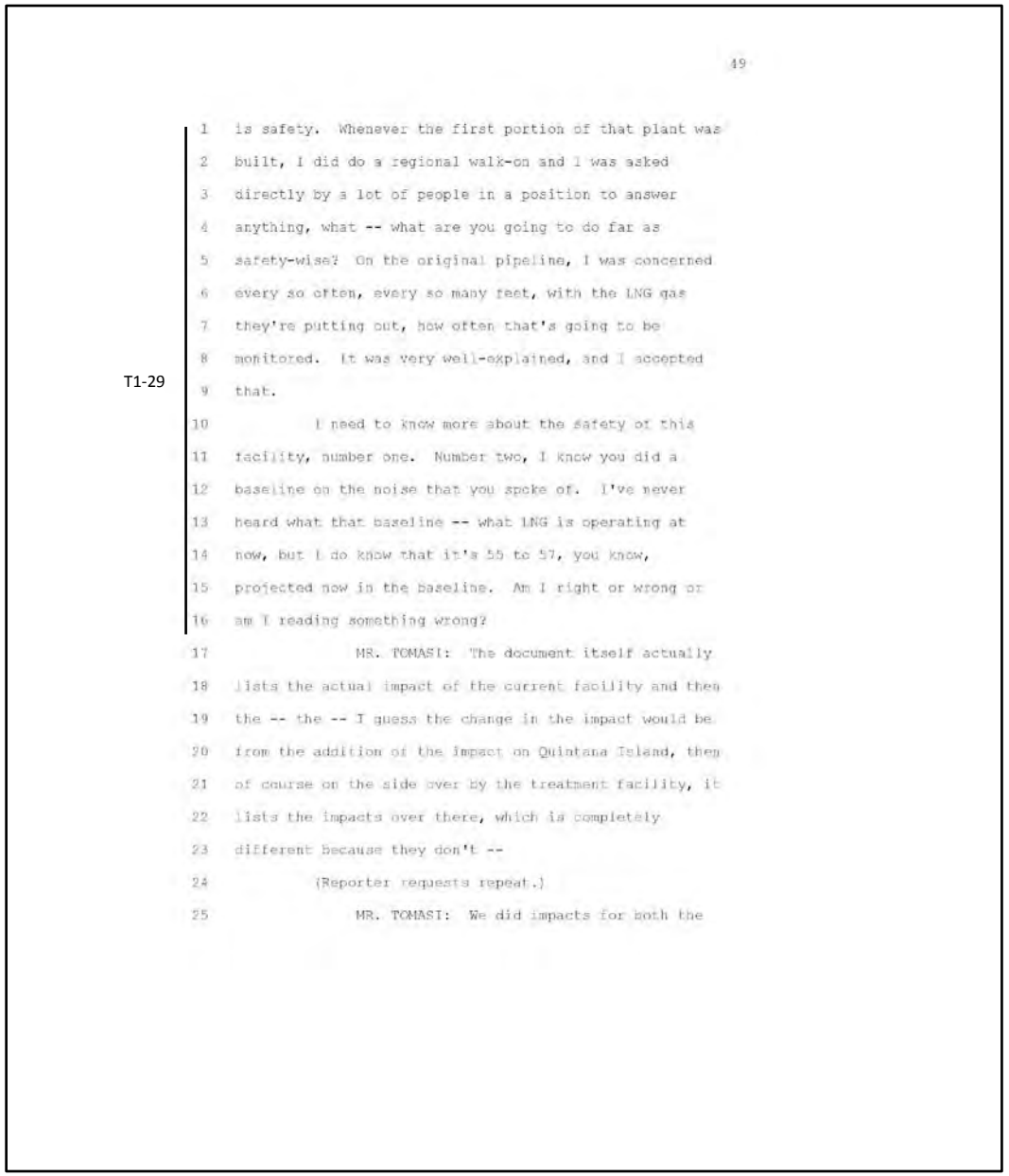
And, of course, safety is a very strong issue. I don't want to speak anymore, you know, tonight, but we want, you know, you guys to consider everything that these people are saying out here. All right? Thank you.

MR. TOMASI: Thank you very much. The next commenter I have is Mr. Jim Martin?

MR. MARTIN: I'm Jim Martin, M-A-R-T-I-N. I live on Quintana Island and have resided out there from '98 on. And one of my deepest concerns out there

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is safety. Whenever the first portion of that plant was built, I did do a regional walk-on and I was asked directly by a lot of people in a position to answer anything, what -- what are you going to do far as safety-wise? On the original pipeline, I was concerned every so often, every so many feet, with the LNG gas they're putting out, how often that's going to be monitored. It was very well-explained, and I accepted that.

I need to know more about the safety of this facility, number one. Number two, I know you did a baseline on the noise that you spoke of. I've never heard what that baseline -- what LNG is operating at now, but I do know that it's 55 to 57, you know, projected now in the baseline. Am I right or wrong or am I reading something wrong?

MR. TOMASI: The document itself actually lists the actual impact of the current facility and then the -- the -- I guess the change in the impact would be from the addition of the impact on Quintana Island, then of course on the side over by the treatment facility, it lists the impacts over there, which is completely different because they don't --

(Reporter requests repeat.)

MR. TOMASI: We did impacts for both the

T1-29

T1-29: See response T1-4.

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treatment facility and for the existing, and basically, the new facility, the liquefaction site.

You know, we have the -- on the liquefaction site, we have the existing noise, and then the change in noise, which that will happen. Then at the pretreatment plant, we simply say, okay, this is going to be the noise from this facility, and then check the walls that show the original -- basically, the baseline.

There will be an increase in noise on Quintana Island, and we lay that out in there.

So we're -- you know, we're very up-front about the fact that noise will be increased.

MR. MARTIN: Right. You already said that.

MR. TOMASI: Yes. So...

MR. MARTIN: I just wanted to know the difference in the baseline and the projected noise, the dba difference.

MR. TOMASI: I'd have to pull up the document. At the end, we can talk about it.

MR. MARTIN: Okay. That's open question.

MR. TOMASI: Okay.

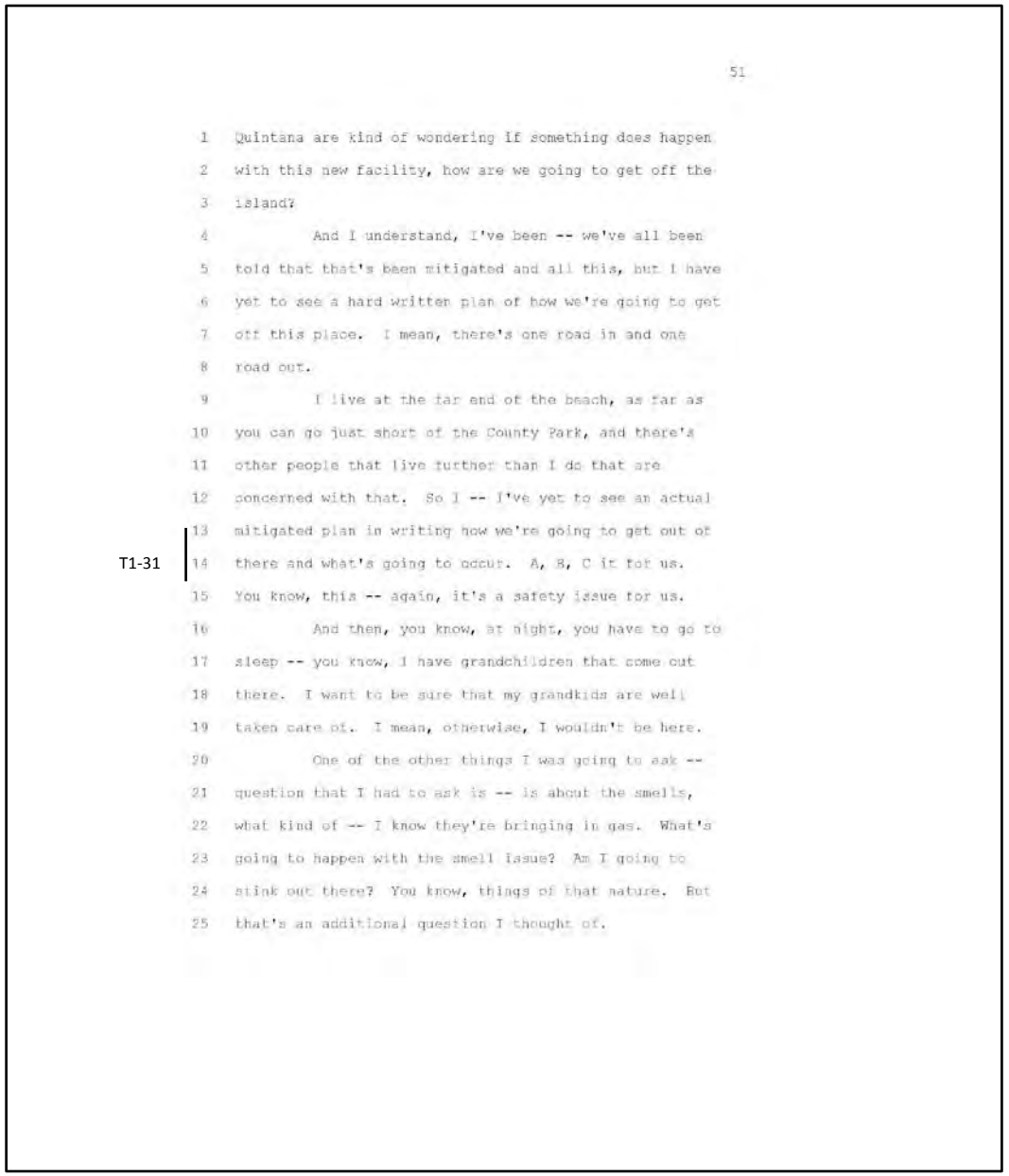
MR. MARTIN: In other words, one of the things I was wanting to comment on is that a lot of the -- most of the people that live out there at

T1-30

T1-30: See response to T1-2.

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Quintana are kind of wondering if something does happen with this new facility, how are we going to get off the island?

And I understand, I've been -- we've all been told that that's been mitigated and all this, but I have yet to see a hard written plan of how we're going to get off this place. I mean, there's one road in and one road out.

I live at the far end of the beach, as far as you can go just short of the County Park, and there's other people that live further than I do that are concerned with that. So I -- I've yet to see an actual mitigated plan in writing how we're going to get out of there and what's going to occur. A, B, C it for us. You know, this -- again, it's a safety issue for us.

And then, you know, at night, you have to go to sleep -- you know, I have grandchildren that come out there. I want to be sure that my grandkids are well taken care of. I mean, otherwise, I wouldn't be here.

One of the other things I was going to ask -- question that I had to ask is -- is about the smells, what kind of -- I know they're bringing in gas. What's going to happen with the smell issue? Am I going to stink out there? You know, things of that nature. But that's an additional question I thought of.

T1-31

T1-31: See response T1-28.

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On the bright side of it, I've toured LNG out there, had great tour. That place is clean enough you can eat off the ground. I think it's a spotless facility. They been an excellent neighbor. They continue to support the community and I'm sure they will continue to do so in the future.

I'm sure this will eventually go through. I hate to say it. Somebody might throw a shoe or rock at me. I believe we'll get our permits and the building will occur to come to full fruition.

And I just would like to honestly ask LNG just to keep up the good work and safety first. That's the whole deal. Take care of our community. We're sitting on top of you. We have to trust in that. So I expect that to go above and beyond, and I think that it has. Thank you.

MR. TOMASI: Thank you very much.

The next commenter is Connie Perlander?

MS. PERLANDER: That's Connie Perlander, P-E-R-L-A-N-D-E-R. Hi. I live on Quintana. I've been on Quintana since the early '80's, on and off, and I did not sell out to Quintana (sic).

I also have my daughter and a one-year-old and two-year old granddaughters that live with me. And I knew for a fact when that bridge was built, something

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was going to happen to Quintana. And I feel that when they started Phase 1, everybody eventually knew there would be a Phase 2 and I believe there will be a Phase 21.

You've created jobs for the residents, even a resident on Quintana worked during Phase 1. They're giving resources for our future. I mean, we've had oil shortages, we've had this shortage, we've had that shortage, you know. I mean, this is to ensure that maybe my grandchildren -- great, great, great grandchildren are warm one night because we've run out of the other resources.

You know, I don't think it's a bad thing. They've been a good neighbor. They've -- I live on the end where the ships come in. And, yes, we did have one ship that came in that was loud, and we let LNG know about it and the ship was never brought back in.

Sometimes I don't even know a ship is there. Like, it will not be there, and then I'll be inside, and you know, two hours later, I go outside and there's a ship. You know, I didn't hear that ship come in.

You know. And I feel that this is going to be built no matter how much anybody complains, and I feel that LNG has been safe. They've been up front with us, you know.

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It was asked in a meeting that was there going to be Phase 2I, and they said, "We can't guarantee that." So they didn't lie and say, no.

You know, I have daughter that has asthma. We -- we've had no attacks, you know, with LNG. And our birds are still migrating, you know. I really think that -- I'm confident that they're going to make a smooth transition.

Yes, it is a lot of people to work on the island, but I think that they are going to figure out how to make it doable. You know. And if we have a problem with it, I think they're going to try to work with us, you know.

And I don't plan on leaving Quintana, I plan on dying on Quintana. You know. And -- but I know that the future is coming, you know, and we need resources for the future. You know, so they've been a good neighbor to me. And like I said, when we did complain about the one ship, they got rid of that ship.

I was there when they built the -- the half on my end of the island. You know, I was rested assured that that was not going to be everything, because I live in reality, and I knew when that bridge was built that something was coming to take over Quintana.

But that's just my opinion. And, you know, I'm

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told they're going to work with us. And, you know, I feel safe to be out there. I'm not scared. I wouldn't have brought my grandchildren out there if I was afraid. You know. And thank you.

MR. TOMASI: Thank you very much. The next commenter on the list is Miss Laura Jones.

MS. JONES: My name is Laura Jones. And I am from Hide-a-Way on the Gulf. I'm a core member of Save our Subdivisions. We have been in quite the epic situation of trying to assure things are done right, done well, and our people are taken care of.

I've kind of -- I probably will run over, so if I need to stop at a point, I will, but I do represent a lot of people.

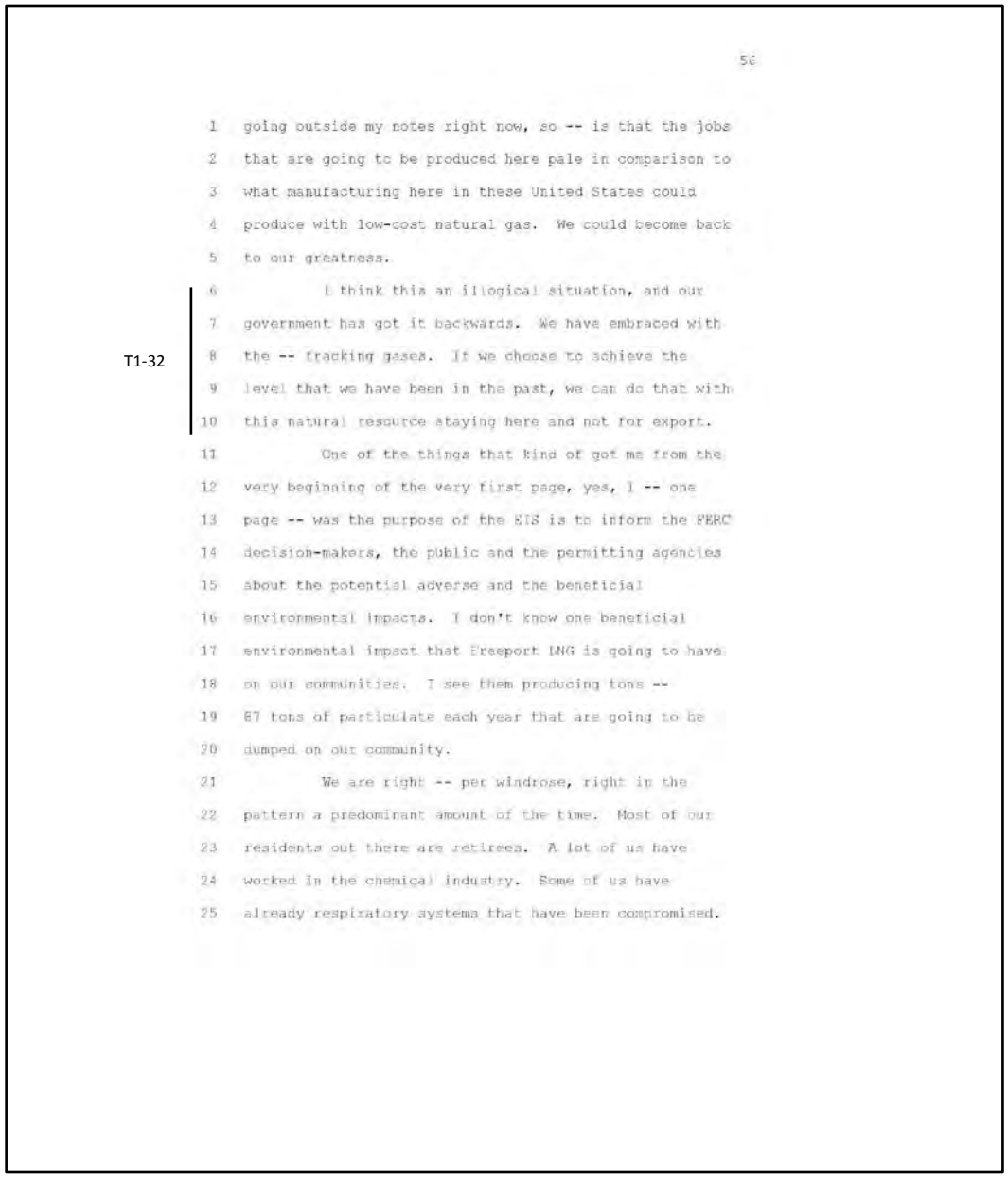
Our subdivision is going to be smack dab in the -- surrounding this chemical plant. It is a chemical plant. It is not just a facility, it is a chemical plant. It's going to be producing something, stripping impurities out for export to countries that have no free trade agreements with us.

In other words, we're going to be shipping our natural resources overseas so they can produce items to sell unfairly back to us without free trade and doing it -- trying to do it at cheaper value than we can.

The concern of mine is -- one concern is -- I'm

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going outside my notes right now, so -- is that the jobs that are going to be produced here pale in comparison to what manufacturing here in these United States could produce with low-cost natural gas. We could become back to our greatness.

I think this an illogical situation, and our government has got it backwards. We have embraced with the -- tracking gases. If we choose to achieve the level that we have been in the past, we can do that with this natural resource staying here and not for export.

One of the things that kind of got me from the very beginning of the very first page, yes, I -- one page -- was the purpose of the EIS is to inform the FERC decision-makers, the public and the permitting agencies about the potential adverse and the beneficial environmental impacts. I don't know one beneficial environmental impact that Freeport LNG is going to have on our communities. I see them producing tons -- 87 tons of particulate each year that are going to be dumped on our community.

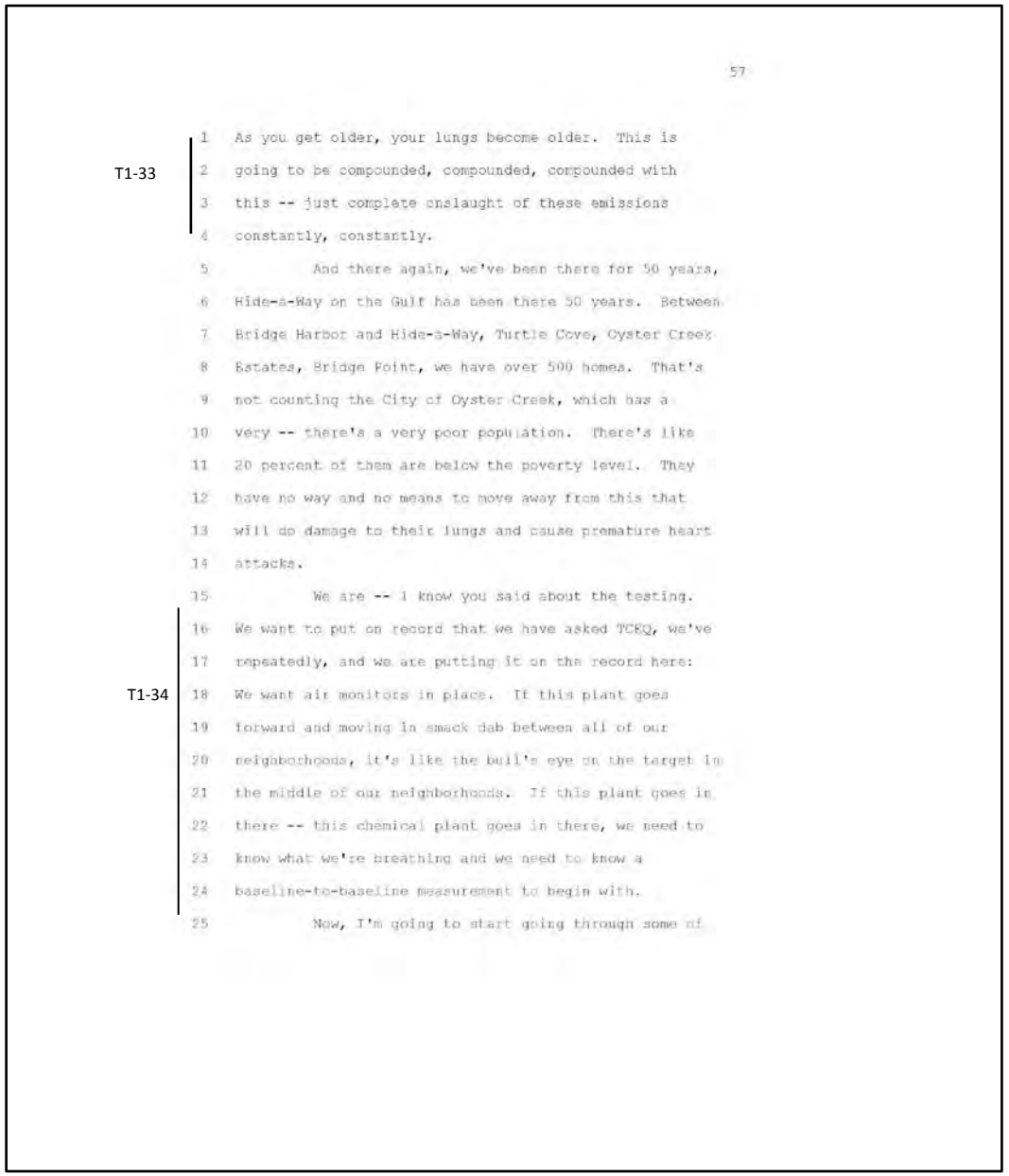
We are right -- per windrose, right in the pattern a predominant amount of the time. Most of our residents out there are retirees. A lot of us have worked in the chemical industry. Some of us have already respiratory systems that have been compromised.

T1-32

T1-32: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

TRANSCRIPT COMMENTS

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As you get older, your lungs become older. This is going to be compounded, compounded, compounded with this -- just complete onslaught of these emissions constantly, constantly.

And there again, we've been there for 50 years, Hide-a-Way on the Gulf has been there 50 years. Between Bridge Harbor and Hide-a-Way, Turtle Cove, Oyster Creek Estates, Bridge Point, we have over 500 homes. That's not counting the City of Oyster Creek, which has a very -- there's a very poor population. There's like 20 percent of them are below the poverty level. They have no way and no means to move away from this that will do damage to their lungs and cause premature heart attacks.

We are -- I know you said about the testing. We want to put on record that we have asked TCEQ, we've repeatedly, and we are putting it on the record here: We want air monitors in place. If this plant goes forward and moving in smack dab between all of our neighborhoods, it's like the bull's eye on the target in the middle of our neighborhoods. If this plant goes in there -- this chemical plant goes in there, we need to know what we're breathing and we need to know a baseline-to-baseline measurement to begin with.

Now, I'm going to start going through some of

T1-33

T1-34

T1-33: Comment acknowledged. See response T1-10.

T1-33: Comment acknowledged. See response T1-10.

TRANSCRIPT COMMENTS

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my notes here.

The -- on one page -- on page 3-6. On page 3-8, there is a graph here that says that -- listing the sites that were available that the proposed industrial use was compatible with the existing surrounding. It's not. As you said before, that's a sand pit. It's not a 24/7 noise-producing, chemical plant producing stuff. That was a thing occasionally, we may need sand, we'll operate during the day; you shut down. This is going to be, until the foreseeable future, running, contaminating, pumping out noise that's going to bother our neighborhoods -- because I can hear a wrench drop four blocks away in my subdivision when it hits somebody's driveway. I can hear conversations from four houses down. We have a very quiet neighborhood. This T1-34 is going to be a complete change in our lives now.

So we are not an industrial area. And the ambient light, we're very concerned about that. Our T1-35 houses are elevated. We're not on the ground. So we're going to be up high and be able to see this. Some of us are 12 to 20 foot above the ground on stilts. We're going to see it. It's going to be a visual impact.

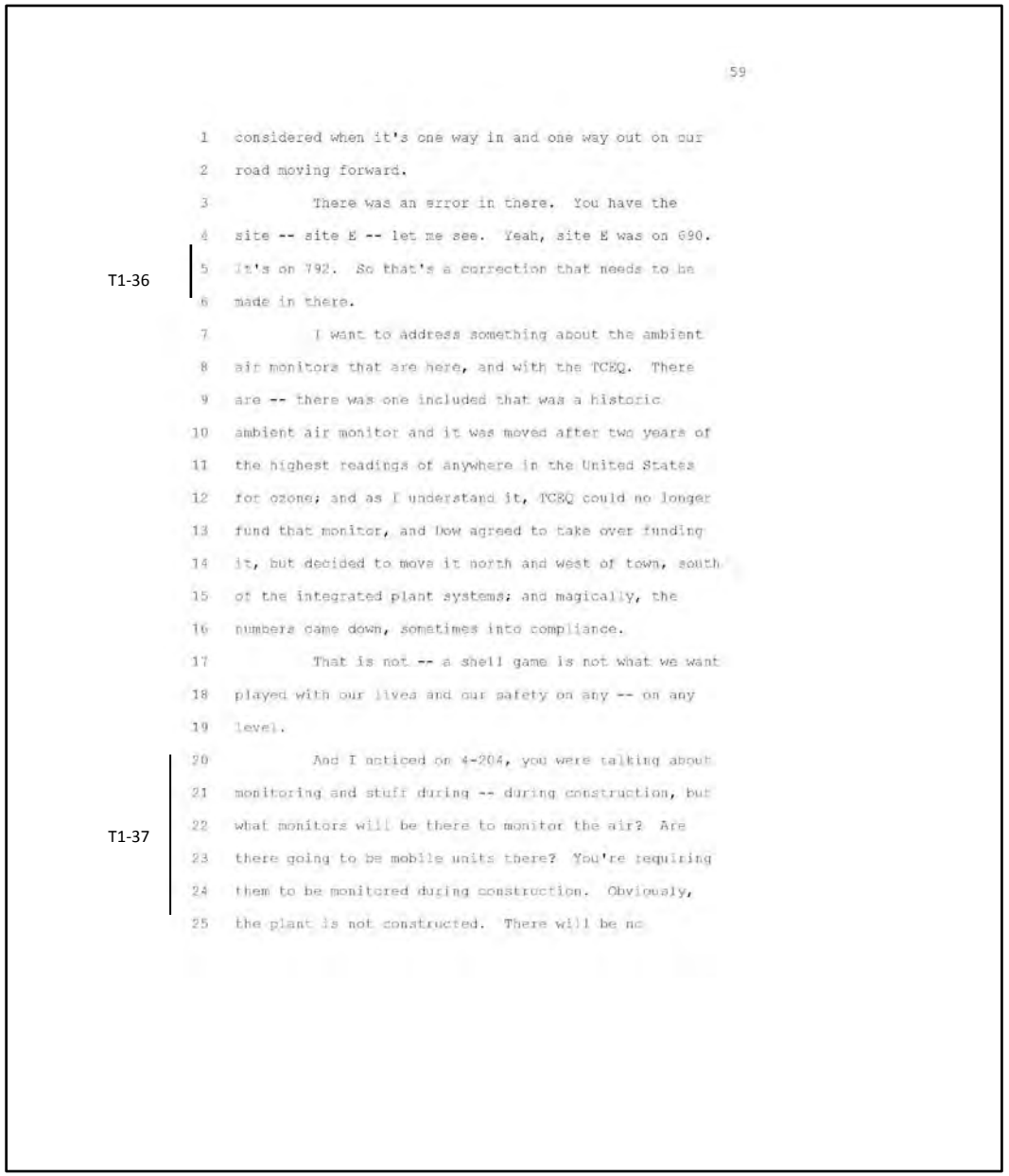
And there was -- it also says in this report that there was suitable road access on 792 at the time. And I'm just shocked at that, that that would be

T1-34: See response to T1-2.

T1-35: See section 4.7.3.

TRANSCRIPT COMMENTS

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considered when it's one way in and one way out on our road moving forward.

There was an error in there. You have the site -- site E -- let me see. Yeah, site E was on 690. It's on 792. So that's a correction that needs to be made in there.

T1-36

I want to address something about the ambient air monitors that are here, and with the TCEQ. There are -- there was one included that was a historic ambient air monitor and it was moved after two years of the highest readings of anywhere in the United States for ozone; and as I understand it, TCEQ could no longer fund that monitor, and Dow agreed to take over funding it, but decided to move it north and west of town, south of the integrated plant systems; and magically, the numbers came down, sometimes into compliance.

That is not -- a shell game is not what we want played with our lives and our safety on any -- on any level.

And I noticed on 4-204, you were talking about monitoring and stuff during -- during construction, but what monitors will be there to monitor the air? Are there going to be mobile units there? You're requiring them to be monitored during construction. Obviously, the plant is not constructed. There will be no

T1-37

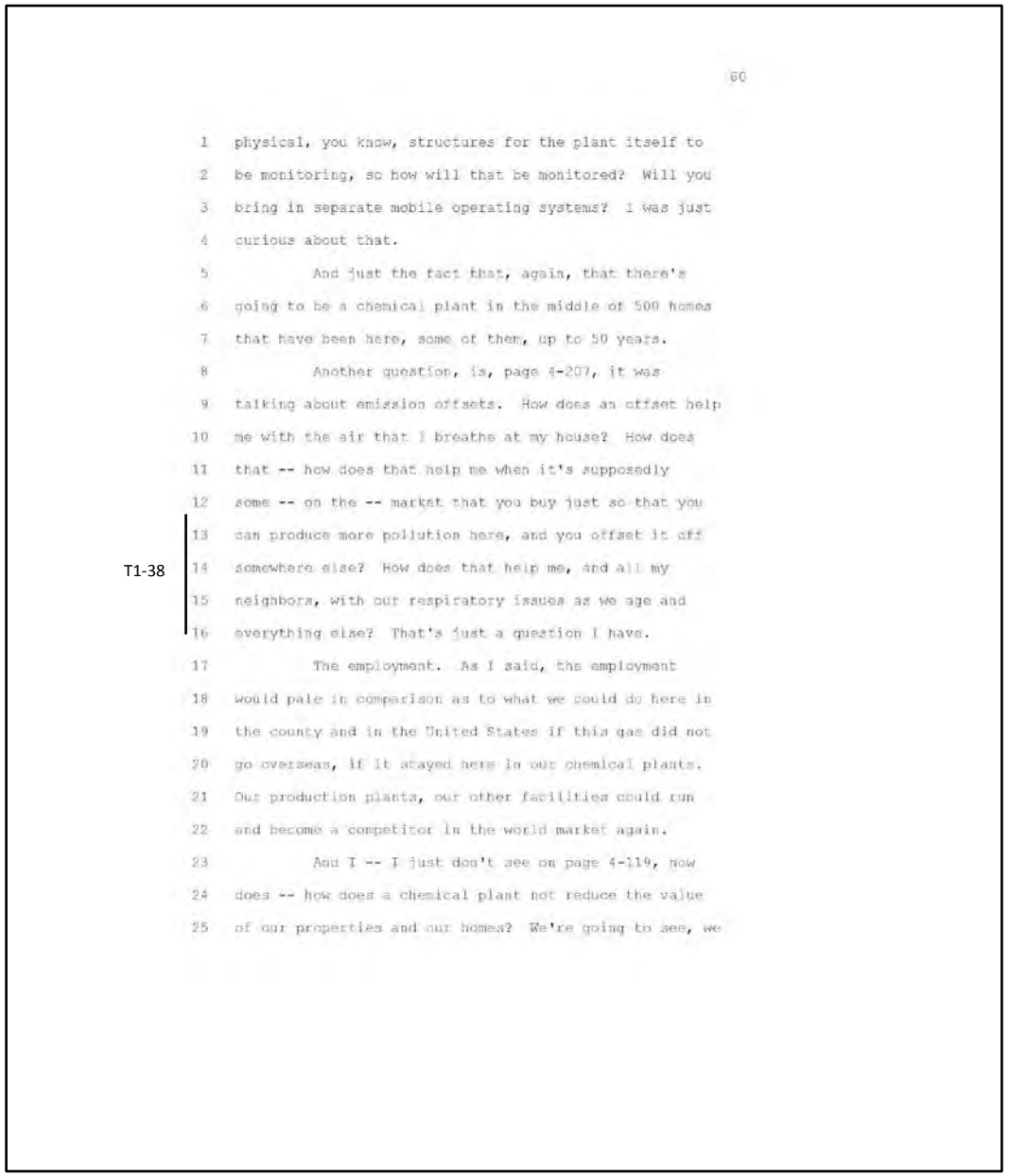
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T1-36: Comment acknowledged. See section 3.3.2.

T1-37: We would have routine environmental inspections which may include ensuring that Freeport LNG would use the mitigation measures they commit to.

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physical, you know, structures for the plant itself to be monitoring, so how will that be monitored? Will you bring in separate mobile operating systems? I was just curious about that.

And just the fact that, again, that there's going to be a chemical plant in the middle of 500 homes that have been here, some of them, up to 50 years.

Another question, is, page 4-207, it was talking about emission offsets. How does an offset help me with the air that I breathe at my house? How does that -- how does that help me when it's supposedly some -- on the -- market that you buy just so that you can produce more pollution here, and you offset it off somewhere else? How does that help me, and all my neighbors, with our respiratory issues as we age and everything else? That's just a question I have.

The employment. As I said, the employment would pale in comparison as to what we could do here in the county and in the United States if this gas did not go overseas, if it stayed here in our chemical plants. Our production plants, our other facilities could run and become a competitor in the world market again.

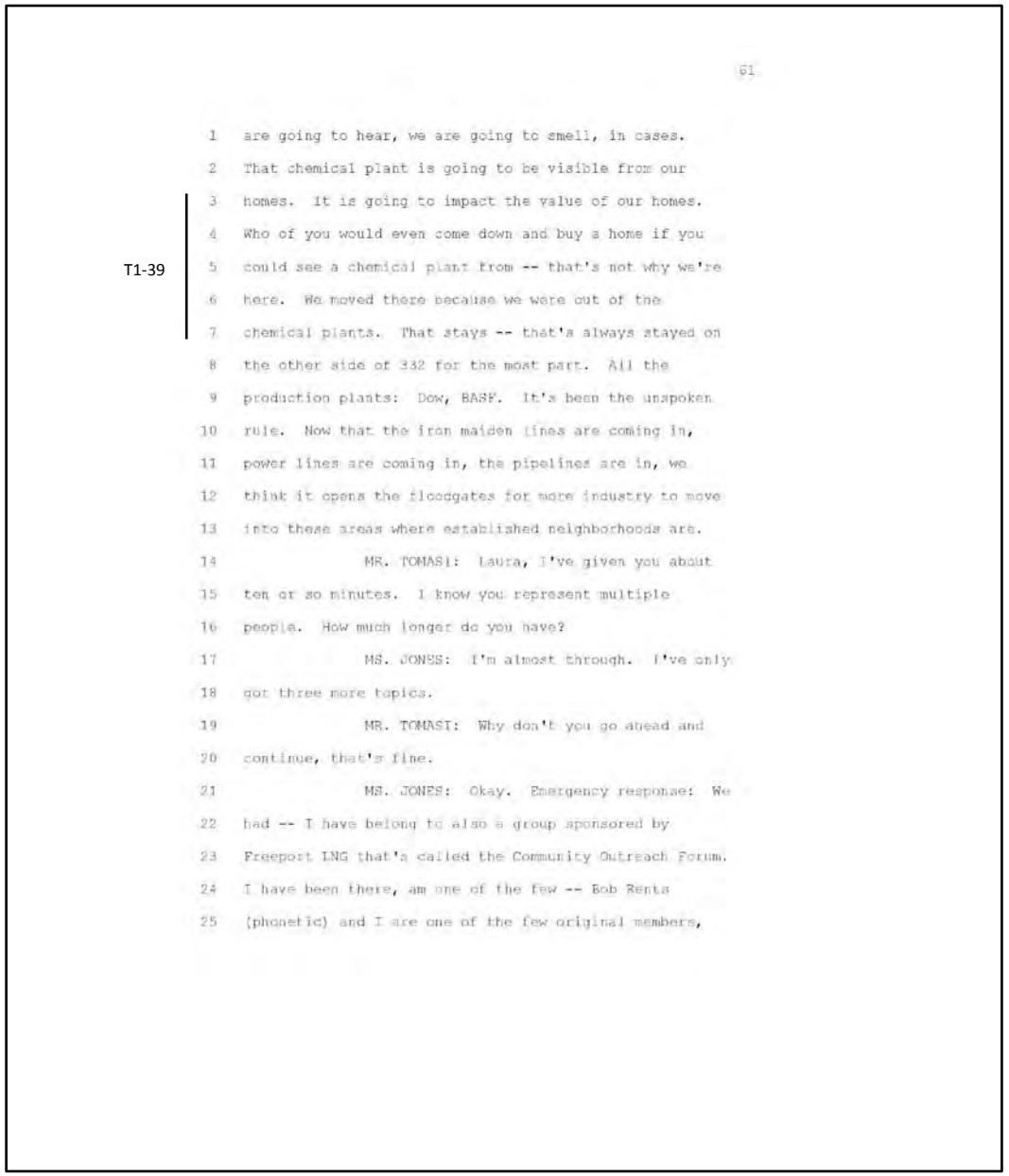
And I -- I just don't see on page 4-119, how does -- how does a chemical plant not reduce the value of our properties and our homes? We're going to see, we

T1-38

T1-38: See response to T1-10.

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are going to hear, we are going to smell, in cases. That chemical plant is going to be visible from our homes. It is going to impact the value of our homes. Who of you would even come down and buy a home if you could see a chemical plant from -- that's not why we're here. We moved there because we were out of the chemical plants. That stays -- that's always stayed on the other side of 332 for the most part. All the production plants: Dow, BASF. It's been the unspoken rule. Now that the iron maiden lines are coming in, power lines are coming in, the pipelines are in, we think it opens the floodgates for more industry to move into these areas where established neighborhoods are.

MR. TOMASI: Laura, I've given you about ten or so minutes. I know you represent multiple people. How much longer do you have?

MS. JONES: I'm almost through. I've only got three more topics.

MR. TOMASI: Why don't you go ahead and continue, that's fine.

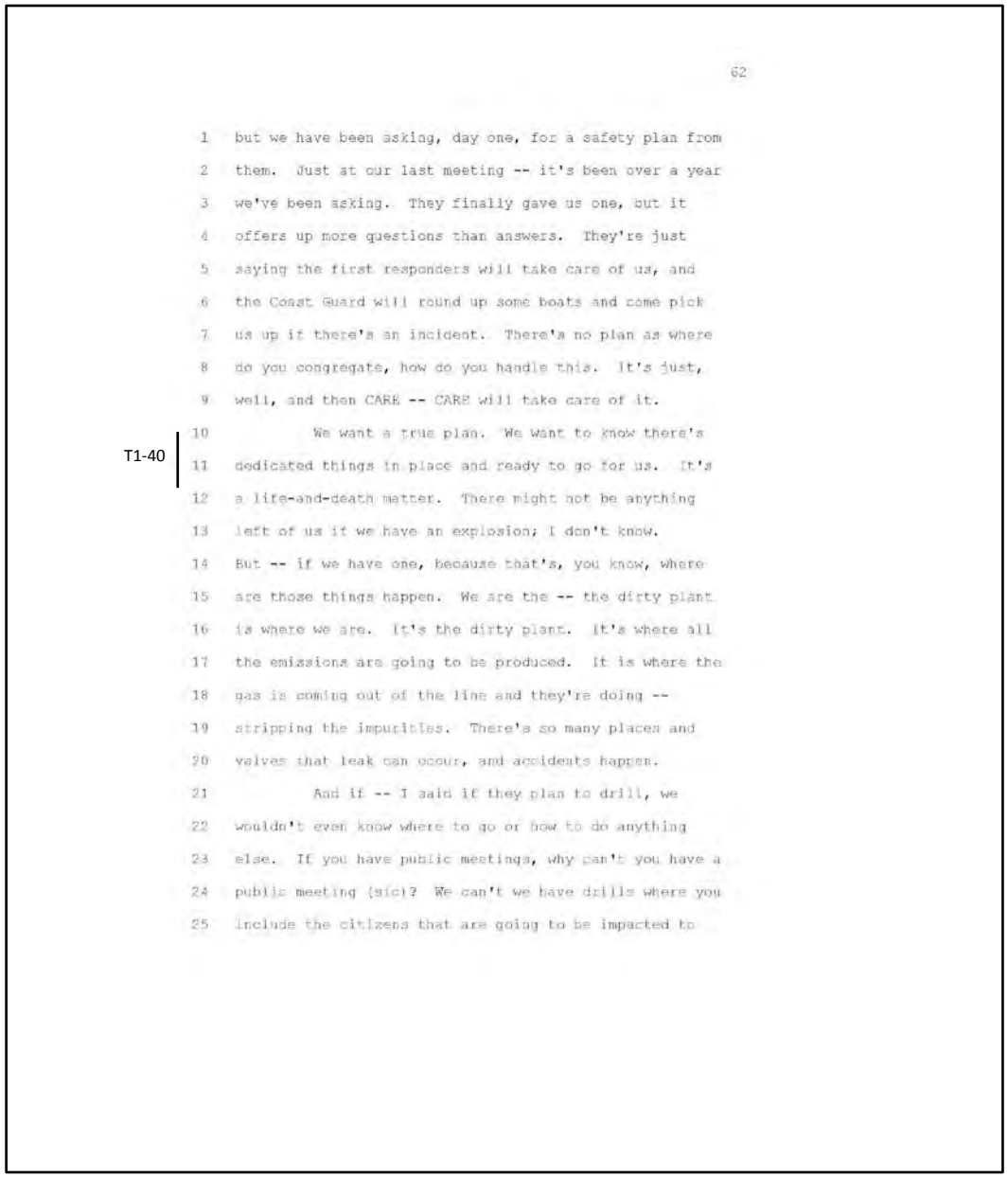
MS. JONES: Okay. Emergency response: We had -- I have belong to also a group sponsored by Freeport LNG that's called the Community Outreach Forum. I have been there, am one of the few -- Bob Renta (phonetic) and I are one of the few original members,

T1-39

T1-39: Home values are addressed in section 4.8 of the EIS.

TRANSCRIPT COMMENTS

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but we have been asking, day one, for a safety plan from them. Just at our last meeting -- it's been over a year we've been asking. They finally gave us one, but it offers up more questions than answers. They're just saying the first responders will take care of us, and the Coast Guard will round up some boats and come pick us up if there's an incident. There's no plan as where do you congregate, how do you handle this. It's just, well, and then CARE -- CARE will take care of it.

We want a true plan. We want to know there's dedicated things in place and ready to go for us. It's a life-and-death matter. There might not be anything left of us if we have an explosion; I don't know. But -- if we have one, because that's, you know, where are those things happen. We are the -- the dirty plant is where we are. It's the dirty plant. It's where all the emissions are going to be produced. It is where the gas is coming out of the line and they're doing -- stripping the impurities. There's so many places and valves that leak can occur, and accidents happen.

And if -- I said if they plan to drill, we wouldn't even know where to go or how to do anything else. If you have public meetings, why can't you have a public meeting (sic)? We can't we have drills where you include the citizens that are going to be impacted to

T1-40

T1-40: See response to T1-28.

TRANSCRIPT COMMENTS

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know what to do? I think it would be an excellent plan.

And I did discuss the population that it is, it's -- 19.2 percent are below the poverty line, and they have no way of moving. But in our situation, as I said, it's not -- we -- we've heard time and time again from Freeport LNG, well, we're not a chemical plant, and you don't really have neighborhoods.

We have 500 -- over 500 homes where this plant is going to move in the middle of it. And we -- we're not happy about that. But we need air monitors, we need a safety plan in place; and if these permits are going to go through, that is what we need to protect our people. We need to know what we're breathing.

MR. TOMASI: Thank you very much, Laura.

MS. JONES: Thank you.

MR. TOMASI: We're going to go ahead -- it's a little bit after 8 o'clock right now. We're going to go ahead and take a ten-minute break. We're going to go ahead and restart at 8:15 so everyone can stretch their legs.

We have four more speakers on the list, then I'll take questions.

(Short break 8:06 to 8:17 p.m.)

MR. TOMASI: We're going to go ahead and start for the next commenter. And also, we magically

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got two more commenters during the break. So we're going to go ahead and start with Diana Stokes. Diana?

MS. STOKES: My name is Diana Stokes, S-T-O-K-E-S, and I'm a resident of Hide-a-Way on the Gulf. And I'd like to start tonight with a quote that I found: "No matter how good your equipment, no matter how tight your maintenance and training programs, no matter how carefully you operate, when you operate equipment, you will have spills and leaks."

That quote is attributed to Freeport FLNG, right off their official website.

Even though FLNG admits there's a real possibility for accidents in their plants, and as we have seen recently in Plymouth, Washington, explosions in LNG facilities do occur. The blast in Washington state seriously burned one worker, injured four others and forced the evacuation of residents within a 2-mile radius of the plant.

While the exact cause of the accident has not been determined, it's clear an explosion and fire in a gas pipeline occurred and this caused a chain reaction.

This illustrates the potential for a catastrophic event in LNG plants. Some experts who helped develop the LNG hazard models for the federal regulators now admit the risk of locating these plants

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near populated areas.

This scenario is alarming for those of us residing in the neighborhoods of Hide-a-Way on the Gulf, Oyster Creek Estates, Turtle Cove, Bridge Point, Bridge Harbor and the City of Oyster Creek. These are the communities and neighborhoods surrounding the Freeport FLNG pretreatment plant, and all are well within a 2-mile radius of the proposed location.

According to U.S. census data, Oyster Creek, Texas, has a population of 1,139 residents with 277 of its citizens living below the poverty level. The unincorporated neighborhoods of Hide-a-Way, Oyster Creek Estates, Bridge Point, Turtle Cove and Bridge Harbor contain approximately 500 homes and hundreds of residents. Many of us are elderly, retired and living on fixed incomes.

Freeport LNG's initial application stated that T1-41 the land required for their project for the pretreatment plant would be located in an industrial area. This is not the case. The land they acquired for the pretreatment plant is in a largely residential area.

While there's industry down the road, it's not located in the middle of our neighborhoods like FLNG's proposed plant.

Freeport's choices for a pretreatment plant

T1-41: Comment acknowledged.

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pose a threat to our health, our safety and the welfare of hundreds of south Brazoria County residents.

While many of us in Hide-a-Way and Oyster Creek Estates felt great relief when the initial site was changed and located to County Road 690 just because it's going to be less unsightly for us, does not mean that it's going to be less dangerous. In reality, this is a chemical plant located about one and a half miles away from the last street in Hide-a-Way and it's much, much closer to Turtle Cove and the City of Oyster Creek.

Natural gas will arrive at this pretreatment plant via a 42-inch high-pressure pipeline. It will undergo a process stripping it of impurities. The impurities will then be released into the air that we breathe or stored for later disposal. After the stripping, it will then be streamed to Quintana in the continuing 42-inch pipeline for further processing.

All of this is occurring in the middle of neighborhoods established long before Freeport FLNG. Recent events that shown us explosions can occur at LNG plants. Freeport FLNG even concedes that safety measures and training cannot prevent all accidents. If this is the case, then why did Freeport FLNG even consider constructing the facility in the middle of residential neighborhoods? And why would our local

T1-42

T1-42: See section 4.10.4 for siting requirements.

TRANSCRIPT COMMENTS

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elected officials turn a blind eye to the constituents who could become potential victims? And why would you, FERC, permit a company to build a potentially lethal plant in the middle of where U.S. citizens live?

Freeport FLNG officials will not even acknowledge that the nearby residents live in neighborhoods. They also would not acknowledge that they need a means to warn us of potential danger or that they have a responsibility to develop a specific evacuation plan to ensure our safety.

According to Mark Mallett, Freeport FLNG vice-president, if we're worried about notification during plant emergency, then we need to preregister our phone numbers with the local CARE agency and wait for the phone call.

Their claims of state-of-the-art equipment and construction techniques using the latest industry modeling theories are just that, theoretical. We, the residents of the surrounding neighborhoods, are not theoretical people. We are real, flesh-and-blood people living in real-time. To protect the health, safety and welfare of hundreds of local residents, I urge FERC to

T1-43

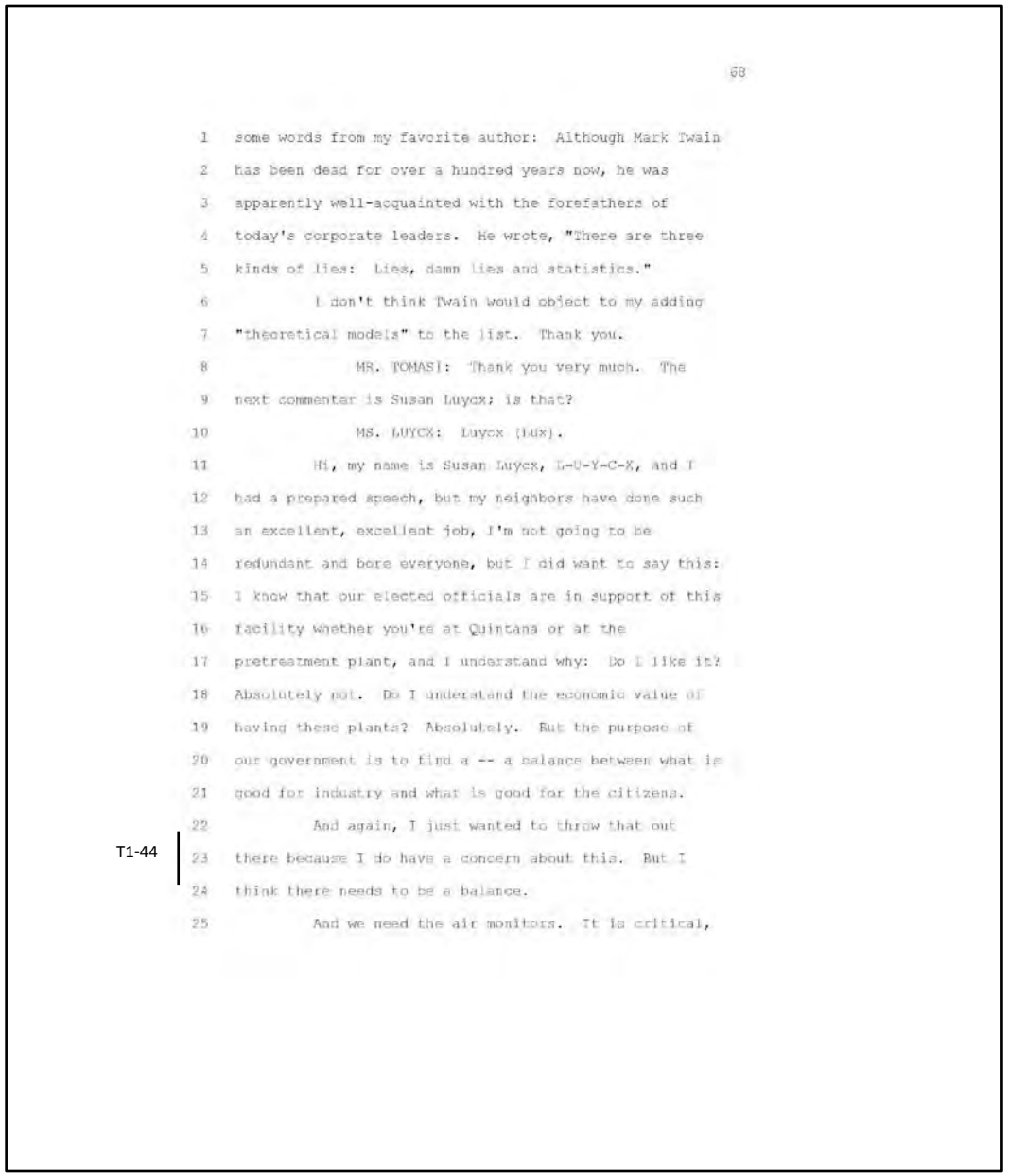
reject FLNG's permit to construct a pretreatment plant at its current location.

Now, in closing, I'd like to share with you

T1-43: Comment acknowledged.

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some words from my favorite author: Although Mark Twain has been dead for over a hundred years now, he was apparently well-acquainted with the forefathers of today's corporate leaders. He wrote, "There are three kinds of lies: Lies, damn lies and statistics."

I don't think Twain would object to my adding "theoretical models" to the list. Thank you.

MR. TOMAS]: Thank you very much. The next commenter is Susan Luycx; is that?

MS. LUYCX: Luycx (lux).

Hi, my name is Susan Luycx, L-U-Y-C-X, and I had a prepared speech, but my neighbors have done such an excellent, excellent job, I'm not going to be redundant and bore everyone, but I did want to say this: I know that our elected officials are in support of this facility whether you're at Quintana or at the pretreatment plant, and I understand why: Do I like it? Absolutely not. Do I understand the economic value of having these plants? Absolutely. But the purpose of our government is to find a -- a balance between what is good for industry and what is good for the citizens.

And again, I just wanted to throw that out there because I do have a concern about this. But I think there needs to be a balance.

And we need the air monitors. It is critical,

T1-44

T1-44: Comment acknowledged.

TRANSCRIPT COMMENTS

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critical to the economic value. So I mean, you have your industry, then you have your residential areas. And then there's got to be a way that they can coexist together with reasonability. I just hope that all parties can understand that and come to some happy medium that can make every -- so that we can live with the outcome. I would hate to see southern Brazoria County, to be quite honest with you, come to sluma, because I think that's what will happen down the road. And then we lose our value, our property values, and that is a -- a big concern.

Unlike some of the residents, I have not been a lifelong resident of southern Brazoria County. I married into southern Brazoria County, so -- but this is home to me, and I want to -- I want to die here like the rest of the long-time residents.

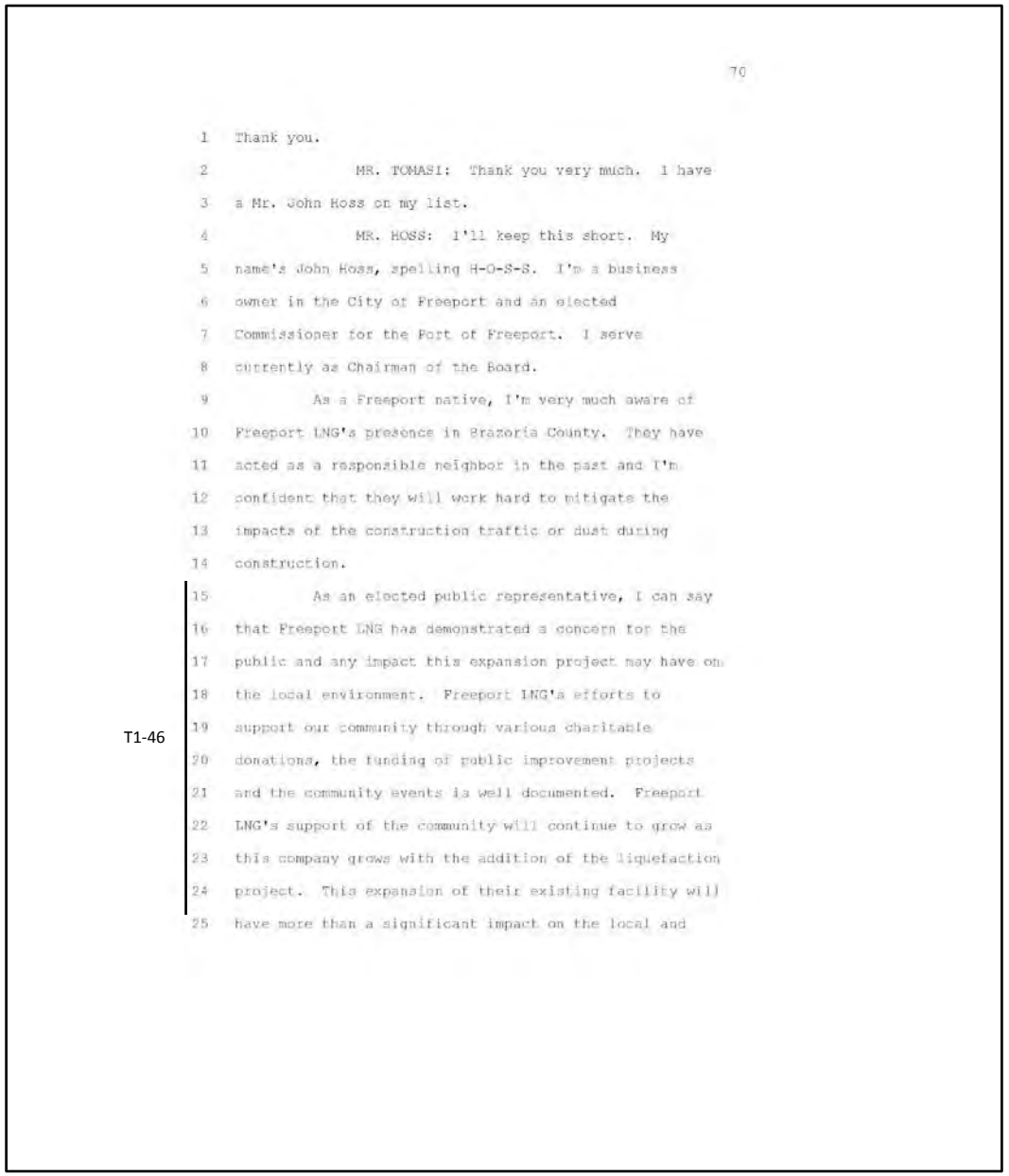
But there has to be a happy medium that we find here, and I don't know if what the Commission is going to do or what the recommendations from you guys are going to be, or if everything in this report -- because to be quite honest, a lot of that in that report is over my head, and I'm not going to B.S. you into any other thing; it's over my head. But I do know people, I do know business, and I do know elected officials. There has to be a balance. And that's all I'm going to ask.

T1-45

T1-45: Comment acknowledged.

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Thank you.

MR. TOMASI: Thank you very much. I have a Mr. John Hoss on my list.

MR. HOSS: I'll keep this short. My name's John Hoss, spelling H-O-S-S. I'm a business owner in the City of Freeport and an elected Commissioner for the Port of Freeport. I serve currently as Chairman of the Board.

As a Freeport native, I'm very much aware of Freeport LNG's presence in Brazoria County. They have acted as a responsible neighbor in the past and I'm confident that they will work hard to mitigate the impacts of the construction traffic or dust during construction.

As an elected public representative, I can say that Freeport LNG has demonstrated a concern for the public and any impact this expansion project may have on the local environment. Freeport LNG's efforts to support our community through various charitable donations, the funding of public improvement projects and the community events is well documented. Freeport LNG's support of the community will continue to grow as this company grows with the addition of the liquefaction project. This expansion of their existing facility will have more than a significant impact on the local and

T1-46

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T1-46: Comment acknowledged.

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regional Texas and U.S. economy.

Currently, Port Freeport impacts the Texas economy by nearly $10 billion annually. Freeport's -- Freeport LNG's export facility will increase that number. This project brings jobs to our community, more than 3500 workers will be employed during the four- to five-year construction period; and over 160 new full-time employees will be hired to manage, operate and maintain the expanded facilities. Those will be local people.

Many local residents have significant ties to and in appreciation for manufacturing in the oil and gas industry in this area and in this region. Various local residents work in and rely upon the economic development generated by these local industries.

Port Freeport is partnering with all of the industries in the region to promote job growth while being good stewards of the environment. We're very sensitive to this.

I personally support Freeport LNG's project. I thank the citizens for taking an interest in their community and showing up tonight and voicing their opinions to you. And I thank you for accepting the comments. Thank you.

MR. TOMASI: Thank you very much. The

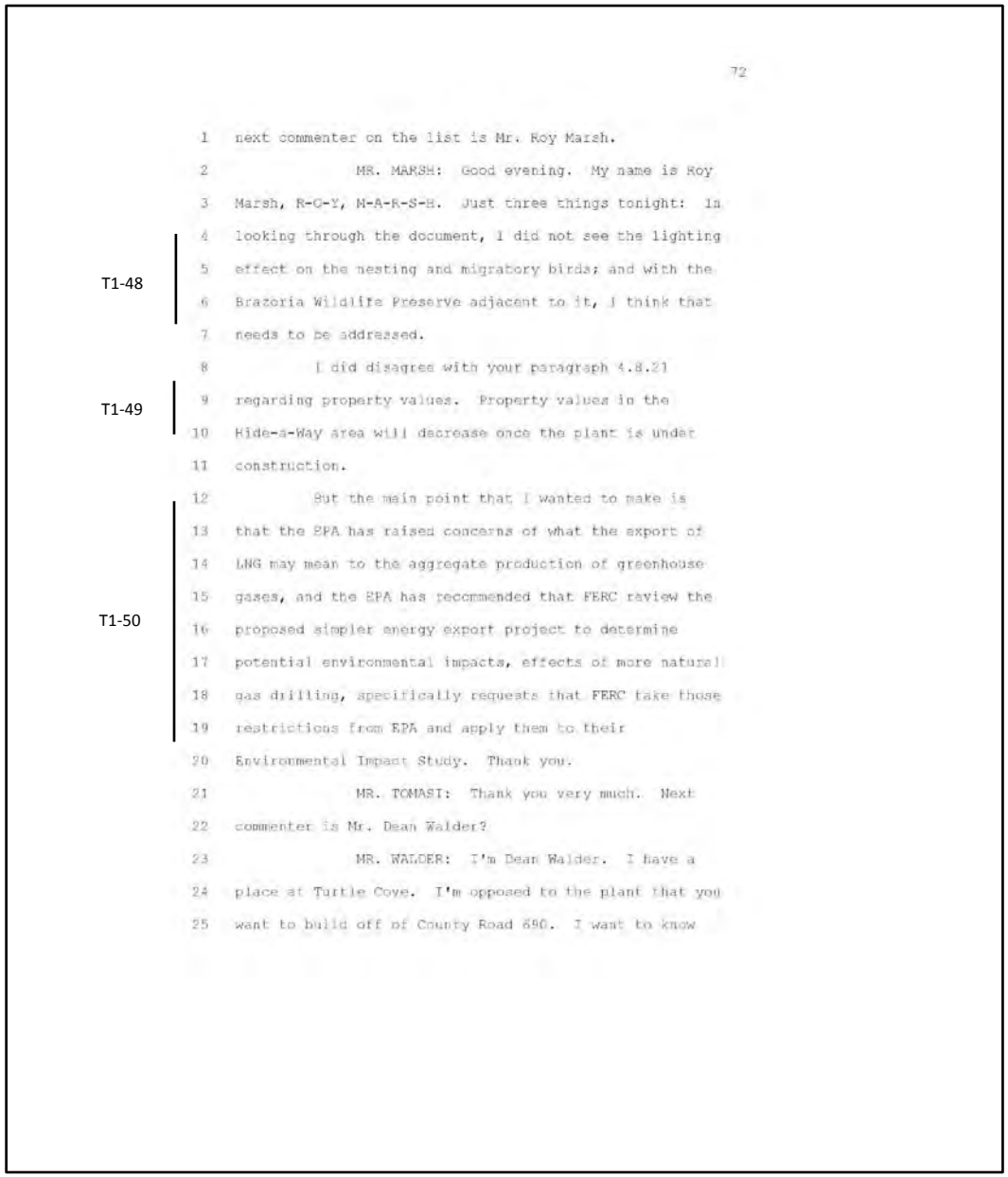
T1-47

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T1-47: Comment acknowledged.

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next commenter on the list is Mr. Roy Marsh.

MR. MARSH: Good evening. My name is Roy Marsh, R-O-Y, M-A-R-S-H. Just three things tonight: In looking through the document, I did not see the lighting effect on the nesting and migratory birds; and with the Brazoria Wildlife Preserve adjacent to it, I think that needs to be addressed.

I did disagree with your paragraph 4.8.21 regarding property values. Property values in the Hide-a-Way area will decrease once the plant is under construction.

But the main point that I wanted to make is that the EPA has raised concerns of what the export of LNG may mean to the aggregate production of greenhouse gases, and the EPA has recommended that FERC review the proposed simpler energy export project to determine potential environmental impacts, effects of more natural gas drilling, specifically requests that FERC take those restrictions from EPA and apply them to their Environmental Impact Study. Thank you.

MR. TOMASI: Thank you very much. Next commenter is Mr. Dean Walder?

MR. WALDER: I'm Dean Walder. I have a place at Turtle Cove. I'm opposed to the plant that you want to build off of County Road 690. I want to know

T1-48

T1-49

T1-50

T1-48: As noted in section 4.5.3.1 we have looked at the potential impacts from facility lighting on wildlife and have concluded that, given Freeport LNG's mitigation efforts and the Freeport LNG Facility Lighting Design Plan (FLDP), impacts to migratory and non-migratory birds would be minor. Section 4.5.2 addresses the Brazoria National Wildlife Refuge.

T1-49: Comment acknowledged.

T1-50: See response to T1-32.

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if -- I don't know if you have physically been there and seen the site. You have? Okay.

MR. TOMASI: Yes, I have been at the site more than once. But I will also be there tomorrow again. I'll meet over -- again, I want to announce I'll meet at Hide-a-Way, but will be going over to the site again.

MR. WALDER: Very good. Thank you.

MR. TOMASI: The next commenter is Miss Colleen Weaver.

MS. WEAVER: Colleen Weaver. C-O-L-L-E-E-N, W-E-A-V-E-R.

Hi, I live in Turtle Cove and my house backs up to County Road 690. We call it Levy Road. And I was the person who got the petition asking them not to run the power lines along Levy Road, and I don't know if they even considered it or not, but they actually -- from what I can tell, they chose 332 as the route to run the power for this plant. I don't know if that's finalized or not.

But when I was gathering the 189 signatures that I gathered for that, many of the people who signed that don't live here. They just come to the beach because they like the beach. It's one of their recreational spots. And many of the people who signed

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that expressed the wish that they didn't feel that the liquefaction plant is right there at all. And I'm of that opinion. I would prefer that it not be built off County Road 690 or 7 -- whatever it was, the 792 or whatever.

But there were a few issues that I wanted to just basically question, because when they built the 42-inch pipeline that's existing, I believe it was first a 36 proposed, and then when that was approved, then it jumped up to a 42, got that approved. And I talked to the foreman who was building that, and he didn't really want to tell me where he was from at first, because he wasn't from the State of Texas, and his crew wasn't from the state of Texas. So I'm thinking that, sure, that it will bring jobs to the area, but not necessarily to Brazoria County residents. It will bring people who will work, but primarily, they will be from other states.

T1-51

Also, the noise pollution, the light pollution and the chemical pollution is a concern for me since I live so close. I mean, I could actually walk to it pretty quickly.

And then also, the pipeline runs right behind my house in the water there, little slough, and I'm wondering -- from what I read, I didn't understand most

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T1-51: See section 4.8.2 of the final EIS.

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of it, but I -- from what I read in the book, it said that there were at least four or five different pipelines that were going to need to be run, and I'm wondering that could possibly take my home, because you can't live within -- I understand 15 feet of a pipeline, and there's not a whole lot of space down there. So unless they have some way of stacking it or whatever, I'm concerned that they might eminent domain because they stack them and keep stacking them side by side, and then here we go, our houses are gone.

MR. TOMASI: Let me address the eminent domain issue right now. This pipeline will not have the ability to do eminent domain. It's a legal reason. It's a Section 3 pipeline as opposed to a Section 7 pipeline. Section 3 pipelines do not have the ability for eminent domain. In addition, the pipeline will be run in the same pipeline corridor that's there now. So it may still be closer to your home, but it won't -- they will not have any right of eminent domain on the federal level that a --

MS. WEAVER: At this time, but --

MR. TOMASI: No, no, not at this time. I mean, this type of pipe simply does not have -- does not give them legal ability to try to obtain eminent domain of any -- you know, on the federal level. So that just

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simply can't happen due to the federal rules.

MS. WEAVER: Well, that's good to know.

MR. TOMASI: I wanted to clear that up. It had come up before. I just wanted to make sure that that was clear. Like I said, the five pipelines will be in the existing corridor that's there. Some of it will be in the same trench. Some of it is like -- not electric lines, but communication lines, too, so.

Thank you.

MS. WEAVER: Well, I am concerned because I don't -- I live on stilts, and I can see -- you know, that's a beautiful sunset. That's a nice westerly sunset. The birds, you know, migrating birds and stuff come through that there, you know. It's a really lovely place to live. I mean, there's alligators in the water and stuff like that, and fish, and it's a variety of bird life that people -- you know, you've seen them on the levy, stop, and I've asked them, "What are you doing?"

"Oh, we're looking for such-and-such a bird."

You know, we're getting -- you know, birders

T1-52 come down there. It's a really beautiful place, and I hope that the FLNG doesn't destroy that. Thank you.

MR. TOMASI: Thank you very much.

The next commenter is Mr. Gilbert Muir.

T1-52: Comment acknowledged.

TRANSCRIPT COMMENTS

T1 – Freeport LNG Transcript from Public Meeting

MR. MUIR: That's M-U-I-R. I am here to tell you I'm very opposed to this thing being built right here. I think it's a very, very bad place to build one. I own two houses in Turtle Cove, one is in the planning stage right now of being built as my retirement home, where I'm going to bring my kids and grandkids down there. I have enough land to build another house.

After y'all build this site, my property value will go down, and the dust is going to be terrible. Instead of looking at the moon, I'll look at a flare. Instead of listening to a dog barking, I'll listen to a pop-off valve reset and everything else like that.

So I am very opposed to what y'all are doing right now. Very bad place to put it.

MR. TOMASI: Okay. Well, we've reached the end of the speaker list, so I wanted to go ahead and see Mr. -- I think the first one was Mr. Doty? Was -- do you want to --

AUDIENCE MEMBER: There was somebody else.

MR. TOMASI: Mr. Pratt, were you first?

MR. PRATT: Harold, go on. I don't care.

MR. DOTY: I'll be brief.

MR. TOMASI: Okay.

MR. DOTY: I don't want to go through this

T1-53

T1-53: Comment acknowledged.

TRANSCRIPT COMMENTS

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and totally pick it apart. The City of Quintana has hired some legal experts in these -- in environmental studies who hopefully will be filing some responses to this on our behalf. But I do kind of wonder about the general validity of the document when I read in the first part that -- in the executive summary -- let me see if I can quote that directly.

That they received a bunch of petitions --

MR. TOMASI: I think I know what you're going to say. There is a mistake in the document in there. That will be fixed.

MR. DOTY: Right. The second letter disavowing the petitions --

MR. TOMASI: That was actually a reference more to -- and that was a mistake on our part. And again, I -- you know, where I think the City of Quintana actually filed some letters and some opposing -- and there were several landowners had filed letters basically saying that, no, this does not represent our opinions.

And unfortunately, that got conflated to the other -- the other petition, and again, that's a mistake which we'll fix, and I realize that.

MR. DOTY: And the other thing is just kind of a general overall feel to this, that in the

TRANSCRIPT COMMENTS

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document -- and I know you modeled it quite a bit after one FLNG filing -- they filed lots and lots and lots of paperwork, so there was lots to choose from.

But basically, any benefits and any impact is -- always seems to start off with taking Brazoria County as a whole. Well, Quintana is an island, is a town on an island. And basically, this plant is going to be right in the middle of our town surrounded by three -- on three sides by our town, the other side being the Intercoastal Canal.

I mean, you're basically taking over the whole town. I mean, it is the idea. And I don't know how you can ignore that as an environmental impact. I mean, it may -- it may not have much impact to the County Commissioner's Court in Angleton. What do they care? "Hey, we're bringing some money in. We got trailer parks full." You know, this is wonderful. Everybody's happy with making money.

But basically, Quintana's going to be destroyed in the process. I don't know how you can ignore that as an impact. I'd like to see a lot more about the actual impact of this on the town of Quintana, which I remind you again, is the oldest city in Texas. It is the original settlement. Thank you.

MR. TOMASI: Thank you very much,

T1-54

T1-54: Comment acknowledged. We acknowledge in the EIS that there will be significant and unavoidable adverse impacts on the town during construction and we discuss impacts of Freeport LNG's purchase program section 4.8 of the EIS.

TRANSCRIPT COMMENTS

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Mr. Doty. Mr. Pratt?

MR. PRATT: Okay. Thank you. I didn't explain earlier, I'm Robert Pratt. I'm also the Property Owner Association President for Turtle Cove. So I am trying to speak for more than just myself. They like for me to talk because I talk a lot.

The first two points I talked about was the siting and the noise. Third point I'd like to talk about is the view. It's specifically addressed in the appendix, what this facility is going to look like back on -- back on the theoretical views of figure 8-11.

Nobody drives to the end of Stringfellow Road and looks out there. Stringfellow Road is -- there's nothing out there. As you can see in this figure 11, that is a very large facility. It's a very tall facility. If you -- if you've got the picture, right behind that bulldozer, between the pipe rack in the back, you can see the levy back there. It's very clearly obvious this facility is far taller than the levy. The levy's elevation is supposed to be 18 feet. Many of these vessels are going to be 70, 80 feet tall, just looking at comparative scale that we've got here in this picture.

But if you turn to the next page, it's blank. The view from the other side of the levy is going to be

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T1 – Freeport LNG Transcript from Public Meeting

considerably different now. A lot of us see that view every day. When I sit on my deck and look over to the right to see the Martin house and see what's going on down at the pool, I'm going to see the plant. That view is going to significantly change for me.

Which leads us to the next point is: What does it do -- oh, wait a minute. In the document, there is also the comparison of this facility, the pretreatment facility and FLNG, with all the other ongoing work in the area. This is a big project. It's a very large project. There are many large projects going on in the area. Every one of the large projects going on in the area are being built at existing facilities. They're being built in existing plant sites. They're being built in areas where they're not having immediate detrimental impact on the people nearby.

This is moving to totally new ground, which leads me to the point about what it's going to end up doing to your property values. For us, it -- related to the pretreatment facility, there's no doubt that what people might have thought of us before as a nice little community way out in the boonies and on the waterfront where they could bring their boats, that was really cool till there's a plant right next door.

I know folks at Hide-a-Way have much more

T1-55

T1-55: See response to T1-39.

TRANSCRIPT COMMENTS

T1 – Freeport LNG Transcript from Public Meeting

expensive homes than we have over at Turtle Cove, but I'll promise you, it's all I've got. And the people that live there, it's all they've got. It might be their retirement home. Gilbert's talking about he wants to build another home. I'm pouring my life into an area that is now going to very easily be reduced in value by the siting of this facility right next door.

Another part that has not been addressed by anybody that I've heard -- so I'm going to skip the ones that have been addressed -- is in this document. It says we're going to have 200 ships a year. For Bridge Harbor, for Turtle Cove, for Hide-a-Way, for Kirby Marina, for everyone that lives on the waterfront, 200 ships a year is going to kill us.

I don't know if any of you have ever been in a boat trying to leave a harbor -- we've only this happen a few times because they never really got any ships -- but when it did happen, what happened is our entire harbor shuts down. The Coast Guard comes zooming out in their little fast patrol boats that were subsidized by LNG in the beginning. They blow the boat sideways in front of you and point an M-16 machine gun at you. Have you ever had that happen? It's really ugly. I'm a captain. I'm a licensed captain operating a flagged U.S. vessel, and when a foreign ship comes into the

T1-56

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T1-56: Comment acknowledged. The U.S. Coast Guard (Coast Guard) is the federal agency responsible for determining the suitability of waterways for LNG marine traffic.

The ships traffic impacts were addressed in the original Phase I final EIS and the Phase II environmental assessment. We have additional discussion in section 4.8.6 of the EIS.

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port, the U.S. Coast Guard throws themself sideways in front of me and points a machine gun at me.

How many people are going to continue to come here to go fishing if 200 out of the 360 days year that they have an opportunity to go fishing, somebody comes and points a machine gun at them? This is totally bad for the fishing industry here. Freeport may not be Miami Beach, but it is a sport fishing community compared to some of the other areas along the Texas coast.

T1-56 cont'd

And that reflects in the property values, also. Why would anybody want waterfront property in an area where you can't use your boat without people hassling you every time you go?

Another point here in the book that really concerns me is the water. We at Turtle Cove, if you average out our peak during the winter versus our peak during the summer, the 68 properties there use about 10,000 gallons a day.

Hide-a-Way is twice as large, 2 and a half times as large. They're probably going to be using about the same.

The City of Oyster Creek -- the well sites are all in there. You saw where they are.

The thing that's made very clear in here is

TRANSCRIPT COMMENTS

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that we're all going to be pulling off of the same aquifer.

And some people have the impression that an aquifer is a lake underground. It's not a lake underground, it's a big sponge, all right? And whoever sucks on the sponge the hardest is going to get the water.

We have small wells, we have small communities. We're doing the best we can with the wells we've got, and Freeport LNG is wanting to come in and suck more water for their plant operation in a day than all of our communities combined.

Their backup plan is they're going to get water from Dow. It's very obvious with what's going on with Dow, they're having to build reservoirs to have enough water to take care of themselves. I don't know how they think they're going to get water from somebody who's already having trouble getting water for themselves. So that's not a viable backup plan for water. And the ability to suck the water out of our aquifer that's going to knock us trying to fight against a huge capacity well is going to be adverse to our water supply.

In the document, there's also the discussions of workforce and housing. I run the two of those

T1-57

T1-57: See Section 4.3.2 for a discussion of potential impacts to groundwater from Project construction and operation.

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together, because I'm currently working on one of these mega-projects here. Right now, we're headed to 3,500 people, also. Right now, we're at 1,200. It's not real big yet. There's no place to live. In here, there are statements about the available houses and the number of houses available, and oh, somebody's building an 85-room hotel.

I'm working with guys every day that are begging me -- because I'm a local -- to tell them, "Where can I find a place to live?" All the RV parks are filled up. All the rental properties are filled up. There's people telling me that right now, the best they can find of anyplace to live is a little fleabag, one-bedroom place for $250 a week. I have had guys coming to me and asking me where they can find a place to live. They are commuting from an RV park almost in Bellville because the RV parks all the way up the road are filled up.

There's no place left to build RV parks right now. There's plenty of people out looking. There's people trying. But you don't just pop up an RV park -- and I'm sorry, those aren't really great additions to the community. That forces an extremely large amount of long-distance commuting, which is bad for our traffic.

In the document, it makes a comment that it

T1-58

T1-58: Comment acknowledged.

TRANSCRIPT COMMENTS

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should not adversely impact traffic. We have the workforce right now trying to park over at the end of Dixie Drive that's about 1,200 people -- 11, 1,200 people. The guys are telling me every day it takes an hour to get out of the parking lot. That's one site with a thousand. That site's going to grow to 3,500. This site's going to grow another 3,500, with the idea that they're going to pull 50 percent of their workforce from the general public of our existing area.

T1-58 cont'd

It's not going happen. The workforce is not there. All of this workforce -- not 100 percent, obviously -- easily 70, 80 percent of this workforce is going to have to come from somewhere else. There's no work force available here.

I work out there. I've been in construction management for 18 years now. I know the guys that work. They're all working. All the workforce that comes in to build this is going to have to be new workforce from the outside. It is going to add a burden to our traffic, it is going to add a burden to our facilities and area, it's going to add a burden to our traffic patterns and our schools.

This says we can handle it. Document says they believe we can handle it. I -- I wonder if that's been verified with BISD, the real numbers that's going to

TRANSCRIPT COMMENTS

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occur from this influx.

The last point is one that was very disturbing to me. All along through this process, county officials, city officials, various people have gone on and on about how much they appreciate the fact that Freeport LNG is going to drive all their prime movers with electric engines -- with electric motors.

I personally thought that sounded great, too. I just got through doing some big compressor projects, and when you drive them with an electric motor, they're a lot quieter. Nobody hardly knows what's going on. It's really good.

But now, there's gas-powered turbine cogen in here. It's the first time I heard about it when I saw it in here. That -- that hadn't -- no one has talked about a turbine installation until this document came out.

It's -- I'm sure you know where it is. It's back here in appendix F. It says one combustion turbine. If you go back over in the core of the document, it explains the cogen -- it doesn't say "cogen." It says, "We're going to have a combustion turbine heat recovery system." Okay?

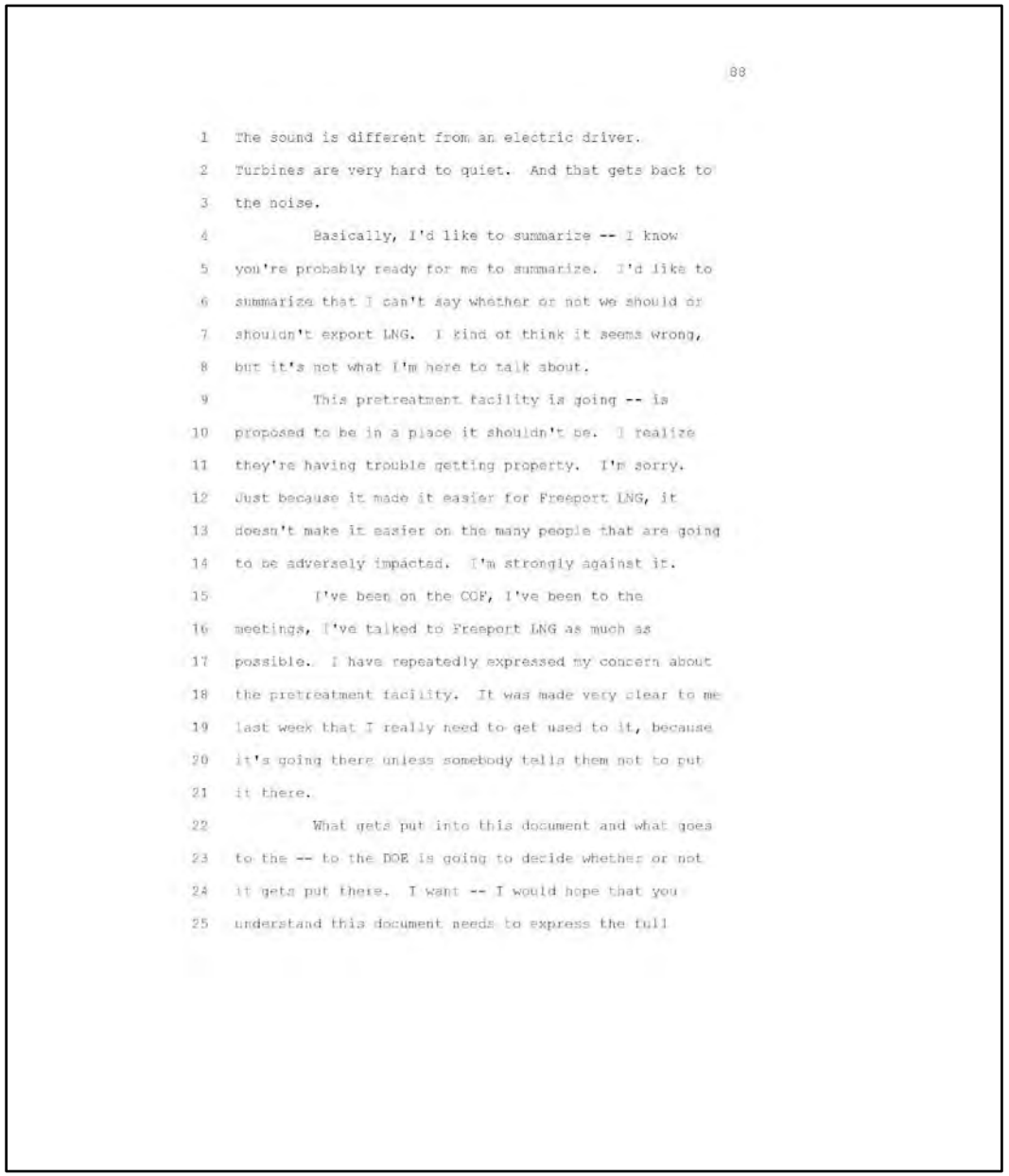
We have been told all along all the drivers were going to be electric. Electric's a lot quieter.

T1-59

T1-59: The Pretreatment Plant would be natural gas-fired. The Liquefaction units would be electric motor-driven/powered.

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The sound is different from an electric driver. Turbines are very hard to quiet. And that gets back to the noise.

Basically, I'd like to summarize -- I know you're probably ready for me to summarize. I'd like to summarize that I can't say whether or not we should or shouldn't export LNG. I kind of think it seems wrong, but it's not what I'm here to talk about.

This pretreatment facility is going -- is proposed to be in a place it shouldn't be. I realize they're having trouble getting property. I'm sorry. Just because it made it easier for Freeport LNG, it doesn't make it easier on the many people that are going to be adversely impacted. I'm strongly against it.

I've been on the COF, I've been to the meetings, I've talked to Freeport LNG as much as possible. I have repeatedly expressed my concern about the pretreatment facility. It was made very clear to me last week that I really need to get used to it, because it's going there unless somebody tells them not to put it there.

What gets put into this document and what goes to the -- to the DOE is going to decide whether or not it gets put there. I want -- I would hope that you understand this document needs to express the full

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impact on the community and why it is not the correct place to put the pretreatment facility. Thank you.

MR. TOMASI: Thank you very much, Mr. Pratt. That -- does anyone else have any? Yes.

MR. KALL: I'm sorry, I just want to make one more comment if I could. The lady over here brought up a very valid point.

MR. TOMASI: Could you repeat your name again for the court reporter?

MR. KALL: My name is Chris Kall. I live on Deep Sea Drive in Quintana. And I -- I'm kind of ashamed I didn't mention it earlier when we were talking about the safety aspect of this with -- with regards to Quintana. We have -- we have two public beaches there. You have Quintana Beach and you have Bryan Beach. So within a 2-mile radius of this plant that they're building in the middle of our town is approximately 3 miles of public beach that has only one way in and one way out. I don't know how you could put together a viable evacuation plan for that many people should something happen.

I can't, in my wildest dreams, understand. We had a simple fight took place in Surfside and it was a disaster. If something goes wrong in this plant, how do you evacuate that many public people? So it not only

T1-60

T1-60: The ERP is addressed in section 4.0.7 and 4.8.3.1 of the EIS.

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affects the folks there in Quintana, it affects anybody that's coming down 288 with all the growth that's happening on 288, that's their public beach. That's where they go for recreation.

If something happens at this plant, how could you possibly have a viable evacuation plan for that many people?

I just wanted to make sure that I mentioned that. Thank you.

MR. TOMASI: Do we have any other people who wish to comment on the record?

MS. LUYCX: I do. I have one more comment, please.

MR. TOMASI: Yes. Come on up.

MS. LUYCX: Again, my name is Susan Luycx, L-U-Y-C-X. What I failed to mention earlier was it is my understanding that the current Levy Road does not meet current standards. I'm not an expert in this. I can -- I have read some articles on it in the past. If -- if it doesn't meet the current standards, when will the levy be raised or increased or meet the federal guidelines? And then what impact is that going to have during construction? That's my question.

MR. TOMASI: To answer, I don't know. It's something we'll have to look into. Thank you. One

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more comment?

MS. JONES: Laura Jones, J-O-N-E-S. One thing I forgot to mention: Talking about property values, one thing I wanted to stress, I did say that a lot of our people are retirees that live out there, they've worked all their lives to achieve to have a home on the water where they can live their last days and fish and bring their grandkids and to have the best memories of anything in the world. And everything they've worked for, in a lot of cases, is invested in that home.

They look at that home as a nest egg, because if something happens with them, if they can no longer live there or whatever, they've always been able to get their money out of their home to finish their lives off living in a decent manner. With our property values going down when this plant comes in, it's going to happen. What's going to happen to these people's nest eggs just because they bought in an area of neighborhoods that has historically been there up to 50 years and somebody who's not been here before -- Freeport hasn't. Yes, they had the import facility, but that was -- they're short-timers. They haven't been here. These other people have -- some people have been living out there at Hide-a-Way for 30 and 40 years.

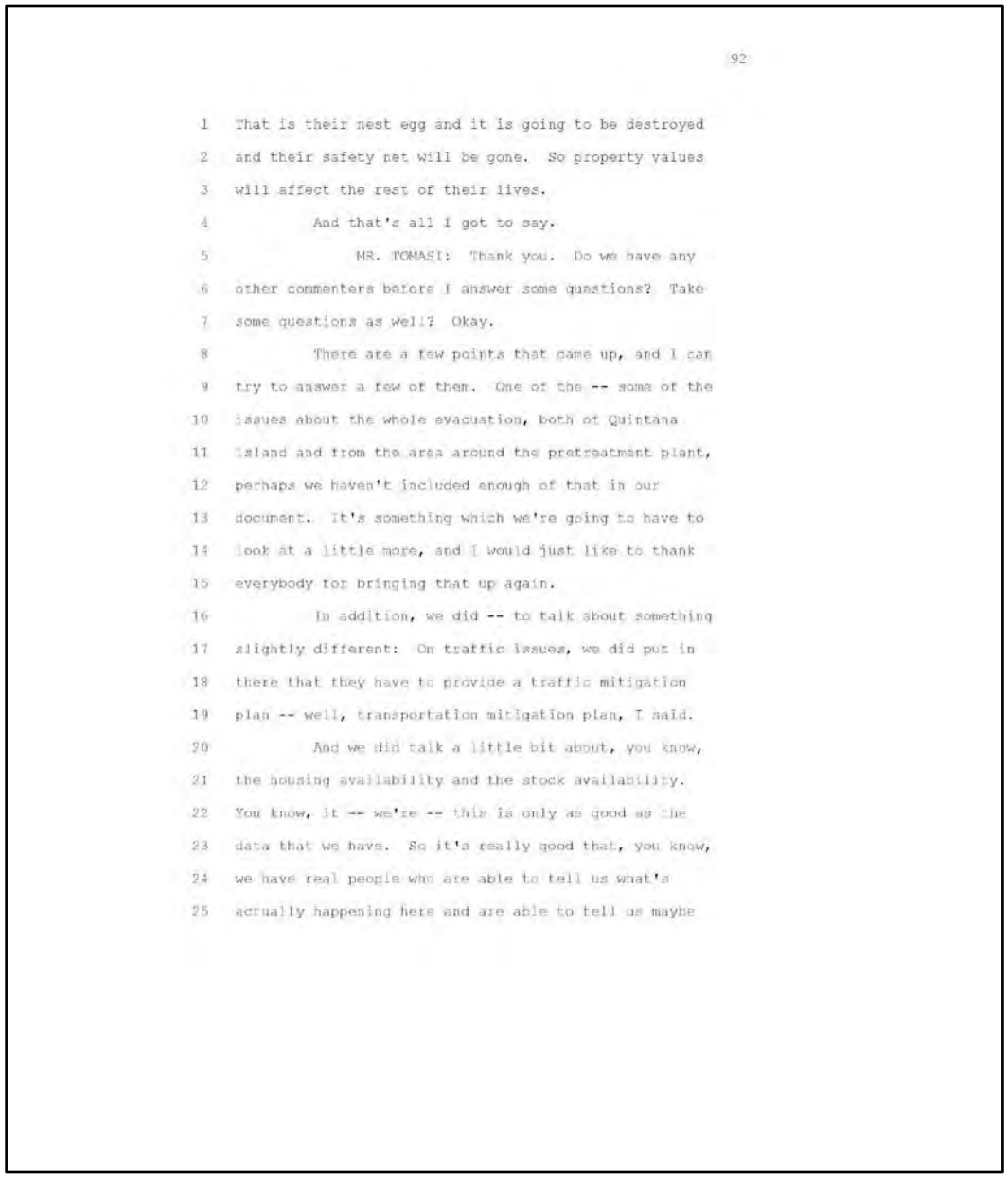
T1-61

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T1-61: Comment acknowledged.

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That is their nest egg and it is going to be destroyed and their safety net will be gone. So property values will affect the rest of their lives.

And that's all I got to say.

MR. TOMASI: Thank you. Do we have any other commenters before I answer some questions? Take some questions as well? Okay.

There are a few points that came up, and I can try to answer a few of them. One of the -- some of the issues about the whole evacuation, both of Quintana Island and from the area around the pretreatment plant, perhaps we haven't included enough of that in our document. It's something which we're going to have to look at a little more, and I would just like to thank everybody for bringing that up again.

In addition, we did -- to talk about something slightly different: On traffic issues, we did put in there that they have to provide a traffic mitigation plan -- well, transportation mitigation plan, I said.

And we did talk a little bit about, you know, the housing availability and the stock availability. You know, it -- we're -- this is only as good as the data that we have. So it's really good that, you know, we have real people who are able to tell us what's actually happening here and are able to tell us maybe

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the data that we have is not currently accurate.

So we're going to go back and look at that a little more and see, well, is the data we have right; is there better data we can get to really figure out -- well, you know, is -- you know, is, you know, is the traffic going to be worse than we had originally anticipated? That sort of thing. And we're going to take a look at that. We take that pretty seriously, as well as the housing availability.

And even just coming down -- I haven't been down here for about two years. But -- and it has -- coming down 288, it's dramatically different than when I was here last time. So you can tell that the region is growing pretty, pretty dramatically. And you know, I see some places going up, some new apartments being built, I don't know what other -- you know, how many are being built, whether it's going to be enough availability, so we're going to look at this a little more for you.

You know, we still have the issue with the water with Dow. But something -- whether it be obtained from Dow or another source, something we're still looking into and we're going to provide that information in the final document. So we're still looking into that.

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That's pretty much all I can really comment on right now -- well, I can comment a little bit. Somebody brought up the issue about the Washington -- about the incident at the LNG peak-shaving facility in Washington state. Obviously, it just happened. You know, our engineers are in consultation with both DOT and -- well, mainly with the companies to find out exactly what happened.

It's in the very preliminary stages, but I did want to point out that we have the ability, once an investigation is done, to make sure that whatever was the cause or if there was a -- if there was a fault in the design of that facility and if there is a design in other facilities, the same sort of design, we can go back and basically ensure that those are fixed, those flaws are fixed in newer facilities.

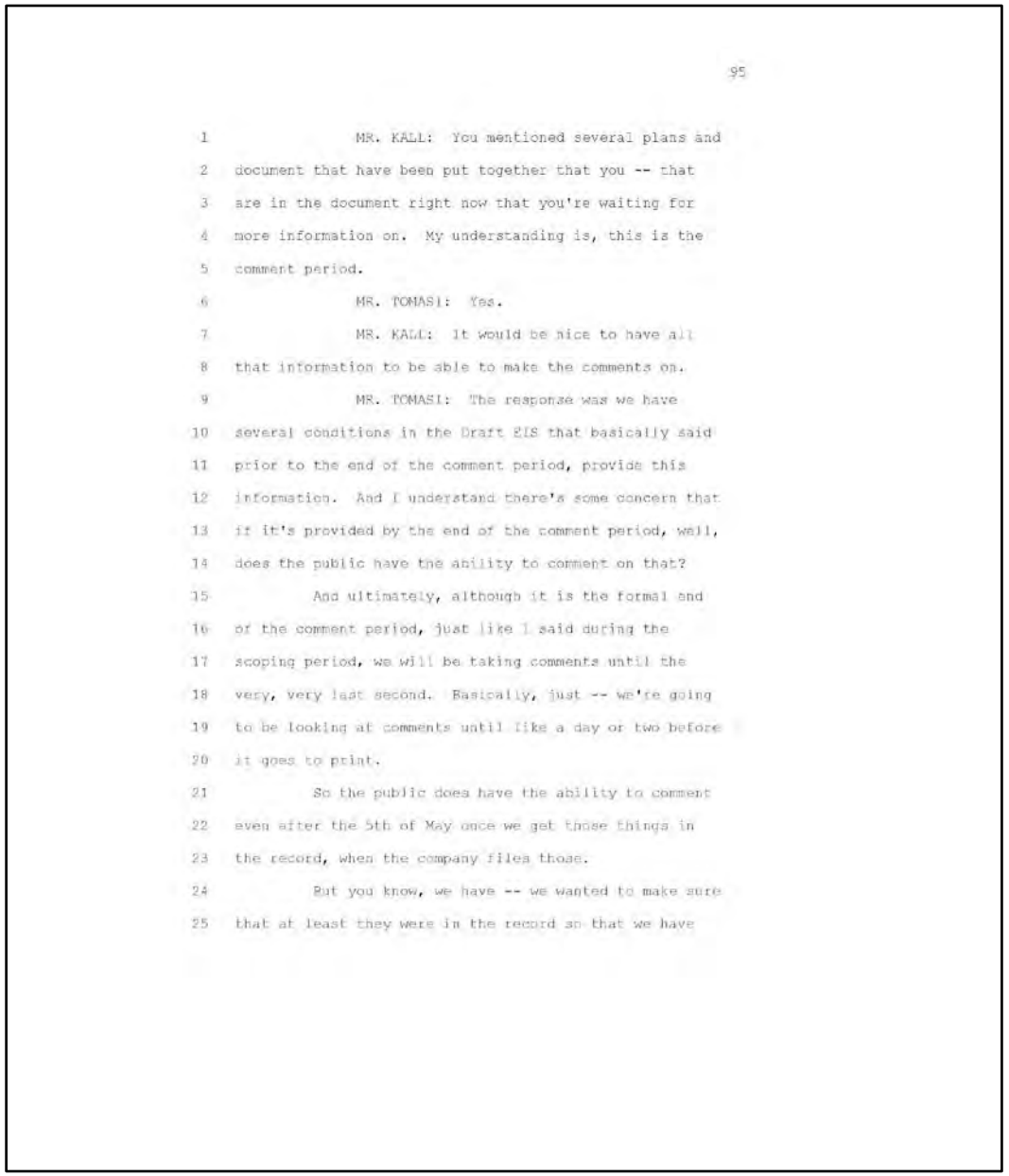
So whatever the results of this investigation, however it comes out, you know, we could use that to sort of try to -- as much as possible, make the facilities there that are in existence, that that flaw doesn't happen again. So just a little bit there.

Now, anyone have any questions? So what I'm going to do is who gets to -- someone gets to take a -- take this out to people.

Jeff, want to do that?

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MR. KALL: You mentioned several plans and document that have been put together that you -- that are in the document right now that you're waiting for more information on. My understanding is, this is the comment period.

MR. TOMASI: Yes.

MR. KALL: It would be nice to have all that information to be able to make the comments on.

MR. TOMASI: The response was we have several conditions in the Draft EIS that basically said prior to the end of the comment period, provide this information. And I understand there's some concern that if it's provided by the end of the comment period, well, does the public have the ability to comment on that?

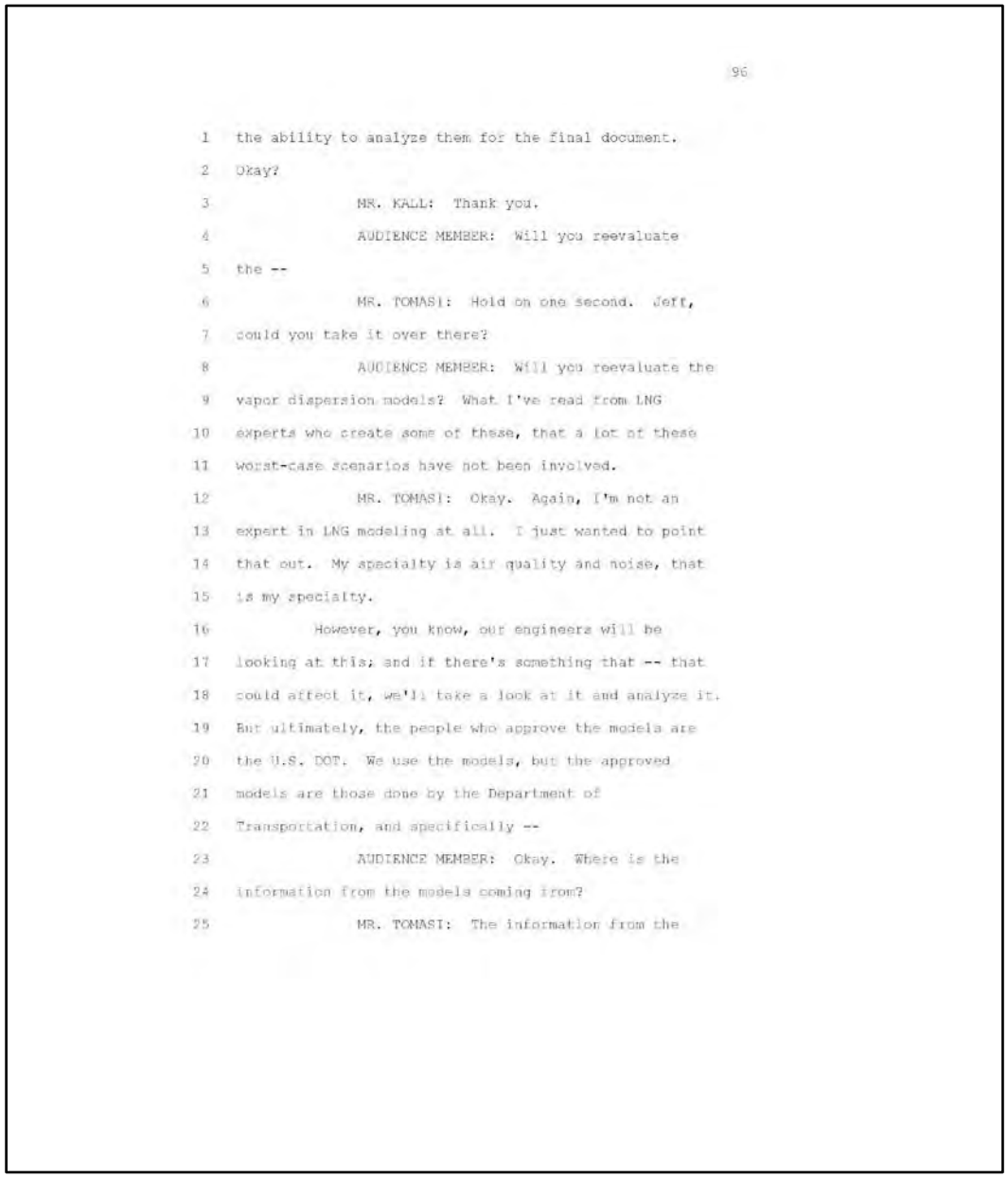
And ultimately, although it is the formal end of the comment period, just like I said during the scoping period, we will be taking comments until the very, very last second. Basically, just -- we're going to be looking at comments until like a day or two before it goes to print.

So the public does have the ability to comment even after the 5th of May once we get those things in the record, when the company files those.

But you know, we have -- we wanted to make sure that at least they were in the record so that we have

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the ability to analyze them for the final document. Okay?

MR. KALL: Thank you.

AUDIENCE MEMBER: Will you reevaluate the --

MR. TOMASI: Hold on one second. Jeff, could you take it over there?

AUDIENCE MEMBER: Will you reevaluate the vapor dispersion models? What I've read from LNG experts who create some of these, that a lot of these worst-case scenarios have not been involved.

MR. TOMASI: Okay. Again, I'm not an expert in LNG modeling at all. I just wanted to point that out. My specialty is air quality and noise, that is my specialty.

However, you know, our engineers will be looking at this; and if there's something that -- that could affect it, we'll take a look at it and analyze it. But ultimately, the people who approve the models are the U.S. DOT. We use the models, but the approved models are those done by the Department of Transportation, and specifically --

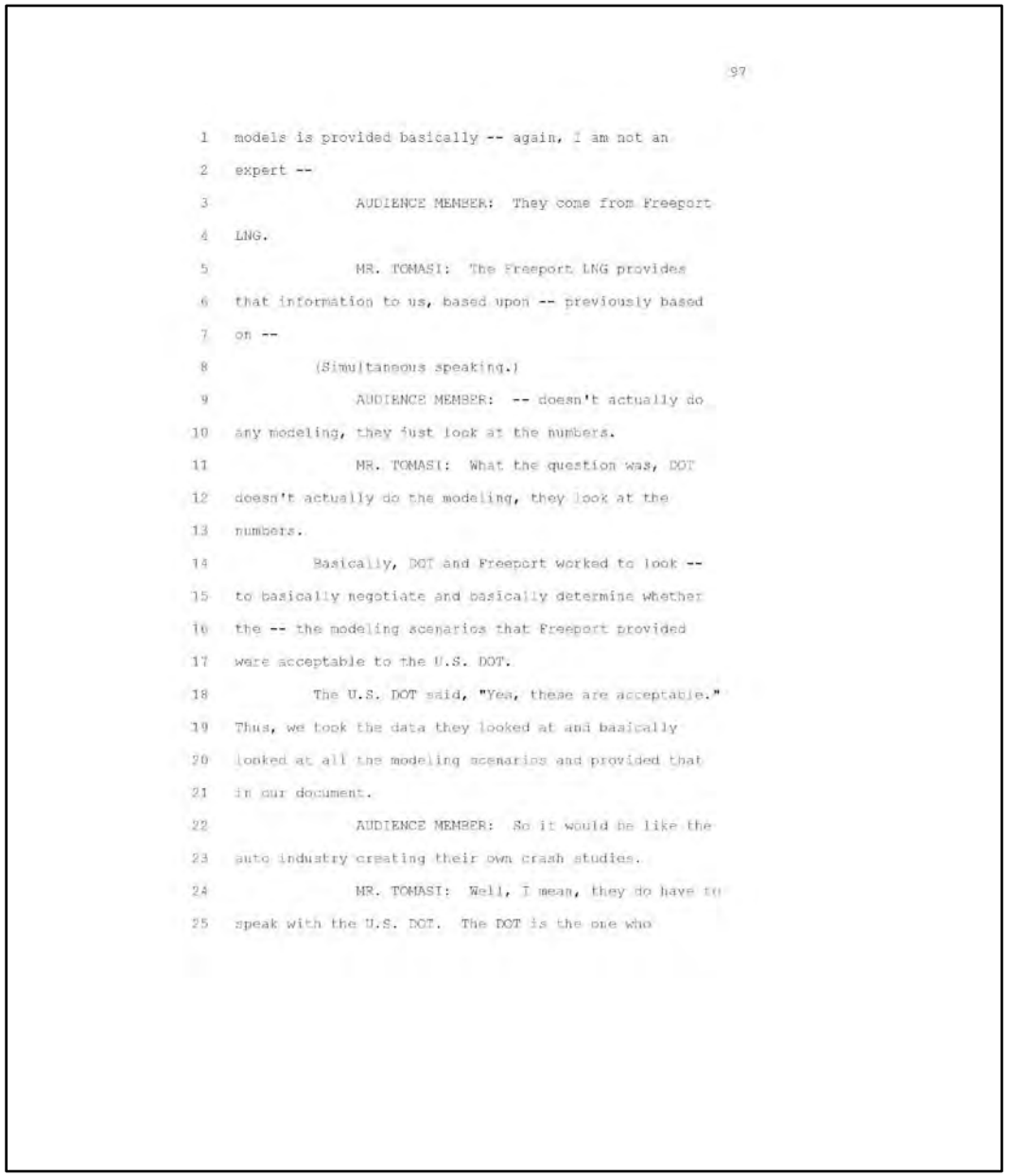
AUDIENCE MEMBER: Okay. Where is the information from the models coming from?

MR. TOMASI: The information from the

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models is provided basically -- again, I am not an expert --

AUDIENCE MEMBER: They come from Freeport LNG.

MR. TOMASI: The Freeport LNG provides that information to us, based upon -- previously based on --

(Simultaneous speaking.)

AUDIENCE MEMBER: -- doesn't actually do any modeling, they just look at the numbers.

MR. TOMASI: What the question was, DOT doesn't actually do the modeling, they look at the numbers.

Basically, DOT and Freeport worked to look -- to basically negotiate and basically determine whether the -- the modeling scenarios that Freeport provided were acceptable to the U.S. DOT.

The U.S. DOT said, "Yea, these are acceptable." Thus, we took the data they looked at and basically looked at all the modeling scenarios and provided that in our document.

AUDIENCE MEMBER: So it would be like the auto industry creating their own crash studies.

MR. TOMASI: Well, I mean, they do have to speak with the U.S. DOT. The DOT is the one who

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approves the modeling. We -- you know, they approve the models that are done and we basically look at the data and make sure that they were done properly.

Okay? Any other questions? Yes.

AUDIENCE MEMBER: I don't need the mic if you can hear me. You mentioned earlier --

MR. TOMASI: Could you repeat your name, then, sir?

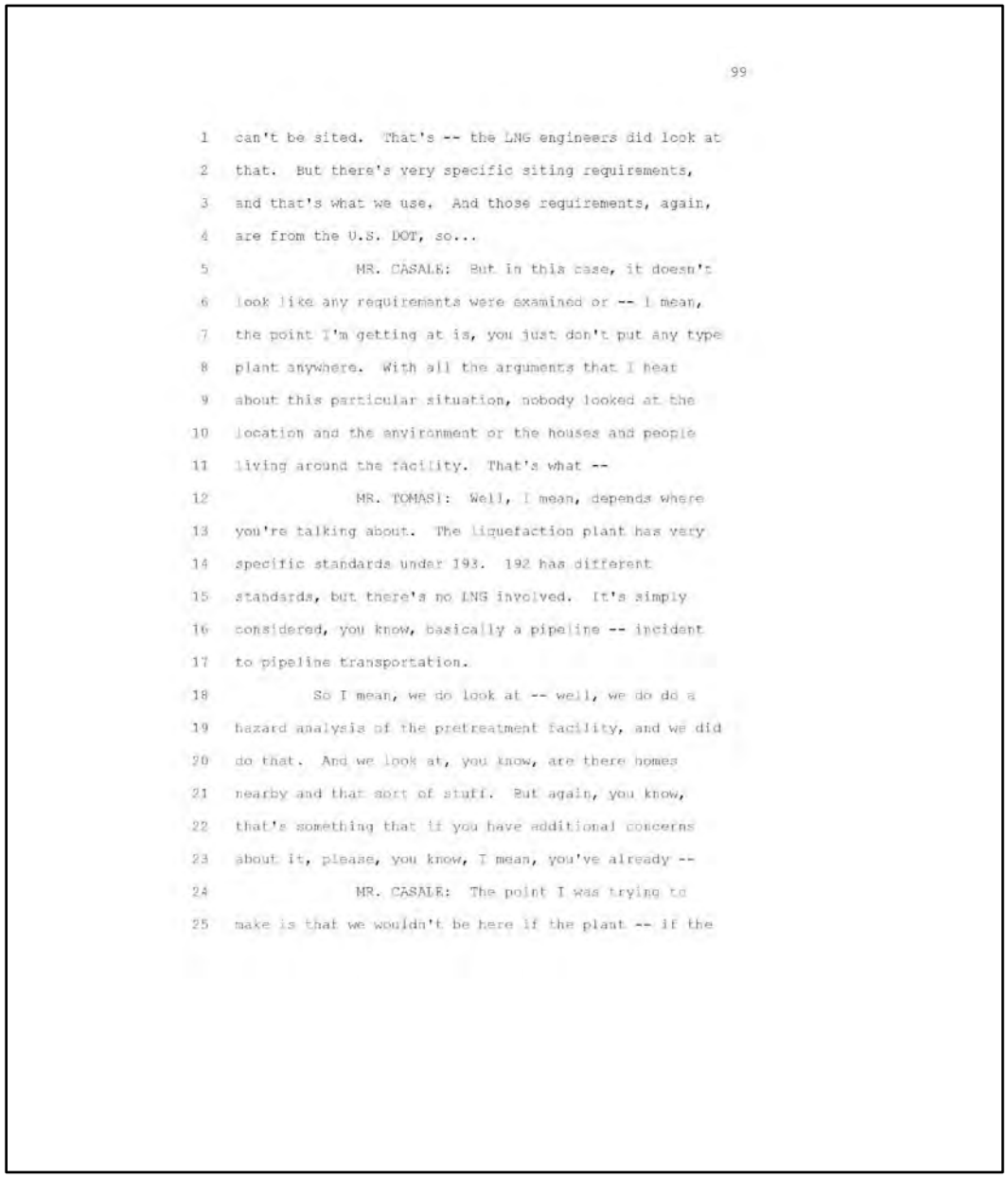
MR. CASALE: Bobby Joe Casale again, from Bridge Harbor.

You mentioned earlier, a lady did, about the government encouraging export -- in favor of exporting all of our oil to other countries, or LNG. But does the government set any -- does the government specify where, like, an LNG plant should be located? Is there any criteria there that don't put it, like, downtown Lake Jackson, you put it where it's going now?

MR. TOMASI: The DOT does have siting criteria, and that's what we use when we're doing the analysis, because the -- as I stated earlier, the Department of Energy has the -- basically, the overall authority for approving whether the facility can actually export LNG. We -- they've delegated to us the siting authority, so we have siting, yes. There is -- I don't know all the specific details of where it can and

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can't be sited. That's -- the LNG engineers did look at that. But there's very specific siting requirements, and that's what we use. And those requirements, again, are from the U.S. DOT, so...

MR. CASALE: But in this case, it doesn't look like any requirements were examined or -- I mean, the point I'm getting at is, you just don't put any type plant anywhere. With all the arguments that I hear about this particular situation, nobody looked at the location and the environment or the houses and people living around the facility. That's what --

MR. TOMASI: Well, I mean, depends where you're talking about. The liquefaction plant has very specific standards under 193. 192 has different standards, but there's no LNG involved. It's simply considered, you know, basically a pipeline -- incident to pipeline transportation.

So I mean, we do look at -- well, we do do a hazard analysis of the pretreatment facility, and we did do that. And we look at, you know, are there homes nearby and that sort of stuff. But again, you know, that's something that if you have additional concerns about it, please, you know, I mean, you've already --

MR. CASALE: The point I was trying to make is that we wouldn't be here if the plant -- if the

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government, you know, specified where the plant could be or where it couldn't. We wouldn't have to be here. So apparently the government's not doing that good of a job.

MR. TOMASI: Well, again, I don't have any -- we don't have any -- we don't actually write the siting regulations. We just basically just site the enforcement effectively. So there's nothing I can do about that. I mean, I apologize.

MR. CASALE: That criteria should be set previously so that we wouldn't have to sit here and argue about this point.

MR. TOMASI: Okay. Well --

MR. CASALE: The location.

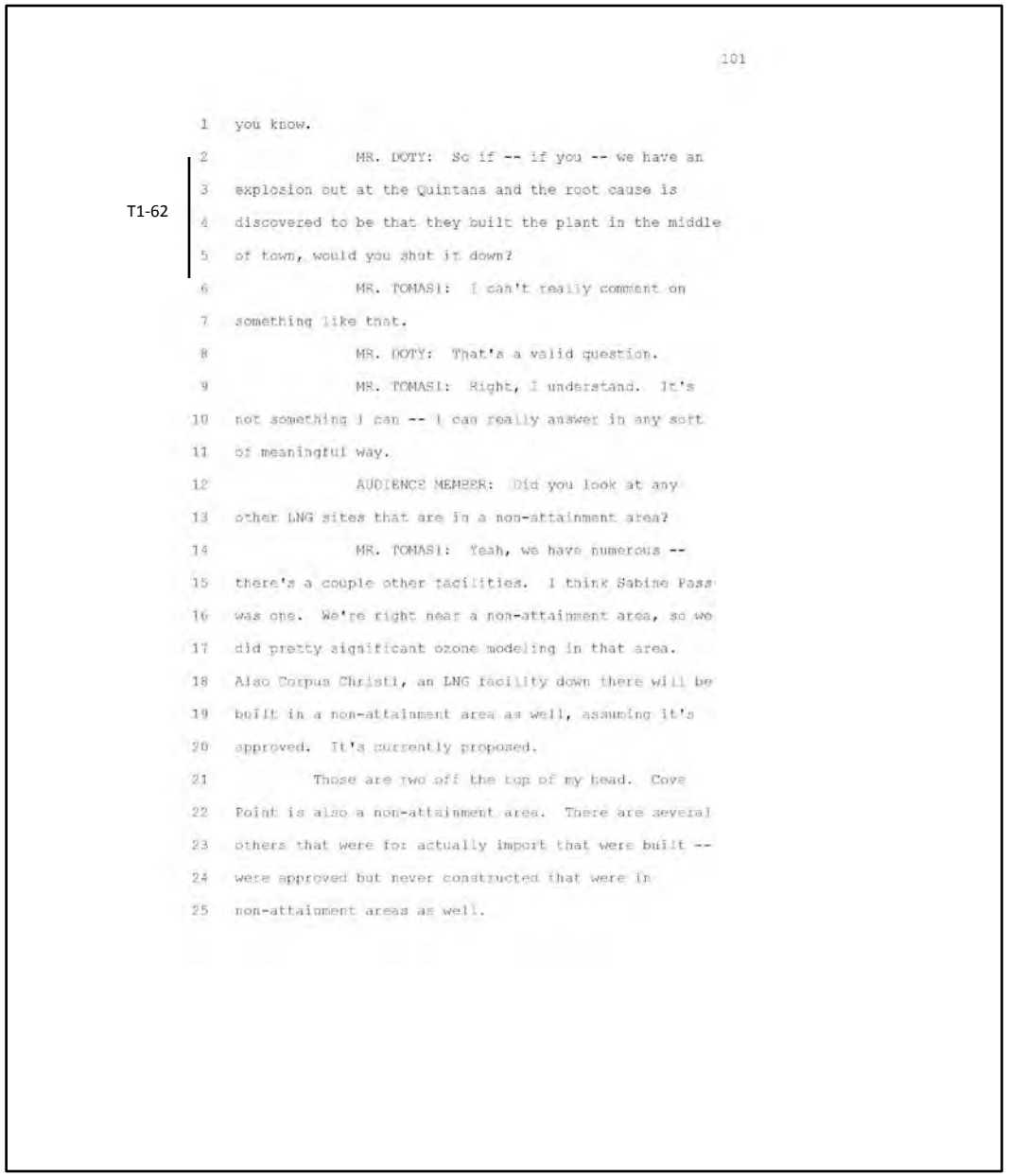
MR. TOMASI: Thank you. I think over here had a comment?

MR. DOTY: Harold Doty again. One last comment. It was kind of a response to your statement that if anything should occur after this plant was built, that your investigators could decide, you know what was done wrong and make recommendations to correct it; is that right?

MR. TOMASI: That is -- I mean, I spoke with our -- the LNG -- the head of the LNG; and after this investigation is over, we do have that authority,

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you know.

MR. DOTY: So if -- if you -- we have an explosion out at the Quintana and the root cause is discovered to be that they built the plant in the middle of town, would you shut it down?

MR. TOMASI: I can't really comment on something like that.

MR. DOTY: That's a valid question.

MR. TOMASI: Right, I understand. It's not something I can -- I can really answer in any sort of meaningful way.

AUDIENCE MEMBER: Did you look at any other LNG sites that are in a non-attainment area?

MR. TOMASI: Yeah, we have numerous -- there's a couple other facilities. I think Sabine Pass was one. We're right near a non-attainment area, so we did pretty significant ozone modeling in that area. Also Corpus Christi, an LNG facility down there will be built in a non-attainment area as well, assuming it's approved. It's currently proposed.

Those are two off the top of my head. Cove Point is also a non-attainment area. There are several others that were for actually import that were built -- were approved but never constructed that were in non-attainment areas as well.

T1-62

T1-62: See section 4.10.

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So typically, we'll have to do what's called a general conformity analysis for everything that's in a non-attainment area. As you can see in the document, that's still an ongoing process.

Is any other comments? Questions? Yes.

MS. JONES: When you look at the comments and you -- when you look at the comments and -- Laura Jones -- and you start to weigh what people are saying, when you see people who are actually in the affected area versus some of the supporters who have simply read form letters or a basic skeleton of a big form letter that was sent out in support of all this and wording's all the same and they don't live in the affected areas, who carries the most weight in that?

MR. TOMASI: We take into account the fact that people nearby, they will be impacted more than people that live farther away. There's no doubt about that.

MS. JONES: Well, just know that I have not seen one form letter in support of this project, and at the expense of our SOS people in there.

MR. TOMASI: Okay.

MS. JONES: These people that have put in these mega things that they've done through the Chamber of Commerce or whoever did it, the swift approval of

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these things, as far as I know, none of them lived down at Hide-a-Way or Turtle Cove. You can see -- our residents, as you can see, are very vocal, and I just want to make sure that they're getting the weight that they deserve on this issue.

MR. TOMASI: Right. I'm trying to make sure that we communicate, you know, with your organization and with the people in Quintana Island as well to make sure that they're aware of where we are in the process. And we take them into account. In fact, you know, there was some concern about that we didn't really look at the true impacts on the people of Quintana Island. And you know, we did specifically say it in our document. There will be a significant and unavoidable impact to the residents of Quintana during construction.

We do not normally -- it's very rare for us to state that in any document, to be perfectly honest, because we recognize the fact that, you know, the construction will be a very long; there will be a lot of traffic onto -- onto the island, even with the busing; and -- because of just construction traffic. And there's a the lot of workers coming -- even though they will not be driving onto the island, they'll be right outside the island, right outside. So we understand

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that there will be impacts, significant impacts during construction.

MS. JONES: And --

MR. TOMASI: And then we are -- and I know there's a lot of concerns, you know, over Turtle Creek and with -- you know, with Hideaway-on-the-Gulf and the other Oyster Creek people over there. And, you know, we're going to maybe take a second look at that. Because we talked a little bit about the traffic, we talked a little bit about the number of workers. So we're going to take a harder look at that to make sure that -- you know, we -- we are really making sure that our analysis is done properly.

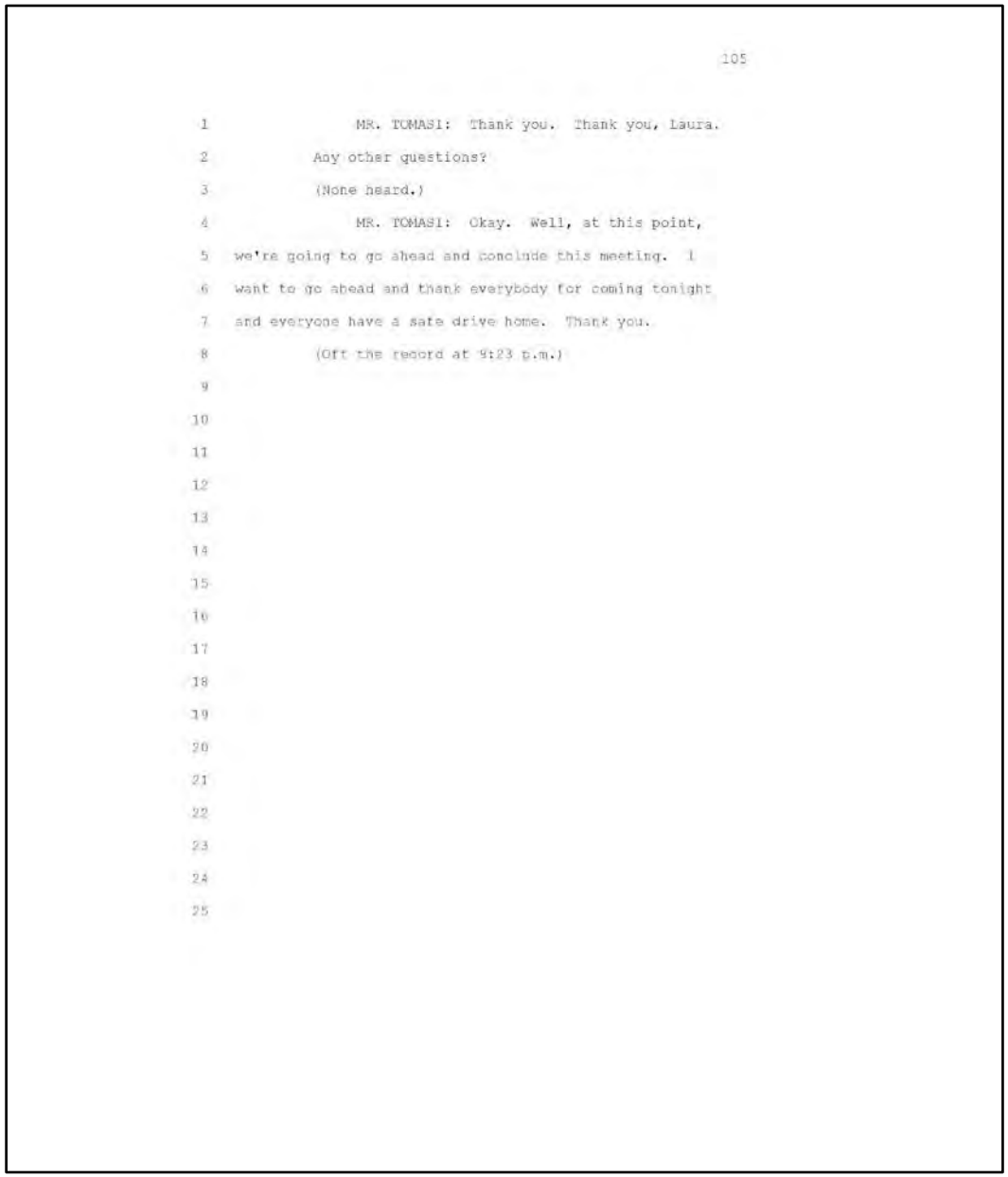
MS. JONES: Just as an example of the construction already impacting me, when I come from Lake Jackson, come down 332 to go home, anytime between 4:30 and 6, it takes me seven to eight cycles sometimes to get through the light so I can turn left. That's quite a bit of time. That's lot of idling. I'm not the only one sitting there. The traffic is backed up. That's right now with what's going on, and it's going to get -- as you heard from Bob Platt -- is going to get much worse. Seven cycles of a light for me to get through sometimes. That is not a good traffic pattern.

That's all I have to say.

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MR. TOMASI: Thank you. Thank you, Laura.
Any other questions?
(None heard.)
MR. TOMASI: Okay. Well, at this point, we're going to go ahead and conclude this meeting. I want to go ahead and thank everybody for coming tonight and everyone have a safe drive home. Thank you.
(Off the record at 9:23 p.m.)

TRANSCRIPT COMMENTS

T1 – Freeport LNG Transcript from Public Meeting

I, Susan T. Baker, a Certified Shorthand Reporter and Notary Public in and for the State of Texas, certify that the foregoing is a correct transcription of the proceedings in the above-entitled matter.

I further certify that I am neither counsel for, related to, nor employed by any of the parties to the action in which this hearing was conducted, and further, that I am not financially or otherwise interested in the outcome of the action.

Certified by me on this 23rd day of April, 2014.

_____

Susan T. Baker, RDR, Texas CSR #1561
Expiration: 12/31/15
Notary Public, State of Texas
Commission Expires: 1/7/18

TRANSCRIPT COMMENTS

T1 – Site Visit after Hearing

20140425-4002 FERC PDF (Unofficial) 04/25/2014

FEDERAL ENERGY REGULATORY COMMISSION
Office of Energy Projects
Division of Gas-Environment and Engineering
Gas Branch 3
888 First St. NE
Washington, DC 20426

Memorandum to Record

To: CP12-509-000, CP12-29-000
From: Eric Tomasi
CC:
Date: April 25, 2014
Re: **Site Visit Notes**

On April 17, 2014 Office of Energy Projects (OEP) staff and its 3rd party contractor TRC conducted a site visit at proposed facilities for the Freeport LNG Facility. The site visit toured locations near the Freeport LNG Pretreatment Plant and on Quintana Island. The site visit was announced at the Public Comment Meeting the previous evening and several landowners nearby accompanied OEP staff.

Near the Pretreatment Plant, we visited the communities of Hide-Away-on the Gulf and Turtle Cove. Specifically, we visited locations where the Pretreatment Plant would be visible to get a better understanding of visual impacts. In addition, we drove the local roads to look at the evacuation areas for residents. We also received verbal comments from residents concerning air quality, noise impacts, visual impacts and concerns about the impacts of potential wells at the Pretreatment on the local water supply.

At Quintana Island we visited various points on the island to look at potential viewsheds. At local resident's urging we viewed one potential evacuation round (picture attached) to look at the difficulties involved in that route. We also looked at the Seaway Dredged Material Placement Area on the south side of Lamar Street. We also received a verbal comment from one landowner that the area known as the "thumb" at the Dow Plant has been cleared of equipment and is available for lease from Dow.

T1-64

OEP Staff Attendance:
Eric Tomasi
Kenneth Warn

TRC Consultants
(3rd party contractor for FERC)
Jeff Brandt
Elizabeth Saxton
John Durance

T1-64: The area referred to as the "thumb" located at the Dow plant was assessed as a possible alternative and found not to be practicable. See section 3.0.

S1 – Texas Parks & Wildlife (May 5, 2014) - Page 1

20140506-5023 FERC PDF (Unofficial) 5/5/2014 5:00:01 PM

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Dick Scott
Wimberley

Lee M. Bass
Chairman-Emeritus
Fort Worth

Carter P. Smith
Executive Director

May 5, 2014

VIA ELECTRONIC FILING

The Honorable Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE, Room 1A
Washington, DC 20426

RE: OEP/DG2E/Gas 3
Freeport LNG Development, L.P.; FLNG Liquefaction LLC; FLNG Liquefaction 2, LLC; FLNG Liquefaction 3, LLC
Notice of Availability of Draft Environmental Impact Statement for the Proposed Phase II Modification and Liquefaction Projects
Docket Nos. CP12-509-000
CP12-29-000

Dear Secretary Bose:

Texas Parks and Wildlife Department (TPWD) received the draft environmental impact statement (DEIS) for the proposed Freeport LNG Phase II Modification Project and the Liquefaction Project, dated March, 2014. The purpose of these projects are to export liquefied natural gas (LNG). The proposed Phase II Modification Project includes modification to the previously authorized LNG vessel berthing dock, LNG transfer pipelines, LNG unloading arms, and access road system. The proposed Liquefaction Project includes a natural gas liquefaction plant, a natural gas pretreatment plant, and a pipeline/utility line system with associated appurtenant structures. The proposed projects are primarily located on Quintana Island and about 2.5 miles north of Quintana Island in Brazoria County, Texas.

TPWD has reviewed information in the DEIS for possible impacts to fish and wildlife resources of the State and offers the following comments regarding the proposed projects.

4.3.5 Wetlands

S1-1

In a letter dated December 2, 2013 to the U.S. Army Corps of Engineers (USACE) – Galveston District (see attachment), TPWD expressed concerns about Freeport LNG's characterization of wetland impacts as temporary and Freeport LNG's compensatory mitigation proposal to preserve emergent wetlands. TPWD stands by our December 2, 2013 comments.

4.5.3 Migratory Birds

The Migratory Bird Treaty Act (MBTA) provides for a year-round closed season for non-game birds and prohibits the taking of migratory bird nests and eggs, except as permitted by the U.S. Fish and Wildlife Service.

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800
www.tpwd.texas.gov

To manage and conserve the natural and cultural resources of Texas and to provide hunting, fishing and outdoor recreation opportunities for the use and enjoyment of present and future generations.

S1-1: The FERC defers to the U.S. Army Corps of Engineers, a cooperating Agency in the Freeport LNG Project review, in regards to wetland impacts and mitigation.

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S1-2

Recommendation: Construction activities such as, but not limited to, tree felling as well as vegetation clearing, trampling, or maintenance should occur outside the April 1 to July 15 migratory bird nesting season of each year the project is authorized and lasting for the life of the project. To comply with the MBTA, the proposed sites should be surveyed for migratory bird nests prior to construction or future maintenance activities. Since raptors nest in late winter and early spring, all construction activities as identified above should be excluded from a minimum zone of 100 meters (328 feet) around any raptor nest during the period of February 1 to July 15.

Please contact the U.S. Fish and Wildlife Service Southwest Regional Office (Region 2) at 505-248-6879 for further information.

4.6 Threatened, Endangered, and Other Special Status Species

State law (Section 68.015 Parks and Wildlife Code) regulates state-listed species. Please note that there is no provision for take (incidental or otherwise) of state-listed species. Please see *TPWD Guidelines for Protection of State-Listed Species* at: www.tpwd.state.tx.us/huntwild/wild/wildlife_diversity/habitat_assessment/media/tpwd_ statelisted_species.pdf. This document includes a list of penalties for take of state-listed species. State-listed species may only be handled by persons with a scientific collection permit obtained through TPWD. For more information on this permit, please contact Mr. Chris Maldonado (512-389-4647) with TPWD's Wildlife Permits Section.

Determining the actual presence of a species in a given area depends on many variables including daily and seasonal activity cycles, environmental activity cues, preferred habitat, transiency and population density (both wildlife and human). The absence of a species can be demonstrated only with great difficulty and then only with repeated negative observations, taking into account all the variable factors contributing to the lack of detectable presence.

The Texas Natural Diversity Database (TXNDD) is intended to assist users in avoiding harm to rare species or significant ecological features. Given the small proportion of public versus private land in Texas, the TXNDD does not include a representative inventory of rare resources in the state. Please note that absence of information in the database does not imply that a species is absent from that area. Although it is based on the best data available to TPWD regarding rare species, the data from the TXNDD do not provide a definitive statement as to the presence, absence or condition of special species, natural communities, or other significant features within the project areas. These data are not inclusive and **cannot be used as presence/absence data**. This information cannot be substituted for on-the-ground surveys. The TXNDD is updated continuously based on new, updated and un-digitized records. For questions regarding a record or to obtain digital data, please contact TexasNaturalDiversityDatabase@tpwd.texas.gov.

S1-2: The final EIS, in section 4.5.3 recommends that Freeport LNG avoid vegetation clearing during the primary nesting season for migratory birds, April 1 through July 15.

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TPWD's review of the TXNDD revealed that the following occurrences of rare species and significant ecological features have been recorded within five (5) miles of the proposed projects:

Federal Listed Threatened and State Listed Threatened
- Piping Plover (*Charadrius melodus*)

Federal Delisted and State Listed Threatened
- Bald Eagle (*Haliaeetus leucocephalus*)

Species of Concern and Natural Communities
- Threeflower broomweed (*Thurovia triflora*)
- Colonial waterbird rookery

TPWD County Lists

TPWD county lists for rare species may be obtained at the following link: www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species/. These lists provide information regarding rare species that have potential to occur within each county. Rare species could potentially be impacted if suitable habitat is present at or near the project site.

S1-3

Recommendation: Freeport LNG should consult the county lists referenced above to determine if habitat for state-threatened species occurs within the project areas. An on-the-ground survey by a qualified biologist should be performed in areas of suitable habitat to determine if rare species are present. If present, Freeport LNG should incorporate actions into the projects to avoid impacts to these species.

Recommendation: Further coordination with TPWD should be conducted by Freeport LNG upon detection of a Texas-listed rare, threatened, or endangered species within or near the projects at any time prior to or during construction and operation. Please contact Ms. Amy Turner with TPWD's Wildlife Habitat Assessment Program at 361-576-0022.

Recommendation: If rare species or their habitat would be adversely impacted by the proposed projects, Freeport LNG should coordinate with TPWD to determine avoidance, minimization, mitigation, and other conservation measures.

Bald Eagle

The Bald Eagle is known to nest and winter in portions of Texas. Although the Bald Eagle is no longer federally-listed as threatened, this species remains state-listed as threatened and receives protection under the U.S. Bald and Golden Eagle Protection Act. Under this act, eagles are protected from disturbance which is defined as follows: "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

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S1-3: Section 4.6.1.2 addresses species and mitigation from TPWD county lists.

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interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

In addition to immediate impacts, this definition also covers impacts that result from human-caused alterations initiated around a previously used nest site during a time when eagles are not present, if upon the eagles return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment. Guidelines for minimizing disturbance to both nesting and wintering Bald Eagles can be found at www.tpwd.state.tx.us/publications/pwdpubs/media/pwd_bk_w7000_0013_bald_eagle_mgmt.pdf.

S1-4

Recommendation: TPWD recommends the project be developed to avoid or minimize potential impacts to areas along the project where the state-threatened Bald Eagle may occur but have not been officially reported and recorded in the TXNDD. Areas buffering active nests should be protected from disturbance.

Rookeries

In general, nesting dates for herons and egrets range from early February to late August in Texas, depending on the species. Great Blue Herons (GBHE) are usually the first to nest. When GBHE get disrupted from the nest and abandon nesting, then the other species of herons and egrets may not attempt to nest at the colony that year. Nesting dates and other information for Texas species within heronries can be found in *Nuisance Heronries in Texas* at the following website:
www.tpwd.state.tx.us/publications/pwdpubs/media/pwd_bk_w7000_0134.pdf.

S1-5

Recommendation: If rookeries are encountered, TPWD recommends best management practices (BMPs) be implemented to avoid/minimize disturbance during nesting. TPWD recommends a primary buffer area of 300 meters (984 feet) from the heronry periphery to avoid any vegetation clearing as a protection measure to protect the heronry and its habitat. Pipeline construction and permanently-maintained easements that would encroach within this buffer area should be re-routed, adjusted, or narrowed to avoid clearing within this buffer area. Utilizing areas that have already been cleared within this buffer area may be acceptable depending on site-specific characteristics. Additionally, human foot traffic or machinery use should not occur within this buffer area during the nesting season.

Recommendation: TPWD recommends a secondary buffer area of 1,000 meters (3,281 feet) from the heronry periphery to avoid clearing activities or construction using heavy machinery during the breeding season (courting and nesting). At this time, TPWD does not have a detailed report of the heronries found within the proposed project areas and along the proposed network of pipeline/utility line routes. When details regarding the heronries

S1-4: Section 4.4.1.2, 4.5.3, Table 4.5.3-1 and 4.6.1.2 addresses the lack of appropriate habitat in the Project area for tree nesters, including the Bald Eagle.

S1-5: Section 3.4 addresses the presence of potential rookery habitat in the Project area.

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are provided, TPWD staff can discuss Freeport LNG's ability to feasibly meet the recommended setback distances. Details to aid in decision making include the size of the heronry number of nests and area of heronry, species utilizing the heronry, distance of heronry periphery from the construction area, and characteristics regarding the habitat within and surrounding the heronry.

5.15 FERC Staff's Recommended Mitigation

S1-6

Recommendation: If the Federal Energy Regulatory Commission (Commission) authorizes the proposed projects, regardless of any USACE regulatory requirements associated with the issuance of a Department of the Army Section 404/10 permit, TPWD recommends a specific condition be included in the Commission's Order to read as follows: "Freeport LNG shall not begin construction activities for the Liquefaction Project until the Pybus Property, as described in the U.S. Army Corps of Engineers permit application, has been conveyed by fee simple property interest from Freeport LNG to the U.S. Fish and Wildlife Service to preserve 300 acres of wetlands."

The above recommendation would further ensure appropriate mitigation for wetland impacts associated with construction and operation of the proposed projects.

Thank you for consideration of our comments. If you have any questions, please do not hesitate to contact Mr. Mike Morgan (281-534-0146) at the Dickinson Marine Lab.

Sincerely,

Rebecca Hensley
Regional Director, Ecosystem Resources Program
Coastal Fisheries Division

RH:WD:MM:lam

Attachment: TPWD correspondence to USACE-Galveston District (December 2, 2013)

S1-6: The FERC defers to the U.S. Army Corps of Engineers, a cooperating Agency in the Freeport LNG Project review, in regards to wetland impacts and mitigation.

LOCAL AGENCIES

L1 – Johnson Radcliffe Petrov & Bobbitt PLLC *for* City of Quintana – Page 1

20140318-0015 FERC PDF (Unofficial) 03/18/2014

ORIGINAL

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FEDERAL ENERGY REGULATORY COMMISSION

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JOHNSON RADCLIFFE
PETROV & BOBBITT PLLC

March 12, 2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First St., NE, Room 1A
Washington, DC 20426
Attention: Gas Branch 2, PJ11.2

Re: Freeport LNG Liquefaction Project and Phase II Developments Cumulative Impacts Analysis; Docket No. CP12-509-000

Dear Ms. Bose:

Johnson Radcliffe Petrov & Bobbitt PLLC represents the City of Quintana, Texas ("Quintana" or "City") as City Attorney. While Quintana is not a party to the above-referenced docket, the Freeport LNG Liquefaction Project and Phase II Developments (collectively, the "Project") are immediately adjacent to Quintana. As such, Quintana has made clear in previous filings that, while the City is not necessarily opposed to the Project, the City wishes to ensure that the Project, if approved, will safeguard and protect the citizens of Quintana as well as the City's local environment.

With this objective in mind, we have recently reviewed the Freeport LNG Liquefaction Project and Phase II Developments Cumulative Impacts Analysis dated January 31, 2014 (the "Cumulative Impacts Analysis"). While the Cumulative Impacts Analysis is an interesting document in that it provides a broad overview of various activities occurring throughout Brazoria County, the very nature of the document, by selecting Brazoria County as a whole for investigation, dilutes the document's relevance to the proposed Project. Moreover, the document completely fails to address or qualify the direct and cumulative impacts on the City.

General Comment

L1-1 In General, by describing Brazoria County as a whole, the Cumulative Impacts Analysis gives the impression that such a voluminous amount of development activities have occurred over the years that the addition of the Project is extremely minor by comparison. For example, page 2 of the Cumulative Impacts Analysis contains the statement that:

> *The regional landscape in the Project area has been radically altered by human occupation over the last 150 years or so, first by agriculture, later by the development of extensive industrial and port facilities, along with communities supporting commercial developments, residential areas, and attendant public infrastructure (schools, hospitals, roads, etc.).*

00158219 2

1001 McKinney, Suite 1000, Houston, Texas 77002-6424 • www.jrpblaw.com • Phone 713.237.1221 / 800.890.3058 • Fax 713.237.1313

L1-1: Comment acknowledged.

The EIS text incorporates Brazoria County as the study area since the projects are wholly within the county.

See section 4.7.3 to review the discussion of visual impacts.

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This obviously leaves one with the impression that the "Project area" has been so "radically" developed that no concern should exist with respect to the Project. This, of course, is incorrect in two (2) very important ways.

First, the simple fact that an area has been developed does not lessen or negate the cumulative impact. Rather, the opposite is the case. In an area undergoing significant development, the next Project could be the proverbial straw that breaks the camel's back. In other words, the fact that several other development already exist makes the careful review of the proposed Project all that more important.

Second, by using data from Brazoria County as a whole, the Cumulative Impacts Analysis understates the actual and cumulative impact on Quintana. As shown in other filings, the Project is not located on the Brazoria County mainland, but instead is actually located on Quintana Island, an island of less than two square miles, located between the mouth of the Old Brazos River and the New Brazos River. This island is home to the City of Quintana, a community described on the Freeport LNG website as:

> *a non-commercialized, beautiful, natural family beach and also home to wildlife and a bird sanctuary. It offers six miles of beautiful, natural sand beaches. Bryan Beach State Park and Quintana Beach County Park are both located on the island. Quintana Beach County Park is a unique, fifty-acre park offering amenities such as RV sites, restrooms and showers. Elevated wooden boardwalks provide a view of the Gulf and dunes. Historical homes, pavilions, and a half mile of pedestrian beach offer plenty of room for children to play and explore. Hiking trails, boating facilities, a fishing pier and grassy areas for volleyball, horseshoes or kite flying are also available. www.freeportlng.com/quintana_history.asp*

The population of Quintana at the 2010 Census was 56. There are no schools or hospitals on the island. The Project is the dominant commercial/industrial development on the island and as such any activity associated with the Project will have a significant and cumulative impact on the island. In other words, compared to the status of development on the island, the addition of one tank or even one car becomes significant.

Specific Comments

Understanding that the Project is located on an island, the cumulative impacts of the Project must be viewed in that same context; *i.e.* not how will the Brazoria County as a whole be impacted, but rather how will the island be impacted.

1. Visual Impacts. The current FLNG plant is the most significant visual obstruction on the island. Any addition to the obstruction is significant. The proposed Project

L1 – Johnson Radcliffe Petrov & Bobbitt PLLC *for* City of Quintana – Page 3

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will increase the existing obstruction by at least 50% with the addition of new tanks, fences, buildings and equipment.

L1-2

2. Traffic/Roads. There is only one major thoroughfare serving the island, a two-lane roadway known as Lamar Street. With approximately fifty residents on the island at anytime, this roadway is more than adequate to handle routine daily traffic. However, the proposed Project anticipates 4,200 workers will need to travel onto the island for construction alone, representing an increase in traffic on the island of almost one-hundred fold. This cumulative traffic impact from construction alone will overburden the existing country roads serving the island.

L1-3

3. Wildlife Habitat. The island is home to abundant wildlife including a bird sanctuary. The Cumulative Impacts Analysis reports that the Project will impact 45.3 acres of wetland, either temporarily or permanently. Such wetlands are home to numerous indigenous wildlife and migratory birds which inhabit the island. When measured against the landmass of the Brazoria County as a whole, the impact represented by the 45.3 acres may not seem much, but again, one must remember that the Project is located on an island where every acre is precious. In that context, the addition of 45.3 impacted acres is indeed significant.

In conclusion, the Cumulative Impacts Analysis appears to obscure the true cumulative impacts of the Project by diluting those impacts with a countywide analysis. Careful consideration should be given to a review of the cumulative impact of the Project on the Project's specific locale, such as Quintana, which is most obviously and directly impacted.

Respectfully submitted,

Alan P. Petrov
Quintana City Attorney

APP/jme

00158219 2

L1-2: Section 4.8.5 discussed traffic impacts.

L1-3: As noted in section 4.5.1.1 we have looked at the potential wildlife impacts from the Projects. Wetlands would be mitigated as discussed in section 4.3.5.1.

L2 – Harold Doty – Page 1

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May 5, 2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First St., NE, Room 1A
Washington, DC 20426
Attention: Gas Branch 2, PJ11.2

Re: Freeport LNG Liquefaction Project and Phase II Developments Draft Environmental Impacts Analysis; Docket No. CP12-509-000

Dear Ms. Bose:

On behalf of myself and other citizens of Quintana, I would like to comment and intervene in the above mentioned dockets pertaining to Freeport LNG Development, L. P. request to your department to procure a new permit to build a liquefaction plant located in Quintana, Texas.

L2-1

Draft Environmental Impact Analysis siting requirements and traffic plan:

In the draft EIS, a request was made for FLNG to file a traffic plan prior to issuance of a permit, as they had made no mention to FERC of what their plans might be regarding trafficking workers to and from the construction site on Quintana. It appears that the filing May 2, 2014 regarding Mitigation measure 22 is their first disclosure to FERC of what their plan might be.

On October 1, 2013 I attended a "Community Outreach Forum" to which FLNG does not invite Quintana community members, but which I was invited to attend by one of the residents of Hideaway on the Gulf subdivision north of Oyster Creek. It was made quite clear by FLNG that they did not like having me attend, as they consider their "Community Outreach Forum" a private party to be attended by invitees of the company only.

However, I did attend, and it was quite informative as to the subject of traffic planning.

I will summarize on the following pages what was presented at that time.

L2-1: Transportation impacts are detailed in section 4.8.5.

L2 – Harold Doty – Page 2

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The following is the email announcing the meeting:

"Dear Laura, Diana and Bob,

Please find attached the proposed agenda for the Freeport LNG Community Outreach Forum Meeting, which will be held on Tuesday, October 1, 2013 from 5:30 – 7:00 p.m. at the Oyster Creek Community Center, located at 134 Linda Lane in Oyster Creek. Please let me know if you have any additions. We look forward to seeing you on October 1.

Thank you.
Anne

Anne B. Rappold
Public Information Officer
Freeport LNG
333 Clay Street, Suite 5050
Houston, TX 77002
1-800-303-6545
"

L2 – Harold Doty – Page 3

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The attached agenda for the October 1, 2013 COF meeting reads as follows:

COMMUNITY OUTREACH FORUM MEETING

Oyster Creek Community Center
Tuesday, October 1, 2013
5:30 p.m. – 7:00 p.m.

1. Welcome and Safety Minute
2. Update on the Freeport LNG Liquefaction and Pretreatment Facility Project
3. Information Regarding Traffic Plan
   a. Pretreatment Facility in Oyster Creek
   b. Quintana Island
4. Noise Information
   a. Pretreatment Facility
   b. Quintana Island
5. Freeport LNG's Intentions Regarding the Pybus Site in Oyster Creek
6. Q & A
7. Discussion of Upcoming Meeting Topics and Next Meeting Date (propose January 7, 2014 from 5:30 p.m. to 7:00 p.m.)

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The traffic plan for Quintana that was distributed at this October 1, 2013 meeting included the following figures:

L2-2





L2-2: Thank you for submitting this information. The text within the EIS has been updated to incorporate the Seaway DMPA.

L2 – Harold Doty – Page 5

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The May 2, 2014 filing contains this figure:

L2-3



Figure 2.1-7

Careful examination and comparison of the figures being presented now with the ones presented only to select people at a private function on October 1, 2013, would indicate that FLNG has had a plan for traffic for quite some time. Indeed, we who were at the October 1, 2013 meeting heard FLNG officials announce that in addition to what we were being given, planning with the County of Brazoria officials was underway to add a bridge between the two dredge spoil areas over the top of the main street into Quintana, CR 723 / Lamar Street.

L2-3: Traffic impacts are discussed in section 4.8.5.

L2 – Harold Doty – Page 6

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My question to FERC is, if FLNG has not been forthcoming on something as simple as a traffic plan, what other more serious discrepancies between what they tell FERC and what they actually plan to do might exist?

L2-4

I could go on about "vapor barriers" that are nothing but 20 foot tall hurricane fences being proposed rather than an earthen dike around the liquefaction plant to protest Quintana (and Freeport) from the explosion that I feel is not an if, but a when. The city of Quintana has engaged experts in this to file questions on our behalf, so I can only hope and pray that you will listen to their findings. As I have said in the past, **We in Quintana do not want to become another "West, Texas" disaster for the news media to cover.**

Please re-examine carefully your draft Environmental Impact Statement and revise it prior to making recommendations to the commission regarding permitting.

Sincerely,

Harold Doty - Intervenor
Quintana City Council position 2
111 South Lake Drive
Quintana, Texas 77541

L2-4: Refer to Section 4.10. The FERC has recommended a condition that final design shall include the details of the vapor fences as well as procedures to maintain and inspect the vapor fences provided to meet the siting provisions of 49 CFR Part 193.2059.

L3 – Blackburn Carter *for* Town of Quintana – Page 1

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May 5, 2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First St., NE, Room 1A
Washington, DC 20426

**Re: Docket CP12-509; Freeport LNG project in Texas;
Comments submitted on behalf of the Town of Quintana.**

Dear Madam:

On behalf of the Town of Quintana, we are submitting comments to the Draft Environmental Impact Statement ("DEIS") prepared by the Federal Emergency Regulatory Commission.

We are submitting comments in the following areas:

• Procedural issues	• LNG Hazards/ Safety	• Safety/ Response
• Safety / Geology	• Noise Impacts	• Socioeconomics
• Groundwater	• Traffic impacts	• Historical sites
• Wildlife resources	• Air Quality	• Wetlands
• Site footprint	• Visual impacts	• Cumulative impacts

Comments

A. **PROCEDURAL ISSUES**

L3-1

1. The DEIS fails to briefly describe and make reasonably available for inspection all incorporated material.

NEPA regulations allow agencies to incorporate material into an EIS if the effect will be to "cut down on bulk without impeding agency and public review of the action." 40 C.F.R. § 1502.21. Incorporated material must be cited and "its content briefly described." *Id.* Furthermore, no material may be incorporated by reference "unless it is reasonably available for inspection by potentially interested persons within the time allowed for comment." *Id.*

The DEIS repeatedly incorporates material without adequately describing its content. This makes it unreasonably difficult for the public to understand what Freeport LNG has already done, what

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Note: Because of the lengthy attachments to this comment letter. We are only including the summary letter.

The attachments can be found under Assession No. 20140505-5239 in our E-library system.

L3-1: Information provided by Freeport LNG has been made public and is available on the FERC library.

L3 – Blackburn Carter *for* Town of Quintana – Page 2

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they propose to do, and what they may be required to do as further mitigation. This hinders public review—a principal aspect of NEPA environmental review.

Additionally, the DEIS incorporates some non-proprietary material that are not "reasonably available for inspection by potentially interested persons." 40 C.F.R. § 1502.21. Many documents referenced and incorporated throughout the DEIS are not reasonably available, or available at all, within the FERC dockets.

L3-2

For example, at DEIS 4-66, FERC states that Freeport LNG conducted a study of avian species at the Quintana NBS and Xeriscape Park. The DEIS states that "[t]his study revealed that pre- and post-construction environments at the Quintana Island terminal did not affect species diversity or abundance. After construction, avian species continued to utilize the same habitats at both the Quintana NBS and Xeriscape Park." *Id.* This same conclusory language is found in Freeport LNG's *Resource Report 3: Fish, Wildlife, and Vegetation*. But this study was not locatable based on searches in Docket Nos. CP-12-509-000 or CP-12-29-000. This study is not available for inspection by potentially interested persons. It is unclear if FERC or a consulting agency even reviewed this study for its methodology and conclusions.

L3-3

As another example, not only is Freeport LNG's Traffic Management Study referenced at DEIS 4-128 not briefly described, but this study is not found in the two dockets. Freeport LNG submitted an Environmental Data Request Response on October 25, 2012. FERC had requested that Freeport LNG submit Level of Service studies and any additional traffic management plans. Freeport LNG attached a Traffic Impact Study in this response, but merely stated that information from a draft study was incorporated into Resource Report 5. It is unclear if the prepared Traffic Management Study is incorporated into the DEIS, but it is not available for inspection by potentially interested parties.

The Town of Quintana requests that all incorporated material be briefly described and made reasonably available for inspection within the time allowed for comment. These materials include, but are not limited to, the studies mentioned above.

B. LNG HAZARDS AND PUBLIC SAFETY

L3-4

1. According to an expert in LNG hazards analysis, the DEIS has omitted an analysis of spills over water, and such an analysis must be included.

On behalf of the Town of Quintana, we retained a hazard analysis expert, Dr. Ron Koopman. Dr. Koopman, an engineer with a PhD in Applied Science, has consulted on LNG projects previously. His report and CV are attached at **Exhibit A**.

Dr. Koopman identified that the DEIS lacks any analysis of spills on water. According to Dr. Koopman, there is a history of unloading arm failure in the industry. This is a weak point in

L3-2: Section 4.5.3, which addresses impacts and mitigation for migratory birds, has been revised.

L3-3: Freeport's Final Traffic Impact Study was submitted as part of the public record on November 14, 2012. Freeport LNG submitted the Freeport LNG Liquefaction Project Transportation Management Plan on May 1, 2014 at the FERC's request. Traffic issues are addressed in this document in section 4.8.5.

L3-4: Section 4.10.5 of the draft EIS addresses spills from unloading arms. We assessed impacts associated with the export of LNG, the use of LNG carriers and LNG spills over water in our previous EIS for LNG import. As the number of vessel trips/vessel size has not changed under the proposed Liquefaction Project, this issue was not assessed further.

Freeport LNG is required to comply with its Spill Pollution Control and Countermeasure plan, which addresses the accidental discharge of hazardous materials.

L3 – Blackburn Carter *for* Town of Quintana – Page 3

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loading and unloading process, when movement occurs between the vessel and the unloading pier. Because there is a history of unloading arm failure in the industry, FERC should closely analyze the possibility and consequences of a spill over water. The vaporization rate of LNG over water is much higher than the earth, which can result in bigger and faster fires. Dr. Koopman explained that the LNGFIRE3, used for fire analysis, is approved for spills on land but not on water.

The DEIS lacks an analysis of spill over water. Further, if such analysis over water was provided in connection with earlier Freeport LNG (Phase I) facilities, the analysis needs to be revisited, as there are significant differences between facilities for importing and exporting LNG.

L3-4 cont'd

Any spill over water would pose one of the worst case scenarios from a hazard standpoint. Therefore, we request that FERC include such analysis.

In connection with this review, FERC may consider a report developed by Sandia entitled "Guidance on Risk Analysis and Safety Implications of a Large Liquefied Natural Gas (LNG) Spill Over Water" (SAND 2004-6258). Sandia worked with the DOE, the U.S. Coast Guard, LNG industry and ship management agencies, LNG shipping consultants, and government intelligence agencies to collect information on ship and LNG cargo tank designs, accident scenarios, and standard LNG ship safety and risk management operations. The report provides communities and agencies with the general scale of safety, security, and hazard issues posed by a large spill.

2. The DEIS relies on vapor fences as mitigation for vapor dispersion, but vapor fences are a relatively new and untested technology.

L3-5

Freeport LNG relies on vapor fences as mitigation for dispersion. Vapor releases from design spills into impoundments would exceed limits allowed at the plant boundary by 49 C.F.R. 193 unless they are confined by vapor fences. These fences are proposed for use throughout the liquefaction facility and the terminal area to reduce vapor concentrations at the fence line. The vapor fences proposed are chain link fences that are 10, 12, or 20 feet tall with privacy slats to reduce the porosity to 10%.

According to Dr. Koopman, the vapor fences are a relatively new and untested technology. The mitigation effect is based on sophisticated computer model calculations but there is very little data to validate their performance. There is little history of their use to demonstrate successful implementation. At a minimum, FERC needs to be skeptical of the vapor fences and give their use in this project a hard look.

Freeport LNG is required to comply with the prescriptive standards in NFPA 59A, which are incorporated in the federal regulations at 49 C.F.R. § 193.2801. The objectives of these regulations and NFPA 59A are to keep any fire and explosion hazards onsite (i.e., within the

L3-5: See Section 4.10.5

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facilities boundaries) in the event of a loss of containment event. Because exposure of fire and explosion hazards are entirely dependent on the proposed vapor fences, Freeport LNG's compliance with these regulations and NFPA 59A are entirely dependent on the success of the proposed vapor fences. FERC needs to be very rigorous about reviewing the vapor fences because the strip of Quintana is a small piece of land and it is possible to imagine instances where people or bystanders are present at or very near to the fence line.

3. It is unclear whether the vapor fences, the proposed mitigation for vapor dispersion, could withstand the frequent and strong winds of the Texas coast.

L3-5 cont'd

Dr. Koopman also stated that the proposed vapor fences would have to be constructed to withstand the high winds that are common on the Texas coasts. He explained that, as with all constructed mitigation measures, the fences will only work if they are maintained for the life of the facility. The vapor fences, if implemented, would have to be designed at the highest standards and would have to be sufficiently maintained given these conditions. Given the strong winds in this area, these vapor fences will have to be built, maintained, and re-built over time.

We request that FERC require Freeport LNG conduct monthly monitoring of the vapor fences for integrity, corrosion, and wind damage. FERC should require that Freeport LNG submit an annual report detailing the results of the inspections, and any maintenance that was performed to repair the vapor fences.

4. The consequences of the confinement provided by piping, tanks, machinery, structures, and vapor fences are unknown and must be investigated.

According to Dr. Koopman, it is possible that confinement provided by piping, tanks, machinery, structures, and vapor fences will result in a confinement situation that can generate damaging overpressure for LNG vapor clouds ignited within the liquefaction area. The consequences of this confinement are unknown and must be further investigated.

L3-6

According to Dr. Koopman, at issue is whether the confinement produced by the machinery, pipe racks, and other structures associated with the liquefaction facility, plus the vapor fences, will create enough confinement to cause LNG vapor releases to explode. Mixed refrigerant (propane, ethane, etc) is explosive without confinement and can produce damaging overpressure in the open. The EIS shows that 1 psi overpressures from the worst case remain on site. BLEVE (boiling liquid expanding vapor) explosions occur when NGL (natural gas liquids, propane, etc) are heated in a pressure vessel. These are capable of producing both overpressure and radiant energy from the fireball produced. Impoundments have been designed to mitigate this hazard by causing any spilled NGL to flow away from the tanks to keep the tanks from being heated. Since propane will flash into a vapor and aerosol cloud, which will be transported by the wind, this may still introduce fire into the vicinity of the tanks. For additional protection, water spray and fire monitors will be installed.

4

L3-6: See Section 4.10.5

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As confinement increases, the flame may increase to point where it can become damaging. There is the possibility of more overpressure, and an explosion. According to Dr. Koopman, this is something that needs to be investigated. FERC needs to be mindful of this situation, and the engineers need to take a hard look. There is no analysis of these risks in the DEIS.

L3-7

5. FERC needs to investigate the recent explosion at an LNG plant in Washington State to determine whether similar problems could exist at the Freeport LNG site.

News stories appeared recently regarding an explosion at the Williams Northwest Pipeline LNG facility in the State of Washington. The explosion injured several workers and forced an evacuation of 400 residents and agricultural workers within a two-mile radius of the facility.

FERC concluded that sufficient safe guards are in place to mitigate potential impacts to the off-site public. FERC concluded that there is only a slight increase in risk to the nearby public. As demonstrated by the Washington explosion, that conclusion may be questioned. At a minimum, the news stories report that the investigation related to the cause of explosion at the Williams facility is ongoing. If it is determined that the cause of the Washington explosion implicates a particular structure or safety mitigation component found within Freeport LNG's proposed project, then FERC needs to review the Freeport LNG facility to determine if similar problems could exist at Freeport LNG's site.

C. PUBLIC SAFETY AND EMERGENCY RESPONSE

1. The unique aspects of the siting of these Freeport LNG facilities—*i.e.*, (1) the facilities are on a small island, (2) the Town of Quintana is very close to the facilities, and (3) only one road exists onto and off of the island—require FERC's very attentive review to the mitigation measures and the emergency response plans.

L3-8

According to Dr. Koopman, the best protection from hazardous material spills is distance. This allows atmospheric mixing to reduce the hazard without human intervention. However, due to the proposed location of this project, distance to the public (to the Town of Quintana) is difficult to achieve. It will be necessary to couple excellent analysis with aggressive monitoring, first-rate emergency response planning and capabilities, and first-rate hazard mitigation measures.

The fact that the proposed facilities are to be sited on a small island (with only one two-lane road, FM 1495, available to depart the island) means that evacuation routes must be selected carefully and maintained. It is possible that evacuation routes could be cut off due to the small size of the island. For the residents of the Town of Quintana, hazards may render the one road exit option unavailable, necessitating water evacuation.

5

L3-7: Refer to Section 4.10.

L3-8: On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in response to a FERC Data Request. This initial Evacuation Plan describes Freeport LNG's public notification procedures, public evacuation procedures, potential available evacuation routes, including assembly areas, marine pickup points, land evacuation routes and marine evacuation routes as well as vessel transit routes. Additional information on the Evacuation Plan and emergency response procedures are discussed in Section 4.10.7 of the EIS.

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During peak visitation events, there can be as many as 5,000 visitors (estimated) in the vicinity of Quintana Island (whether directly with the Town limits or on adjacent beaches). We note that there is disagreement among the Town Council as to the peak number of visitors; at least one member of Town Council estimates the peak numbers to be lower, around 2,000, and states that the Town has a practice of shutting the beaches when they become too crowded.

During times of peak visitation, the majority of these visitors use Bryan Beach. But in the event of an emergency, all town residents and beach users, at both Bryan Beach and Quintana Beach, will have to use either FM 1495 or water evacuation. The emergency response plan must account for the peak number of island visitors and residents.

Dr. Koopman concludes his review of the DEIS with this: "The biggest concern is congestion and the potential to expose large numbers of visitors to industrial hazards because of the small size of the island, the potential for 5,000 visitors, the large amount of hazardous, flammable material from multiple sources, and lack of suitable evacuation routes make this a disaster waiting to happen. Special measures will be necessary to reduce the importance of each of the items listed above to the overall hazard."

L3-8 cont'd

We request that FERC's review of Freeport LNG's submissions takes into account these unique aspects of the siting of the project, particularly as they relate to mitigation measures and emergency response plans.

2. **Due to the unique aspects of siting this project, a robust, well-staffed, and up-to-date emergency response plan is critical; and FERC must ensure that Freeport LNG develops such a plan.**

According to Dr. Koopman, the high concentration of industrial hazards and hazardous chemical shipping and handling in this very small area will make it difficult to safely and effectively evacuate and separate the residents from the hazards should an accident occur. A robust, well staffed and up to date emergency response capability will be necessary to assure rapid and efficient protection of the residents and to isolate the accident before it impacts other industries in the vicinity. The Town of Quintana has an Emergency Response Plan from FLNG dated 2013.

The DEIS requests that Freeport LNG provide an updated Emergency Response Plan (DEIS at 4-197). According to the DEIS, the plan is to be prepared in consultation with the Coast Guard and state and local agencies (DEIS at 4-196). Brazosport CAER routinely contacts the Mayor and Town Hall of Quintana when there is an issue. However, it is unclear from documents in the FERC docket to what extent Freeport LNG has coordinated with the Coast Guard to evacuate the island by sea, which is particularly important during peak tourist season. FERC must ensure that full coordination with federal, state and local agencies takes place.

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3. The most important elements of a robust emergency response plan are: (1) monitoring; (2) response and evacuation plan; (3) education to the public; (4) testing and re-testing; and (5) agency oversight.

Dr. Koopman provided guidance on the elements of effective emergency response planning, and listed these five aspects as critical.

First, Freeport LNG must detect leaks early through an aggressive monitoring system.

Second, there must be a first-rate response and evacuation plan. The various scenarios need to be developed for each possible incident that could occur. Due to the location of the facility immediately adjacent to FM 723, the one and only road evacuation route available to residents of and visitors to Quintana, it is possible that the only way to evacuate would be by water.

L3-8 cont'd

Third, education is critical. The public needs to know what to do in advance. A complicating wrinkle to the education component is the fact that there could be an influx of thousands of visitors to the island. FERC needs to make sure that the emergency response plan has an educational component.

Fourth, the evacuation and response plan must be tested and re-tested periodically to ensure that it remains effective and the public still knows the correct protocols. Dr. Koopman remarked that history is littered with failed response plans. For this reason, testing is critical. Finally, FERC can play a role in oversight, by making sure the plan is tested, implemented, and re-tested.

FERC has required an updated emergency response plan, and these elements must be included.

4. A release incident occurred in 2009, during which citizens from the Town of Quintana could not quickly reach personnel at Freeport LNG to determine whether an emergency situation was taking place—demonstrating that Freeport LNG must improve their communication channels with the nearby Town and public.

There has already been one incident, in 2009, at the Phase I facilities. During this incident, adequate emergency response measures were not evident. Citizens saw a vapor cloud and called the plant to find out more information. Citizens witnessed gas or vapors blowing from the north towards the residential area of the island. It took multiple attempts to reach a knowledgeable person, as opposed to a recording or low-level security guard employee, to find out whether a safety problem existed. This event was reported to FERC by the citizens from their perspective.

This event was discussed, and Freeport LNG's "Quintana FLNG Gas Release Dec. 2, 2009 Report" was attached, in a FERC Docket No. CP03-75 filing on December 21, 2009 (Accession

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No. 20091221-5081). But this event was not discussed in the DEIS, despite its relevance to Freeport LNG's safety and evacuation plans for the new project.

L3-8 cont'd

According to some member of Town Council and the Mayor, Freeport LNG has done a better job communicating with the public regarding safety and evacuation since this event. Communication has improved (including with the false alarms). But FERC must ensure that Freeport LNG is required to continue to improve communication with residents who would be directly affected by a release or other emergency. The plant must continue to do better to inform citizens about possible emergency events. And FERC must demand that the Company maintain a robust response and communication system.

5. The regional hazard mitigation plan lacks reference to LNG issues.

FERC should be aware that the regional plan, called the HGAC Regional Hazard Mitigation Plan (2011), does not adequately reference Freeport LNG matters. It does not mention Quintana except with respect to evacuation during hurricanes. It does not identify that Freeport LNG facility presents special risks that may require evacuation of large numbers of people during evacuation from the island. The plan can be found here: http://videos.h-gac.com/CE/hazard/2011-Hazard-Mitigation-Plan.pdf .

D. SAFETY – GEOLOGIC HAZARDS

1. From a geologic perspective, the area in which the Freeport LNG project is cited is vulnerable—notable issues include those of dredged spoils as foundation; subsidence; faulting; soil liquefaction; shoreline erosion; and the salt caverns.

L3-9

On behalf of the Town of Quintana, we hired Dr. H.C. Clark, geologist and geophysicist, to review the safety aspects of the proposed Freeport LNG project from a geological perspective. He is familiar with the area involved and the geologic issues of concern. He prepared a report, which is attached with his CV as **Exhibit B**.

As discussed in Dr. Clark's report, the Quintana area sits on a mass of wet sediments that make up the shoreline of the Gulf of Mexico Basin. This particular shoreline has been subject to aggressive erosion, sometimes episodic and exacerbated by manmade structures, including jetties protecting the Brazos River cut. In recent years, the beach has been better managed, resulting in some accretion along Quintana Beach.

These sediments are composed of sands and clays that serve as the foundation material for anything built here. As discussed in Dr. Clark's report, the sands contain fresh water at depth, and, at about 265', this fresh water has supplied two wells of the Town of Quintana. These relatively shallow sands also supply water wells owned by the various industrial facilities, both on the island and near it.

8

L3-9: Geologic hazards are thoroughly addressed in section 4.1.

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L3-10

Just to the west and across the intracoastal waterway is the Bryan Mound salt dome; the Stratton Ridge salt dome is onshore and further north of Quintana. Both salt domes, as their names imply, are positive topographic features, driven by their buoyant salt pillars, rising from the Louann salt, several tens of thousands of feet below. Both domes involve radial faulting, developed as the piercement process allowed the salt to cut through overlying sediments.

Dr. Clark's report also discusses that, as the Gulf basin has developed, the salt dome's mass has subsided to receive these sediments, always remaining at about sea level. The result has been a shoreline migrating from far inland to where it is today. The load of sediments coming from inland to the edge of the continent is considerable, and the edge has accommodated the basin loading through sets of down-to-the-coast fault systems, with some of these faults active today.

Each component of the Freeport LNG project interacts with the geology. Dr. Clark identified several areas of concern for the Freeport LNG project—the issues of dredged spoils as foundation; subsidence; faulting; soil liquefaction; shoreline erosion; and the salt caverns.

2. **The liquefaction trains are proposed to be located on top of dredge spoil, which is not an ideal foundation platform.**

The liquefaction trains are to be located at the highest elevation in the project. The top thirty feet (30') of the geologic section the trains will sit on is dredge spoil from the adjacent channel. Dredge spoil, however, is not the ideal foundation platform.

Dr. Clark explains that, while the DEIS notes the sheer velocities of the top one-hundred feet (100') in general, the detailed profiles would say more about the foundation condition presented by this dredge spoil. FERC or the company must furnish more detail to the public about the near-surface geology rather than generalizing about the top one-hundred feet (100'). It will be necessary to conduct monitoring to ensure that, for example, the plant does not sink into the ocean.

Dr. Clark observes that the engineers designing the project apparently plan to support all structures in all areas with deep driven piles. *Therefore, the discussion of foundation conditions should include analysis about the long term capability of deep driven pilings in this environment, their expected depth range, and something about the geology of this expected depth range.*

3. **The DEIS needs to address the performance specifications for the fill that underlies the proposed Pretreatment Plant.**

According to Dr. Clark, the foundation conditions for the Pretreatment Plant are similar to other Gulf Coast conditions, and the DEIS notes that "[t]he Pretreatment Plant site footprint overlies the eastern section of the central borrow pit." DEIS at 4-4. Dr. Clark discusses that, until a few years ago, this borrow pit was a sand mine, and the pit will be rebuilt with approximately twenty

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L3-10: Freeport LNG is not using the dredge fill as a plant foundation platform. All critical foundations for the Project will be supported on deep pile foundations with a penetration of 100 feet or more. This approach is customary for construction of facilities in soft soil or unsuitable fill material. Ground improvement will be used to improve the near-surface dredge fill to allow movement of construction equipment and support of lightly loaded shallow foundations. Driven concrete piles have been used for structures in similar environments and have supported the loads for 50 years or more. In fact, driven concrete piles were successfully used for the support of much heavier and larger existing tanks near the site. The depth of the piles will depend on the structural loads and subsurface conditions. The geology of the subsurface soils consists of dredge fill overlying recent deposits consisting of alluvial, deltaic and beach, bay and marsh deposits. These deposits are underlain by the Beaumont formation consisting of interlayered stiff to hard clays and dense sands.

A more comprehensive description of the strata at depths at the Liquefaction Plant site is provided in section 6.2.2.12 of the public version of Resource Report 6 dated August 28, 2014. Boring logs from the geotechnical investigation are considered privileged are not available to the public.

The Pretreatment Plant will be founded on deep piles and as with LNG facility the final depths of the piles will be determined during the final design phase. As stated in the EIS, structures proposed for the borrow pit area will also be founded on deep piles and shallow foundations are not recommended in the areas of the borrow pit which are to be backfilled. On site clayey materials, if used as fill, will likely require lime or cement stabilization. The fill will be compacted to a level determined during detailed design but will at least be compacted to 90 percent relative compaction as a minimum.

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feet (20') of fill. Thus, the discussion of the Pretreatment Plant foundation conditions should include a discussion about the performance specifications for this fill.

L3-11

4. **The concerns with active faulting justify the monitoring that Fugro has proposed, and additionally, monitoring should be conducted to include the pipelines.**

According to Dr. Clark, there are active faults in the area of the LNG project. The draft EIS (page 4-6) required a detailed fault study. The detailed study by Fugro was just made available to the public and was briefly reviewed by Dr. Clark.

Dr. Clark recognized that the Fugro study recommended monitoring the identified fault (at the PreTreatment site) for expected effects in the future. Dr. Clark agreed with Fugro's recommendations but also recommended to expand the Fugro recommendation to include the pipelines (the detailed study confirms that this fault and others cross the pipeline route) and the Stratton Ridge salt dome. *Thus, while the fault discussion focuses on the faults affecting the Liquefaction Plant and the Pretreatment Plant, the pipelines to and between these facilities should be a concern as well. There must be monitoring for the pipelines to ensure that the pipelines are not becoming stressed such that they might break.*

Dr. Clark stated that the faulting in the Freeport LNG pipeline, cavern, pretreatment plant, continued pipeline, and LNG plant area appears to be related to the Stratton Ridge piercement salt dome—in the form of radial faulting created by its emplacement and continued activity. According to Dr. Clark, this underscores the need that the Stratton Ridge salt dome, the cavern and the surface cavern well structures be evaluated and monitored.

5. **Soil liquefaction is a concern not only due to the possibility of earthquakes, but also due to vibrations associated with the equipment at the Liquefaction Plant; these continuous harmonic vibrations must be addressed by FERC.**

L3-12

A layer of sand that would liquefy under certain conditions (such as earthquake shaking) has been identified in the shallow subsurface at the Liquefaction Plant site. This concern was dismissed in the DEIS because FERC concluded that the potential for a causal earthquake is very low. According to Dr. Clark, it is a reasonable conclusion that earthquake potential is low, but there are other means to create soil liquefaction, near-liquefaction, or low-strength conditions. Specifically, soil liquefaction, near-liquefaction, or low-strength conditions can be created by the continuous harmonic vibrations associated with equipment at the Liquefaction Plant, including vibrations from the activities of very large compressors, and the Pretreatment Plant.

As discussed by Dr. Clark, the geologic section that is the framework for the LNG system foundations is very wet. Because this geologic section is next to the Gulf of Mexico, it will stay wet or get wetter over time. *This wet geologic section should be the subject of FERC concern.*

L3-11: Fugro has recommended monitoring for the LNG facility but monitoring of the pipelines is not considered necessary because pipelines have sufficient flexural capacity to accommodate relative movement associated with growth fault effects.

L3-12: The site consists of clayey soils in the top 48 feet and a potentially liquefiable sand layer between depths of 48 and 62 feet. As stated in the EIS, because of the low potential of seismic ground shaking predicted at the Liquefaction Plant and the Pretreatment Plant, the associated risk of liquefaction is negligible. Regarding liquefaction due to machine vibrations, the clayey soils above the sand layer will damp out any vibration due to operation of machinery. Furthermore, the vibrations from the machinery are not of sufficient amplitude to cause liquefaction at the depth at which the sand layer is present. Therefore, we have concluded that additional liquefaction studies are not necessary.

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and these concerns should not be simply dismissed due to a lack of earthquake threats; they should be addressed.

Dr. Clark also observes that the wet geologic section is clearly on the minds of the plant designers, as they plan to support all the critical structures with deep driven piles. Dr. Clark advises that the FERC review of soil liquefaction should be re-directed to consider the performance of the deep driven piles and their behavior under the expected long-term heavy machinery vibration impact. Part of this consideration should include the liquefaction study at the Pretreatment Plant site, including consideration of the twenty or more feet of borrow pit filling required, recommended by Fugro, but removed by FERC.

6. **Subsidence, a major concern along the Gulf Coast, has not been adequately addressed as part of Freeport LNG's proposed project.**

L3-13

As Dr. Clark explains, subsidence is a major concern along the Gulf Coast, particularly for areas such as where the proposed Freeport LNG project is situated, which are at or near sea level. Subsidence at the Gulf edge is the result of several things, including groundwater withdrawal, tectonic accommodation, and rising sea level. Dr. Clark explains that parts of the Houston Ship Channel area have subsided more than ten feet (10'), and the subsidence bowl encompasses the several county region. There is now general recognition of subsidence in the area resulting from the groundwater withdrawal by industry and municipalities, and several groundwater districts have been created and have assisted in the reduction of subsidence by controlling groundwater withdrawals. Dr. Clark explains that while that mechanism has been effective for the groundwater dimension of surface subsidence, there is more to subsidence than only groundwater withdrawals.

According to Dr. Clark, on the Gulf Coast, effective subsidence equals the sum of near surface groundwater subsidence (section compaction), plus deep basin downwarping as it is sediment loaded, plus sea level rise (for whatever cause, the measurement is a rising sea level). Dr. Clark observes that the FERC commentary is satisfied that subsidence at the project site is on the wane because of the efforts of the Brazoria County Groundwater Conservation District—but that is true only for the groundwater component of the equation. The analysis does not account for deep basin downwarping as it is sediment loaded or predicted sea level rise.

The LNG application and FERC review should include an evaluation and prediction for effective subsidence and a plan for dealing with it. This study must include all relevant components of subsidence.

L3-14

7. **Any levee upgrades proposed in connection with storm surges from hurricanes must be careful not to direct water to the detriment of nearby residences on Quintana island.**

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L3-13: As stated in the EIS subsidence in the Freeport area has been greatly reduced because of a reduction in pumping of groundwater from the Chilcot aquifer. Subsidence predicted through 2050 is approximately one foot according to the Brazoria County Conservation District. Also as indicated in section 6.5.4 of the public version of Resource Report 6, long term sea level rise is estimated at 4 inches for the Project life of the facility. Given the elevation of the Liquefaction Plant site, the combination of the subsidence and sea level rise are considered adequately addressed in the Freeport design. Dr. Clark also mentions subsidence effects from deep basin downwarping in Appendix B but does not go into detail. This regional effect would take place over large areas and as such, would not cause significant differential movement on the Project.

L3-14: No levee upgrades are currently included in the scope of the Freeport LNG Project. There are plans to stabilize and improve the slopes of the Liquefaction Plant site but that would not change how water is directed in the event of a storm surge.

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Dr. Clark agrees with the assessment in the DEIS that storm surge related to hurricane events is important. However, it should be noted that any upgrades to the levees accomplished for these purposes must not direct water to the detriment of residents in the Town of Quintana.

8. **The proposed Freeport LNG plant will be subject to shoreline erosion, even though the plant is located on the inland side of the island; thus, a plan for shoreline erosion must be addressed.**

L3-15

According to Dr. Clark, the cause of the beach erosion is the sediment supply reduction created by the re-routing of the Brazos and the source blocking by the channel jetties. The FERC analysis agrees that shoreline erosion along the Gulf side of Quintana has been rapid, about eleven feet (11') per year, and thus shoreline protection is a primary consideration. Over the past few years, the beach has been rebuilt through the planning and efforts of the Town of Quintana.

According to Dr. Clark, the reality of shoreline erosion will affect the LNG project. Simply because the plant is located on the inland side of the island, does not mean the LNG project is buffered from erosion. *Rather, the FLNG plant will be subject to that erosion, at some point in the future, and part of the plan should be an involvement in beach erosion mitigation.*

9. **Monitoring systems need to be in place to detect salt caverns dome failure, so that nearby citizens can safely evacuate.**

L3-16

Dr. Clark also reviewed the salt dome caverns, and he observes that they are an important part of Gulf Coast gas related systems. There is one salt dome cavern at Stratton Ridge that is a part of the Pretreatment Plant facility. As discussed by Dr. Clark, like any part of an engineered system, they can and do fail, sometimes with disastrous consequences. (Recent nearby examples include the Brenham explosion and the Napoleonville collapse resulting in the Bayou Corne Sinkhole.) Dr. Clark advises that it is important to the citizens of Quintana and other members of the public that the cavern at Stratton Ridge (and all salt caverns at Stratton Ridge and those at Bryan Mound) be monitored to provide warning of impending failure. *We request that monitoring be instituted in order to ensure that there is ample opportunity for safe evacuation in the result of failure.*

This concept of alerting the town is a legitimate concern, especially in light of the release event in 2009 when the Town of Quintana residents had a difficult time getting information from Freeport LNG regarding the release incident.

Finally, Dr. Clark has explained that, according to Sandia National Laboratories, the caverns are an issue due to the geological zone in which Freeport LNG is to be sited. This issue merits additional review and disclosure of what the cavern looks like. Investigation is necessary to determine whether any odd features of the cavern exist that pose safety concerns.

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L3-15: As stated in the public version of Resource Report 6, section 6.5.2.1, the Liquefaction Plants aboveground facilities are proposed to be constructed behind a protective berm located 0.25-mile from the shoreline. This indicates that concerns related to shoreline erosion will be minimal.

L3-16: The Stratton Ridge Salt Dome is not part of the Freeport LNG Projects.

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E. NOISE IMPACTS

1. **There are several areas of concern with regard to noise impacts—(1) pile driving, (2) dredging, (3) operation of the Pretreatment plant, (4) operation of the Liquefaction Plant, and (5) vessel backing—and, although noise control treatments are discussed for these operations, they are not specific and there is no commitment to effectively implement them.**

On behalf of the Town of Quintana, we hired Mr. Arno Bommer, INCE Board Certified, to review the noise impacts from this project. He is employed by CSTI Acoustics, a noise engineering firm in Houston. Mr. Bommer reviewed the DEIS and also various supplemental noise analysis reports prepared by Freeport LNG. Mr. Bommer prepared a report for us, which is attached with his CV as **Exhibit D**. According to Mr. Bommer, there are five areas of significant concern for the Freeport LNG project from a noise standpoint.

Mr. Bommer expressed concern that, although noise-control treatments are discussed for the operations in the DEIS and supplemental documents provided to FERC, they are not sufficiently specific and there is no commitment to effectively implement them.

FERC must ensure that Freeport LNG is committed to implementing noise-control treatments and mitigation measures, some of which are discussed below, in order to ensure that the quality of life for nearby residents does not unreasonably degrade.

L3-17

2. **FERC must make the details on the noise modeling available to the public, so that experts retained by interested members of the public can evaluate them.**

Mr. Bommer commented that, although the DEIS reviewed some aspects of the noise modeling that Freeport LNG created, he was not able to see any of the detailed aspects, which would have facilitated his more thorough review. *Accordingly, we request that FERC and Freeport LNG make the detailed versions of the models available for public review, including recommended noise treatments.*

3. **To reduce the noise impacts from pile driving, FERC and Freeport LNG should consider other options, such as the use of vibratory pile driving.**

Freeport LNG's report predicts noise impacts from pile driving and recommends several different optional treatments. The report acknowledges that pile-driving noise includes maximum sounds that are significantly higher than the L_{eq} "average" and thus have a greater impact.

Mr. Bommer has experience recommending the use of vibratory pile driving as a means to reduce the noise associated with pile-driving noise. With this method, the pile is vibrated such that it burrows into the ground without impacts. If used correctly and in suitable soils, vibratory

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L3-17: Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility. The FERC has adopted the EPA determination that noise levels should not exceed an L_{dn} of 55 dBA. In general we do not specify specific noise attenuation methods as suggested by the commenter (e.g. vibratory pile insertion, use of electric motors, a vessel noise mitigation plan, sound proofing homes) but rather require compliance with the referenced noise performance criteria. Therefore, the noise attributable to the facility would remain below 55 dBA L_{dn}. We acknowledge in the EIS that there would be a significant and unavoidable adverse impact on the residents of the Town of Quintana during construction, which would include noise impacts. Regarding comments on vessel backing and associated noise and vibration, refer to revisions based on further assessment in section 4.11.2.2.

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pile driving can be an efficient pile installation and extraction method. Vibratory pile driving is especially effective in less cohesive soils, and the dredge spoil foundation found on Quintana Island may produce little resistance for vibratory pile driving. This method is considerably quieter than standard pile driving.

Freeport LNG should undertake a feasibility study for the use of vibratory pile driving given the soil conditions at the Quintana Terminal site. If Freeport LNG cannot demonstrate that the use of vibratory pile driving as a noise mitigation strategy is technically unfeasible, then FERC should require that Freeport LNG use this technique on Quintana Island. Based upon a review of some of the available information online, we believe that vibratory pile driving may be suitable method that could be employed by Freeport LNG to mitigate some of the noise impacts described in the DEIS. In particular, some information suggests that vibratory pile driving is more suitable in loosely consolidated soils and sands, exactly the type that exists at the Dredged Material Placement Area where the Liquefaction trains will be constructed.

L3-17 cont'd

Vibratory pile driving can be both quicker and much quieter that conventional pile driving under the right circumstances. Other pile driving methods are even quieter, such as grip pile driving (*e.g.* the Australasian Pile Company's G-Pile system; https://www.youtube.com/watch?v=OX7OmbY9kgE).

Therefore, we request that FERC require that Freeport LNG conduct and submit an evaluation of the use of vibratory pile driving (or other techniques) at the site. The evaluation should compare the effectiveness (in terms of drivability and penetration) as well as the noise impacts of the two methods. If, after reviewing the evaluation, FERC determines that vibratory pile driving is technically feasible for the Freeport LNG Liquefaction project, then FERC should require the use of that method to mitigate the noise impacts.

4. **To reduce the noise impacts from dredging, FERC and Freeport LNG should consider additional options, such as the use of electric-driven dredges, engine room sound absorption, and ventilation silencing.**

Freeport LNG's report predicts noise impacts from dredging. Although initial dredging will be of limited duration, dredging will be a regular requirement for continued operation of the facility. According to Mr. Bommer, there are other options for reducing the noise impacts from dredging, including the use of electric-driven dredges, engine room sound absorption, and ventilation silencing. He has researched and reviewed these other options in connection with other projects.

FERC should consider other options for reducing the noise impacts from dredging, including the use of electric-driven dredges, engine room sound absorption, and ventilation silencing as required mitigation for noise impacts from dredging.

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5. Vessel-backing constitutes low frequency noise that can penetrate homes, may be loud enough to wake people at night, and may also induce excessive vibration.

The DEIS describes vessel backing as loud but short term. However, vessel backing could occur up to 400 times per year, and there may be low-frequency noise that would penetrate houses. According to Mr. Bommer, there is reason to be concerned that it may be loud enough to wake people at night.

Additionally, according to Mr. Bommer, in the FERC analysis, the vessel-backing noise seems to be compared only with daytime sound levels. If there is any chance that the operations will ever occur at night, the levels should be compared with nighttime ambient sound levels. Further, noise induced vibration from LNG vessel backing may also be excessive.

L3-17 cont'd

We understand that in the early days of the existing facility operations, one particular vessel exceeded acceptable noise levels while at the dock. It is our understanding that this particular vessel did not return, but we do not know if this was due to lack of business, or because Freeport LNG banned the vessel from returning.

Due to the enormous increase in anticipated vessel dockings, we request that FERC require Freeport LNG to develop and submit for approval a "vessel noise control plan" This plan would detail the noise standards and mitigation that Freeport LNG will implement for every vessel visiting the facility. The vessel operators would be instructed about the contents of the plan and be required to adhere to it while in the dock.

6. The DEIS analysis and use of the L_{dn} criterion omits certain critical issues—such as failing to take into account undeveloped land that may house residences in the future.

L3-18

The noise study primarily references the FERC noise limit of 55 L_{dn} at the nearest Noise Sensitive Area (NSA). According to Mr. Bommer, this may be a reasonable limit as long as sounds from construction and operations are generally steady. However, there are possible problems with the measure.

First, brief, loud sounds may cause annoyance without significantly raising the L_{dn} level due to their short duration compared with the 24-hour L_{dn} measure. Additionally, the noise analysis is conducted only at existing residences, and undeveloped land is not evaluated. Thus, future development of the town and tax base may be hindered due to excessive noise at sites where no noise impact was even considered.

L3-19

7. Soundproofing of nearby homes and buildings could provide additional noise mitigation for the Town of Quintana.

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L3-18: The referenced noise limits are designed to address existing sensitive receptors and can not anticipate where future development would occur.

L3-19: Freeport LNG will be required to comply with the 55 dBA L_{dn} limit.

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Soundproofing treatments do not reduce exterior sound levels, but they can significantly reduce sound levels inside the homes. According to Mr. Bommer, this could be an effective method to further reduce noise impacts (whether dredging, pile driving, vessel backing or others) of the proposed project.

L3-19 cont'd

Soundproofing may be utilized on the windows of homes or through other means such as installing insulation. One of the first tasks in sound proofing a home is to ensure that it uses central air conditioning. Window air-conditioning units are major sound leaks. The next greatest concern is usually the windows. There are noise-rated windows that provide significantly greater sound isolation than regular windows. These windows are typically constructed with multiple panes, air gaps of 1" or greater between the panes, and laminated glass. Beyond air conditioning type and windows, other methods of sound proofing ought to be explored.

We request that FERC require Freeport LNG to investigate sound proofing methods of nearby homes in the Town of Quintana.

8. Construction hours should be tailored to minimize noise impacts.

L3-20

According to Mr. Bommer, construction hours will be critical to many noise impacts. Ambient sound levels are lower at night, and people are also generally more sensitive. Of note, the DEIS states that certain construction activities at the Liquefaction Plant, such as HDD work, dredging, and pile driving, would have 24-hour noise impacts (DEIS at ES-8). However, construction hours should be tailored to minimize such noise impacts.

9. Potential traffic noise impacts from road vehicles entering and leaving the facility during construction and operations should be addressed.

L3-21

According to Mr. Bommer, road traffic noise was not adequately addressed in the DEIS. FERC is recommending that Freeport LNG develop a Construction Noise Mitigation Plan, which would presumably include road traffic noise during the construction phase. The results of the Plan should be coordinated with the Town of Quintana, which stands to be most impacted by construction noise, including vehicular traffic noise.

10. Engine braking on FM 1495 should be prohibited, in order to reduce noise pollution impacts on residences of Quintana island.

Although the use of trucks has been limited by the delivery of most materials by barge, the DEIS recognizes that a certain number of large trucks will be delivering materials to the construction site each day. In addition to truck traffic, there will be shuttle buses conveying workers from the offsite parking areas to the construction site numerous times a day.

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L3-20: Construction hours will comply with local requirements including local and federal noise limits. Pile driving will be restricted to daytime hours.

L3-21: Noise associated with truck traffic will be required to comply with local regulations for engine braking.

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L3-21 cont'd

The residents on the southwest end of the Town are concerned that the trucks and buses will employ engine braking as they descend from the FM 1495 bridge high over the Gulf Intracoastal Waterway. Engine braking is a vehicle retarding device used on diesel-powered vehicles which converts a power producing engine into a power absorbing compressor. Engine braking is an alternative to friction brakes or magnetic breaks used to slow a vehicle down. Diesel engines often use compression release brakes (or "jake" brakes). Compression-release braking in particular produces large amounts of noise pollution, especially if there is no muffler on the intake manifold of the engine.

The decent from the FM 1495 bridge is steep, and there is a four way stop junction very shortly after coming off the bridge. Any use of engine braking will greatly increase the noise levels, and intermittent loud noises are often more of a disturbance to nearby residences than normal traffic noise. The Town of Quintana does not want trucks using engine braking or compression release braking on or as they enter Quintana Island. Freeport LNG should require that its construction and delivery trucking contractors, as well as other trucks, not use engine braking or compression release braking as they enter onto the Island via FM 1495.

We request that FERC require that Freeport LNG address this issue by making it a condition on all employees, contractors and vendors, that any use of engine braking is prohibited near the Town of Quintana.

F. SOCIOECONOMICS

NEPA requires FERC to disclose the indirect effects, including "growth inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate…" 40 C.F.R. § 1508.8(b). "Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial." 40 C.F.R. § 1508.

The DEIS purports to identify the effects of the Phase II Liquefaction Project, and the Phase II Modification Project in Section 4.8. DEIS at 4-115 to 4-134. We provide the following comments on the socioeconomic section regarding population, economy, public services, housing, and vessel traffic.

To assist in developing these comments, we retained Associate Professor of Sociology at the University of Oregon, Dr. James Elliot. Professor Elliott's scholarship has focused on urban development and social inequalities in the United States, ranging from research on native- and foreign-born migration, racial and gender inequalities in the labor market, struggles over public housing, and social vulnerabilities to environmental hazards. His research has employed a variety of quantitative and qualitative methods and has received funding from the U.S. Department of Housing and Urban Development and the National Science Foundation.

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Dr. Elliott reviewed portions of the DEIS to assess the socioeconomic impacts including those that the DEIS omits, drawing on broader research in his field of specialty. His report and CV are attached as **Exhibit C**.

Other comments are based upon our review of information filed on the FERC docket, information published by Freeport LNG, and information developed by other federal agencies. As applicable, these sources of information are identified in footnotes, with hyperlinks, or attached as exhibits. We ask that FERC include all this information, both footnoted and attached, in the administrative record for this matter.

1. **The DEIS fails to take a sufficiently "longitudinal" perspective on the Freeport LNG project, and thereby omits the actual array of impacts on the local community in Quintana.**

L3-22

Dr. Elliott observed, after his review, that the DEIS says little about the impacts on the local community and too narrowly focused on items such as reduced housing or increased traffic congestion during construction. Dr. Elliott concluded that the DEIS needs to take a "longitudinal" perspective, meaning a longer-term and fuller assessment of impacts on the local community. (Exh. C, p. 3). Failing to take a longitudinal view is problematic, because it results in shifting the costs and risks of the proposed project from its principal beneficiaries to the local residents. The failure to take a longer-term perspective relegates the townspeople to bystanders to the transformation of their own community

2. **FERC's approval of Freeport LNG's latest project could have devastating socio-economic consequences on the Town of Quintana.**

L3-23

Dr. Elliott discusses the socioeconomic developments in the Town of Quintana since the Industrial District was formed in the 1980s—a district for Freeport LNG which is sited on the island. Dr. Elliott's analysis used available information for the census tract in which both Freeport and Quintana are located. Similar industrial districts exist elsewhere in the census tract in closer proximity to the City of Freeport.

What is revealing are the charts showing demographic trends since the industrial districts were formed, compared by census tract (Exh. C, p. 7). The trend shows that, as the industrial districts have developed, there has been a decrease in population, housing units and land area, and a corresponding increase in vacant units throughout the census tract. These trends will intersect with the impacts of the future development of the Freeport LNG project, if it is approved.

According to Dr. Elliott, citizens begin to anticipate the impacts of a project such as the LNG terminal before they happen, and often conflict arises among citizens as citizens perceive the new project as either an "opportunity" or a "threat." This has started to happen already in the Town of Quintana. We see evidence of this Opportunity-Threat dichotomy as Freeport LNG mobilizes sympathetic residents to support the project; as townspeople are divided on what's best

L3-22: The final EIS addresses the required range of socioeconomic impacts in section 4.8 of the EIS.

L3-23: Socioeconomic impacts are addressed in section 4.8 of the final EIS.

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for the community; and as local residents sign petitions either to slow or alter the proposed project.

L3-23 cont'd

Over the longer term, in such cases of large-scale development in small towns, sociological research shows that small towns do not return to normal but instead they "overadapt". (Exh. C, p.5). For example, local residents may have few real linkages to the industrial facility, but they depend upon it for tax revenue or capital outlays. Over the longer term, the industrial facility effectively takes over the local community and re-shapes the local community (the social as well as the physical environment), leaving the residents less able to create future opportunities for themselves.

L3-24

In the case of Quintana, according to Dr. Elliott, these consequences are particularly acute because the loss of the town equates to the loss of one of the oldest settlements in Texas. This is a cultural and historical resource that cannot be re-created if it is lost. According to Dr. Elliott, to diminish this settlement for the sake of profit and modernization—without looking at the longer-view—is to treat historical communities as expendable. (Exh. C, p.6).

Under NEPA, FERC must disclose these effects and impacts of the Freeport LNG project on the Town of Quintana.

3. The DEIS fails to discuss the Freeport LNG buy-out program, which has been mentioned in numerous docket submissions, and which threatens the longevity of the Town of Quintana.

The DEIS completely fails to mention, much less analyze, the effects of Freeport LNG's proposed buyout program for residents of Quintana. This may be due to Freeport LNG's failure to disclose this issue to FERC, although we believe that FERC is now aware of the program through various filings made by citizens on the docket.

Freeport LNG calls their buyout program the "Property Sale Option." It is currently unclear exactly when this buyout program was first proposed by Freeport LNG. However, the first buyouts were of certain residences on Cortez Street. These residences were identified in noise studies as the nearest Noise Sensitive Area ("NSA"). These properties were transferred to a subsidiary of Freeport LNG—called FLNG Land II Inc.—in March 2013.

On June 7, 2013, fifty-seven residents of Quintana signed their names to a petition filed with FERC requesting that the authorizations requested by Freeport LNG be denied. FERC Docket No. 12-509-000, Accession No. 20130612-5009. The fifty-seven residents cited numerous grounds for denying the permits, including noise, air quality, and safety grounds. (We received feedback from a member of the Town Council that, of the 57 residents, some were renters or are

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L3-24: Regarding cultural impacts associated with Freeport LNG's purchase of homes in the historic Town of Quintana, see section 4.9.2.

Socioeconomic impacts of the purchase of homes are discussed in section 4.8.

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residents that no longer live on the island; also, some signatories reportedly no longer have any issues with FLNG, or their questions have been answered.)

L3-24 cont'd

We do know that Freeport LNG proposed a $5000 "Impact Payment Option" on September 16, 2013. It is possible that the "Property Sale Option" was made at the same time, although it could have been made subsequently. We also know that on February 24th, 2014, Freeport LNG sent a letter to all Quintana Residents reminding them that the "Property Sale Option" program would close on February 28, 2014. In that same letter, Freeport LNG stated:

> At this time, forty-six (46) residence owners have either reached an agreement or are actively negotiating with Freeport LNG to sell one or more of their homes to Freeport LNG (after we receive the appropriate regulatory approvals and project financing). This means that over 63% of the homes on Quintana Island are either under contract or are the subject of ongoing sale negotiations with Freeport LNG. Thus far, eleven (11) residence owners have elected to receive the annual impact payments from Freeport LNG.

After Freeport LNG's buyout and impact payment programs, a second petition of Quintana residents garnered 37 signatures requesting: "Stop Council from spending any more money on Attorneys." This petition was presented at the Town Council meeting on April 14, 2014. The petition asked the Town Council to stop "Spending Town funds on trying to stop and or delay the permitting process using Town's income on Attorneys that is eventually going to happen anyway. … Also, the delay on the final permitting causes the delay of buyouts for the residents that sold out." (Accession Number 20140428-0046). Around thirteen of the signatories to the second petition had previously signed the petition opposing the permits.

Presumably some, if not all, of the residence owners who decide to sell will leave the island permanently. Some may elect to stay and instead rent properties on the island. However it is clear that once FERC approves the proposed project, and once the necessary financing is obtained, there will be a dramatic fall in the number of persons living on Quintana. This loss of Town residents will change the Town forever.

A similar depopulation has happened before. Between 1900 and 1913, after a series of powerful hurricanes devastated Quintana, the entire population of residents left and it was not until 1968 that people returned. The Town of Quintana remained in existence, but only because there were no residents to vote or be elected, and therefore no persons remained to dissolve the incorporation of the Town. A newspaper article described the Town of Quintana as a "Zombie City".

Cities require a critical mass of residents to remain viable entities. The tax base provides funding for city programs. After the Freeport LNG buyouts, it is not clear what the company will do with

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the residences. A large part of the taxable value of Quintana is comprised on the improvements (*i.e.*, buildings) on the raw land. Should Freeport LNG elect to demolish all the improvements on the properties it purchases a significant portion of the tax base of the Town could be eliminated overnight. Furthermore, depopulation can further depress property values on an almost uninhabited island. This depression will further reduce the tax base of the Town.

L3-24 cont'd

Because Freeport LNG has made the "Property Sale Option" conditional upon FERC's approval of the project, its existence is and implementation will be a direct effect of the federal decision. Any socioeconomic effects caused by the buyouts and depopulation of the Town are indirect effects of the federal decision. Both kinds of impacts must be discussed and analyzed in the FEIS. Additionally, FERC should request that Freeport LNG fully disclose all the details of the "Property Sale Option" so that the agency can review and fully analyze its likely socioeconomic effect on the Town. Failure by FERC to fully comply with its duties under NEPA will result in a decision by a federal agency that would inevitably lead to the Town of Quintana becoming a "Zombie City" for the second time in its long history.

4. **Due to the potentially devastating socio-economic impacts on the Town of Quintana, FERC must be aggressive in requiring mitigation for the Town to keep it intact.**

According to Dr. Elliott, the public good is not simply increased tax dollars and modernization, but also the historical and social value of maintaining lasting communities in place. Exh. C, p.6. As described above, there is the potential for the loss of the Town of Quintana should the new Freeport LNG facility be built.

We are mindful of the regulations which allow FERC to require additional mitigation measures "that might be more effective" than the applicant's proposed mitigation measures. 18 C.F.R. § 380.7 provides: "In addition to the requirements for an environmental impact statement prescribed in 40 CFR § 1502.10 of the regulations of the Council, an environmental impact statement prepared by the Commission will include a section on the literature cited in the environmental impact statement and a staff conclusion section. The staff conclusion section will include summaries of: (a) The significant environmental impacts of the proposed action; (b) Any alternatives to the proposed action that would have a less severe environmental impact or impacts and the action preferred by the staff; (c) Any mitigation measures proposed by the applicant, ***as well as additional mitigation measures that might be more effective***…."

In light of the potentially devastating socio-economic impacts on the Town of Quintana, FERC must be aggressive in requiring mitigation for the Town to help maintain the quality of life for the Town people who decide to remain.

5. **The reduction in the number of residents, resulting from the buyout proposed by Freeport LNG, will reduce water demand, and this will burden the Town with increased water supply management difficulties.**

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L3-25

The Town of Quintana supplies water to its residents. For water supply, the Town relies on three groundwater wells, each supplying water of varying quality, and capable of producing differing quantities. The water from these three wells is blended by the Town before being piped to residences. One of the problems the Town currently faces relates to the slow movement of water through the supply system. When low demand leaves the water sitting in the pipes for too long, the water can stagnate, and disinfectant levels can drop too low. Increasing disinfectant levels in the supply can leave some parts of the system with too high levels. Stagnant water in the supply pipes can also lead to corrosion and discoloration of the water. Because the Town supply is a public water system, it is required by state and federal law to meet stringent quality standards. The Town currently has 89 connections. Before annexing the western part of the Town, there were approximately 27 connections, albeit covering a smaller area.

Major parts of the water supply system were installed by the Town at a time of predicted population growth (before Freeport LNG was even proposed) 1980s. The size of the mainline pipes was selected at that time based upon the predicted increase in population and demand. The growth predict after 2000 did not occur, and the Town has had difficulties managing its water supply system. The buyout proposed by Freeport LNG will greatly reduce the number of residents served by the Town. Fewer residents and fewer connections will reduce demand. This may burden the Town with increased water supply management difficulties. The basic cost to maintain a clean and safe supply of water will remain the same or possibly even increase, while at the same time serve fewer customers. In order to continue operating a public water system, and still meet state and federal standards, the Town may be forced to install new (*i.e.*, smaller diameter) pipes at a high cost. The Town is considering installing a new loop line and new water tank to alleviate problems and to facilitate better water management.

Because the Freeport LNG buyout program is conditional upon FERC's approval of the proposed projects, the buyout and the effects of the buyout upon public services are indirect effects that must be fully analyzed by the agency;

L3-26

6. The DEIS wrongly states that no vessel traffic impacts anticipated; rather, a full review of this issue is required, and mitigation for impacts related to new vessel traffic may be necessary.

The DEIS discloses that "no vessel traffic impacts are anticipated." DEIS at 4-130. The stated basis for this conclusion is that the projects "would not result in vessel transits to/from the terminal beyond the level accommodated by current authorizations." DEIS at 4-130. Indeed, this phrase or something similar is repeated three times in the DEIS. DEIS at 4-130 – 4-131. However, using the basis of "current authorizations" is not the standard of disclosure of environmental impacts under NEPA.

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L3-25: Freeport LNG has not stated whether it would raze homes purchased. It would be speculative to forecast if or when water service in the town would need to be adjusted to meet future conditions.

L3-26: We agree that the Freeport LNG terminal has not had the number of ships per year call on its existing facility as was permitted. However, a full environmental and navigation safety review of the ship traffic proposed in the current project was completed and determined to not present any significant problems.

The socioeconomic issues related to ship traffic are identified in section 4.8.6.

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Actual *existing conditions* must be used as baseline in order to evaluate the impact. The Freeport LNG website lists the first vessel docking at the facility in April 2008.[1] This vessel was chartered by Freeport LNG to deliver LNG for the first "cool-down" of the tanks at the Phase I facility. According to Freeport LNG, the facility did not begin formal operations until June 2008.

We reviewed information on national LNG imports from the U.S. Energy Information Administration ("EIA").[2] Based upon the data at the EIA, we estimate that since the Freeport LNG import terminal (Phase I) began operation in June of 2008, there have been a total of 11 vessel dockings at the facility for LNG imports. This number is confirmed by the Dept. of Energy's *Natural Gas Imports And Exports Reports*,[3] which detail each shipment. The first was in January 2011, and the most recent was in September 2013. Thus, over the 71 months of operation of Phase I, a vessel has docked at the Quintana facility on average one time every five and a half months. No vessels docked for import purposes in the first 31 months of operation. In 2011, there were seven import dockings, in 2012 there were two, and in 2013, there were two.

We understand that in addition to import vessel docking, Freeport LNG has been re-exporting LNG. Typically, low utilization at import terminals has created available LNG storage capacity in the terminals' storage tanks. Re-exportation of LNG lets marketers and suppliers store liquid gas, while waiting for price signals before delivering their LNG to the higher-paying markets. Based on a review of the Dept. of Energy's *Natural Gas Imports And Exports Reports*,[4] there have been 10 re-export vessel dockings.

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L3-26 cont'd

Year	Import docking	Re-export docking	Total
2008	0	0	0
2009	0	0	0
2010	0	0	0
2011	7	5	12
2012	2	4	6
2013	2	1	3
2014 (through Feb.)	0	0	0
Totals	**11**	**10**	**21**

Throughout almost six years of operation, there have been a total of 21 vessel dockings for import or re-export purposes, 11 imports and 10 re-exports. In short, Freeport LNG has been

[1] FACILITY START-UP: Arrival of the First LNG Cargo at the Freeport Regas Terminal. http://www.freeportlng.com/terminal_start-up.asp

[2] U.S. Natural Gas Imports by Point of Entry, http://www.eia.gov/dnav/ng/ng_move_poe1_a_EPG0_IML_Mmcf_a.htm; Excel spreadsheet of U.S. Natural Gas Imports by Point of Entry (1973-2014), http://www.eia.gov/dnav/ng/xls/ng_move_poe1_a_EPG0_IML_Mmcf_a.xls (downloaded April 29, 2014).

[3] http://energy.gov/fe/key-publications-natural-gas-regulation

[4] http://energy.gov/fe/key-publications-natural-gas-regulation

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operating as a LNG temporary storage facility. Twenty-one vessels means an average of one vessel docking approximately every four to five months over the operational life of the facility. Therefore the Freeport LNG dock has been mostly idle, much like the rest of the Phase I regasification plant. This is the environmental baseline against which FERC must analyze the proposed action. The baseline for vessel dockings is one of highly infrequent dockings, never more than two in any month, and long periods of several months with zero vessel activity, zero vessel noise, and zero vessel air emissions.

The pending FERC action proposes to add an estimated 400 vessel dockings every year. DEIS at 4-33. This equates to one or more vessel docking every day.

L3-26 cont'd

A review of previous authorizations for this facility shows that in the FEIS for Freeport LNG Phase I, FERC stated that the marine terminal had a capability of unloading up to 200 ships per year. Phase I FEIS (FERC/EIS – 0164), at 2-1. The previous NEPA documentation did not disclose the impacts on the residents of Quintana of 400 vessels a year. On September 26, 2006, FERC issued an order authorizing the Phase II expansion of the Freeport LNG import terminal, which included an expansion of the Freeport Terminal's send-out capacity. 116 FERC 61,290 (2006), *available at* http://elibrary.ferc.gov/idmws/file_list.asp?document_id=4441979. The Phase II project authorized the increase of import terminal's send out capacity from 1.5 Bcf per day to 4.0 Bcf per day. This order also discusses managing the safety and security risks of LNG marine traffic in this area in light of up to 400 vessels per year. An Environmental Assessment was conducted by FERC to support the 2006 order. However, that NEPA document only reviewed some of the impacts associated with the increased vessel traffic. In particular the noise analysis in EA did not review vessel noise.

We offer two main conclusions. First, the history of NEPA reviews for Freeport LNG's various projects is complicated and extremely difficult for the public to unravel. It is unreasonable for FERC to expect the public to perform review of all previous draft and final NEPA documents in order to be able to comments on the current NEPA document. We understand that FERC can incorporate material into an EIS by reference, but "[t]he incorporated material shall be cited in the statement and its content briefly described." 40 C.F.R. § 1502.21. "No material may be incorporated by reference unless it is reasonably available for inspection by potentially interested persons within the time allowed for comment." *Id.* It is therefore arbitrary and capricious for FERC to rely of previous authorization without explaining exactly what effects were reviewed for NEPA purposes in those previous authorizations.

Second, regardless of what was previously authorized, the baseline environmental conditions on Quintana are that only twenty-one vessel dockings took place over six years. The difference in environmental effects between a vessel every four to five months, and one or more vessels every day is dramatic, and nowhere is this analyzed in the current DEIS or any previous NEPA document (as best we can tell). The current NEPA review must be done in light of the changed

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circumstances since the previous reviews, namely a decline in domestic natural gas prices leading to very low levels of LNG import.

Therefore, we request that FERC perform a full review of the effects of the proposed increase in vessel traffic and docking from existing levels of activity, and the proposed level that would occur if Phase II export facility is approved by FERC. The analysis should cover vessel noise, and any other impacts that might occur due to the vessel traffic increase.

L3-26 cont'd

Finally, even with the occasional dockings, vessel noise has still been a problem leading to at least one complaint from residents. During one vessel docking in 2013, the ship ran some sort of generator or engine during the night-time. In response, Freeport LNG banned this one particular ship from utilizing the dock.

FERC should require Freeport LNG to submit plans on how it intends to require visiting vessels to reduce the impacts on the Quintana residents, such as providing dockside power so that generators to not need to be operated onboard, and reducing light pollution from berthed vessels during the night.

7. The DEIS incorrectly characterizes the nature of the Quintana residents' petition

L3-27

In the Executive Summary, FERC incorrectly characterizes the petition submitted by landowners of Quintana Island. FERC states:

> As of February 28, 2014, we have received a total of 186 comment letters and two petitions (a petition in opposition signed by 323 people associated with the Liquefaction Project, and a second letter disavowing the petition signed by 57 landowners from Quintana Island).

DEIS at ES-3. The petition on the FERC docket at the time of publication of the DEIS was the June 7, 2013 petition from 57 residents of Quintana Island requesting that the permits for the Freeport LNG project on Quintana Island "be **DENIED**." The petition cited seven concerns: noise; air quality; pollution risk to natural resources and wildlife; explosion and fire hazards; Freeport LNG contractual obligations to the Town; the buyout program, and a request for a protective berm if the project is allowed to proceed.

We understand that FERC is aware of this error. We request that FERC correct this error and accurately describe the petition contents.

G. GROUNDWATER

1. The DEIS inadequately analyzes the vulnerability of the groundwater drinking sources for the Town of Quintana.

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L3-27: See revision in Executive Summary of the EIS.

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Dr. H.C. Clark also provided review of the groundwater resources for the Town of Quintana. Quintana relies on municipal wells, which draw from the Chicot Aquifer at 265' depth. The TWDB well records indicate that the wells are constructed properly. These are shallow wells, completed to take advantage of the freshwater resource present at that depth.

L3-28 According to Dr. Clark, the Freeport LNG plant wells will be used during construction, and the DEIS and Freeport LNG do not anticipate added groundwater depletion. That may be so, but, to demonstrate this, FERC should require Freeport LNG to maintain two of the monitor wells as water level indicators.

According to Dr. Clark, the Quintana water wells are vulnerable by virtue of how shallow they are and their location. Water wells in the area are currently under some threat for saltwater intrusion. Any additional pumping for dewatering or disturbance of the groundwater table may increase the risk of saltwater intrusion for the Town's three water wells. This needs to be taken into account, and disclosed in FERC's environmental review.

2. Freeport LNG should be prepared to provide potable water to the Town, should the facility render the groundwater unusable.

Of the three Quintana water wells, the best quality of them is on the west end near Bryan beach. The water from this well is blended with the water from the other wells to produce water that meets applicable quality standards. If there is any damage to this well, the quality of the entire Town's water supply could be jeopardized. If there is any damage to this well, or to the water supply of Quintana due to Freeport LNG activities, and Freeport LNG renders the groundwater unusable, then the company needs to plan to supply the town with potable water.

II. TRAFFIC DURING CONSTRUCTION PHASE

L3-29 **1. The DEIS concludes that construction traffic would result in significant and unavoidable impacts on the residents of the Town of Quintana during construction of the Liquefaction Plant and Phase II Modification Projects.**

The DEIS correctly concludes that construction traffic will generate adverse traffic impacts and will inconvenience the residents of the Town of Quintana. This traffic will also likely inconvenience visitors to Bryan and Quintana beaches. The road transportation of materials, earthen fill, and equipment to the terminal site will also generate noise and increased roadway dust and debris. The project's cumulative direct impacts on Quintana residents will be significant.

2. Given these significant impacts, FERC should take a hard look at additional mitigation measures that might be more effective at reducing these impacts to the maximum extent practicable on the residents of the Town of Quintana.

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L3-28: See section 4.3.1.

L3-29: Traffic issues are addressed in section 4.8.5 of the EIS.

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Quintana Island is accessible from the mainland and the City of Freeport via FM 1495. This two-lane road passes as a high-rise bridge across the ICW. Once across the bridge, the Quintana Island terminal is approached by turning left from FM 1495 onto CR 723, which becomes Lamar Street. These roads are two-lane asphalt roadways with little to no shoulder.

L3-29 cont'

The Liquefaction Project on Quintana Island has a required peak workforce of approximately 1,700 and an estimated construction workforce of 1,000 persons. The Phase II Modification Project has an estimated construction workforce of 300 persons. According to the DEIS, these workers would park off-site on the mainland and would be bused to and from the construction site on Quintana Island. DEIS at 4-126. For every 1,000 workers, 48 bus trips would take place for both morning and evening peak hours: 12 buses, 2 loads per bus in each peak period. This suggests that for an hour in the morning and an hour at night, up to 144 bus trips will be required onto or off of Quintana Island. Additionally, road transportation of materials, earthen fill, and equipment to the Liquefaction site will generate at least 10 to 12 deliveries via tandem truck per day during construction, with a peak of at least 15 to 20 trips per day. These projections do not include the operational workforce of these facilities. These workers will drive directly to and from the site.

Freeport LNG has just filed its Transportation Management Plan. FERC should ensure that Freeport LNG's proposed mitigation measures reduce the impact to residents of the Town of Quintana to the maximum extent practicable. In its August 2012 Resource Report 5, Freeport LNG states that its Transportation Management Plan will be presented for comment to area law enforcement, emergency response, and local city management personnel. The Town of Quintana, which will bear much of the impact from these activities, requests that it be able to submit comments on the plan prior to construction.

Furthermore, this plan should represent the real-world conditions for the actual impacts due to construction and operation activities. In the DEIS, several conditional statements are made. For example, on DEIS 4-126, FERC writes that "[t]he large amount of fill material needed for the Liquefaction Plant, *if trucked to the Quintana Island terminal*, would generate adverse traffic impacts and inconvenience the residents of the Town of Quintana." The final Transportation Management Plan should include specific, required mitigation measures for such scenarios.

I. **HISTORICAL SITES**

L3-30

1. The DEIS ignores the historical and cultural significance of the Town of Quintana, one of the oldest incorporated cities in Texas.

The history of human use of the Brazos River Delta and Quintana/Velasco area goes back long before written records. That part of the Texas coast was thought to be inhabited by Paleo-Indians as far back as 6000BC. More recently groups of the Karankawa Tribe were associated with the coastal area. In 1528, the Island was likely the land spot for the expedition of Cabeza de Vaca.

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L3-30: Impacts to cultural resources including the historic Town of Quintana are addressed in section 4.9.2.

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Stephen F. Austin founded a settlement on Quintana Island in the 1820s and named it Quintana. Written documents exist showing the development of the township of Quintana starting in the 1830s. By 1850 the population of Quintana had grown to some thirty to sixty households. Repeated hurricanes struck the Island from 1875 through 1913, and caused much of the population to move away from Quintana.

L3-30 cont'd

The settlement of Quintana has a long historical and cultural significance for Texas, and this was not disclosed or discussed in the DEIS. FERC must do so.

J. **WILDLIFE RESOURCE IMPACTS**

1. **The DEIS provides an inadequate description of the environmental, aesthetic, and recreational value of wildlife areas on Quintana island, including the Quintana Neotropical Bird Sanctuary (NBS) and Xeriscape Park.**

L3-31

The DEIS describes the managed and sensitive wildlife areas within an approximately ten-mile radius of the Quintana Island terminal and the Pretreatment Plant site. Among these managed wildlife areas are two parks on Quintana Island: the Quintana Neotropical Bird Sanctuary (NBS) and Xeriscape Park.

These two wildlife areas serve both as an important ecological role for migratory birds, and also as popular birding locations for enthusiasts, town residents, and visitors to Quintana's beaches. We have attached the photographs of a Quintana resident, Jimmy Kall, to demonstrate the variety and distinction of birds seen and photographed at these areas by bird watchers. Attached as **Exhibit E**. During the month of April, the Quintana NBS is also used in an educational capacity. During this time, the GCBO and Quintana host the Spring Fling, leading bird walks, providing birding information, and offering field guides to the visiting public.

The Quintana NBS is located less than 0.1 mile south of the existing Quintana Island terminal. Since its origination in 1994, this sanctuary, which contains woody vegetation, a nature trail, ponds, benches, and an observation tower, serves as an important stopover for a number of neotropical migrants during March and April. The NBS provides food, shelter, and water for birds migrating north during the Spring, and nearly 150 species of birds can be viewed during this period. The NBS is owned by the Town of Quintana and managed collectively by the Town of Quintana, the Gulf Coast Bird Observatory (GCBO), the Houston Audubon Society, and Partners in Flight. The Town of Quintana also owns Xeriscape Park, which was relocated and expanded in 2005. Xeriscape Park, like the Quintana NBS, serves as an important stopover point for migratory birds. Attached as **Exhibit F** (bird observations at Quintana NBS).

2. **The DEIS does not provide an adequate basis for concluding that there will be no significant impact on these wildlife areas.**

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L3-31: The NBS and Xeriscape Park are described in section 4.5.

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The DEIS concludes that FERC does not expect that construction of the Liquefaction Project and Phase II Modification Project would have a significant impact on managed and sensitive wildlife areas. DEIS at 4-62. The Town of Quintana is concerned about adverse impacts on these critical flyover bird sanctuaries resulting from noise, vibration, and artificial lighting resulting from Freeport LNG's construction and operational activities. The sole bases provided in the DEIS for FERC's conclusion are Freeport LNG's previous study regarding construction impacts on avian species and the fact that wildlife in the area are accustomed to industrial activities.

As required mitigation for Freeport LNG's existing Quintana Island terminal project, Freeport LNG conducted a 6-year study of avian species observed on a seasonal basis at the Quintana NBS and Xeriscape Park between May 2004 and June 2009. The study evidently concluded that species diversity and abundance showed no significant differences before and after terminal construction. While this study is discussed in Freeport LNG's Resource Report 3, we have been unable to locate the study itself. The Town of Quintana requests that FERC review and describe this study's methodology and conclusions if it has not already done so.

L3-32

The Town of Quintana also requests that, as required mitigation, Freeport LNG be required to conduct a multiyear study of avian species observed at the Quintana NBS and Xeriscape Park during construction and operation of the Liquefaction Project and Phase II Modification Project. The results of this study should be provided to the GCBO and the Town of Quintana. It is well-documented that noise deters wildlife and that traffic and construction noise can negatively affect bird distributions. In one recent study, road noise resulted in more than a one-quarter decline in bird abundance and almost complete avoidance by some species. C. J. W. McClure et al., "An Experimental Investigation into the Effects of Traffic Noise on Distributions of Birds: Avoiding the Phantom Road." *Proceedings of the Royal Society B: Biological Sciences* 280 (2013). Even if these wildlife areas are situated southeast of the new construction, construction- and operation-related noise may have a significant impact on these critical stopover points for migratory birds.

Wildlife, especially migrating birds (including birds migrating for the first time), are not necessarily accustomed to industrial activities. As described above, the existing LNG import facility has remained largely idle during the past six years. *The construction- and operation-related noise from the new facilities will not be insignificant, and Freeport LNG should not be able to solely rely on previous studies undertaken in different circumstances in its determination of no significant impact on these wildlife areas.*

3. The DEIS incorrectly states that Freeport LNG's bird strike study showed no injuries or mortalities to any migratory avian species during construction and operation of the Phase I Terminal Facilities.

As the DEIS describes, all migratory birds are protected under the Migratory Bird Treaty Act (MBTA). The Fish and Wildlife Service (FWS) Migratory Bird Office has developed lists of Birds of Conservation Concern (BCC), a subset of birds protected under the MBTA, to stimulate

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L3-32: Section 4.5.3, which addresses impacts and mitigation for migratory birds, has been revised. Also see Freeport LNG's Migratory Birds Conservation and Compliance Plan. Freeport LNG's bird-strike study indicates minor impacts to migratory birds and therefore, we conclude further avian studies are unnecessary.

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proactive conservation action by federal agencies, state agencies, and private parties. Freeport LNG found a total of 43 BCC species which have been documented or cited as probable to occur in the region. Most of these species favor herbaceous upland and/or emergent wetland habitat, both of which are found within the projects' construction space.

The DEIS incorrectly states that Freeport LNG's bird strike study "showed no injuries or mortalities to any threatened/endangered (or migratory) avian species occurred during construction and operation of the Phase 1 terminal facilities." DEIS at 5-10. Earlier, the DEIS states that "[n]one of the birds struck were migratory BCCs." DEIS at 4-65. But six of the seven birds struck by the facility, its appurtenant structures, and its fence were migratory birds protected under the MBTA. Specifically, Red-Eyed Vireo (tank strike), Rube-Throated Hummingbird (strike), Purple Gallinule (tank strike), Cliff Swallow (tank strike), Blackpoll Warbler (tank strike), and Common Yellowthroat (air tower strike) are all protected under the MBTA, even if they are not BCCs.

Please correct these misrepresentations. Furthermore, because these facilities are in the flyover path of many migratory birds, and in light of these previously documented bird takes, FERC and its consulting agencies must ensure that takes are limited to the maximum extent practicable.

L3-32 cont'd

4. The DEIS does not provide for adequate studies and mitigation for migratory bird takes.

Despite knowing about the Migratory Bird Office's 43 BCC species and despite knowing that the MBTA protects *all* migratory birds and not merely the BCC species, there is no description or adequate discussion of the possible impact the projects will have on these bird species. Instead, Table 4.5.3-1 merely lists the sixteen BCC species that breed in or near the project area. DEIS at 4-64. There is no table outlining the other migratory bird species present in or near the project area. In their Migratory Birds Conservation and Compliance Plan, Freeport LNG concludes that non-breeding birds occupying the project area prior to construction will likely relocate to nearby areas with similar habitat characteristics. FERC Docket No. 12-509-000, Accession No. 20130207-5009, at 6. Similarly, Freeport LNG merely concludes that breeding species seeking to nest within the project area will likely seek out nearby undisturbed areas with similar habitat characteristics. *Id.*

We request that FERC not allow Freeport LNG to merely rely on these conclusory impact statements. Instead, in addition to the mitigation already proposed in the DEIS, Freeport LNG should be required to:

- *List all species known to occur or that potentially could occur in the project area, including all migratory birds protected by the MBTA;*
- *File a preconstruction survey outlining wildlife species and bird nest sites within the project area;*

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- *In the event that nesting areas are discovered, Freeport LNG should consult with the FWS and Texas Parks & Wildlife Department to determine appropriate mitigation; and*
- *Conduct a bird-strike study during both construction and operation of the new project facilities.*

L3-32 cont'd

There is no explanation in the DEIS for the exclusion of BCC and other migratory bird species known to occur or potentially occur in the project area. This description of project impacts is inconsistent with the MBTA, Executive Order 13186 (January 2001), and the FWS' "Suggested Priority of Migratory Bird Conservation Actions for Projects" (March 9, 2010), all of which emphasize that the take of any migratory bird is prohibited. Freeport LNG should be required to list all wildlife species known or likely to occur within the project area.

Similarly, Freeport LNG should be required to file a preconstruction survey outlining wildlife species and any bird nesting sites within the project area. Other LNG Final Environmental Impact Statements (e.g., the Sierrita Pipeline Project, Calhoun LNG Terminal and Pipeline Project) have had similar requirements. The results of the survey should be filed with the Secretary, FWS, and TPWD. In the event that nesting areas are discovered at the proposed LNG site during this survey, Freeport LNG should consult with the FWS and TPWD to determine appropriate mitigation.

L3-33

Freeport LNG should also be required to conduct a bird-strike study during both construction and operation of the new project facilities, similar to the study completed during the previously permitted LNG terminal. Freeport LNG's facilities are substantially increasing in size and activity compared to the existing Phase I facilities. This results in an increased risk of incidental migratory bird takes. Generally speaking, studies on building strikes by birds focus not only on the structures themselves, but also on the veneer of reflective or clear glass construction materials, the use of wires to support taller structures, and lighting from inside or outside sources. Lighting, as the DEIS alludes to, is a particular concern, since migrating birds, which often fly at night, are drawn to artificial lights. Artificial light can also disorient migrating birds. Additionally, artificial light can attract insect species. Birds that prey on these insects, especially those that are normally active only during the day, can become increasingly exposed to injury or predation. Even though the DEIS indicates that Freeport LNG's draft lighting design plan is proper mitigation under the circumstances, the results of a bird-strike study will provide feedback on this lighting design plan's adequacy.

We request that FERC require Freeport LNG to conduct a bird-strike study during both construction and operation of the new project facilities, similar to the study completed during the previously permitted LNG terminal.

L3-33: Freeport LNG's bird-strike study indicates minor impacts to migratory birds and therefore, we conclude further avian studies are unnecessary.

L3 – Blackburn Carter *for* Town of Quintana – Page 32

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K. **AIR QUALITY**

L3-34

1. The methodology for estimating operational vessel emissions assumes that there will be only 200 LNG carrier calls per year.

We do not take issue with the methodologies provided for air dispersion modeling, estimating operational vessel emissions, or modeling the cumulative $PM_{2.5}$ impacts from the project. But a data assumption in the vessel emissions analysis appears to be incorrect. The DEIS consistently states that up to 400 ship calls may occur at the Quintana Island terminal. DEIS at 4-33, 4-231. But the vessel emissions calculation states that one of the model's assumptions was that there will be 200 LNG carrier calls per year. DEIS at F-4. It is unclear why there is this discrepancy. Please review and correct (if appropriate) this assumption to reflect the maximum number of LNG carrier calls authorized by FERC.

L3-35

2. Thermal air pollution is a concern for the Town of Quintana, and is not quantified in the DEIS.

The liquefaction process works by removing the heat energy from the natural gas feedstock, and cooling it to -264F. During normal operation, the liquefaction trains will discharge this heat into the atmosphere. We were unable to find a discussion of any impacts from the hot air emissions from the facility. Due to the very close proximity of some of the residence on the island, any increase in ambient air temperature from the facility would have an impact.

We request that FERC provide some quantification of the heat emissions from the facility, and if needed, explain what mitigation measures would be required.

L. **WETLANDS**

L3-36

1. FERC and the USACE should consider increasing the ratios of compensatory mitigation to the permanently impacted wetlands on Quintana Island and at the Pybus Property.

Since the Bush administration, there has been a national policy goal of no net loss of the Nation's wetlands. The Department of the Army Corps of Engineers Galveston District shares this goal of no net loss of aquatic resource function. *See, e.g.*, U.S. ARMY CORPS OF ENGINEERS, GALVESTON DISTRICT, *SWG-Standard Operation Procedures* (Sept. 11, 2008).

Freeport LNG will permanently impact 7.80 acres of wetlands at the terminal site on Quintana Island. They have proposed planting 11.0 acres of *Spartina* along the edge of the former DMPA (9.5 acres) and in the vicinity of the Phase I construction dock (1.5 acres). This means that Freeport LNG is replacing only 1.4 acres of wetlands on the terminal site for each acre the project is permanently impacting. For the 0.42 acre of open water permanently removed at the site, Freeport LNG has proposed an equal replacement of 0.42 acre of estuarine emergent

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L3-34: Four hundred calls per year are authorized, and 400 calls per year were assumed for some analyses, such as discharge of ballast water and noise impacts. However, air quality impacts were calculated assuming 200 calls per year and 180,000 cubic meters of LNG carrier capacity (approximately 36 million cubic meters per year of LNG throughput). This assumption is conservative because the liquefaction capacity of the Project is 13.2 million metric tons (30 million cubic meters of LNG) per year.

While LNG carriers with lower carrying capacity may be used, the emissions per call from such vessels would be less. The lower-capacity LNG carrier would use smaller engines and/or boilers, few tugs would be needed, and the time in port would be briefer. Hence, the results of the analysis performed with 200 high-capacity LNG carriers are representative of the impact on air quality impacts of the Proposed Action.

L3-35: See section 4.11.1.2.

L3-36: See section 4.3.5 for a discussion of wetland mitigation.

L3 – Blackburn Carter *for* Town of Quintana – Page 33

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wetlands. The Galveston District uses a functional assessment methodology for compensatory wetlands mitigation known as iHGM (interim hydrogeomorphic approach for assessing wetland functions). Freeport LNG's calculations show that the iHGM Functional Capacity Unit (FCU) creation to impact ratios are 2.0 : 1 (biota); 1.4 : 1 (botanical); 1.5 : 1 (physical); and 4.1 : 1 (chemical).

The district engineer must require a mitigation ratio greater than one-to-one where necessary to "account for the method of compensatory mitigation (*e.g.*, preservation), the likelihood of success, differences between the functions lost at the impact site and the functions expected to be produced by the compensatory mitigation project, temporal losses of aquatic resource functions, the difficulty of restoring or establishing the desired aquatic resource type and functions, and/or the distance between the affected aquatic resource and the compensation site." 33 C.F.R. § 332.2. A 1.4-to-1.0 replacement acreage ratio and an iHGM FCU average of 2.25-to-1.0 functional replacement meets the floor requirements, but may not be adequate mitigation in light of these factors and the fact that this is (by necessity) permittee-responsible mitigation, the least preferred form of compensatory mitigation.

L3-36 cont'd

We ask FERC and the USACE to closely examine the adequacy of the proposed wetlands mitigation on Quintana Island, especially in light of the project's probable temporary and permanent effects on Quintana's aquatic resources, downstream aquatic systems, and habitat for wildlife species. If feasible, more mitigation should be required on Quintana Island.

To offset the 11.83 acres of permanent wetland impact at the Pretreatment Plant site, Freeport LNG has proposed the long-term protection for 70.00 acres of palustrine emergent wetlands on company-owned property through a land conservation easement with a COE-approved Conservator. These 70.00 acres are part of a 500-acre property owned by Freeport LNG which features approximately 302 acres of *Spartina*-dominated plaustrine emergent wetlands. This means that Freeport LNG is preserving 5.9 acres of wetlands for each acre permanently impacted at the Pretreatment Plant site. The average Functional Capacity Index (FCI) values preservation to impact ratios are 2.0 : 1 (temporary storage and detention of storage water; 0.7 : 1 (maintenance of plant and animal communities); and 1.3 : 1 (removal and sequestration of elements and compounds). In other words, the FCI value for maintenance of plant and animal communities is lower at the mitigation site than at the permanently impacted wetlands site.

As the regulation above states, the district engineer must require a mitigation ratio greater than one-to-one where necessary to account for the method of compensatory mitigation. Preservation is the most disfavored method of compensatory mitigation because it runs afoul of the national policy goal of no net loss. In this case, Freeport LNG is permanently impacting 11.93 acres of wetlands. Instead of creating or restoring wetlands, they are only preserving existing wetlands on property they own.

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L3 – Blackburn Carter *for* Town of Quintana – Page 34

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L3-36 cont'd

In light of this method of mitigation, the differences between the functions lost at the impact site and functions expected at the compensatory mitigation site, the distance between the affected aquatic resource and the compensation site, the fact that Freeport LNG already owns the site they are going to preserve, and the fact that additional wetlands are available at this site, the Town of Quintana requests that FERC and the USACE closely examine the adequacy of the proposed wetlands mitigation for permanent impacts at the Pretreatment Plant site.

M. SITE FOOTPRINT

L3-37

1. The project footprint is neither accurately described nor accurately depicted in the DEIS; specifically, maps and descriptions fail to describe and depict the defined laydown area and the concrete batch plant.

The project footprint, as described and depicted in the DEIS, does not accurately reflect the actual project footprint.

The DEIS describes a defined laydown area that is part of the temporary workspace for the Liquefaction Project. The DEIS states that Freeport LNG would prepare temporary workspaces, including laydown and support areas, as needed outside the proposed operational footprints prior to construction. DEIS at 2-11. Figure 1-2, referenced throughout the DEIS, depicts the laydown area on the western side of the terminal, north of the ground flare. DEIS at 1-5.

But Freeport LNG's preliminary traffic maps show a 30–60 acre laydown area south of the Liquefaction Project and workspace layout and south of Lamar Street. In their Transportation Management Plan, filed on May 1, 2014, Freeport LNG's Figure 2.1-7 shows a large Seaway DMPA area, presumably intended to be used for laydown. *See* FERC Docket No. 12-59-000, Accession No. 20140501-5384. This same Transportation Management Plan states that Freeport LNG "anticipates an increase in vehicular traffic across Lamar Street between the project work site and the planned laydown consisting principally of trucks loaded with stabilized soil." *Id.* at 12. Freeport LNG later states that permanent plant equipment needing to be stored will be stored in these laydown yards located "on the seaway area on the south side of Lamar Street opposite the project site." *Id.* at 14.

These facilities are not included in any maps or descriptions in the DEIS. Figure 1-2 misrepresents the project's temporary workspace. Furthermore, as Freeport LNG acknowledges in their Transportation Management Plan, trucks crossing Lamar Street will have an impact on local traffic. These impacts must be studied, described in the FEIS, and mitigated to the extent practicable.

FERC must include updated maps in the FEIS to accurately depict the Liquefaction Project's temporary workspace. FERC needs to accurately describe the operational footprint of these facilities and thoroughly analyze the workspace's noise and visual impact on local residents.

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L3-37: See figure 2.3-1 of the EIS.

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N. VISUAL IMPACTS

1. FERC ought to revisit mitigation measures for visual impacts on the local Town of Quintana, including the option of a berm or the option of lowering the dredge spoil platform on which the facilities are to be built.

L3-38

It is very plain that the visual impacts for local residents in the Town of Quintana will be substantial, and cumulative to what already exists. The visual impacts were not treated with much rigor in the DEIS. Some options exist, which FERC should revisit, such as a berm, or the possibility of lowering the dredge spoil platform, so that the Freeport LNG structures are better concealed behind the existing berm.

O. CUMULATIVE IMPACTS

L3-39

The island of Quintana is already dominated by industrial complexes. The impacts to the island are cumulative. We believe the DEIS focuses too heavily on regional impacts, ignoring the cumulative impacts to Quintana.

Under federal law in the Fifth Circuit, a "meaningful cumulative-effects study must identify: (1) the area in which effects of the proposed project will be felt; (2) the impacts that are expected in that area from the proposed project; (3) other actions—past, proposed, and reasonably foreseeable—that have had or are expected to have impacts in the same area; (4) the impacts or expected impacts from these other actions; and (5) the overall impact that can be expected if the individual impacts are allowed to accumulate." *Fritiofson v. Alexander*, 772 F.2d 1225, 1245 (5th Cir. 1985). The impacts that are becoming cumulative to the Town of Quintana underscore the need for FERC to require aggressive mitigation by FLNG for the Town to preserve the quality of life for the Town.

Conclusion

NEPA requires that federal agencies take a "hard look" at impacts of proposed federal actions. The above comments are offered to ensure that FERC takes the requisite hard look, and also to ensure that adequate mitigation is included where appropriate.

We thank you for your attention to these matters. Please do not hesitate to contact us with any questions about these comments.

Sincerely,

BLACKBURN CARTER, P.C.

by _____
James B. Blackburn, Jr.

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L3-38: Visual impacts have been addressed in section 4.7.3, the alternative analysis for raising the berm is addressed in section 3.3.1.

L3-39: Cumulative impacts have been addressed in section 4.12.

L3 – Blackburn Carter *for* Town of Quintana – Page 36

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Of counsel as of May 2, 2014:

IRVINE & CONNER, PLLC
Charles W. Irvine
Mary B. Conner

L3-40

Exhibits that follow:

Exhibit A: Dr. Ronald P. Koopman, "Review of Draft Environmental Impact Statement (EIS) for the Freeport LNG Liquefaction Project and Phase II Modification" (April 30, 2014); Resume.

Exhibit B: Dr. H.C. Clark, Letter to BlackburnCarter (April 28, 2014); Letter to BlackburnCarter (April 29, 2014); Curriculum vitae.

Exhibit C: Dr. James R. Elliot, "Open Letter to Blackburn Carter, P.C. Re: Broader Socioeconomic Impacts of Freeport LNG Development" (April 22, 2014); Curriculum vitae.

Exhibit D: Arno S. Bommer, INCE. Bd. Cert., "Analysis of Noise Impact of Freeport LNG Facility on Town of Quintana, Texas" April 10, 2014); Curriculum vitae.

Exhibit E: Jimmy Kall, Birds of Quintana Photo Gallery on PBase Forums, at http://www.pbase.com/kallofthewild/birds_of_quintana_texas (checked March 28, 2014).

Exhibit F: eBird data for Quintana Neotropical Bird Sanctuary, through 2014, at http://ebird.org/ebird/GuideMe?cmd=decisionPage&getLocations=hotspots&hotspots=L248659&bYear=1900&eYear=2014&bMonth=1&eMonth=12&reportType=location& (checked March 28, 2014).

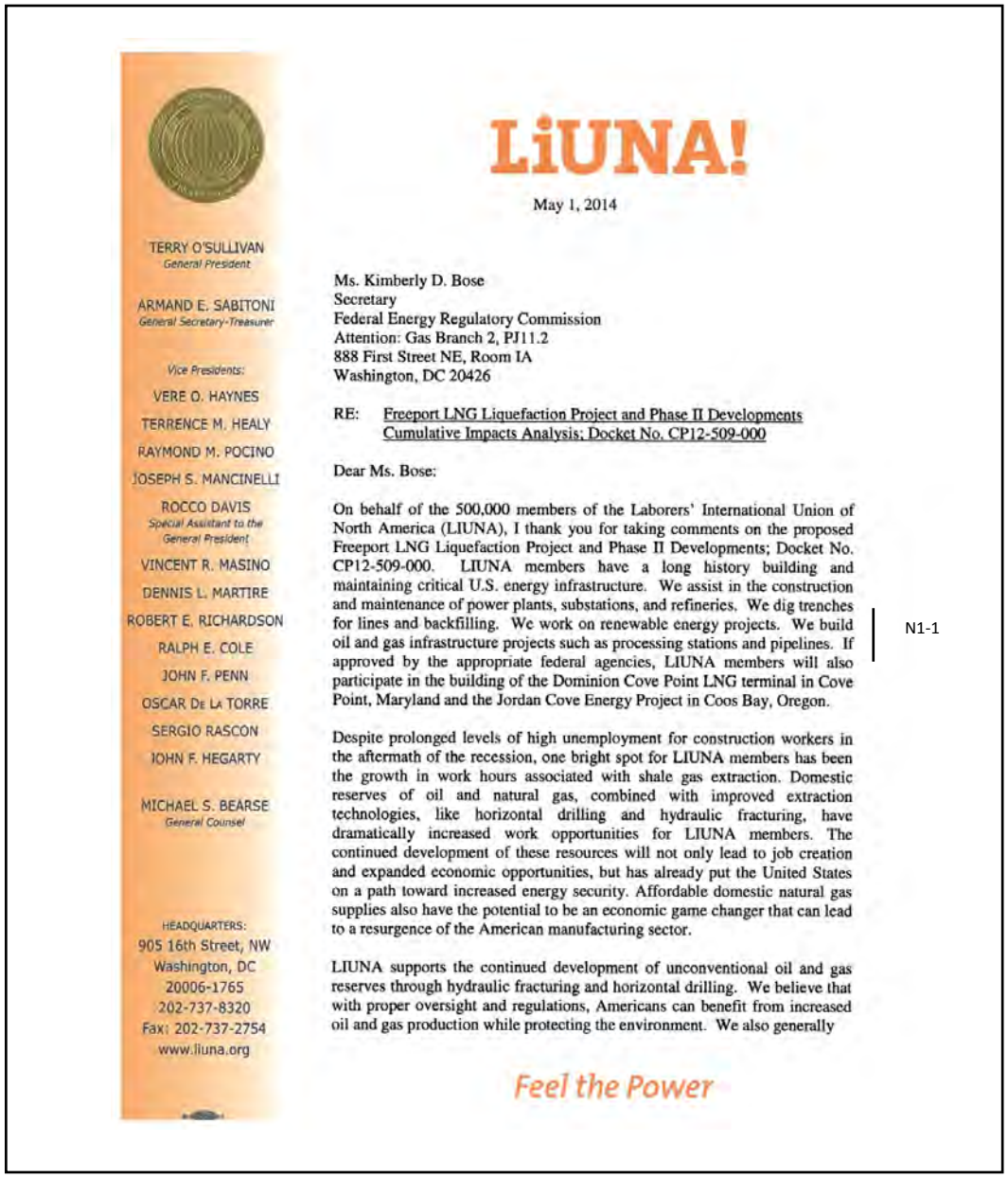
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L3-40: Exhibits are not included in this comment and response documents. These are available on the FERC E-library.

Note: Because of the lengthy attachments to this comment letter. We are only including the summary letter.

The attachments can be found under Assession No. 20140505-5239 in our E-library system.

N1 – Laborer's International Union of North America (LIUNA) – Page 1



LiUNA!

May 1, 2014

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ARMAND E. SABITONI
General Secretary-Treasurer

Vice Presidents:
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Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
Attention: Gas Branch 2, PJ11.2
888 First Street NE, Room IA
Washington, DC 20426

RE: Freeport LNG Liquefaction Project and Phase II Developments Cumulative Impacts Analysis; Docket No. CP12-509-000

Dear Ms. Bose:

On behalf of the 500,000 members of the Laborers' International Union of North America (LIUNA), I thank you for taking comments on the proposed Freeport LNG Liquefaction Project and Phase II Developments; Docket No. CP12-509-000. LIUNA members have a long history building and maintaining critical U.S. energy infrastructure. We assist in the construction and maintenance of power plants, substations, and refineries. We dig trenches for lines and backfilling. We work on renewable energy projects. We build oil and gas infrastructure projects such as processing stations and pipelines. If approved by the appropriate federal agencies, LIUNA members will also participate in the building of the Dominion Cove Point LNG terminal in Cove Point, Maryland and the Jordan Cove Energy Project in Coos Bay, Oregon. N1-1

Despite prolonged levels of high unemployment for construction workers in the aftermath of the recession, one bright spot for LIUNA members has been the growth in work hours associated with shale gas extraction. Domestic reserves of oil and natural gas, combined with improved extraction technologies, like horizontal drilling and hydraulic fracturing, have dramatically increased work opportunities for LIUNA members. The continued development of these resources will not only lead to job creation and expanded economic opportunities, but has already put the United States on a path toward increased energy security. Affordable domestic natural gas supplies also have the potential to be an economic game changer that can lead to a resurgence of the American manufacturing sector.

LIUNA supports the continued development of unconventional oil and gas reserves through hydraulic fracturing and horizontal drilling. We believe that with proper oversight and regulations, Americans can benefit from increased oil and gas production while protecting the environment. We also generally

Feel the Power

N1-1: Comments acknowledged.

N1 – Laborer's International Union of North America (LIUNA) – Page 2

support the development and permitting of LNG export facilities that can bring these new resources to an expanded market.

We would like to emphasize, however, that the industry and the public is best served when both environmental and socio economic critical impacts are addressed. We believe that too often, the training, working conditions, and wages and benefits of workers have not been sufficiently emphasized in the national debate around hydraulic fracturing and LNG exports. Further, we believe that there is a direct link between worker training, and the payment of prevailing wages and benefits, and the safe and efficient completion of construction projects.

Concerns Regarding Freeport LNG

The draft Environmental Impact Statement (EIS) issued by FERC focused on the socio economic impacts of the project, as well as the environmental impacts. LIUNA believes that the owners, contractors, and investors of Freeport LNG have, thus far, not considered best practices that could mitigate some of the project's socio economic impacts that largely involve the temporary construction workforce. N1-2

The draft EIS's executive summary states, "The Liquefaction Project would require, during the peak construction period, greater than 3,000 temporary construction workers and operation of the Liquefaction Project facilities would require the addition of about 163 permanent workers, significantly greater than that required for the original terminal construction."

LIUNA believes that owners should consider strong local hiring plans and responsible contractor policies that govern sub-contractors' participation in large construction projects. We note that after Hurricane Katrina similar demands for large amounts of construction labor were needed to rebuild the Gulf Coast. Reports of exploitation of construction workers were rampant. With the large number of LNG facilities proposed for the Gulf Coast, Freeport will be competing for a limited number of skilled construction workers. We urge Freeport LNG to consider a better approach to construction labor management than they have currently outlined. Strong responsible contractor policies and/or project labor agreements are used by leading businesses and investors around the country because they ensure that owners, investors, community members, and workers are protected from risk and unethical treatment during construction. These policies are most effective

N1-2: Freeport LNG would have to comply with federal labor laws, and has stated in the socioeconomic section that it expects a substantial number of the workers would be hired locally. Sections 4.8 and 5.10 address Project related socioeconomic impacts.

when they include rigorous training and apprenticeship requirements and the support of the community with local residents sharing in the jobs and economic development opportunities.

Absent the adoption of such standards by owners like Freeport LNG, we would urge FERC to prioritize projects where owners have taken steps to ensure all stakeholders are protected, where owners have a plan to assure sufficient skilled workers are available for construction, and where owners have created ample job opportunities for local residents. For example, the Jordan Cove Energy Project will be constructed under a signed Project Labor Agreement, and therefore will use a highly skilled workforce with experience building projects in Oregon and the Pacific Northwest.

In conclusion, the Cumulative Impact Analysis recognizes that there will be a large impact on the area due to the construction workforce on a small island. As an example of the socio economic strain this project will place on the community, comments filed by attorneys representing the nearby town of Quintana, Texas on March 12, 2014, point out that the proposed project is actually on Quintana Island and only have one major thorough fare serving the island. They state that, "With approximately fifty residents on the island at any time, this roadway is more than adequate to handle routine daily traffic. However, the proposed Project anticipates 4,200 workers will need to travel onto the island for construction alone, representing an increase in traffic on the island of almost one-hundred fold."

N1-2 con't

Careful consideration should be given to Freeport's current labor and workforce management plan before granting final approval.

With kind regards, I remain

Sincerely yours,

Terry O'Sullivan

TERRY O'SULLIVAN
General President

pgt

N2 – Sierra Club Comments

SIERRA CLUB

May 5, 2014

By U.S. Post, eComment, and eFiling.
Ms. Kimberly D. Bose,
Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

RE: Comments on Draft Environment Impact Statement for Freeport LNG Liquefaction Project, Docket Nos. CP12-509, CP12-29, Issued March 14, 2014

N2-1 Sierra Club and Galveston Baykeeper submit these comments concerning the Draft Environmental Impact Statement (the "draft EIS" or "DEIS") prepared by the Federal Energy Regulatory Commission ("FERC") for the Freeport LNG Development, L.P., FLNG Liquefaction, LLC, FLNG Liquefaction 2, LLC, and FLNG Liquefaction 3, LLC (collectively, "Freeport") proposed Liquefaction Project (the "Project"). The Commenters reserve the right to rely on all public comments submitted, request a written response to comments, and request written notification when any action is taken on this draft EIS (such as a final EIS, supplemental EIS, programmatic EIS, etc.). These comments supplement and incorporate by reference the Sierra Club's Motion to Intervene, Protest, and Comment, dated October 3, 2012.

I. Introduction

FERC's Draft Environmental Impact Statement fails to take the hard look that the National Environmental Policy Act (NEPA) requires. Examples of the draft EIS's include: inadequately considering the effects of reviving a moribund import project, including the effects of increasing ship traffic beyond the current minimal level; inadequately describing the effect of air pollution emitted by the project, including emission of air pollutants that will contribute to air pollution levels in violation of national ambient air quality standards; ignoring the effects of producing the electricity that the project will require; omitting discussion of alternative designs that would incorporate carbon capture and sequestration; inadequately discussing safety by failing to consider recent LNG accidents and failing to discuss the risk of accidents that might affect the nearby Dow chemical plant; and entirely failing to discuss many indirect effects of the project, including effects of induced gas production, increased coal consumption in response to higher gas prices, and the effects of end users' consumption of LNG. FERC must revise its draft

Note: Because of the lengthy attachments to this comment letter. We are only including the summary letter.

The attachments can be found under Accession No. 20140505-5239 in our E-library system.

N2-1: Comment acknowledged.

N2 – Sierra Club Comments

EIS to provide accurate, consistent and complete data and analyses by which it and other agencies relying on its information can take a hard look at the potential impacts of the proposed Project.

II. Background

Freeport proposes to export liquefied natural gas (LNG) from an existing LNG import terminal on Quintana Island, near Freeport, Texas. Construction of import facility began in 2005, and was completed in 2008. Although the import facility nominally entered service in 2008, it has sat essentially idle. Designed to accommodate 400 vessels per year, the terminal has received only an average of 3 ship cargoes per year over the past six years, for 19 in total.

The present proposal seeks to expand and add export facilities to the existing terminal. This involves construction of three electrically-powered liquefaction trains, an additional LNG storage tank, and other ancillary facilities at the terminal site. DEIS ES-1 to ES-2. Expansion of facilities at the terminal site will permanently impact 23.9 acres. DEIS 2-9. The proposal also includes a natural gas pretreatment plant 2.5 miles from the existing terminal, which will have an operational footprint of 113.4 acres. DEIS 2-3. This pretreatment facility will incorporate a gas-fired GE Frame 7A turbine serving three pretreatment units that remove carbon dioxide and other elements from pipeline gas prior to liquefaction. The project also involves various interconnecting pipelines and utility lines. Construction of these projects would have extensive air impacts, temporary impacts on wetlands, and other environmental harms. In total, the modified projects will have a permanent footprint of 283.7 acres, including newly and permanently impacting 19 acres of wetlands. DEIS 2-10, ES-5.

N2-2

III. Legal Standards.

A. National Environmental Policy Act

NEPA requires federal agencies to consider and disclose the "environmental impacts" of proposed agency actions. 42 U.S.C. § 4332(C)(i). Agencies must "carefully consider [ ] detailed information concerning significant environmental impacts" and NEPA "guarantees that the relevant information will be made available" to the public. *Dep't of Transp. v. Public Citizen*, 541 U.S. 752, 768 (2004) (quoting *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989)). Federal regulations require agencies to "integrate the NEPA process with other planning at the earliest possible time to insure that planning and decisions reflect environmental values." 40 C.F.R. § 1501.2.

NEPA is "a procedural statute that demands that the decision to go forward with a federal project which significantly affects the environment be an environmentally conscious one." *Holy Cross v. U.S. Army Corps of Engineers*, 455 F. Supp. 2d 532, 540 (E.D. La. 2006), quoting *Sabine River Auth. v. United States Dep't of Interior*, 951 F.2d 669, 676 (5th Cir. 1992). In the

N2-2 Comment acknowledged. Portions of the EIS have been revised to present information made public after the draft EIS was issued.

Fifth Circuit, the following factors are generally considered by courts in evaluating an EIS: "(1) whether the agency, in good faith and objectively, has taken a hard look at the environmental consequence of the proposed action and alternatives, (2) whether the EIS contains detail sufficient to allow parties, besides the preparing agency, to understand and consider the relevant environmental influences, and (3) whether the alternatives are sufficient to permit a reasoned selection therefrom." *Holy Cross Neighborhood Ass'n v. U.S. Army Corps of Engineers* 2011 WL 4015694, *6 (E.D. La. 2011), citing *Sierra Club v. Froehlke*, 816 F.2d 205, 213 (5th Cir. 1987). An agency must consider environmental impacts in the context of current circumstances and information, not outdated data. *See Holy Cross*, 455 F. Supp. 2d at 545 ("In light of Hurricane Katrina, the underlying purpose of NEPA will not be served if the Corps moves forward with the [] Project according to a plan devised almost a decade ago. Without further study and planning, the project cannot be considered 'environmentally conscious.'"). An EIS must describe:

> i. the environmental
> ii. impact of the proposed action,
> iii. any adverse environmental effects which cannot be avoided should the proposal be implemented,
> iv. alternatives to the proposed action,
> v. the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
> vi. any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

42 U.S.C. § 4332(C). The alternatives analysis "is the heart of the environmental impact statement." 40 C.F.R. § 1502.14. An agency "must take care not to define the project purpose so narrowly as to prevent the consideration of a reasonable range of alternatives. *See, e.g., Simmons v. U.S. Army Corps of Eng'rs*, 120 F.3d 664, 666 (7th Cir. 1997). If it did otherwise, it would lack "a clear basis for choice among options by the decisionmaker and the public." *See* 40 C.F.R. § 1502.14.

An EIS must also describe the direct and indirect effects and the cumulative impacts of a proposed action. 40 C.F.R §§ 1502.16, 1508.7, 1508.8; *N. Plains Resource Council v. Surface Transp. Bd.*, 668 F.3d 1067, 1072-73 (9th Cir. 2011). These terms are distinct from one another: Direct effects are "caused by the action and occur at the same time and place." 40 C.F.R. § 1508.8(a). Indirect effects are also "caused by the action" but:

> are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth

N2 – Sierra Club Comments

> rate, and related effect on air and water and other natural systems, including ecosystems.

40 C.F.R. § 1508.8(b). Cumulative impacts, finally, are not causally related to the action. Instead, they are:

> the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

40 C.F.R. § 1508.7. NEPA requires that where "several actions have a cumulative ... environmental effect, this consequence must be considered in an EIS." *City of Tenakee Springs v. Clough*, 915 F.2d 1308, 1312 (9th Cir.1990). The EIS must give each of these categories of effect fair emphasis.

Agencies may also prepare "programmatic" EISs, which address "a group of concerted actions to implement a specific policy or plan; [or] systematic and connected agency decisions allocating agency resources to implement a specific statutory program or executive directive." 40 C.F.R. § 1508.17(b)(3); *see also* 10 C.F.R. § 1021.330 (DOE regulations discussing programmatic EISs).

B. Endangered Species Act

The Endangered Species Act (ESA) directs that all agencies "shall seek to conserve endangered species." 16 U.S.C. § 1531(c)(1). Consistent with this mandate, FERC must ensure that its approval of Freeport's proposal "is not likely to jeopardize the continued existence of any endangered species . . . or result in the destruction or adverse modification of [critical] habitat of such species." 16 U.S.C. § 1536(a)(2).

To make this determination, FERC must first conduct a biological assessment, including the "results of an on-site inspection of the area affected," "[t]he views of recognized experts on the species at issue," a review of relevant literature, "[a]n analysis of the effects of the action on the species and habitat, including consideration of cumulative effects, and the results of any related studies," and "[a]n analysis of alternate actions considered by the Federal agency for the proposed action." *See* 50 C.F.R. § 402.12(f). If that assessment determines that impacts are possible, FERC must enter into formal consultation with the Fish and Wildlife Service ("FWS") and the National Marine Fisheries Service ("NMFS"), as appropriate, to avoid jeopardy to endangered species or adverse modification of critical habitat as a result of its approval of Freeport's proposal. 16 U.S.C. § 1536(a), (b).

C. Natural Gas Act

Section 3 of the Natural Gas Act requires FERC to determine whether the siting,

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N2-3

N2-3: Comment acknowledged. See section 4.6.

N2 – Sierra Club Comments

N2-4

construction, and operation of Freeport's proposed terminal facilities are "consistent with the public interest." 15 U.S.C. § 717b(a). FERC's review of Freeport's pipeline application requires an analogous public interest determination. *Id.* § 717f(c). FERC must consider environmental factors in the course of this public interest analysis. Accordingly, FERC cannot proceed with Freeport's application without fully evaluating the environmental impacts of Freeport's proposal. NEPA provides the congressionally mandated procedure for assessment of these impacts.

IV. Project Purpose and Alternatives

The alternatives analysis is "the heart of the environmental impact statement," designed to offer a "clear basis for choice among options by the decisionmaker and the public." 40 C.F.R. § 1502.14. Fundamentally, an agency must "to the *fullest* extent possible . . . consider alternatives to its action which would reduce environmental damage." *Calvert Cliffs' Coordinating Comm. v. U. S. Atomic Energy Comm'n*, 449 F.2d 1109, 1128 (D.C. Cir. 1971) (emphasis in original). Absent this comparative analysis, decisionmakers and the public can neither assess environmental trade-offs nor avoid environmental harms. *See id.* at 1114 (NEPA's alternatives requirement "seeks to ensure that each agency decision maker has before him and takes into proper account all possible approaches to a particular project (including total abandonment of the project) which would alter the environmental impact and the cost-benefit balance" and "allows those removed from the initial process to evaluate and balance the factors on their own"). The alternatives must include "reasonable alternatives not within the jurisdiction of the lead agency," as well as "appropriate mitigation measures not already included in the proposed action or alternatives." 40 C.F.R. § 1502.14. Because alternatives are so central to decisionmaking and mitigation, "the existence of a viable but unexamined alternative renders an environmental impact statement inadequate." *Oregon Natural Desert Ass'n v. Bureau of Land Mgmt.*, 625 F.3d 1092, 1100 (9th Cir. 2010) (internal alterations and citations omitted).

The alternatives analysis, in turn, is informed in part by the purpose and need of the project. Alternatives are measured, in part, by their ability to satisfy the project purpose and need.

N2-5

Despite the central importance of alternatives in NEPA analysis, here, the only alternatives meaningfully discussed by the draft EIS are alternative sites for the pretreatment facility and an alternative site configuration for the liquefaction terminal, involving different placement of liquefaction trains. FERC fails to acknowledge, much less consider, numerous additional alternatives, including alternatives identified by Sierra Club's earlier comment on Freeport's application and alternatives discussed by Commenters below.

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N2-4: Comment acknowledged. See section 1.4.

N2-5: **The alternatives analysis provided in the EIS is consistent with the CEQ regulations at 40 CFR 1500. Additional information on alternatives can be found in section 3.0 of the EIS. We consider an alternative until it is proven to not be significantly environmentally preferable to the proposal or doesn't meet the stated purpose and need. As stated in Section 3 of the final EIS our alternatives analysis considers whether the Project meets the stated purpose and need. Our analysis included consideration of a wide range of alternatives including those identified by commenters.**

A. The Draft EIS Implicitly and Improperly Defined the Proposed Project's Purpose and Need

The draft EIS states that the purpose of the project is "to allow Freeport LNG to export domestic natural gas to the world market," DEIS 3-1, or alternatively, to "allow for exportation of domestic natural gas to the global market and meet [Freeport's] contractual obligations." DEIS 1-3.

N2-6 FERC cannot uncritically accept that there is a "need" for the full 1.8 bcf/d of exports Freeport proposes. The macroeconomic study commissioned by the Department of Energy concluded that under the "reference" cases for both US gas production and international demand, there would be *no* market for US LNG exports.[1] Where an agency thoughtlessly adopts a private party's narrow goals as the overall purpose and need, the agency "necessarily consider[s] an unreasonably narrow range of alternatives," and thus necessarily violates NEPA. *See Nat'l Parks & Conservation Ass'n v. BLM*, 606 F.3d 1058, 1072 (9th Cir. 2009). When preparing an EIS, it is the agency, not the project proponent, that "bears the responsibility for defining at the outset the objectives of an action." *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 195-96 (D.C. Cir. 1991). To be sure, agencies may not ignore private applicants' objectives; an agency may pursue both private and public goals.[2] However, these two objectives are not "mutually exclusive or conflicting;" they simply "instruct agencies to take responsibility for defining the objectives of an action and then provide legitimate consideration to alternatives that fall between the obvious

N2-7 extremes." *Colorado Envtl. Coalition*, 185 F.3d at 1175. The mere fact that private parties have contracted for exports cannot provide a basis for defining the purpose and need of the project so narrowly as to avoid full consideration of alternatives that might frustrate those contracts.[3]

On the other hand, in reviewing the effects of the proposed project, FERC must consider the effects that would occur if the project in fact operated at the full authorized capacity. The fact that the market may not support the full volume of exports Freeport proposes is not an excuse to avoid analysis of the effects full operation of the project would have.

Thus, FERC should consider alternatives that would allow only some of the proposed exports, such as an alternative that would not require construction of a third LNG storage tank. Assuming that storage tank capacity is correlated 1:1 with facility throughput, a design with 2/3 of the capacity would have less than 2/3 of the impact, because the amount of *new* land disturbance that would be required would be reduced by much more than 1/3. Yet while FERC must consider alternatives with lower authorized output, for each of these alternatives, FERC must consider the environmental impacts that would result in full utilization of the authorized capacity.

[1] NERA Economic Consulting, *Macroeconomic Impacts of LNG Exports from the United States* (2012), ("NERA Study") at 4, attached as Exhibit 1.
[2] *Colorado Envtl. Coalition v. Dombeck*, 185 F.3d 1162, 1175 (10th Cir. 1999) ("Agencies . . . are precluded from completely ignoring a private applicant's objectives."); *Citizens Against Burlington*, 938 F.2d at 196 ("[T]he agency should take into account the needs and goals of the parties involved in the application.")
[3] Commenters do not dispute that frustration of those contracts is one of the many factors that might weigh in FERC's choice among alternatives; rather, we argue that these contracts cannot circumvent or abridge the alternatives analysis.

N2-6: The US DOE has sole jurisdiction over the export of LNG as identified in section 1.1.

N2-7: The DOE povided a confidential approval for the export of LNG at Freeport's facility. This EIS specifically evaluates the siting and operation of the proposed project. The purpose and need statement in the EIS serves as a disclosure of Freeport LNG's stated purpose to which the FERC is responding and provides the basis for developing a reasonable range of alternatives. FERC staff neither endorses nor opposes Freeport's assertions of need.

Section 3 of the EIS contains a thorough analysis of alternatives to the Freeport LNG Project, including the No-Action alternative.

N2 – Sierra Club Comments

B. The No Action Alternative Improperly Assumes that the Project Would Not Increase U.S Exports

In discussing the no action alternative, the draft EIS understates the environmental impacts that could be avoided by disapproving LNG export projects such as Freeport's. The draft EIS states that "It is possible that natural gas infrastructure supplying natural gas to the global market area could be developed in other ways unforeseen at this point, including the construction of other associated LNG export projects to serve global markets." DEIS 3-1. Natural gas from the US cannot be exported to foreign markets unless DOE approves the exports and FERC approves construction and operation of export facilities. It is true that, if DOE and FERC were to approve other LNG export projects, "These other LNG export projects would have their own environmental impacts, which could be less than, equal to, or greater than the Freeport LNG Projects." FERC must acknowledge, however, that unless such approvals are granted, those projects, and their associated impacts, will not occur. Because LNG exports cannot occur without FERC and DOE approval, FERC cannot present them as a fait accompli. FERC cannot claim that it does not know whether, if the no action alternative is adopted here, other projects will take this project's place. Nor can FERC conclude that it is entirely "speculative" to predict actions taken by natural gas producers if exports are not approved. This prediction is straightforward: if this or other export projects are approved, natural gas producers will produce more gas than they would if exports are denied. We discuss this in greater detail below.

N2-8

NEPA requires a clear statement of the effects of the alternatives evaluated. Here, the draft EIS improperly obscures the difference between the no action alternative and the preferred alternative by asserting, without basis, that it is unknown whether certain effects will occur, or are even more likely to occur, if the preferred alternative is adopted.

C. FERC Fails To Take a Hard Look at System Alternatives

The draft EIS explains that:

> System alternatives are alternatives to the proposed action that would make use of other existing, modified or proposed facilities that would meet the stated purpose of the proposed actions. A system alternative would make it unnecessary to construct part or all of the proposed actions, though additions or modifications to existing facilities may result in environmental impacts that are less than, equal to, or greater than the environmental impacts of the proposed facility.

DEIS 3-1. Despite introducing the concept of system alternatives, the draft EIS does not discuss system alternatives in any useful detail. It states that the other "proposed export terminals do not offer [any] significant environmental advantage of the proposed Project." DEIS 3-1 to 3-2. The only analysis underlying this conclusion is the assertion that the Freeport project is a brownfield project converting an existing terminal, and that every potential system alternative would also require additional development. While Commenters agree that brownfield projects generally

N2-8: Our assessment of the No-Action alternative clearly states that with the No Action Alternative"… the environmental impacts described in this EIS would not occur." The market will ultimately decide which and how many LNG export facilities will be built and operated.

have lower impacts than greenfield development, NEPA requires a much more searching inquiry. For example, many of the other proposed projects are also conversions of existing LNG import terminals, which would use existing infrastructure, yet these projects do not occur in ozone nonattainment areas and appear not to be sited near facilities like the Dow Chemical Plant that may be especially susceptible to fire or other hazards. As such, these other existing terminal sites may be in areas better able to absorb the impact of an LNG facility. Additionally, the disadvantages of being in an ozone nonattainment area and near a potentially vulnerable chemical plant could potentially more than offset the advantages of using existing infrastructure, but the draft EIS contains no analysis of this possibility. Meaningful choice among alternatives requires assessment and weighing of these differences, but the draft EIS glosses over these issues entirely.

N2-9

V. Direct and Local Impacts

A. Baseline and Tiering Issues

In discussing some environmental impacts—particularly vessel traffic's impacts on water quality and wildlife—the draft EIS contends that the projects will not increase impacts beyond those previously discussed and authorized. In these cases, the draft EIS itself provides no meaningful discussion of, for example, the effects of vessel traffic on water quality. Although the draft EIS does not clearly explain the basis for this omission, it implies two possible justifications. One possibility is that FERC contends that since the projects will not authorize an increase in vessel traffic beyond that previously permitted, increased vessel traffic is not an effect of the project. Alternatively, some language suggests that FERC acknowledges that, as a practical matter, the project will increase vessel traffic, but that FERC tiers its analysis of the impacts of this increase off the prior NEPA documents.

As a threshold matter, these two rationales are not the same, and FERC must therefore clarify which (if either) it adopts. The former, by using authorized rather than actual vessel traffic as the baseline, misinforms the public and decisionmakers about the effects of the project, by hiding the fact that as a practical matter, there will be more vessel traffic and associated impacts if the projects are approved than if the projects are disapproved. We further explain the inappropriateness of such a baseline below. The latter better informs the public by acknowledging that an increase in shipping traffic will occur, and cause attendant environmental harms, although as we explain below, some additional analysis is required. Especially where, as in the draft EIS, FERC concludes that the total impacts of the project will not be significant,[4] FERC must be clear as to which effects are or are not attributed to the project, and how FERC determined that these efforts would not, as a whole, amount to significant impacts.

N2-10

[4] *See, e.g.*, DEIS ES-9.

N2-9: Comment acknowledged. The final EIS has adequately addressed alternative sites. See section 3.3.

N2-10: Comment acknowledged. See section 3.3.

1. FERC Implicitly Relies on the Wrong Baseline to Analyze Environmental Impacts

NEPA requires that each federal action be judged against a "no action" baseline. 42 U.S.C. § 4332(E); 40 C.F.R. §§ 1502.14(d), 1508.9. This baseline is intended to provide a fair "benchmark, enabling decisionmakers to compare the magnitude of environmental effects of the action alternatives." 46 Fed. Reg. 18,026, 18.027 (Mar. 23, 1981). Here, if the proposed project is not approved, the existing LNG import terminal will likely see little, if any utilization, and therefore have minimal ongoing operational environmental impacts. Yet in many portions of the draft EIS, FERC masks the fact that the project would revive an otherwise moribund terminal, by measuring the project's effects against the level of activity previously authorized but never actually realized. Because the "current level of activity is used as a benchmark," *Custer Cty. Action Ass'n v. Garvey*, 256 F.3d 1024, 1040 (10th Cir. 2001), FERC cannot define the baseline in terms of environmental effects that, although potentially previously authorized, have never actually occurred and that will not actually occur in the future but for FERC action here. *Accord Cmtys. for a Better Env't v. S. Coast Air Quality Mgmt. Dist.*, 48 Cal.4th 310, 328, 106 Cal.Rptr.3d 502, 226 P.3d 985 (2010) ("An approach using hypothetical allowable conditions as the baseline results in 'illusory' comparisons that 'can only mislead the public as to the reality of the impacts and subvert full consideration of the actual environmental impacts,' a result at direct odds with [the state environmental review statute's] intent.") (applying state NEPA-like statute). "NEPA procedures emphasize clarity and transparency of process," and, for this reason, "courts not infrequently find NEPA violations when an agency miscalculates the 'no build' baseline." *N.C. Wildlife Fed'n v. N.C. Dep't of Transp.*, 677 F.3d 596, 603 (4th Cir. 2012). Failing to provide complete baseline data, or relying on stale or misleading data, violates the statute's requirement that agencies provide a fair benchmark for their decisions. *See N. Plains Res. Council v. Surface Trans. Bd.*, 668 F.3d 1067, 1084-86 (9th Cir. 2011). FERC's analysis must therefore reflect the fact that if the proposed projects are authorized, the impacts will be greater than merely an increase over previously authorized, but never realized, activity.

N2-11

The draft EIS's apparent use of an improper baseline is most apparent when it comes to LNG ship or vessel traffic. For example, the draft EIS states that "no vessel traffic impacts are anticipated," and that "we do not anticipate further risk specific to vessel strikes to threatened/endangered species under the Liquefaction Project." DEIS 4-130, 4-90; *see also* DEIS ES-5. Yet since entering operations six years ago in 2008, the previously-authorized project has sat essentially unused, with an average of only three cargoes per year.[5] Indeed, FERC's chosen baseline would be too high even for *nationwide* LNG vessel traffic, which was only 213 vessels in 2006 and has been below this level ever since.[6]

[5] Detailed Monthly and Annual LNG Import Statistics 2004-2012, slide 5 (available at http://energy.gov/sites/prod/files/2013/04/f0/LNG%20Historical%20Data%20Slides.pdf), (data showing 16 cargoes from 2008 through 2012) attached as Exhibit 2. http://energy.gov/sites/prod/files/2014/04/f15/4th13ng.pdf (three cargoes in 2013), attached as Exhibit 3.

[6] Maritime Administration, Dep't of Transp., "Vessel Calls Snapshot, 2011," *available at* http://www.marad.dot.gov/documents/Vessel_Calls_at_US_Ports_Snapshot.pdf.

N2-11: We agree that the Freeport LNG terminal has not had the number of ships per year call on its existing facility as was permitted; however, they are permitted to do so, and the environmental effects of those ships were reviewed and determined to be environmentally acceptable in previous dockets. There would be no cumulative effects of shipping resulting from the Project as there are no changes proposed to the number or size of vessels that are currently authorized to call on the Terminal. We do not believe this to be misleading, as we clearly state the number of vessels that are authorized for the Terminal. Further, the U.S. Coast Guard (Coast Guard) is the federal agency responsible for determining the suitability of waterways for LNG marine traffic. The FERC relies on the Coast Guard to carry out the necessary evaluations under its jurisdiction for LNG facilities, and we incorporate the findings of the Coast Guard into our environmental reviews of LNG export and import terminals.

N2 – Sierra Club Comments

N2-12

FERC's treatment of vessel traffic is also inconsistent. For example, in discussing air impacts, FERC purports to model the air impacts of all vessel and tug traffic that will occur in connection with the project. DEIS at F-6. FERC must explain why it has treated vessel traffic differently in discussing air, water, and wildlife impacts.

2. FERC's Outdated Data Precludes the Necessary Hard Look at Environmental Impacts.

N2-13

For the reasons stated above, FERC must acknowledge that, as a practical matter, the project will likely increase in utilization of existing facilities, in vessel traffic, and otherwise cause impacts relating to the revival of the inactive import terminal. Although some of these activities were analyzed in previous NEPA documents, FERC cannot assume that those prior analyses are still valid. For example, once it is acknowledged that approving the project will cause greater vessel traffic than would result from project disapproval, FERC cannot simply point to the prior NEPA analysis as describing the effects of that traffic increase. Tiering off these prior analyses is inappropriate here because in the time since those analyses were completed, the area has suffered an increase in other activity and degradation of environmental quality, limiting the ability to withstand future environmental impacts.

Although 40 C.F.R. § 1502.20 permits agencies to "tier" off prior analyses in some circumstances, tiering can be improper if new issues have developed since the prior environmental analysis. *See W. Watersheds Project v. BLM*, 774 F. Supp. 2d 1089, 1098-99 (D. Nev. 2011). Here, the draft EIS does not address whether background levels of vessel traffic have increased since FERC's prior analyses were prepared. In addition, it appears that the baseline water quality in the area has degraded, or at least that the understanding of its condition has been refined. The BP oil spill in 2010 had widespread environmental impacts. EPA designated nearby sections of the Gulf as impaired by dioxins and Polychlorinated Biphenyls (PCBs) in 2010.[7] The Gulf of Mexico and its coastline have suffered under oil spills such as the BP/Horizon disaster in 2010. The "dead-zone" in the Gulf of Mexico off the coast of Louisiana has increased over the past decade, and EPA has designated much of the Louisiana Gulf Coast impaired for dissolved oxygen.[8] Because these impairments are not reflected in the prior environmental analysis, FERC must assess whether these impairments render waterbodies less able to endure the impacts of vessel traffic.

N2-14

B. Air Pollutants From Operation of The Project and Related Activity

[7] Compare http://ofmpub.epa.gov/tmdl_waters10/attains_waterbody.control?p_list_id=&p_au_id=TX-2424_01&p_cycle=2010&p_state=TX with http://ofmpub.epa.gov/tmdl_waters10/attains_waterbody.control?p_list_id=&p_au_id=TX-2424_01&p_cycle=2008&p_state=TX

[8] Record of Decision for EPA Action on Louisiana's CWA 2012 § 303(d) List. Available at: http://www.epa.gov/region6/6xa/pdf/la_303d_2012_record_of_decision.pdf; attached as Exhibit 4.

N2-12: The FERC does not see a difference in treatment of vessel traffic between sections. Potential impacts on water quality and aquatic life from the vessels associated with the proposed Project are included in those sections in a manner consistent with the types of impacts likely to occur (i.e., potential changes in water quality from ballast discharges and impacts to aquatic life from water quality changes). The air quality analysis in Section 4.11.1 addresses the air impacts associated with the vessel traffic that would be associated with the proposed Project.

N2-13: The EIS does not rely on data from previous NEPA documents to evaluate impacts of the proposed Project. Freeport LNG is not proposing to increase the number or size of LNG carriers currently authorized to call on the terminal, those earlier documents are referred to because they were part of the decision-making process to authorize LNG carrier trips from the territorial seas to the existing berthing facilities at the Freeport LNG Terminal.

N2-14: See the response to N-13 above.

N2 – Sierra Club Comments

1. FERC Must Clearly Describe Total Emissions from the Proposed Projects and These Emissions' Effects

N2-15

The draft EIS fails to clearly describe the air impacts of the proposed projects, especially during post-construction operation. The primary discussion of these emissions appears to be Table 4.11.1-5 on page 4-206, "Air Emission Estimates for the Existing and Proposed Stationary Facilities." *See also* 4-207, 4-212, 4-251 (referring to table 4.11.1-5). However, it is unclear whether emissions from the Phase II modifications are included in these totals. On page 4-212, the draft EIS refers to Table 4.11.1-5 as "list[ing] the estimated operating emissions for the existing and proposed stationary facilities," and states that these projects are subject to NNSR and PSD permitting. The following paragraph then separately refers to the Phase II Modification Project as being the source of 1.18 tpy of VOC, and the draft EIS appears to indicate that these emissions are *not* within the scope of the NNSR and PSD permitting. Thus, the draft EIS is unclear as to whether emissions from operation of Phase II are or are not included in the totals provided in Table 4.11.1-5. Moreover, Table 4.11.1-5 does not include emissions from operation of LNG vessels and support vessels. Vessel emissions are instead separately listed in Table 4.11.1-7. Because the public and environment will suffer the impacts of these emissions in aggregate, NEPA requires disclosing the total annual emissions for the project. Only discussing these emissions in isolation impedes the ability of decisionmakers and the public to assess these impacts.

N2-16

N2-17

The need for consolidated treatment of all project air emissions, and the inadequacy of the draft EIS's discussion, is demonstrated in the air impact modeling. While the available tables appear to identify the effects of various subsets of project emissions (e.g., stationary source emissions, vessels) and the effects of all sources in the area (including but not limited to project emissions) (multi-source emissions), pages 4-213 to 4-216 of draft EIS does not appear to explain the most pertinent issue: the effect of all emissions attributable to the project. For example, on Table 4.11.18, the "single-source modeling results" appear not to include effects of vessel emissions, while the applicant and FERC multi-source modeling appear to include emissions not attributable to this project. Table 4.11.1-9, in turn, titled "Air Emission Estimates for the Anticipated LNG Carriers and Support Vessels," appears to account *only* for vessel emissions, excluding project stationary source emissions. No table or discussion in the draft EIS appears to present the combined effect of all project sources. The draft EIS states that "[i]n January 2014 FERC revised the emission calculations to better characterize the expected operations and account for all the reasonably expected vessel emissions." 4-213. FERC implies that the effects of these aggregate emissions were modeled. Yet it is unclear which table, if any, presents the results of these increases. Clear presentation of this information is especially important because the public and decisionmakers cannot recreate this information independently. That is, while commenters can attempt to calculate total tons of pollutants attributable to the project by adding the totals presented on tables 4.11.1-7 and 4.11.1-5 (subject to the caveat that it is unclear whether these tables account for phase II emissions), it is unclear whether the modeling results permit such similar simple addition.

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N2-15: The draft EIS clearly describes the operating emissions for the Proposed Action. See page 4-214 under "Air Pollutant Emissions from Operation".

N2-16: See section 4.11.1 of the EIS.

N2-17: The impacts of the consolidated operating emissions from the Proposed Action were assessed by air dispersion modeling. This is clearly described in section 4.11.1.2 of the EIS. This modeling included (1) vessel emissions, (2) the Project's onshore emission sources, (3) nearby non-Project emission sources, and (4) background concentrations.

N2 – Sierra Club Comments

2. Particulate Matter

The inadequacy of the draft EIS's discussion of project impacts is demonstrated by the discussion of fine particulate matter, $PM_{2.5}$. Both operation of stationary source equipment and operation of associated vessels will emit $PM_{2.5}$, raising ambient $PM_{2.5}$ levels in areas near the project. Modeling indicates that ambient $PM_{2.5}$ levels in some of these affected locations will exceed the 24-hour and annual national ambient air quality standards (NAAQS) for $PM_{2.5}$. DEIS 4-216.

The draft EIS concludes that $PM_{2.5}$ impacts are not significant, notwithstanding these violations, because "the impacts from only the Liquefaction Project (Liquefaction Plant, Pretreatment Plant, Vessel Emissions) would result in impacts below the NAAQS" and because "impacts in excess of the NAAQS near the Liquefaction Plant exist regardless of the emissions from the Projects." DEIS 4-216. As a threshold issue, the draft EIS fails to provide data supporting either statement. As to whether the project would itself cause NAAQS violations, table 4.11.1-8 appears to exclude emissions from vessels, whereas table 4.11.1-9 appears to exclude emissions from the liquefaction and pretreatment plants, such that no table describes the full impact of the liquefaction project. As to whether violations would occur even without the project, the tables presenting modeling results do not include this information in isolation, and since the project's contribution is not specified, commenters cannot "subtract out" the project's contribution from the "Multi-Source Maximum + Predicted Background" values.

More importantly, the draft EIS does not support its standard of significance; *i.e.*, the premise that $PM_{2.5}$ impacts are insignificant if the project in isolation would not cause violation of the NAAQS and if violations that do occur would occur even without the project. Locations near the project will suffer air pollution levels that EPA has deemed unsafe, and the project will make this problem worse. The project's contribution is substantial. If the total project emissions can be estimated by simply summing the "single source modeling results" from table 4.11.1-8 with the "maximum $PM_{2.5}$ predicted concentration" from table 4.11.1-9,[9] we see the following:

N2-18

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[9] As explained in the prior paragraph, based on the draft EIS, commenters do not know whether such summation is proper, or whether it actually captures the impact of the liquefaction project. It may be that the areas with the maximum impact included in the "single source" table do not overlap the areas of maximum vessel impacts. Yet because the draft EIS contains no discussion of this issue, this simplistic analysis appears to be the best that the draft EIS supports.

N2-18: Simultaneous liquefaction and vaporization facilities operation would not occur, and as such were not modeled.

For $PM_{2.5}$ impacts of Freeport LNG operations are less than the NAAQS. See table 4.11.1-11 of the EIS.

N2 – Sierra Club Comments

N2-19

Table 1: Total Freeport Project $PM_{2.5}$ Impacts

Averaging Period	$PM_{2.5}$ Concentration (ug/m3)			Liquefaction Project Impacts as % of NAAQS
	Liquefaction Project Impacts	Background + Liquefaction Project Impacts	NAAQS	
24-hour	11.44	32.14	35	33%
Annual	1.65	10.95	12	14%

We note that EPA's recent cross state air pollution rule determined that an increase in pollution of a single percentage of the NAAQS was significant. The proposed projects would increase $PM_{2.5}$ emissions in some areas far beyond this amount. In addition, although the project emissions might not, on their own, cause a violation of the NAAQS, they would bring pollution levels very close to exceedance. Finally, the draft EIS does not indicate where the modeled impacts above the NAAQS would occur. The project will cause increases in 24-hour $PM_{2.5}$ that cross the modeling "significance" threshold in residential areas, including Surfside Beach. Figure 4.11.1-1, DEIS 4-217. The draft EIS does not address, however, where the modeled NAAQS violations will occur. The draft EIS indicates that the project will increase air pollution by a large fraction of the NAAQS, that some areas where pollution will increase are residential and recreational, and that in some areas where pollution will increase the pollution will violate health standards. This analysis, without more, does not support the conclusion that air pollution caused by the project will not have significant adverse effects. Indeed, it implies the opposite.

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3. Ozone Precursor Emissions

As Sierra Club explained in its protest filed earlier in CP12-509, ground-level (or tropospheric) ozone (O_3) is an air pollutant that harms human respiratory systems and has been linked to premature death, heart failure, chronic respiratory damage, and premature aging of the lungs.[10] Ozone may also exacerbate existing respiratory illnesses, such as asthma and emphysema, or cause chest pain, coughing, throat irritation and congestion. Children, the elderly, and people with existing respiratory conditions are the most at risk from ozone pollution.[11] Significant ozone pollution also damages plants and ecosystems.[12] Ozone also contributes substantially to global climate change over the short term. According to a recent study by the

[10] EPA, *Proposed New Source Performance Standards and Amendments to the National Emissions Standards for Hazardous Air Pollutants for the Oil and Natural Gas Industry: Regulatory Impact Analysis*, 4-25 (July 2011) ("O&G NSPS RIA"), *available at* http://www.epa.gov/ttnecas1/regdata/RIAs/oilnaturalgasfinalria.pdf, and attached as Exhibit 5, Jerrett *et al., Long-Term Ozone Exposure and Mortality*, New England Journal of Medicine (Mar. 12, 2009), *available at* http://www.nejm.org/doi/full/10.1056/NEJMoa0803894#t=articleTop, and attached as Exhibit 6.
[11] *See* EPA, *Ground-Level Ozone, Health Effects*, *available at* http://www.epa.gov/glo/health.html, and attached to Sierra Club ("SC") Protest of Freeport Apps. as Exhibit 4. EPA, *Nitrogen Dioxide, Health*, available at http://www.epa.gov/air/nitrogenoxides/health.html, and attached to SC Protest of Freeport Apps. as Exhibit 5.
[12] EPA, *Proposed New Source Performance Standards and Amendments to the National Emissions Standards for Hazardous Air Pollutants for the Oil and Natural Gas Industry: Regulatory Impact Analysis*, 4-26 (July 2011) ("O&G NSPS RIA"), *available at* http://www.epa.gov/ttnecas1/regdata/RIAs/oilnaturalgasfinalria.pdf and attached as Exhibit 5.

N2-19: As the values reported in Tables 4.11.1-8 and 4.11.1-9 represent maximum values that would not occur at the same time and location, adding the values presents a case that is technically impossible and would not occur.

N2 – Sierra Club Comments

United Nations Environment Program (UNEP), behind carbon dioxide and methane, ozone is now the third most significant contributor to human-caused climate change.[13]

Ozone is a criteria pollutant under the Clean Air Act. EPA has set a National Ambient Air Quality Standard (NAAQS) for ozone, determining that allowing pollution in excess would fail to protect human health and public welfare. This standard limits ozone to 75 parts per billion (ppb).[14] The project facilities are in an area that is designated as non-attainment of this standard: the Houston-Galveston-Brazoria area.[15]

The project will aggravate already unhealthy levels of ozone pollution. Ozone is not emitted directly, but rather results from the interaction of other chemicals, especially nitrogen oxides (NOx) and volatile organic chemicals (VOC) in sunlight. The project is in an area that violates EPA's ozone standards, and has been designated as in non-attainment of those standards.

N2-20 As summarized above, the draft EIS does not clearly explain the project's total emissions, including emissions of ozone precursors. Commenters believe the total ozone precursor emissions, as identified in the draft EIS, to be as follows, although as explained above, the draft EIS does not present an aggregate emission total:

Table 2: Liquefaction Project Operating Ozone Precursor Emissions

Source of operating emissions	Emissions, in TPY	
	NO_x	VOC
Liquefaction Plant (DEIS 4-206, Table 4.11.1-5)	14	7*
Pretreatment Plant (DEIS 4-206, Table 4.11.1-5)	51	17*
Phase II Modification (DEIS 4-212)	--	1.18
LNG Vessels (operations within TX waters) (DEIS 4-213, Table 4.11.1-7)	104.4	7.3
Assist Tugs (operations within TX waters) (DEIS 4-213, Table 4.11.1-7)	36.5	1.0
Totals	**205.9**	**33.48**

N2-21 * TCEQ's draft permits and associated documents for these facilities indicate that they will emit a combined total of 24.96 tpy of VOC.[16] Pursuant to EPA guidance, this should be rounded up to 25 tpy, rather than down to 24.[17]

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[13] *Id. See also* United Nations Environment Programme and World Meteorological Organization, (2011), *Integrated Assessment of Black Carbon and Tropospheric Ozone: Summary for Decision Makers* (hereinafter "UNEP Report") at 7, available at http // www.unep.org/dewa/Portals/67/pdf/Black_Carbon.pdf, and attached to SC Protest of Freeport Apps. as Exhibit 6.

[14] Specifically, an area violates this standard when the three-year average of annual fourth-highest daily maximum 8 hour ozone concentrations exceeds 75 ppb. EPA, *National Ambient Air Quality Standards for Ozone*, 73 Fed. Reg. 16436 (Mar. 27, 2008); 40 C.F.R. Pt. 50, App'x I.

[15] EPA, *Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standard*, 77 Fed. Reg. 30,088 (May 12, 2012).

[16] TCEQ, Freeport Liquefaction Plant Preliminary Determination Summary, Permit Nos. 100114, PSDTX1282, and N150, at 2, attached as Exhibit 7 (PDF page 19 of 29); TCEQ, Freeport Pretreatment Plant Preliminary Determination Summary, Permit Nos. 104840, PSDTX1302 and N170, at 3, attached as Exhibit 8 (PDF page 30 of 42).

[17] EPA, Performance Test Calculation Guidelines (June 6, 1990), *available at* http://www.epa.gov/ttnemc01/rounding.pdf and attached as Exhibit 9.

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N2-20: The EIS clearly delineates the emissions due to construction and operation of the Project in tables 4.11.1-3 through 4.11.1-8 of the EIS.

N2-21: All emissions, including VOC emissions are summed correctly. Footnote 17 refers to a 1990 letter from the EPA which pertains to guidelines which should be used in calculating and reporting emission rates and concentrations when determining compliance with the new source performance standards and national emission standards for hazardous pollutants. It does not pertain to preparation of emission inventories for New Source Review or EISs nor does it pertain to emissions compared to the major source thresholds.

N2 – Sierra Club Comments

N2-22

The draft EIS's discussion of effects on ozone pollution is minimal and inadequate. The draft EIS finds three reasons to conclude that the project's impacts on all air pollution would not be significant:

> through [1] implementation of construction work practices, [2] our recommendation for a general conformity analysis of the estimated emissions from construction and operation, and [3] an analysis of the modeled air quality impacts from operation of Liquefaction Plant, Pretreatment Plant and Vaporization Plant, we find there would be no regionally significant impacts on air quality although residents near the construction areas would have elevated fugitive dust impacts during the period of construction.

DEIS 4-218. Only the second of these reasons has any applicability to ozone impacts from operation. The first deals solely with construction. The third does not apply to ozone, because unlike with $PM_{2.5}$ or other criteria pollutants, the draft EIS does not discuss any modeling of ozone impacts. DEIS 4-211 to 4-217. Indeed, section 4.11.1.2, "Air Quality Impacts and Mitigation," does not contain the terms "ozone" or "O_3."

The conformity analysis, and Clean Air Act requirements applicable to Freeport generally, cannot stand in for the analysis of air impacts that NEPA requires. The conformity analysis was not included in the draft EIS, nor had it been completed by the close of the NEPA comment period. Thus, the conformity analysis is not a document incorporated by reference: it is a promise to complete analysis in the future, pursuant to FERC's obligations under a different statute. NEPA requires, however, that FERC take a "hard look" at the impacts, and disclose the results of that examination to the public as part of the NEPA process.

Additionally, a project might comply with conformity obligations while still having significant impacts on air quality. For example, FERC must consider the large body of evidence indicating that ozone harms human health at levels above 60 ppb but below the present 75 ppb standard.[18] If the cumulative effect of the proposed project, together with other projects in the area, is to increase the number of people exposed to pollution in violation of this more protective threshold, the frequency of such exposures, or the extent by which pollution exceeds this threshold, these effects must be disclosed, and could constitute a significant impact.

N2-23

Finally, the conformity analysis may not consider the operating emissions from the liquefaction terminal and pretreatment site, because under EPA regulations:

> a conformity determination is not required for . . . (1) The portion of an action that includes major or minor new or modified stationary sources that require a permit under the new source review (NSR) program (Section 110(a)(2)(c) and Section 173 of

[18] *See, e.g.*, EPA, *Proposed National Ambient Air Quality Standard for Ozone*, 75 Fed. Reg. 2938 (Jan. 19, 2010).

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N2-22: The discussion of the effects of the Projects are substantive and adequate. Freeport LNG will conduct its operations in a manner that would minimize emission of ozone precursors and this would be enforced by permit conditions.

N2-23: The conformity analysis does not consider operational emissions from the liquefaction and Pretreatment Plant because these are exempt from the conformity determination thresholds because these emissions would be covered under a New Source Review Permit.

N2 – Sierra Club Comments

the Act) or the prevention of significant deterioration program (title I, part C of the Act).

40 C.F.R. § 93.153(d)(1). As described in the draft EIS, the liquefaction terminal and pretreatment facility require nonattainment new source review (NNSR) and prevention of significant deterioration (PSD) permits, and this operation of these facilities appears to fall within this exception. We further note that the draft EIS appears to assume that, pursuant to the NNSR program, these projects will be subject to emission restrictions beyond those that the Texas Commission on Environmental Quality proposes to impose. The draft EIS explains that "Sources that trigger NNSR are subject to a variety of requirements, including the need to apply control technologies capable of achieving the Lowest Available Emission Rate (LAER) and the need to obtain emission offsets. . . . the Projects would be subject to NNSR permitting for NOx and VOC." DEIS 4-207. This summary implies that FERC understands the project to be "subject to NNSR permitting" and therefore to "trigger NNSR" for both NOx and VOC, such that emissions of both of these pollutants will be controlled with LAER and subject to offsets. FERC's understanding is incorrect, in that TCEQ has determined that the project the project will only have the potential to emit 24.96 tpy of VOC and that it therefore falls below the 25 tpy "trigger" for NNSR requirements for VOC.[19] Thus, absent a change of course from TCEQ, the EIS cannot use the "offsetting" of VOC emissions as a basis for omitting analysis of their impacts. Of course, commenters contend that TCEQ is mistaken in determining that the project falls below the 25 tpy trigger, and commenters encourage FERC to raise this issue with TCEQ. As explained above, EPA guidance documents indicate that, unless otherwise specified, emissions levels should be rounded to two or three significant digits; under either level of rounding, 24.96 tpy of VOC should be rounded up to the 25 tpy threshold.[20] Furthermore, the TCEQ emission calculation excluded several sources of emissions, such as emissions from operation of pressure release valves[21] and emissions from the associated Phase II project.

N2-24

N2-25

4. Global Warming Potential of Methane

The draft EIS discusses greenhouse gas emissions from the proposed projects in terms of CO_2e, or carbon dioxide equivalent. To calculate CO_2e, emissions of non-CO_2 greenhouse gases are multiplied by a pollutant-specific "global warming potential," which reflects the ratio between the amount of warming a ton of that pollutant causes and the amount of warming that would be caused by a ton of CO_2. Of particular importance in facilities dealing with natural gas is methane, the primary constituent in natural gas. Methane is a much more potent greenhouse gas than carbon dioxide, but methane is much shorter-lived in the atmosphere. Thus, in converting methane to CO2e, different values must be used for different timescales.

N2-26

[19] See *supra* Table 2 and n.16, 40 C.F.R. § 51.165(a)(1)(iv)(A)(1)(ii).
[20] *See supra* n.17
[21] Sierra Club, *Comments on Proposed State Air Quality Permit Number 100114, PSD Permit Number PSDTX1282 and Nonattainment Permit Number N150 and Proposed State Air Quality Permit Number 104840, PSD Permit Number PSDTX1302 and Nonattainment Permit Number N170 for the Emission of Air Pollutants from the Proposed Freeport LNG Liquefaction Plant in Quintana, Texas* (March 10, 2014), attached as Exhibit 10

N2-24: See text edit on page 4-207 of the EIS.

The air permits require Freeport LNG to purchase 67.4 and 18.1 tpy of NOx offsets for the Pretreatment Plant and the Liquefaction Plant, respectively.

N2-25: See section 4.11.

N2-26: FERC relies upon EPA GWP for their various GHG permitting programs. If EPA updates these values, they will be used in our analysis.

The draft EIS does not acknowledge any of this complexity, simply reporting all greenhouse gas emissions as CO_2e. DEIS 4-202, 4-206, 4-213, 5-15. The draft EIS apparently relies on the calculations performed by EPA in issuing the draft PSD permit for greenhouse gases, which were based on a 100-year timeframe, and assumed that methane's global warming potential on this timeframe was 21. DEIS App. B at 13. Although the draft EIS does not identify greenhouse gas emissions by individual pollutant, the draft EIS appears to rely on the EPA's determination that the project would emit 74.5 tpy of methane. *Id.*

The draft EIS's use of a global warming potential of 21 for methane is flawed. First, FERC must explain the basis for its decision to use the 100-year, rather than 20-year, assessment of methane's impacts. Authorities including the EPA, the Obama Administration, and the Intergovernmental Panel on Climate Change (IPCC) have emphasized the importance of acting quickly on climate change and the danger of reaching "tipping points" triggering cascading releases of greenhouse gases within the coming decades.

Second, even on the 100-year timeframe, both EPA and the Intergovernmental Panel on Climate Change now use higher estimates. EPA proposed to update the greenhouse gas reporting rule in March of 2013, and finalized this update on November 29, 2013, months before the draft EIS was released.[22] This rule adopted a methane global warming potential of 25. EPA based this decision on the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). While EPA's proposed update was waiting to be finalized, in September 2013, the IPCC's Fourth Assessment Report was superseded in pertinent part by that body's Fifth Assessment Report.[23] This report estimates that methane has 34 times the global warming potential of carbon dioxide over a 100 year time frame and at least 86 times the global warming potential of carbon dioxide over a 20-year time frame.[24] Thus, the available evidence overwhelmingly indicates that the methane global warming potential FERC used in the draft EIS is too low. Because the Fifth Assessment Report represents the best available science, FERC should use the global warming potentials identified therein. It is also crucial for a reasoned assessment of the impacts of the increases in gas production that would be an indirect effect of the proposed projects, as discussed in part VI below.

N2-27

5. Indirect Emissions from Electricity Consumption

The proposed liquefaction terminal will use electric motors to drive liquefaction compressors. These electric motors will have significant electricity demands, requiring between 600 and 700 megawatts of electricity (with a maximum anticipated load of 720 megawatts) on an essentially constant basis.[25] This is roughly the entire output of the average coal-fired power plant in the US, and is greater than the entire output of the average gas-fired power plant.

[22] EPA, *2013 Revisions to the Greenhouse Gas Reporting Rule and Proposed Confidentiality Determinations for New or Substantially Revised Data Elements; Proposed Rule*, 78 Fed. Reg. 19802, 19808-810 (Apr. 2, 2013); EPA, *2013 Revisions to the Greenhouse Gas Reporting Rule and Final Confidentiality Determinations for New or Substantially Revised Data Elements; Final Rule*, 78 Fed. Reg. 71904, 71909 (Nov. 29, 2013).
[23] IPCC, *Climate Change 2013: The Physical Science Basis; Chapter 8*, page 714, Table 8.7, attached as Exhibit 11.
[24] *Id.*
[25] DEIS 1-13, *see also* Resource Report 1 at 1-60 and Freeport's Nov. 14, 2012 response to data request.

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N2-27: See response N2-26.

N2 – Sierra Club Comments

N2-28

Generating and supplying this electricity will have significant environmental impacts, and these effects are plainly "indirect effects" of the project that must be considered. 40 C.F.R. § 1508.8(b). Yet the draft EIS is completely silent as to these impacts: not only does it not analyze them, it provides no basis for excluding them from analysis.

Commenters assume that the proposed design's use of electric-driven compression has lower environmental impacts than alternative designs such as using gas turbines to mechanically drive compressors. NEPA requires agencies to do more than make assumptions, however: they must take hard look at environmental impacts. In particular, FERC's recent draft EIS for the Cameron LNG project illustrates the need to consider such effects. There, FERC determined that using a gas fired turbine for a pipeline compressor station was environmentally preferable to using an electric motor, because the electricity supplying an electric motor would come from a coal-fired power plant, providing worse lifecycle impacts than the impacts of gas combustion. Although Sierra Club contends that FERC's conclusion that power would come solely from this coal-fired powerplant is mistaken, the Cameron analysis nonetheless underscores the importance of considering indirect impacts.

Most importantly, NEPA requires more than merely a comparison between the effects of alternative project designs: NEPA also requires comparison of the project with a no-action alternative. Even if it was certain that electric-driven compression is the least-harmful way to build the proposed liquefaction facility, the public and decisionmakers would still need to be informed of the extent to which this action alternative imposes harms that would not be realized under the no-action alternative.

Fortunately, available tools make it possible to assess likely emissions associated with increased demand for electricity. Reflecting the integrated nature of the electricity grid, EPA has created the Emissions & Generation Resource Integrated Database (eGRID),[26] which can be used to estimate air pollution impacts associated with adding marginal units of electricity demand at the level of subregions, states, or by utility.[27] The eGRID database uses detailed information on historical emissions from electric generating units throughout the United States and associated transmission constraints to define emission rates for each subregion. The database conveniently provides emission rates in units of lb/MWh for the three main greenhouse gases (CO_2, CH_4, and N_2O) as well as for the 2 primary air pollutants associated with power production (SO_2 and NO_x, with NO_x given in annual NO_x rates and ozone season NO_x rates).

Using the eGRID emissions factors associated with grid purchased electricity in the ERCT eGRid subregion, which covers the Freeport, TX area, Commenters calculate that generation of an additional 700 MWs to power the liquefaction plant will result in the emission

[26] *See* http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html. Information for 2010, for example, is provided at http://www.epa.gov/cleanenergy/documents/egridzips/eGRID_9th_edition_V1-0_year_2010.zip and attached here as Exhibit 12.

[27] EPA, *How to use eGRID for Carbon Footprinting Electricity Purchases in Greenhouse Gas Emission Inventories* (July 2012), *available at* http://www.epa.gov/ttnchie1/conference/ei20/session3/adiem.pdf and attached as Exhibit 13.

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N2-28: See section 4.12.4 under climate change.

of approximately 3,547,254.02 tons per year of CO_2e.[28] Because the effects of greenhouse gas emissions occur on a global scale, discussion of the impact of these emissions does not require knowledge of where they will occur. However, FERC must use eGRID and other tools to further estimate the impact of non-GHG pollutants associated with the project's electricity demands.

6. Carbon Capture and Sequestration

The draft EIS did not identify or consider *any* design alternatives that would reduce air emissions and associated impacts. However, as Sierra Club explained in comments on EPA's draft GHG PSD permit for the project, carbon capture and sequestration (CCS) is an available design alternative that could cheaply and drastically reduce greenhouse gas emissions from the project.[29] The draft EIS does not consider this technology at all.[30] Commenters provide herein a brief summary of CCS as an alternative that must be evaluated as part of the NEPA process, and Commenters further incorporate by reference Sierra Club's comment on EPA's draft GHG PSD permit for the project.

CCS is a process that uses a chemical or physical solvent to remove CO_2, the dominant GHG, from a CO_2-containing stream (such as natural gas, flue gas, synthesis gas) using absorption, with subsequent stripping of the absorbed CO_2 to produce a concentrated CO_2 stream. Depending upon the acid gas removal technology applied, the CO_2 may need to be dried, then compressed to a dense phase state for pipeline transport to an appropriate storage location, most likely underground in a geological storage reservoir such as a deep saline aquifer or an oil reservoir or coal seam. CCS is far and away the most effective add-on technology available to reduce, by as much as 90 percent, GHG emissions from industrial facilities like the Freeport project.

The pretreatment plant is already designed to remove CO_2 from pipeline gas, producing a high-purity CO_2 stream that is amenable to capture and sequestration. The resulting waste stream from the Amine Units should be expected to result in a highly concentrated CO_2 stream, as much as 96% CO_2 by volume (98% by weight), which is ideal for CCS. This stream can be sequestered in a geologic formation with no further treatment or used for enhanced oil recovery or other end uses. EPA has already determined that CCS is technically feasible for both the gas pretreatment and combustion emissions from the proposed GE 7EA turbine.[31] In the GHG PSD proceeding, Freeport indicated that CO_2 from gas pretreatment could be captured and sequestered for less

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[28] This figure was calculated using the "baseload" eGRID2012 emission factor available at http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html, 8,760 annual hours of operation, global warming potentials for methane and nitrous oxide of 25 and 298, respectively. Commenters added an estimate of 7% assumed transmission and distribution losses, as these eGRID does not include the emissions impact of these losses.

[29] Sierra Club, *Comments on Freeport LNG Liquefaction Project –Permit No. PSD-TX-1302-GHG*, at 3, 14-17 (Jan. 6, 2014), attached as Exhibit 14.

[30] The abbreviation CCS is defined in Appendix B, EPA's draft GHG PSD permit, but CCS is not discussed in this appendix. DEIS App. B at 8.

[31] EPA Region 6, *Statement of Basis: Draft Greenhouse Gas Prevention of Significant Deterioration Preconstruction Permit for the Freeport LNG Development, L.P., Freeport LNG Liquefaction Project*, PSD-TX-1302-GHG, at 12, 29-30 (Dec. 2, 2013), *available at* http://www.epa.gov/earth1r6/6pd/air/pd-r/ghg/freeport_lng_sob120213.pdf and attached as Exhibit 15.

than $15 per ton, and EPA agreed. Sierra Club's analysis concluded that with better facility design, such as a selective acid gas removal technology that uses a physical solvent, instead of the amine units Freeport LNG proposes, Freeport could capture this CO_2 so cheaply that it could make a net profit off of its sale.[32] Examples of these technologies are Selexol[33] or Rectisol[34] units, which could selectively remove both CO_2 and sulfur compounds to levels suitable for enhanced oil recovery or other sequestration. The resulting CO_2 stream would have a low water content and a lower sulfur content and could go directly to a compression and smaller drying plant and then to a pipeline. CCS is also feasible for capture of turbine combustion emissions.

Turning to sequestration, Freeport could deliver captured CO_2 to the Denbury Green Pipeline, which would then transport CO_2 to regions where it could be sequestered.

Although EPA's draft GHG PSD permit did not identify CCS as BACT, that determination does not excuse FERC's obligation to consider CCS as a design alternative here. EPA's basis for rejecting CCS was flawed, as identified in Sierra Club's comment thereon. Freeport withdrew its application from EPA before EPA could respond to Sierra Club's criticisms or finalize that application. As such, that PSD proceeding provides no basis for rejecting Commenters' arguments about the availability of CCS as a feasible alternative. Furthermore, the obligation to identify and take a hard look at alternatives NEPA is also distinct from the obligation to require best available control technology under the Clean Air Act, and FERC cannot avoid its obligation under the former by pointing to another agency's as yet undischarged obligation under the latter. FERC must take a hard look at alternatives for full or partial capture and sequestration of CO_2 emissions from the gas pretreatment process as well as the proposed combustion turbine.

N2-29

C. Water Quality and Wetlands Impacts

As noted above, the draft EIS provides an inadequate assessment on impacts on water quality by failing to properly assess the impacts of vessel traffic, including resuspension of sediment as a result of vessel passage, noise, vessel strikes, ballast water discharge, risk of accident, etc. Commenters additionally join in and reiterate previously raised concerns regarding deposition of air pollutants, and the impact of such deposition on wetlands and other waterbodies in the area.

N2-30

D. Safety Impacts

The draft EIS's evaluation of safety impacts is deficient both with regard to the likelihood of an accident and the potential impact of an accident.

As to the likelihood of an accident, the draft EIS generally contends that modern design and regulation make accidents extraordinarily unlikely. Shortly after the draft EIS was released,

[32] Sierra Club, *Comments on PSD-TX-1302-GHG, supra* n.29 at 3, 14-17.
[33] UOP, *UOP Selexol Technology for Acid Gas Removal* (2009), available at http://www.uop.com/?document=uop-selexol-technology-for-acid-gas-removal&download=1 and attached as Exhibit 16.
[34] Arthur L. Kohl and Richard B. Nielsen, Gas Purification, 5th Edition, Gulf Publishing Company, Chapter 14: Physical Solvent for Acid Gas Removal, 1997.

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N2-29: See section 4.12.4 under the climate change

N2-30: Wetland impacts are discussed in section 4.3.5.

an explosion occurred at a Williams LNG facility near Plymouth, Washington.[35] This accident injured four workers and led to the evacuation of all people within a two mile radius. According to press reports, a "processing vessel" exploded, causing shrapnel to pierce both walls of a double-walled LNG storage tank, allowing LNG to leak.[36] Although the Williams facility, with a capacity of 2.4 bcf, was significantly smaller than the proposed Freeport facility (with 480,000 cubic meters of proposed storage), local emergency responders were concerned that a second explosion at the facility could be lethal to all within ¾ miles.[37] The investigation of the cause or causes of the Williams accident is still underway. FERC must determine whether the Freeport facility would be susceptible to a similar accident. This determination must include both the newly proposed facilities as well as the existing facilities such as LNG storage tanks that, absent the export project, are unlikely to be used and therefore unlikely to present a hazard.

N2-31

Even for one the prior accidents the draft EIS does discuss, the draft EIS fails to explain how the Freeport facility would not be susceptible to a similar accident. The draft EIS summarizes the 2004 accident at Sonatrach's Skikda, Algeria, facility. DEIS 4-147. The draft EIS states that the accident originated in a train that "had been operating with its original equipment since start-up in 1981." *Id.* The draft EIS does not explain, however, how the Freeport equipment would not be susceptible to a similar accident. Unlike with the 1944 and 1979 accidents described in the draft EIS, for the Algeria accident, the draft EIS does not identify any change in design standards or regulations adopted after the accident to prevent a recurrence. Thus, the draft EIS gives no reason to believe that the Freeport facility is different from the Algerian facility in pertinent regard. Nor is the long service life of the Algerian train significant, because it appears that the proposed Freeport liquefaction trains will be permitted to run for a similar timeframes without being required to undergo any overhaul.

As to the severity of a potential accident, the draft EIS appears not to fully incorporate recent DOE work on this issue. As the draft EIS recognizes, "In May 2012, the USDOE released a Report to Congress, Liquefied Natural Gas Safety Research, on the findings of new experimental data on large LNG pool fires conducted over water." DEIS 4-169.[38] The draft EIS asserts that, after reviewing this study, FERC concluded that existing tools remained "appropriate for modeling thermal radiation from LNG pool fires *on land* and [were] suitable for use in siting onshore LNG facilities." DEIS 4-170 (emphasis added). However, the draft EIS does not appear to reflect the DOE LNG Safety Research regarding LNG vessel accidents. This research explained that LNG breaches and pool fires quickly severely damaged structural

[35] See, e.g., Associated Press, *4 injured, 200 evacuated after Washington natural gas plant explosion*, The Oregonian (March 31, 2014), available at http://www.oregonlive.com/pacific-northwest-news/index.ssf/2014/03/4_injured_200_evacuated_after.html and attached as Exhibit 17.
[36] Joshua Schneyer, Timothy Gardner, and Richard Valdmanis, *Blast at U.S. LNG site casts spotlight on natural gas safety*, Reuters (Apr. 6, 2014), available at http://reut.rs/1hPDoMe and attached as Exhibit 18.
[37] *Id.*, *see also* Williams Co., *Plymouth, WA Update*, http://co.williams.com/williams/news-media/plymouth-wa-update/, attached as Exhibit 19.
[38] *See* DOE, Liquefied Natural Gas Safety Research (May 2012), available at http://energy.gov/sites/prod/files/2013/03/f0/DOE_LNG_Safety_Research_Report_To_Congre.pdf, attached as Exhibit 20.

N2-31: See Section 4.10

elements of LNG vessels, as the combination of cooling from LNG and heating from fire could produce a 75 to 80 percent reduction in strength within 10-20 minutes.[39] LNG vessels can quickly become disabled and at risk of sinking.[40] In modeling various pool fire scenarios resulting from a breach over water, DOE determined that the 5 kW/m^2 hazard (which present immediate human health hazards) extended nearly two kilometers, with the distance in the "nominal case" reaching 1266 meters.[41] The 37.5 kW/m2 radius, which will damage structures and equipment, extended 391 meters in the nominal case, and beyond 600 meters in some other cases.[42]

Thus, the DOE LNG Safety Research appears to indicate that if a LNG vessel suffers an accident leading to a large pool fire, the vessel will be unable to be moved, and will present a hazard for a large radius. This prospect is particularly troubling for the Freeport site, because there are numerous additional facilities nearby which likely present particular risks if exposed to fire. Most obviously, the proposed terminal is immediately across the channel from what the draft EIS identifies as the "Dow Performance Plastics Plants & Idem-Itsu/Mitsui Olefins Unit." DEIS 4-239. Indeed, individual storage tanks that are part of the plant can be seen in many of the satellite photos included in the draft EIS. DEIS 1-5, 1-7. Some of these tanks are likely to be within the 37.5 kW/m2 hazard zones for a pool fire that could occur while LNG vessels were approaching the Freeport berth, and much of this plant would be within the 5 kW/m2 hazard zone. More generally, Freeport is an area with extensive industry, and it likely that tanker accidents could impact other facilities as well.

N2-32

Despite this apparent potential for impacts, chapter 4.10 of the draft EIS, titled "Reliability and Safety," does not contain a single reference to the Dow plant. Nor could Commenters find any discussion elsewhere in the draft EIS about the effects of an accident on the Dow plant. NEPA requires FERC to assess the effects of an accident at the Freeport project on nearby facilities, especially facilities such as a chemical plant that may present an abnormal health hazard in the event of a fire or other accident. Accordingly, while the DOE LNG Safety Report appears to indicate that an LNG vessel accident would risk damaging structures, including tanks, at the Dow chemical plant, the draft EIS has failed to take a hard look at this risk or the potential impacts.

The potential for an LNG accident to be compounded by effects at the Dow Chemical plant may create a heightened risk of terrorist attack, by constituting a particularly vulnerable target. The draft EIS recognizes that "potential terrorism issues" were identified during the public comment period, and contends that the "draft EIS section where [these] comments are addressed" is Chapter 4.10. DEIS 1-13. The only discussion of these issues, however, is the half page on "Facility Security and LNG Vessel Safety" provided on pages 4-197 to 4-198. This discussion merely identifies other regulations, studies, and letters regarding security, without summarizing or describing the content of any of these letters. This discussion fails to provide

N2-33

[39] DOE LNG Safety Research, *supra* n 38 at 10.
[40] *Id.* at 14, 16.
[41] *Id.*
[42] *Id.*

N2-32: Ship transits for the Freeport LNG terminal were considered in Dockets CP03-75 and CP05-361 using similar hazard zones. The May 2012 Report to Congress entitled "Liquefied Natural Gas Safety Research" states that "based on the data collected from the large-scale LNG pool fire tests conducted, thermal (fire) hazard distances to the public from large LNG pool fires will decrease by at least two to seven percent compared to results obtained from previous studies." This report did not indicate shortcomings with the previous analysis. In addition, the USCG continually assesses the waterway based on the most current information.

N2-33: See Section 4.10

Commenters and their members with information regarding specific steps that are taken to reduce this risk, the susceptibility of the facilities to terrorist attack, or the potential consequences of such an attack. As such, the draft EIS fails to hard look at these risks.

VI. Indirect Effects of Induced Gas Production, Gas Price Increases, and End Use of LNG.

Gas exported as LNG must come from somewhere. The only options are an increase in domestic supply to match this new demand or a decrease in other domestic consumption to free up gas that would otherwise be used elsewhere. As explained in the Energy Information Administration's January 2012 LNG Export Study and in numerous subsequent analyses, the US will likely see a combination of both.[43] The predominant effect will be an increase in supply as gas producers increase output in response to new demand. The extra demand will also cause increases in domestic gas prices, which will cause some domestic consumers (primarily in the electricity generating sector) to reduce their consumption (according to EIA, primarily but not exclusively by switching to coal). Both this increase in production and this shift in the power sector will have environmental impacts. Additional environmental impacts will result from the consumption of exported LNG by end users. These environmental impacts are all indirect effects that must be included in the NEPA analysis. The draft EIS is deficient because it improperly excludes effects relating to gas production and domestic power production from analysis, and because the analysis of impacts relating to end use of US LNG is incomplete.

N2-34

A. Environmental Impacts of Induced Gas Production

The additional demand for US natural gas that will be created by Freeport's proposal will induce an increase in domestic gas production, with a general agreement that roughly 63% of exported gas will come from new production.[44] Moreover, available tools also allow FERC to predict where increased production will occur with a level of specificity sufficient to support meaningful analysis of the environmental impacts of this production—and for many impacts, such as greenhouse gas emissions, geographic specificity is not needed at all.

N2-35

1. Freeport's Proposal Will Induce Additional U.S. Gas Production

Freeport, DOE, the EIA, NERA, essentially every other LNG export applicant, and other informed commenters all agree that LNG exports will induce additional production in the United

[43] DOE/FE has commissioned a two part study of the economic impacts of LNG exports. Energy Information Administration, *Effect of Increased Natural Gas Exports on Domestic Energy Markets*, (2012) ("EIA Export Study"), attached as Exhibit 21; *NERA Study, supra* n.1. Sierra Club and others submitted extensive comments on these studies. Sierra Club Initial NERA Comment, attached as Exhibit 22; Synapse Analysis of NERA Study; attached as Exhibit 23; Sierra Club Reply NERA Comment, attached as Exhibit 24.
[44] EIA Export Study, *supra* n.43, at 10.

N2-34: We agree that the end users would cause environmental impacts; however, neither the location nor the footprint of these impacts is known. Consequently, an analysis would be speculative and provide no meaningful data for decision makers to consider.

N2-35: The commenter contends that the proposed Project and other planned LNG export projects, if constructed and operated, will cause an increase in environmental impacts from induced gas production and pipeline transportation. First, no specific shale-gas play has been identified as a source of natural gas and the proposed Project does not depend on additional shale gas production, which may occur for reasons unrelated to the Projects and over which the Commission has no control, such as state permitting for additional gas wells. The development of natural gas in shale by hydraulic fracturing is not the subject of this EIS nor is the issue directly related to the proposed Project. Determining the well and gathering line locations and the environmental impacts associated with their development and operation is not feasible as the market and gas availability at any given time would determine the source of the natural gas. Further, future shale production is not reasonably foreseeable because local governments make the decisions concerning siting and timing of wells and gathering lines. Consequently, the Commission cannot know the specifics of when, where, or even if, shale production will occur. Therefore, an analysis of shale production would be too speculative for inclusion in the Freeport LNG EIS because the impact cannot be described with sufficient specificity to make its consideration useful to a reasoned decision maker.

States. As explained in Sierra Club's previously filed Protest, Freeport's own applications to FERC and DOE predict such production and tout it as a source of benefits.[45] The consensus of the EIA and private modelers is that US LNG exports will induce domestic production equivalent to "about 60 to 70 percent" of the demand created by export projects (*i.e.*, the volume of gas exported together with the gas necessary for the operation of export facilities), with EIA putting the specific estimate for its reference cases at 63%.[46] The EIA further predicts that "about three quarters of this increased production [will come] from shale sources," with the remainder derived from other production types.[47] DOE's conditional authorizations of Freeport's applications to export LNG to non-free trade agreement countries explicitly endorsed and relied upon this EIA analysis.[48]

Accordingly, Freeport's proposed export of 1.8 bcf/d of gas, can be expected to induce an additional 1.13 bcf/d of production.[49]

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EIA's core analytical tool is the National Energy Modeling System ("NEMS"). NEMS was used to produce the EIA exports study. NEMS models the economy's energy use through a series of interlocking modules that represent different energy sectors on geographic levels.[50] Notably, the "Natural Gas Transmission and Distribution" module models the relationship between U.S. and Canadian gas production, consumption, and trade, specifically projecting U.S. production, Canadian production, imports from Canada, *etc.*[51] For each region, the module links supply and demand annually, taking transmission costs into account, in order to project how demand will be met by the transmission system.[52] Importantly, the Transmission Module is *already* designed to model LNG imports and exports, and contains an extensive modeling apparatus allowing it to do so on the basis of production in the U.S., Canada, and Mexico.[53] At present, the Module focuses largely on LNG imports, reflecting U.S. trends up to this point, but

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[45] Sierra Club Protest at 19.
[46] From the EIA Export Study, *supra* n.43, at 6, 10. *See also, e.g.*, Deloitte MarketPoint, Analysis of Economic Impact of LNG Exports from the United States, at 3, 24 ("Deloitte Study"), attached as Exhibit 25.
[47] EIA Study at 6.
[48] DOE/FE Order 3282 (May 17, 2013), at 111 ("Our decision is not premised on an uncritical acceptance of the general conclusion of the LNG Export Study of net economic benefits from LNG exports."), 110 ("we find that the LNG Export Study is fundamentally sound"), 71 ("we observe that more natural gas is likely to be produced domestically if LNG exports are authorized than if they are prohibited"); *accord* DOE/FE Order 3357 (Nov. 15, 2014).
[49] This calculation does not account for energy used in the liquefaction process. The EIA Study found that liquefaction generally consumed an additional 10% of the gas liquefied. Because Freeport proposes to use electricity, rather than natural gas, to drive it's liquefaction process, the EIA Study does not directly apply here. It is likely that the ultimate energy requirement remains the same. As discussed above, FERC's NEPA analysis must consider the effects of this energy useage.
[50] EIA, *The National Energy Modeling System: An Overview*, 1-2 (2009), attached as Exhibit 26. Available at http://www.eia.gov/oiaf/aeo/overview/pdf/0581(2009).pdf.
[51] *Id.* at 59.
[52] EIA, *Model Documentation: Natural Gas Transmission and Distribution Module of the National Energy Modeling System*, 15-16 (2012), attached as Exhibit 27, *available at* http://www.eia.gov/FTPROOT/modeldoe/m062(2011).pdf.

it also already links the Supply Module to the existing Alaskan *export* terminal and projects exports from that site and their impacts on production.[54]

Similarly, EIA's "Oil and Gas Supply" module models individual regions and describes how production responds to demand across the country. Specifically, the Supply Module is built on detailed state-by-state reports of gas production curves across the country.[55] As EIA explains, "production type curves have been used to estimate the technical production from known fields" as the basis for a sophisticated "play-level model that projects the crude oil and natural gas supply from the lower 48."[56] The module distinguishes coalbed methane, shale gas, and tight gas from other resources, allowing for specific predictions distinguishing unconventional gas supplies from conventional supplies.[57] The module further projects the number of wells drilled each year, and their likely production – which are important figures for estimating environmental impacts.[58] In short, the supply module "includes a comprehensive assessment method for determining the relative economics of various prospects based on future financial considerations, the nature of the undiscovered and discovered resources, prevailing risk factors, and the available technologies. The model evaluates the economics of future exploration and development from the perspective of an operator making an investment decision."[59] Thus, for each play in the lower 48 states, the EIA is able to predict future production based on existing data. The model is also equipped to evaluate policy changes that might impact production; according to EIA, "the model design provides the flexibility to evaluate alternative or new taxes, environmental, or other policy changes in a consistent and comprehensive manner."[60] Thus, there is no technical barrier to modeling where exports will induce production going forward. Indeed, EIA used this model for its export study, which forecast production and price impacts.

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Deloitte Marketpoint has provided similar discussion of the ways exports will induce domestic production.[61] Deloitte explains that its "World Gas Model" includes detailed global gas resources, including modeling of "575 plays in the US alone."[62] For this model, "Within each major region are very detailed representations of many market elements: production, liquefaction, transportation, market hubs, regasification and demand by country or sub area."[63] This includes modeling individual "producers, pipelines, refineries, ships, distributors, and consumers." *Id.* Deloitte applied this model to another proposal and derived specific volumes of predicted production increases in five distinct shale gas plays.[64] While Deloitte only provides as

[53] *See id.* at 22-32.
[54] *See id.* at 30-31.
[55] EIA, *Documentation of the Oil and Gas Supply Module*, 2-2 (2011), attached as Exhibit 28, *available at* http://www.eia.gov/FTP/ROOT/modeldoc/m063(2011).pdf
[56] *Id.* at 2-3
[57] *Id.* at 2-7.
[58] *See id.* at 2-25 to 2-26.
[59] *Id.* at 2-3.
[60] *Id.*
[61] Deloitte Study, *supra* n.46 at 14.
[62] *Id.* at 25.
[63] *Id.* at 24.
[64] *Id.*

aggregate estimates for other shale plays and for non-shale sources, it appears that Deloitte's model is capable of providing geographically specifying where this aggregated production will occur. We offer no opinion at this time about the strengths or weaknesses of Deloitte's models relative to EIA's. We simply note that multiple tools exist which allow predictions of how and where production will respond to exports.

2. Induced Production Must Be Considered in the NEPA Analysis

As Commenter Sierra Club previously explained, the effects of increased gas production must be considered in the NEPA analysis.[65] NEPA requires consideration of "indirect effects" of the proposed action, which include "growth inducing effects" and "reasonably foreseeable" effects "removed in distance" from the site of the proposed action. 40 C.F.R. § 1508.8(b). The fact that FERC does not regulate gas production or pipelines in the production sector does not remove this issue from the scope of FERC's NEPA obligations, as courts have consistently held that NEPA requires consideration of effects that are outside the scope of the reviewing federal agency's regulatory authority. The Ninth Circuit has explicitly held that NEPA requires agencies to analyze the effects of their actions even when the agency does not have permitting authority over those effects, explaining that "[W]hile it is the development's impact on jurisdictional waters that determines the scope of the [Army Corps of Engineers'] *permitting authority*, it is the impact of the permit on the environment at large that determines the Corps' NEPA responsibility." *Save Our Sonoran v. Flowers*, 408 F.3d 1113, 1122 (9th Cir. 2005) (emphasis added). Similarly, the Surface Transportation Board has been required to consider impacts railroad permitting would have on coal combustion and coal mining despite the Board's lack of authority to regulate these issues. *Mid States Coalition for Progress v. Surface Transportation Board*, 345 F.3d 520 (8th Cir. 2003), *N. Plains Resource Council v. Surface Transp. Bd.*, 668 F.3d 1067, 1081-82 (9th Cir. 2011). Still other cases have required NEPA analyses of proposed casino projects to include impacts of increases in vehicle traffic the projects would induce. *Michigan Gambling Opposition v. Kempthorne*, 525 F.3d 23, 29 (D.C. Cir. 2008), *Taxpayers of Michigan Against Casinos v. Norton*, 433 F.3d 852, 863 (D.C. Cir. 2006).

We also note that there is no need to determine the precise wells in which the particular gas molecules used at the Freeport facility are located. As with changes in electricity production, all that is required is a forecast as to how the nation's gas production system as a whole will respond. FERC has not shown that, despite the use of available tools such as NEMS, uncertainty regarding where this production precludes useful discussion of possible impacts. Indeed, for some issues, such as greenhouse gas emissions associated with production, it is unclear how the uncertainty that FERC claims could be relevant.

3. Induced Production Will Impose Significant Environmental Harms

Natural gas production—from both conventional and unconventional sources—is a significant air pollution source, can disrupt ecosystems and watersheds, leads to industrialization

[65] Sierra Club Protest, 19-24.

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of entire landscapes, and presents challenging waste disposal issues. DOE/FE must consider the increase in these environmental harms that exports are likely to stimulate.

Much of the induced production resulting from exports is likely to come from shale gas and other unconventional sources. EIA has concluded that "[o]n average, across all cases and export scenarios, the shares of the increase in total domestic production coming from shale gas, tight gas, [and] coalbed sources are 72 percent, 13 percent, [and] 8 percent," respectively.[66]

A subcommittee of the DOE's Secretary of Energy's Advisory Board recently highlighted "a real risk of serious environmental consequences" resulting from continued expansion of shale gas production.[67] Shale gas production (as well as coalbed and tight sands production) requires the controversial practice of hydraulic fracturing, or fracking. As we explain below, natural gas production in general, and fracking in particular, impose a large number of environmental harms.

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a) Natural Gas Production is a Major Source of Air Pollution

Natural gas production is a significant source of greenhouse gases and other air pollutants, including methane (CH_4), volatile organic compounds (VOCs), nitrogen oxides (NO_x), sulfur dioxide (SO_2), hydrogen sulfide (H_2S), and particulate matter (PM_{10} and $PM_{2.5}$). These operations also emit listed hazardous air pollutants (HAPs) in significant quantities, and so contribute to cancer risks and other acute public health problems. Pollutants are emitted during all stages of natural gas development, including (1) oil and natural gas production, (2) natural gas processing, (3) natural gas transmission, and (4) natural gas distribution.[68] Within these development stages, the major sources of air pollution include wells, compressors, pipelines, pneumatic devices, dehydrators, storage tanks, pits and ponds, natural gas processing plants, and trucks and construction equipment.

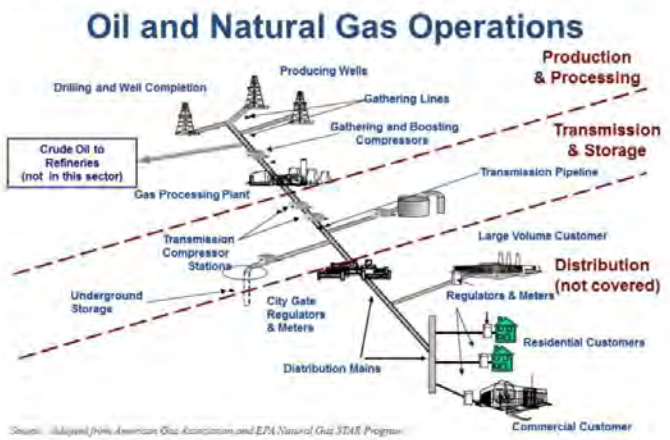
[66] EIA Export Study, *supra* n.43, at 11.
[67] DOE, Secretary of Energy's Advisory Board, Shale Gas Production Subcommittee Second 90-Day Report (2011) at 10, attached to the SC Protest of Freeport Apps as Exhibit 20. *See also* DOE, Shale Gas Production Subcommittee First 90-Day Report, attached to the SC Protest of Freeport Apps as Exhibit 21.
[68] EPA, Oil and Natural Gas Sector: Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution, Background Technical Support Document for the Proposed Rules, at 2-4 (July 2011) ("2011 TSD"), attached to the SC Protest of Freeport Apps as Exhibit 25.

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Figure 1, drawn from EPA's regulation of some of the aspects of this sector, summarizes these emission points.

Figure 1: The Oil and Natural Gas Sector



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(1) Greenhouse Gas Emissions from Gas Production

Methane is the primary pollutant emitted by gas production. Emissions occur as result of intentional venting or unintentional leaks during drilling, production, processing, transmission and storage, and distribution. For example, methane is emitted when wells are completed and vented, as part of operation of pneumatic devices and compressors, and as a result of leaks (fugitive emissions) in pipelines, valves, and other equipment.

Methane is a potent greenhouse gas: the Intergovernmental Panel on Climate Change estimates that methane has 34 times the global warming potential of carbon dioxide over a 100 year time frame and at least 86 times the global warming potential of carbon dioxide over a 20-year time frame.[69]

EPA has recognized methane emissions from natural gas production and systems as a major contributor to climate change, and many recent studies indicate that EPA has in fact understated the scope of the problem. EPA has identified natural gas systems as the "single largest contributor to United States anthropogenic methane emissions," amounting to over 40%

[69] IPCC, Climate Change 2013: The Physical Science Basis: Chapter 8, page 714, Table 8.7, attached as Exhibit 29. Methane is also an ozone precursor. EPA, *Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews*, 76 Fed. Reg. 52,738, 52,791 (Aug. 23, 2011).

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of the total.[70] Even when using a global warming potential that has been superceded by recent higher estimates, EPA concluded that methane emissions from the oil and gas production industry constituted 5% of all carbon dioxide equivalent (CO_2e) emissions in the country.[71]

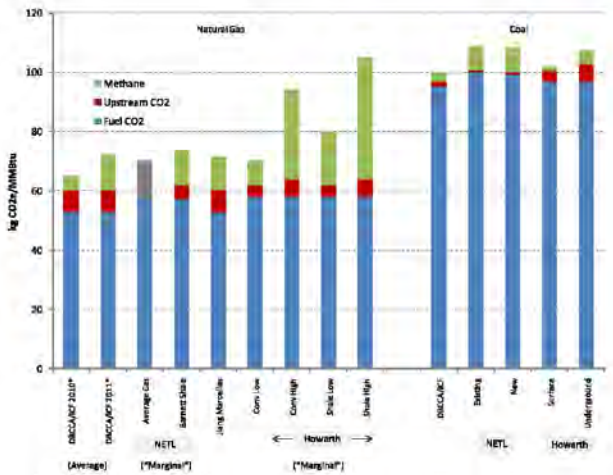
The question of how much methane is released during gas production has received extensive recent attention. EPA's 2013 greenhouse gas inventory, which is based on industry's self-reported data and assumed emission factors, implies that about 1.5% of gross gas production leaks to the atmosphere in one way or another.[72] Numerous other recent studies indicate that the EPA assessment is, if anything, too low, and that actual emissions may be significantly higher. An August 2011 report from the Worldwatch Institute and Deutsche Bank summarizes much of the work that had been done at that point.[73] The Worldwatch Report discussed three prior reports that used "bottom-up" methodologies, based on assumed emissions from individual components and sources in the gas production sector; these were reports by Dr. Robert Howarth et al., of Cornell,[74] Mohan Jiang et al. of Carnegie-Mellon,[75] and Timothy Skone of NETL.[76] The Worldwatch Report separately derived a "top-down" estimate, which produced a result similar to the NETL estimate.[77] These various assessments are summarized in the following chart.

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[70] *Id.* at 52,792 (Aug. 23, 2011)
[71] *Id.* at 52,791–92.
[72] EPA's 2013 inventory does not explicitly state the leak rate for natural gas production. EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2011*, Table ES-2 (2013), attached as Exhibit 30. EPA's prior inventory implied a leak rate of 2.4%, as extrapolated by a previous study. Alvarez *et al.*, *Greater focus needed on methane leakage from natural gas infrastructure*, Proceedings of the National Academy of Science (Apr. 2012) at 1, attached as Exhibit 31. Because the current inventory's sector-wide emissions estimates for the same time periods have been reduced by roughly 1/3, the current inventory implies a leak rate of roughly 1.5%.
[73] Mark Fulton *et al.*, *Comparing Life-Cycle Greenhouse Gas Emissions from Natural Gas and Coal* (Aug. 25, 2011) ("Worldwatch Report"), attached to the SC Protest of Freeport Apps as Exhibit 74.
[74] Robert W. Howarth *et al.*, *Methane and the greenhouse-gas footprint of natural gas from shale formations*, Climactic Change (Mar. 2011), attached to the SC Protest of Freeport Apps as Exhibit 75.
[75] Mohan Jiang *et al.*, *Life cycle greenhouse gas emissions of Marcellus shale gas*, Environ. Res. Letters 6 (Aug. 2011), attached to the SC Protest of Freeport Apps as Exhibit 76.
[76] The Worldwatch Report discusses Timothy J. Skone, *Life Cycle Greenhouse Gas Analysis of Natural Gas Extraction and Delivery in the United States*, Presentation to Cornell (May 12, 2011), attached to the SC Protest of Freeport Apps as Exhibit 77. NETL published a more complete version of this analysis after the Worldwatch Report was released. Timothy J. Skone, *Life Cycle Greenhouse Gas Inventory of Natural Gas Extraction, Delivery and Electricity Production* (Oct. 24, 2011), attached to the SC Protest of Freeport Apps as Exhibit 78.
[77] Worldwatch Report, *supra* n. 73 at 9.

Figure 2: Comparison of Recent Life-Cycle Assessments[78]



Source: DBCCA Analysis 2011; NETL 2011; Jiang 2011; Howarth 2011. Note: NETL Average Gas study includes bar shaded grey due to inability to segregate upstream CO2 and methane values, which were both accounted for in the study. See page 10 for more information. *2011 EPA methodology compared to 2010.

As this figure demonstrates, although the 2011 studies differ, most of them estimate production greenhouse gas emissions (combined methane and "upstream CO_2") in a similar range. Synthesizing these studies, the Worldwatch Report estimated, using a now-outdated methane global warming potential of 25, that normalized life-cycle GHG emissions from domestic natural gas production at approximately 20.1 kilograms, or over 44 pounds, of CO_2e per MMBtu of gas produced.[79] This is roughly comparable to EPA's implied 1.5% leak rate estimate.

Studies completed since 2011 indicate that methane emissions from gas production could be much higher. One study looking specifically to emissions from gas production in the Dallas-Fort Worth area, in the Barnett Shale, concluded that gas production in this region (which is subject to a number of strict pollution controls because of its ozone non-attainment status) had a

[78] *Id.* at 3.
[79] *Id.* at 15 Ex. 8

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leak rate of approximately 1.5%.[80] This study cautions, however, that its bottom-up methodology can understate emissions, and this study failed to account for emissions from liquids unloading at the well site. Two studies led by researchers with the National Ocean and Atmospheric Administration (NOAA) Earth System Research Laboratory that have directly measured methane in the atmosphere in other regions have estimated much higher leak rates. The first of these studies explains that by monitoring methane, propane, benzene, and other volatile organic compounds in the air around oil and gas fields, the authors can estimate oil and gas production's contributions to these pollutant levels.[81] According to the study authors, their "analysis suggests that the emissions of the species we measure are most likely underestimated in [the then-]current inventories," perhaps by as much as a factor of two, which would imply a leak rate of about 4.8% of production.[82] A second announced NOAA study suggests that leak rates may be as high as 9%.[83] Most troublingly, a California study identified a 17% leak rate for oil and gas operations in the Los Angeles basin.[84]

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Two studies released in the past three months specifically criticize EPA's estimates of greenhouse gas emissions from gas production as too low. In December of 2013, a paper published by Scot M. Miller *et al.* in the Proceedings of the Natural Academy of Sciences reviewed atmospheric measurements of methane and concluded that "The US EPA recently decreased its CH_4 emission factors for fossil fuel extraction and processing by 25–30% (for 1990–2011), but we find that CH_4 data from across North America instead indicate the need for a larger adjustment of the opposite sign."[85] In other words, rather than reducing the estimated leak rate from 2.4% to something approaching 1.5%, EPA should have increased its estimate to at least 3%. In February, a paper published in Science similarly concluded that bottom-up estimates like EPA's greenhouse gas inventory underestimate methane emissions from gas production.[86]

The additional production that would be induced in response to Freeport's proposed project could have emissions that are even higher than these nationwide estimates. One reason is

[80] Jeffrey Logan et al., Joint Inst. for Strategic Analysis, Natural Gas and the Transformation of the U.S. Energy Sector (2012) ("JISEA report") at 5, available at http://www.nrel.gov/docs/fy13osti/55538.pdf and attached as Exhibit 32. This study concluded that greenhouse gas emissions from natural gas production add 78g CO_2e/kWh to the total emissions associated with electricity generating at an efficient modern combined cycle natural gas plant, a figure similar to what Worldwatch estimates. *Id.* at 25.

[81] G. Petron *et al., Hydrocarbon emissions characterization in the Colorado Front Range: A pilot study*, 117 J. of Geophysical Research 4304, DOI 10.1029/2011JD016360 (2012), attached to the SC Protest of Freeport Apps as Exhibit 26.

[82] *Id.* at 4304. The inventory this study referred to was EPA's prior greenhouse gas inventory, which had implied a gas production leak rate of 2.4%. *See supra* n.72.

[83] J. Tollefson, *Methane leaks erode green credentials of natural gas*, Nature (Jan. 2, 2013), attached to the SC Protest of Freeport Apps as Exhibit 97.

[84] Peischl, J., *et al., Quantifying sources of methane using light alkanes in the Los Angeles basin, California*, J. Geophys. Res. Atmos (2013), attached to the SC Protest of Freeport Apps as Exhibit 35.

[85] Miller, S., *et al., Anthropogenic emissions of methane in the United States*, Proceedings of the National Academy of Sciences (Dec. 10, 2013) ("PNAS Study"), at 20022, attached to the SC Protest of Freeport Apps as Exhibit 36.

[86] Brandt, A.R., *et al, Methane Leaks from North American Natural Gas Systems*, Science, Vol. 343, no. 6172 at pp. 733-735 (Feb. 14, 2014), attached to the SC Protest of Freeport Apps as Exhibit 37.

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that, according to EIA's predictions, additional production that results from exports will include a higher proportion of unconventional gas than the current production mix, and these unconventional sources are likely to have higher greenhouse gas emissions. As noted above, the EIA Export Study predicts that extraction induced by exports will overwhelmingly be from shale gas sources.[87] Several studies have found that shale gas has higher production emissions than conventional sources. Notably, EPA recently estimated methane emissions from a conventional well completion at only 0.80 tons, while completion of a hydraulically fractured well yielded 158.55 tons of methane.[88] Furthermore, if exports disproportionately increase production near the terminal rather than evenly increasing production nationwide, this production could have higher than average emissions: the Miller *et al.* study found that methane emissions from gas production in the south central United States were particularly severe.[89] Even if FERC determines that it impossible to assess whether or how emissions from production induced by Freeport's proposal would differ from average national production emissions, however, DOE must analyze the greenhouse gas emissions that would result from production increases if it assumed that the nationwide data is representative.

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(2) Non-greenhouse Gas Air Pollution from Gas Production

Volatile Organic Compounds (VOCs) and NO_x: The gas industry is also a major source of two other ozone precursors: VOCs and NO_x.[90] VOCs are emitted from well drilling and completions, compressors, pneumatic devices, storage tanks, processing plants, and as fugitives from production and transmission.[91] The primary sources of NO_x are compressor engines, turbines,

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[87] EIA Export Study, *supra* n.43, at 11.
[88] *See* 2011 TSD, *supra* n.68 at 4-7 (Table 4-2). Although JISEA recently found greenhouse gas emissions from unconventional production in the Barnett shale to be "similar to levels reported in the literature from conventional natural gas," JISEA, *supra* n.80, at 4, that study's estimates may be too low. First, the JISEA study used data from the Barnett Shale, which is located in an ozone nonattainment area where emissions are likely to be rigorously controlled. It is therefore possible that its results may not generalize well to production in other plays. Second, the study did not include emissions associated with liquids unloading, a practice that involves removal of liquids from the well and consequent release of greenhouse gases, based on the assumption that liquids unloading is not frequently practiced in unconventional production. A recent industry survey suggests that liquids unloading is in fact practiced in unconventional production, however, so it may be appropriate to add emissions from liquids unloading to JISEA's life-cycle emissions total. Adding emissions associated with liquids unloading would contribute an additional 6 to 28 grams of CO_2e/kWh, or even 100g under low-recovery conditions. JISEA *supra* n.80, at 29 (citing Terri Shires & Miriam Lev-On, *Characterizing Pivotal Sources of Methane Emissions from Unconventional Natural Gas Production*, 11-14 (2012), attached to the SC Protest of Freeport Apps as Exhibit 98).
[89] PNAS Study, *supra* n.85, at 20021.
[90] *See, e.g.*, Al Armendariz, *Emissions from Natural Gas Production in the Barnett Shale Area and Opportunities for Cost-Effective Improvements* (Jan. 26, 2009), available at http://www.edf.org/documents/9235_Barnett_Shale_Report.pdf (hereinafter "Barnett Shale Report") at 24, attached to the SC Protest of Freeport Apps as Exhibit 31.
[91] *See, e.g.*, 2011 TSD, *supra* n.68, at 4-7, 5-6, 6-5, 7-9, 8-1; *see also* Barnett Shale Report, *supra* n.90, at 24.

and other engines used in drilling and hydraulic fracturing.[97] NO_x is also produced when gas is flared or used for heating.[93]

As a result of significant VOC and NO_x emissions associated with oil and gas development, numerous areas of the country with heavy concentrations of drilling are now suffering from serious ozone problems. For example, the Dallas Fort Worth area in Texas is home to substantial oil and gas development. Within the Barnett shale region, as of September 2011, there were more than 15,306 gas wells and another 3,212 wells permitted.[94] Of the nine counties surrounding the Dallas Fort Worth area that EPA has designated as "nonattainment" for ozone, five contain significant oil and gas development.[95] A 2009 study found that summertime emissions of smog-forming pollutants from these counties were roughly comparable to emissions from motor vehicles in those areas.[96]

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Oil and gas development has also brought serious ozone pollution problems to rural areas, such as western Wyoming.[97] On July 20, 2012, the US EPA designated Wyoming's Upper Green River Basin as a marginal nonattainment area for ozone.[98] In an extended assessment, the Wyoming Department of Environmental Quality ("WDEQ") found that ozone pollution was "primarily due to local emissions from oil and gas . . . development activities: drilling, production, storage, transport, and treating."[99] In the winter of 2011, the residents of Sublette County suffered thirteen days with ozone concentrations considered "unhealthy" under EPA's current air-quality index, including days when the ozone pollution levels exceeded the worst days of smog pollution in Los Angeles.[100] In 2013, a Wyoming Department of Health study linked elevated levels of ozone pollution to increased visits at two local health clinics for

[92] *See, e.g.*, 2011 TSD, *supra* n.68, at 3-6; Barnett Shale Report, *supra* n.90, at 24; Air Quality Impact Analysis Technical Support Document for the Revised Draft Supplemental Environmental Impact Statement for the Pinedale Anticline Oil and Gas Exploration and Development Project at 11 (Table 2.1).), attached to the SC Protest of Freeport Apps as Exhibit 41.

[93] 2011 TSD, *supra* n.68, at 3-6; Colorado Department of Public Health and Environment, *Colorado Visibility and Regional Haze State Implementation Plan for the Twelve Mandatory Class I Federal Areas in Colorado*, Appendix D at 1 (2011), available at http://www.cdphe.state.co.us/ap/RegionalHaze/AppendixD/4-FactorHeaterTreaters07JAN2011FINAL.pdf and attached to the SC Protest of Freeport Apps as Exhibit 42.

[94] Texas Railroad Commission history of Barnett Shale, attached to the SC Protest of Freeport Apps as Exhibit 33.

[95] Barnett Shale Report, *supra* n.90, at 1, 3.

[96] *Id.* at 1, 25-26.

[97] Schnell, R.C, *et al.* (2009), "Rapid photochemical production of ozone at high concentrations in a rural site during winter," *Nature Geosci.* 2 (120 – 122). DOI: 10.1038/NGEO415, attached as Exhibit 33.

[98] EPA, *Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards*, 77 Fed. Reg. 30088, 30157 (May 21, 2012).

[99] Wyoming Department of Environmental Quality, Technical Support Document I for Recommended 8-hour Ozone Designation of the Upper Green River Basin (March 26, 2009) at viii, *available at* http://deq.state.wy.us/out/downloads/Ozone%20TSD_final_rev%203-30-09_jl.pdf, attached to the SC Protest of Freeport Apps as Exhibit 36.

[100] EPA, *Daily Ozone AQI Levels in 2011 for Sublette County, Wyoming*, *available at* http://www.epa.gov/cgi-bin/broker?mssorcountyName=countycode &ms=sorcountyValue=56035&poll=44201&county=56035&mss=-1&sy=2011&flag=Y & debug=2& service=data& program=dataprog.trend_tile_dn.sas, attached to the SC Protest of Freeport Apps as Exhibit 37, *see also* Wendy Koch, *Wyoming's Smog Exceeds Los Angeles' Due to Gas Drilling*, USA Today, *available at* http://content.usatoday.com/communities/greenhouse/post/2011/03/wyomings-smog-exceeds-los-angeles-due-to-gas-drilling/1, attached to the SC Protest of Freeport Apps as Exhibit 38.

respiratory-related complaints.[101] In the past, residents have faced repeated warnings regarding elevated ozone levels and the resulting risks of going outside[102] and WDEQ has drafted a plan, which includes weather forecasting, public updates and short-term ozone emission reduction measures, in anticipation of elevated ozone levels in 2014.[103]

Ozone problems are mounting in other Rocky Mountain states as well. In recent years Northeastern Utah's Uintah Basin has experienced severe ozone pollution. In the winter of 2012 to 2013, this region suffered over fifty days where air quality monitors measured ozone in excess of federal standards and some days where ozone levels were almost twice the federal standard.[104] The Utah Department of Environmental Quality has determined that "Oil and gas operations were responsible for 98-99 percent of volatile organic compound (VOC) emissions and 57-61 percent of nitrogen oxide (NOx) emissions," the primary chemical contributors to ozone formation.[105] The Bureau of Land Management (BLM) has similarly identified the multitude of oil and gas wells in the region as the primary cause of the ozone pollution.[106]

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Rampant oil and gas development in Colorado and New Mexico is also leading to high levels of VOCs and NO_x. In 2008, the Colorado Department of Public Health and Environment concluded that the smog-forming emissions from oil and gas operations exceed vehicle emissions for the entire state.[107] Moreover, significant additional drilling has occurred since 2008. Colorado is now home to more than 51,000 wells.[108] On July 20, 2012, the US EPA designated the metropolitan Denver and the North Front Range area in Colorado as a marginal

[101] State of Wyoming, Department of Health, *Associations of Short-Term Exposure to Ozone and Respiratory Outpatient Clinic Visits — Sublette County, Wyoming, 2008–2011* (Mar. 1, 2013) at 3, available at http://www.health.wyo.gov/phsd/ehl/index.html and attached as Exhibit 34.

[102] *See, e.g.*, 2011 DEQ Ozone Advisories, Pinedale Online! (Mar. 17, 2011), http://www.pinedaleonline.com/news/2011/03/OzoneCalendar.htm (documenting ten ozone advisories in February and March 2011), attached to the SC Protest of Freeport Apps as Exhibit 39; Wyoming Department of Environmental Quality, Ozone Advisory for Monday, Feb. 28, Pinedale Online! (Feb. 27, 2011), http://www.pinedaleonline.com/news/2011/02/OzoneAdvisoryforMond.htm, attached to the SC Protest of Freeport Apps as Exhibit 40.

[103] *DEQ plans for the 2014 winter ozone season*, Pinedale Online! (Dec. 19, 2013), available at http://www.pinedaleonline.com/news/2013/12/DEQplansforthe2014wi.htm and attached as Exhibit 35.

[104] *See, e.g.*, Utah Dept. of Environmental Quality, *Utah's Environment 2013: Planning and Analysis: Uintah Basin Ozone Study* (updated Jan. 17, 2014), *available at* http://www.deq.utah.gov/envrpt/Planning/s12.htm and attached as Exhibit 36.

[105] Utah Dept. of Environmental Quality, *Uinta Basin: Ozone in the Uinta Basin* (Updated Jan. 28,2014), *available at* http://www.deq.utah.gov/locations/uintahbasin/ozone.htm, attached as Exhibit 37.

[106] BLM, *GASCO Energy Inc. Uinta Basin Natural Gas Development Draft Environmental Impact Statement* ("GASCO DEIS"), at 3-13, *available at* http://www.blm.gov/ut/st/en/fo/vernal/planning/nepa_/gasco_energy_eis.html, attached to the SC Protest of Freeport Apps as Exhibit 43.

[107] Colo. Dept. of Public Health & Env't, Air Pollution Control Division, Oil and Gas Emission Sources, Presentation *for the Air Quality Control Commission Retreat*, at 3-4 (May 15, 2008), attached to the SC Protest of Freeport Apps as Exhibit 44.

[108] Colorado Oil & Gas Conservation Commission, *Colorado Weekly & Monthly Oil and Gas Statistics*, at 11 (Jan. 7, 2014), available at http://cogcc.state.co.us/ (library—statistics—weekly/monthly well activity), attached to the SC Protest of Freeport Apps as Exhibit 45.

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nonattainment area for ozone.[109] Additionally, portions of Colorado's Western Slope now qualify as a nonattainment area because the three year average ozone value is above the NAAQS.[110] Monitoring also shows that many other areas of the state have ozone pollution levels that exceed levels EPA has recognized as having significant health impacts.[111] In 2013, the Colorado Department of Public Health and Environment issued 42 advisories, cautioning active children and adults, older adults, and people with asthma to reduce prolonged or heavy outdoor exertion, for the Front Range region due to ozone levels that had been exceeded or were expected to be exceeded.[112]

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There is also significant development in the San Juan Basin in southeastern Colorado and northwestern New Mexico, with approximately 35,000 wells in the Basin. As a result of this development and several coal-fired power plants in the vicinity, the Basin suffers from serious ozone pollution.[113] This pollution is taking a toll on residents of San Juan County. The New Mexico Department of Public Health has documented increased emergency room visits associated with high ozone levels in the County.[114]

VOC and NO_x emissions from oil and gas development are also harming air quality in national parks and wilderness areas. Researchers have determined that numerous "Class I areas" – a designation reserved for national parks, wilderness areas, and other such lands[115] – are likely to be impacted by increased ozone pollution as a result of oil and gas development in the Rocky Mountain region. Affected areas include Mesa Verde National Park and Weminuche Wilderness Area in Colorado and San Pedro Parks Wilderness Area, Bandelier Wilderness Area, Pecos

[109] EPA, *Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards*, 77 Fed. Reg. at 30110, *supra* n.98.
[110] Colorado Air Quality Control Commission, 2013 Summer Ozone Season Review (Oct. 17, 2013) slides at 5, available at http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadername1=Content-Disposition&blobheadername2=Content-Type&blobheadervalue1=inline%3B+filename%3D%22Review+of+the+2013+Ozone+Season+%2822+pages%29.pdf%22&blobheadervalue2=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1251896466011&ssbinary=true and attached as Exhibit 38.
[111] *Id.* at 2-11.
[112] Colorado Department of Public Health and the Environment, Forecasting Air Quality in Colorado (May 16, 2013) at slides 2-3, 5, available at http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadername1=Content-Disposition&blobheadername2=Content-Type&blobheadervalue1=inline%3B+filename%3D%22Forecasting+Air+Quality+in+Colorado+-+15+pgs.pdf%22&blobheadervalue2=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1251854889571&ssbinary=true and attached as Exhibit 39.
[113] *See Four Corners Air Quality Task Force Report of Mitigation Options*, at vii (Nov. 1, 2007), *available at* http://www.nmenv.state.nm.us/aqb/4C/TaskForceReport.html, attached to the SC Protest of Freeport Apps as Exhibit 46.
[114] Myers *et al.*, *The Association Between Ambient Air Quality Ozone Levels and Medical Visits for Asthma in San Juan County* (Aug. 2007), *available at* http://www.nmenv.state.nm.us/aqb/4c/Documents/SanJuanAsthmaDocBW.pdf, attached to the SC Protest of Freeport Apps as Exhibit 47.
[115] *See* 42 U.S.C. § 7472(a).

Wilderness Area, and Wheeler Peak Wilderness Area in New Mexico.[116] These areas are all near concentrated oil and gas development in the San Juan Basin.[117]

As oil and gas development moves into new areas, particularly as a result of the boom in development of shale resources, ozone problems are likely to follow. For example, regional air quality models predict that gas development in the Haynesville shale will increase ozone pollution in northeast Texas and northwest Louisiana and may lead to violations of ozone NAAQS.[118]

Moreover, VOCs are not simply ozone precursors. They are also co-emitted with a stew "hazardous air pollutants" (HAPs) including benzene. HAPs, by definition, are toxic and also may be carcinogenic. High levels of carcinogens, including benzene compounds, are associated with gas production sites. Unsurprisingly, recent risk assessments from Colorado document elevated health risks for residents living near gas wells.[119] Indeed, levels of benzene and other toxics near wells in rural Colorado were "higher than levels measured at 27 out of 37 EPA air toxics monitoring sites . . . including urban sites" in major industrial areas.[120] These pollution levels are even more concerning than these high concentrations would suggest because several of the toxics emitted by gas operations are endocrine disruptors, which are compounds known to harm human health by acting on the endocrine system even at very low doses; some such compounds may, in fact, be especially dangerous specifically at the low, chronic, doses one would expect near gas operations.[121]

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Sulfur dioxide: Oil and gas production also emits sulfur dioxide, primarily from natural gas processing plants.[122] Sulfur dioxide is released as part of the sweetening process, which removes hydrogen sulfide from the gas.[123] Sulfur dioxide is also created when gas containing hydrogen sulfide (discussed below) is combusted in boilers or heaters.[124]

Hydrogen sulfide: Some natural gas contains hydrogen sulfide. Gas containing hydrogen sulfide above a specific threshold is classified as "sour gas."[125] According to EPA, there are 14 major

[116] Rodriguez et al., *Regional Impacts of Oil and Gas Development on Ozone Formation in the Western United States*, 59 Journal of the Air and Waste Management Association 1111 (Sept. 2009), available at http://www.wrapair.org/forums/aime/meetings/091111_Nox/Rodriguez_et_al_OandG_Impacts_JAWMA9_09.pdf, attached to the SC Protest of Freeport Apps as Exhibit 48.
[117] *Id.* at 1112.
[118] *See* Kemball-Cook et al., *Ozone Impacts of Natural Gas development in the Haynesville Shale*, 44 Environ. Sci. Technol. 9357, 9362 (2010), attached to the SC Protest of Freeport Apps as Exhibit 49.
[119] L. McKenzie *et al.*, *Human Health Risk Assessment of Air Emissions from Development of Unconventional Natural Gas Resources*, Science of the Total Environment (In Press, Mar. 22, 2012), attached to the SC Protest of Freeport Apps as Exhibit 27.
[120] *Id.* at 16.
[121] *See* L. Vandenberg *et al.*, *Hormones and Endocrine-Disrupting Chemicals: Low-Dose Effects and Nonmonotonic Dose Responses*, Endocrine Disruption Review (2012), attached as Exhibit 40.
[122] 76 Fed. Reg., *supra* n.70, at 52,756.
[123] 2011 TSD, *supra* n.68, at 3-3 to 3-5.
[124] 76 Fed. Reg., *supra* n.70, at 52,756.
[125] *Id.* at 52,756. Gas is considered "sour" if hydrogen sulfide concentration is greater than 0.25 grain per 100 standard cubic feet, along with the presence of carbon dioxide. *Id.*

areas in the U.S., found in 20 different states, where natural gas tends to be sour.[126] All told, between 15 and 20% of the natural gas in the U.S. may contain hydrogen sulfide.[127]

Given the large amount of drilling in areas with sour gas, EPA has concluded that the potential for hydrogen sulfide emissions from the oil and gas industry is "significant."[128] Hydrogen sulfide may be emitted during all stages of development, including exploration, extraction, treatment and storage, transportation, and refining.[129] For example, hydrogen sulfide is emitted as a result of leaks from processing systems and from wellheads in sour gas fields.[130]

Hydrogen sulfide emissions from the oil and gas industry are concerning because this pollutant may be harmful even at low concentrations.[131] Hydrogen sulfide is an air pollutant with toxic properties that smells like rotten eggs and can lead to neurological impairment or death. Long-term exposure to hydrogen sulfide is linked to respiratory infections, eye, nose, and throat irritation, breathlessness, nausea, dizziness, confusion, and headaches.[132] Although hydrogen sulfide was originally included in the Clean Air Act's list of hazardous air pollutants, it was removed with industry support.[133]

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Although direct monitoring of hydrogen sulfide around oil and gas sources is limited, there is evidence that these emissions may be substantial, and have a serious impact on people's health. For example, North Dakota reported 3,300 violations of an odor-based hydrogen sulfide standard around drilling wells.[134] People in northwest New Mexico and western Colorado living near gas wells have long complained of strong odors, including but not limited to hydrogen sulfide's distinctive rotten egg smell. Residents have also experienced nose, throat and eye irritation, headaches, nose bleeds, and dizziness.[135] An air sample taken by a community monitor at one family's home in western Colorado in January 2011 contained levels of hydrogen sulfide concentrations 185 times higher than safe levels.[136]

Particulate Matter (PM): The oil and gas industry is a major source of PM pollution. This pollution is generated by heavy equipment used to move and level earth during well pad and road

[126] EPA, Office of Air Quality Planning and Standards, *Report to Congress on Hydrogen Sulfide Air Emissions Associated with the Extraction of Oil and Natural Gas* (EPA-453/R-93-045), at ii (1993) (hereinafter "EPA Hydrogen Sulfide Report"), attached to the SC Protest of Freeport Apps as Exhibit 13.
[127] Lana Skrtic, *Hydrogen Sulfide, Oil and Gas, and People's Health* ("Skrtic Report"), at 6 (May 2006), *available at* http://www.earthworksaction.org/pubs/hydrogensulfide_oilgas_health.pdf, attached to the SC Protest of Freeport Apps as Exhibit 50.
[128] EPA Hydrogen Sulfide Report, *supra* n. 126, at III-35.
[129] *Id.* at ii.
[130] 2011 TSD, *supra* n.68, at 2-3.
[131] *See* James Collins & David Lewis, *Report to CARB, Hydrogen Sulfide: Evaluation of Current California Air Quality Standards with Respect to Protections of Children* (2000), available at http://oehha.ca.gov/air/pdf/oehhah2s.pdf, attached to the SC Protest of Freeport Apps as Exhibit 14.
[132] EPA Hydrogen Sulfide Report, *supra* n. 126, at ii.
[133] *See* Pub. L. 102-187 (Dec. 4, 1991). We do not concede that this removal was appropriate. Hydrogen sulfide meets section 112 of the Clean Air Act's standards for listing as a hazardous air pollutant and should be regulated accordingly.
[134] EPA Hydrogen Sulfide Report, *supra* n. 126, at III-35.
[135] See Global Community Monitor, *Gassed! Citizen Investigation of Toxic Air Pollution from Natural Gas Development*, at 11-14 (2011), attached to the SC Protest of Freeport Apps as Exhibit 51.
[136] *Id.* at 21.

construction. Vehicles also generate fugitive dust by traveling on access roads during drilling, completion, and production activities.[137] Diesel engines used in drilling rigs and at compressor stations are also large sources of fine PM/diesel soot emissions. VOCs are also a precursor to formation of $PM_{2.5}$.[138]

PM emissions from the oil and gas industry are leading to significant pollution problems. For example, monitors in Uintah County and Duchesne County, Utah have repeatedly measured wintertime $PM_{2.5}$ concentrations above federal standards.[139] These elevated levels of $PM_{2.5}$ have been linked to oil and gas activities in the Uinta Basin.[140] Modeling also shows that road traffic associated with energy development is pushing PM_{10} levels very close to violating NAAQS standards.[141]

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In summary, gas production emits numerous harmful air pollutants. These pollutants take a serious toll on surrounding communities. For example, a research team led by the Colorado School of Public Health measured benzene and other pollutants released from unconventional well completions.[142] Elevated levels of these pollutants correspond to increased cancer risks for people living within half of a mile of a well[143] – a very large population which will increase as drilling expands.

(3) Freeport's Project Will Itself Will Induce Significant Production-related Air Emissions

Freeport proposes to export 1.8 bcf/d of natural gas, or 657 bcf/year. Ignoring the effect of any demand created by Freeport's electricity consumption, and assuming that 63% of this demand comes from new production, Freeport will stimulate 414 bcf/year of additional gas production relative to the no action alternative. EPA conversion factors allow us to estimate the emissions impacts of this new production. These leak rates, and EPA conversion factors between the typical volumes of methane, VOC, and HAP in natural gas,[144] make it possible to estimate the potential impact of increasing gas production in the way that LNG export would require.

The table below uses these conversion factors to calculate the emissions associated with producing 414 bcf/year of new gas demand, the likely inducement specifically attributable to the present Freeport application. We calculate for a 1% leak rate (which is below the current value,

[137] *See* GASCO DEIS, *supra* n.106, at App. J at 2.
[138] O&G NSPS RIA, *supra* n.10, at 4-18.
[139] GASCO DEIS, *supra* n.137, at 3-12.
[140] BLM, West Tavaputs Plateau Natural Gas Full Field Development Plan Final Environmental Impact Statement (July 2010), at 3-20, available at http://www.blm.gov/ut/st/en/fo/price/energy/Oil_Gas/wtp_final_eis.html
[141] *See* GASCO DEIS, *supra* n.137, at 4-27.
[142] L. McKenzie *et al.*, *supra* n.119.
[143] *Id.* at 2.
[144] *See* 2011 TSD, *supra* n.68, at Table 4.2. EPA calculated average composition factors for gas from well completions. These estimates, which are based on a range of national data are robust, but necessarily imprecise for particular fields and points along the line from wellhead to LNG terminal. Nonetheless, they provide a beginning point for quantitative work. EPA's conversions are: 0.0208 tons of methane per mcf of gas; 0.1459 lb VOC per lb methane; and 0.0106 lb HAP per lb methane.

but is included as a conservative case to reflect successful air pollution controls more extensive than those which EPA has promulgated), the current EPA estimated rate of 1.5%, the 2.4% rate used in EPA's previous inventory, the 3% leak rate advocated by the Miller *et al.* PNAS study, and the higher leak rates the NOAA studies suggest in studies of particular plays, generating results for methane, VOC, and HAP.[145]

Table 3: Emissions Associated with Production of 414 bcf/y of Natural Gas

Leak Rate	Methane (tons)	VOC (tons)	HAP (tons)
1%	86,112	12,564	913
1.50%	129,168	18,846	1,369
2.40%	206,669	30,153	2,191
3.00%	258,336	37,691	2,738
4.80%	413,338	60,306	4,381
9%	775,008	113,074	8,215

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Thus, Freeport's proposal, alone, would be responsible for hundreds of thousands of tons of increased air pollution. Notably, the threshold for major source permitting under the Clean Air Act is generally just tens of tons of pollution; for greenhouse gases, it is generally 75,000 tons. Freeport would thus greatly increase air pollution in the regions from which it draws its gas, imperiling public health and the global climate.

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b) Gas Production Disrupts Landscapes and Habitats

Increased oil and gas production will transform the landscape of regions overlying shale gas plays, bringing industrialization to previously rural landscapes and significantly affecting ecosystems, plants, and animals. These impacts are large and difficult to manage.

Land use disturbance associated with gas development impacts plants and animals through direct habitat loss, where land is cleared for gas uses, and indirect habitat loss, where land adjacent to direct losses loses some of its important characteristics.

Regarding direct losses, land is lost through development of well pads, roads, pipeline corridors, corridors for seismic testing, and other infrastructure. The Nature Conservancy (TNC) estimated that in Pennsylvania, "[w]ell pads occupy 3.1 acres on average while the associated infrastructure (roads, water impoundments, pipelines) takes up an additional 5.7 acres, or a total of nearly 9 acres per well pad."[146] New York's Department of Environmental Conservation

[145] These figures were calculated by multiplying the volume of gas to be exported (in bcf) by 1,000,000 to convert to mcf, and then by 63% to generate new production volumes. The new production volumes of gas were, in turn, multiplied by the relevant EPA conversion factors to generate tonnages of the relevant pollutants. These results are approximations. Although we reported the arithmetic results of this calculation, of course only the first few significant figures of each value should be the focus.

[146] TNC, Pennsylvania Energy Impacts Assessment, Report 1: Marcellus Shale Natural Gas and Wind 10, 18 (2010), attached to the SC Protest of Freeport Apps as Exhibit 52.

reached similar estimates.[147] After initial drilling is completed the well pad is partially restored, but 1 to 3 acres of the well pad will remain disturbed through the life of the wells, estimated to be 20 to 40 years.[148] Associated infrastructure such as roads and corridors will likewise remain disturbed. Because these disturbances involve clearing and grading of the land, directly disturbed land is no longer suitable as habitat.[149]

Indirect losses occur on land that is not directly disturbed, but where habitat characteristics are affected by direct disturbances. "Adjacent lands can also be impacted, even if they are not directly cleared. This is most notable in forest settings where clearings fragment contiguous forest patches, create new edges, and change habitat conditions for sensitive wildlife and plant species that depend on "interior" forest conditions."[150] "Research has shown measureable impacts often extend at least 330 feet (100 meters) into forest adjacent to an edge."[151]

TNC's study of the impacts of gas extraction in Pennsylvania is particularly telling. TNC mapped projected wells across the state, considering how the wells and their associated infrastructure, including roads and pipelines, interacted with the landscape. TNC's conclusions make for grim reading. It concluded:

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- About 60,000 new Marcellus wells are projected by 2030 in Pennsylvania with a range of 6,000 to 15,000 well pads, depending on the number of wells per pad;
- Wells are likely to be developed in at least 30 counties, with the greatest number concentrated in 15 southwestern, north central, and northeastern counties;
- Nearly two thirds of well pads are projected to be in forest areas, with forest clearing projected to range between 34,000 and 83,000 acres depending on the number of number of well pads that are developed. An additional range of 80,000 to 200,000 acres of forest interior habitat impacts are projected due to new forest edges created by well pads and associated infrastructure (roads, water impoundments);
- On a statewide basis, the projected forest clearing from well pad development would affect less than one percent of the state's forests, but forest clearing and fragmentation could be much more pronounced in areas with intensive Marcellus development;

[147] N.Y. Dep't of Envtl. Conservation, Revised Draft Supplemental General Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program, 5-5 (2011) ("NY RDSGEIS"), available at http://www.dec.ny.gov/energy/75370.html.
[148] Id. at 6-13.
[149] *Id.* at 6-68.
[150] Pennsylvania Energy Impacts Assessment, *supra* n.146, at 10.
[151] NY RDSGEIS, *supra* n.147, at 6-75.

- Approximately one third of Pennsylvania's largest forest patches (>5,000 acres) are projected to have a range of between 1 and 17 well pads in the medium scenario;

- Impacts on forest interior breeding bird habitats vary with the range and population densities of the species. The widely-distributed scarlet tanager would see relatively modest impacts to its statewide population while black-throated blue warblers, with a Pennsylvania range that largely overlaps with Marcellus development area, could see more significant population impacts;

- Watersheds with healthy eastern brook trout populations substantially overlap with projected Marcellus development sites. The state's watersheds ranked as "intact" by the Eastern Brook Trout Joint Venture are concentrated in north central Pennsylvania, where most of these small watersheds are projected to have between two and three dozen well pads;

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- Nearly a third of the species tracked by the Pennsylvania Natural Heritage Program are found in areas projected to have a high probability of Marcellus well development, with 132 considered to be globally rare or critically endangered or imperiled in Pennsylvania. Several of these species have all or most of their known populations in Pennsylvania in high probability Marcellus gas development areas.

- Marcellus gas development is projected to be extensive across Pennsylvania's 4.5 million acres of public lands, including State Parks, State Forests, and State Game Lands. Just over 10 percent of these lands are legally protected from surface development.[152]

Increased gas production will exacerbate these problems, which is bad news for the state's lands and wildlife and the hunting, angling, tourism, and forestry industries that depend on them. Although TNC adds that impacts could be reduced with proper planning,[153] more development makes mitigation more difficult. Indeed, the Pennsylvania Department of Conservation and Natural Resources recently concluded that "zero" remaining acres of the state forests are suitable for leasing with surface disturbing activities, or the forests will be significantly degraded.[154]

These land disturbance effects will harm rural economies and decrease property values, as major gas infrastructure transforms and distorts the existing landscape. They will also harm endangered species in regions where production would increase in response to Freeport's exports. Harm to these species and their habitat is inconsistent with the profound public interest

[152] Pennsylvania Energy Impacts Assessment, *supra* n.146, at 29.
[153] *See id.*
[154] Penn. Dep't of Conservation and Natural Resources, Impacts of Leasing Additional State Forest for Natural Gas Development (2011), attached to the SC Protest of Freeport Apps as Exhibit 53.

in land and species conservation, as expressed in the Endangered Species Act and similar statutes.

c) Gas Production Poses Risks to Ground and Surface Water

As noted above, most of the increased production that would result from Freeport's proposal will likely be from shale and other unconventional gas sources, and producing gas from these sources requires hydraulic fracturing, or fracking.[155] Hydraulic fracturing involves injecting a base fluid (typically water),[156] sand or other proppant, and various fracturing chemicals into the gas-bearing formation at high pressures to fracture the rock and release additional gas. Each step of this process presents a risk to water resources. Withdrawal of the water may overtax the water source. Fracking itself may contaminate groundwater with either chemicals added to the fracturing fluid or with naturally occurring chemicals mobilized by fracking. After the well is fracked, some water will return to the surface, composed of both fracturing fluid and naturally occurring "formation" water. This water, together with drilling muds and drill cuttings, must be disposed of without further endangering water resources.

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(1) Water Withdrawals

Fracking requires large quantities of water. The precise amount of water varies by the shale formation being fracked. The amount of water varies by well and by formation. For example, estimates of water needed to frack a Marcellus Shale wells range from 4.2 to over 7.2 million gallons.[157] In the Gulf States' shale formations (Barnett, Haynesville, Bossier, and Eagle Ford), fracking a single well requires from 1 to over 13 million gallons of water, with averages between 4 and 8 million gallons.[158] Fresh water constitutes 80% to 90% of the total water used to frack a well even where operators recycle "flowback" water from the fracking of previous wells for use in drilling the current one.[159] Many wells are fractured multiple times over their productive life.

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[155] *See* DOE, Shale Gas Production Subcommittee First 90-Day Report, *supra* n.67, at 8.

[156] The majority of hydraulic fracturing operations are conducted with a water-based fracturing fluid. Fracking may also be conducted with oil or synthetic-oil based fluid, with foam, or with gas.

[157] TNC, Pennsylvania Energy Impacts Assessment, *supra* n.146, at 10, 18; *accord* NY RDSGEIS, *supra* n.147, at 6-10 ("Between July 2008 and February 2011, average water usage for high-volume hydraulic fracturing within the Susquehanna River Basin in Pennsylvania was 4.2 million gallons per well, based on data for 553 wells."). Other estimates suggest that as much as 7.2 million gallons of frack fluid may be used in a 4000-foot well bore. NRDC, *et al., Comment on NY RDSGEIS on the Oil, Gas and Solution Mining Regulatory Program* (Jan. 11, 2012) (Attachment 2, Report of Tom Myers, at 10), attached as Exhibit 41("Comment on NY RDSGEIS").

[158] Jean-Philippe Nicot, *et al., Draft Report – Current and Projected Water Use in the Texas Mining and Oil and Gas Industry*, 52-54 (Feb. 2011) (water use from 1 to over 13 million gallons), attached as Exhibit 42; Jean-Philippe Nicot, *et al., Oil & Gas Water Use in Texas: Update to the 2011 Mining Water Use Report* 11-14 (Sept. 2012) (updated data presented as averages), attached as Exhibit 43. DOE's Shale Gas Subcommittee generally states that nationwide, fracking an individual well requires between 1 and 5 million gallons of water. DOE, Shale Gas Production Subcommittee First 90-Day Report, *supra* n.67, at 19.

[159] NY RDSGEIS, *supra* n.147, at 6-13; *accord* Nicot 2012, *supra* n.158, at 54.

Water withdrawals can drastically impact aquatic ecosystems and human communities. Reductions in instream flow negatively affect aquatic species by changing flow depth and velocity, raising water temperature, changing oxygen content, and altering streambed morphology.[160] Even when flow reductions are not themselves problematic, the intake structures can harm aquatic organisms.[161] Where water is withdrawn from aquifers, rather than surface sources, withdrawal may cause permanent depletion of the source. This risk is even more prevalent with withdrawals for fracking than it is for other withdrawals, because fracking is a consumptive use. Fluid injected during the fracking process is (barring accident) deposited below freshwater aquifers and into sealed formations.[162] Thus, the water withdrawn from the aquifer will be used in a way that provides no opportunity to percolate back down to the aquifer and recharge it.

(2) Groundwater Contamination

Fracturing poses a serious risk of groundwater contamination. Contaminants include chemicals added to the fracturing fluid and naturally occurring chemicals that are mobilized from deeper formations to groundwater via the fracking process. Contamination may have several causes, such as improper well siting, poor well design and construction, including casing and cementing; blow-outs and other catastrophic accidents; leaks in wells, pipes, and waste pits; spills of hydraulic fracturing chemicals and waste; fracturing operations that were inappropriately conducted near an improperly plugged well, fractures that grew out of zone, or a combination of these causes. Although information on groundwater contamination is incomplete, the available research indicates that contamination has already occurred on multiple occasions.

One category of potential contaminants includes chemicals added to the drilling mud and fracturing fluid. The fluid used for slickwater fracturing is typically comprised of more than 98% fresh water and sand, with chemical additives comprising 2% or less of the fluid.[163] Chemicals are added as solvents, surfactants, friction reducers, gelling agents, bactericides, and for other purposes.[164] New York recently identified 322 unique ingredients used in fluid additives, recognizing that this constituted a partial list.[165] These chemicals include petroleum distillates; aromatic hydrocarbons; glycols; glycol ethers; alcohols and aldehydes; amides; amines; organic acids, salts, esters and related chemicals; microbicides; and others. Many of these chemicals present health risks.[166] Of particular note is the use of diesel, which the DOE Subcommittee has singled out for its harmful effects and recommended be banned from use as a fracturing fluid

[160] NY RDSGEIS, *supra* n.147, at 6-3 to 6-4, *see also* Maya Weltman-Fahs, Jason M. Taylor, *Hydraulic Fracturing and Brook Trout Habitat in the Marcellus Shale Region: Potential Impacts and Research Needs*, 38 Fisheries 4, 6-7 (Jan. 2013), attached as Exhibit 44.
[161] NY RDSGEIS, *supra* n.147, at 6-4.
[162] *Id.* at 6-5; First 90-Day Report, *supra* n.67, at 19 ("[I]n some regions and localities there are significant concerns about consumptive water use for shale gas development.")
[163] NY RDSGEIS, *supra* n.147, at 5-40.
[164] *Id.* at 5-49.
[165] *Id.* at 5-41.
[166] *Id.* at 5-75 to 5-78.

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additive.[167] The minority staff of the House Committee on Energy and Commerce has determined that, despite diesel's risks, between 2005 and 2009 "oil and gas service companies injected 32.2 million gallons of diesel fuel or hydraulic fracturing fluids containing diesel fuel in wells in 19 states."[168]

Contamination may also result from chemicals naturally occurring in the formation. Flowback and produced water "may include brine, gases (e.g. methane, ethane), trace metals, naturally occurring radioactive elements (e.g. radium, uranium) and organic compounds."[169] For example, mercury naturally occurring in the formation becomes mixed in with water-based drilling muds, resulting in up to 5 pounds of mercury in the mud per well drilled in the Marcellus region.[170]

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There are several vectors by which these chemicals can reach groundwater supplies. Perhaps the most common or significant are inadequacies in the casing of the vertical well bore.[171] The well bore inevitably passes through geological strata containing groundwater, and therefore provides a conduit by which chemicals injected into the well or traveling from the target formation to the surface may reach groundwater. The well casing isolates the groundwater from intermediate strata and the target formation. This casing must be strong enough to withstand the pressures of the fracturing process—the very purpose of which is to shatter rock. Multiple layers of steel casing must be used, each pressure tested before use, then centered within the well bore. Each layer of casing must be cemented, with careful testing to ensure the integrity of the cementing.[172]

Separate from casing failure, contamination may occur when the zone of fractured rock intersects an abandoned and poorly sealed well or natural conduit in the rock.[173] One recent study concluded, on the basis of geologic modeling, that frack fluid may migrate from the hydraulic fracture zone to freshwater aquifers in less than ten years.[174]

Available empirical data indicates that fracking has resulting in groundwater contamination in at least five documented instances. One study "documented the higher concentration of methane originating in shale gas deposits . . . into wells surrounding a producing shale production site in northern Pennsylvania."[175] By tracking certain isotopes of methane, this

[167] DOE, Shale Gas Production Subcommittee First 90-Day Report, *supra* n.67, at 25.
[168] Natural Resources Defense Council, Earthjustice, and Sierra Club, Comments [to EPA] on Permitting Guidance for Oil and Gas Hydraulic Fracturing Activities Using Diesel Fuels 3, (June 29, 2011) (quoting Letter from Reps. Waxman, Markey, and DeGette to EPA Administrator Lisa Jackson 1 (Jan. 31, 2001)) ("Comment on Diesel Guidance"), attached to the SC Protest of Freeport Apps as Exhibit 55.
[169] Shale Gas Production Subcommittee First 90-Day Report, *supra* n.67, at 21; *see also* Comment on NY RDSGEIS, *supra* n.157, attachment 3, Report of Glen Miller, at 2.
[170] Comment on NY RDSGEIS, *supra* n.157, attachment 1, Report of Susan Harvey, at 92.
[171] DOE, Shale Gas Production Subcommittee First 90-Day Report, *supra* n.67, at 20.
[172] Comment on Diesel Guidance, *supra* n.168, at 5-9.
[173] Comment on NY RDSGEIS, *supra* n.157, attachment 3, Report of Tom Myers, at 12-15.
[174] Tom Myers, *Potential Contaminant Pathways from Hydraulically Fractured Shale to Aquifers* (Apr. 17, 2012), attached to the SC Protest of Freeport Apps as Exhibit 56.
[175] DOE, Shale Gas Production Subcommittee First 90-Day Report at 20 (citing Stephen G. Osborn, Avner Vengosh, Nathaniel R. Warner, and Robert B. Jackson, *Methane contamination of drinking water accompanying*

study – which the DOE Subcommittee referred to as "a recent, credible, peer-reviewed study" determined that the methane originated in the shale deposit, rather than from a shallower source.[176] Two other reports "have documented or suggested the movement of fracking fluid from the target formation to water wells linked to fracking in wells."[177] "Thyne (2008)[[178]] had found bromide in wells 100s of feet above the fracked zone. The EPA (1987)[[179]] documented fracking fluid moving into a 416 – foot deep water well in West Virginia; the gas well was less than 1000 feet horizontally from the water well, but the report does not indicate the gas – bearing formation."[180]

More recently, EPA has investigated groundwater contamination in Pavillion, Wyoming and Dimock, Pennsylvania. In the Pavillion investigation, EPA's draft report concludes that "when considered together with other lines of evidence, the data indicates likely impact to ground water that can be explained by hydraulic fracturing."[181] EPA tested water from wells extending to various depths within the range of local groundwater. At the deeper tested wells, EPA discovered inorganics (potassium, chloride), synthetic organic (isopropanol, glycols, and tert-butyl alcohol), and organics (BTEX, gasoline and diesel range organics) at levels higher than expected.[182] At shallower levels, EPA detected "high concentrations of benzene, xylenes, gasoline range organics, diesel range organics, and total purgeable hydrocarbons."[183] EPA determined that surface pits previously used for storage of drilling wastes and produced/flowback waters were a likely source of contamination for the shallower waters, and that fracturing likely explained the deeper contamination.[184] The U.S. Geological Survey, in cooperation with the Wyoming Department of Environmental Quality, also provided data regarding chemicals found in wells surrounding Pavillion.[185] Although the USGS did not provide analysis regarding the likely source of the contaminants found, an independent expert who

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gas-well drilling and hydraulic fracturing, Proceedings of the National Academy of Science, 108, 8172-8176, (2011), attached as Exhibit 45)

[178] *Id.*

[177] Comment on NY RDSGEIS, *supra* n.157, attachment 3, Report of Tom Myers, at 13.

[178] Dr. Myers relied on Geoffrey Thyne, *Review of Phase II Hydrogeologic Study* (2008), prepared for Garfield County, Colorado, *available at* http://cogcc.state.co.us/Library/Presentations/Glenwood_Spgs_HearingJuly_2009/(1_A)_ReviewofPhase-II-HydrogeologicStudy.pdf.

[179] Environmental Protection Agency, *Report to Congress, Management of Wastes from the Exploration, Development, and Production of Crude Oil, Natural Gas, and Geothermal Energy*, vol. 1 (1987), *available at* nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=2001ZD4P.txt, attached to the SC Protest of Freeport Apps as Exhibit 57.

[180] Comment on NY RDSGEIS, *supra* n.157, attachment 3, Report of Tom Myers, at 13.

[181] EPA, Draft Investigation of Ground Water Contamination near Pavillion, Wyoming, at xiii (2011), available at http://www.epa.gov/region8/superfund/wy/pavillion/EPA_ReportOnPavillion_Dec-8-2011.pdf, attached to the SC Protest of Freeport Apps as Exhibit 58. EPA has not yet released a final version of this report, instead recently extending the public comment period to September 30, 2013. 78 Fed. Reg. 2396 (Jan. 11, 2013).

[182] *Id.* at xii

[183] *Id.* at xi.

[184] *Id.* at xi, xiii.

[185] USGS, *Groundwater-Quality and Quality-Control Data for two Monitoring Wells near Pavillion, Wyoming, April and May 2012*, USGS Data Series 718 p.25 (2012), attached as Exhibit 46.

reviewed the USGS and EPA data at the request of Sierra Club and other environmental groups concluded that the USGS data supports EPA's findings.[186] EPA recently stated that it would turn further investigation of contamination of Pavillion over to Wyoming, such that EPA will not finalize its draft report, but that EPA "stands behind its work and data" in the draft report.[187]

EPA also identified elevated levels of hazardous substances in home water supplies near Dimock, Pennsylvania.[188] EPA's initial assessment concluded that "a number of home wells in the Dimock area contain hazardous substances, some of which are not naturally found in the environment," including arsenic, barium, bis(2(ethylhexyl)phthalate, glycol compounds, manganese, phenol, and sodium.[189] Arsenic, barium, and manganese were present in five home wells "at levels that could present a health concern."[190] Many of these chemicals, including arsenic, barium, and manganese, are hazardous substances as defined under CERCLA section 101(14). *See* 42 U.S.C. § 9604(a); 40 C.F.R. § 302.4. EPA's assessment was based in part on "Pennsylvania Department of Environmental Protection (PADEP) and Cabot Oil and Gas Corporation (Cabot) sampling information, consultation with an EPA toxicologist, the Agency for Toxic Substances and Disease Registry (ATSDR) Record of Activity (AROA), issued, 12/28/11, and [a] recent EPA well survey effort."[191] The PADEP information provided reason to believe that drilling activities in the area led to contamination of these water supplies. Drilling in the area began in 2008, and was conducted using the hazardous substances that have since been discovered in well water. Shortly thereafter methane contamination was detected in private well water. The drilling also caused several surface spills. Although EPA ultimately concluded that the five homes with potentially unsafe levels of hazardous substances had water treatment systems sufficient to mitigate the threat,[192] the Dimock example indicates the potential for gas development to contaminate groundwater.

The serious groundwater contamination problems experienced at the Pavillion and Dimock sites demonstrate a possibility of contamination, and attendant human health risks. Such risks are not uncommon in gas field sites, and will be intensified by production for export. DOE/FE must account for these risks, as well, in its economic evaluation.

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[186] Tom Myers, *Assessment of Groundwater Sampling Results Completed by the U.S. Geological Survey* (Sept. 30, 2012), attached as Exhibit 47. Another independent expert, Rob Jackson of Duke University, has stated that the USGS and EPA data is "suggestive" of fracking as the source of contamination. Jeff Tollefson, *Is Fracking Behind Contamination in Wyoming Groundwater?*, Nature (Oct. 4, 2012), attached as Exhibit 48. *See also* Tom Myers, *Review of DRAFT: Investigation of Ground Water Contamination near Pavillion Wyoming* (April 30, 2012) (concluding that EPA's initial study was well-supported), attached to the SC Protest of Freeport Apps as Exhibit 59.

[187] http://www2.epa.gov/region8/pavillion (last accessed Aug. 2, 2013), attached as Exhibit 49.

[188] EPA Region III, Action Memorandum - Request for Funding for a Removal Action at the Dimock Residential Groundwater Site (Jan. 19, 2012), available at http://www.epaosc.org/sites/7555/files/Dimock%20Action%20Memo%202001-19-12.PDF, attached to the SC Protest of Freeport Apps as Exhibit 60; EPA, *EPA Completes Drinking Water Sampling in Dimock, Pa.* (Jul. 25, 2012), attached to the SC Protest of Freeport Apps as Exhibit 62.

[189] EPA Region III Action Memorandum, *supra* n.188, at 1, 3-4.

[190] *EPA Completes Drinking Water Sampling in Dimock, Pa.*, *supra* n.188.

[191] EPA Region III Action Memorandum, *supra* n.188, at 1.

[192] *EPA Completes Drinking Water Sampling in Dimock, Pa.*, *supra* n.188.

(3) Waste Management

Fracturing produces a variety of liquid and solid wastes that must be managed and disposed of. These include the drilling mud used to lubricate the drilling process, the drill cuttings removed from the well bore, the "flowback" of fracturing fluid that returns to the surface in the days after fracking, and produced water that is produced over the life of the well (a mixture of water naturally occurring in the shale formation and lingering fracturing fluid). Because these wastes contain the same contaminants described in the preceding section, environmental hazards can arise from their management and ultimate disposal.

On site, drilling mud, drill cuttings, flowback and produced water are often stored in pits. Open pits can have harmful air emissions, can leach into shallow groundwater, and can fail and result in surface discharges. Many of these harms can be minimized by the use of seal tanks in a "closed loop" system.[193] Presently, only New Mexico mandates the use of closed loop waste management systems, and pits remain in use elsewhere.

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Flowback and produced water must ultimately be disposed of offsite. Some of these fluids may be recycled and used in further fracturing operations, but even where a fluid recycling program is used, recycling leaves concentrated contaminants that must be disposed of. The most common methods of disposal are disposal in underground injection wells or through water treatment facilities leading to eventual surface discharge.

Underground injection wells present risks of groundwater contamination similar to those identified above for fracking itself. Gas production wastes are not categorized as hazardous under the Safe Drinking Water Act, 42 U.S.C. § 300f *et seq.*, and may be disposed of in Class II injection wells. Class II wells are brine wells, and the standards and safeguards in place for these wells were not designed with the contaminants found in fracking wastes in mind.[194]

Additionally, underground injection of fracking wastes appears to have induced earthquakes in several regions. For example, underground injection of fracking waste in Ohio has been correlated with earthquakes as high as 4.0 on the Richter scale.[195] Underground injection may cause earthquakes by causing movement on existing fault lines: "Once fluid enters a preexisting fault, it can pressurize the rocks enough to move; the more stress placed on the rock formation, the more powerful the earthquake."[196] Underground injection is more likely than fracking to trigger large earthquakes via this mechanism "because more fluid is usually being pumped underground at a site for longer periods."[197] In light of the apparent induced seismicity, Ohio has put a moratorium on injection in the affected region. Similar associations between

[193] *See, e.g.*, NY RDSGEIS, *supra* n.147, at 1-12.
[194] *See* NRDC et al., Petition for Rulemaking Pursuant to Section 6974(a) of the Resource Conservation and Recovery Act Concerning the Regulation of Wastes Associated with the Exploration, Development, or Production of Crude Oil or Natural Gas or Geothermal Energy (Sept. 8, 2010), attached to the SC Protest of Freeport Apps as Exhibit 63.
[195] Columbia University, Lamont-Doherty Earth Observatory, Ohio Quakes Probably Triggered by Waste Disposal Well, Say Seismologists (Jan. 6, 2012), available at http://www.ldeo.columbia.edu/news-events/seismologists-link-ohio-earthquakes-waste-disposal-wells, attached to the SC Protest of Freeport Apps as Exhibit 64.
[196] *Id.*
[197] *Id.*

earthquakes and injection have occurred in Arkansas, Texas, Oklahoma and the United Kingdom.[198] In light of these effects, Ohio and Arkansas have placed moratoriums on injection in the affected areas.[199] The recently released abstract of a forthcoming United States Geological Survey study affirms the connection between disposal wells and earthquakes.[200]

As an alternative to underground injection, flowback and produced water is also sent to water treatment facilities, leading to eventual surface discharge. This presents a separate set of environmental hazards, because these facilities (particularly publicly owned treatment works) are not designed to handle the nontraditional pollutants found in fracking wastes. For example:

> One serious problem with the proposed discharge (dilution) of fracture treatment wastewater via a municipal or privately owned treatment plant is the observed increases in trihalomethane (THM) concentrations in drinking water reported in the public media (Frazier and Murray, 2011), due to the presence of increased bromide concentrations. Bromide is more reactive than chloride in formation of trihalomethanes, and even though bromide concentrations are generally lower than chloride concentrations, the increased reactivity of bromide generates increased amounts of bromodichloromethane and dibromochloromethane (Chowdhury, et al., 2010). Continued violations of an 80microgram/L THM standard may ultimately require a drinking water treatment plant to convert from a standard and cost effective chlorination disinfection treatment to a more expensive chloramines process for water treatment. Although there are many factors affecting THM production in a specific water, simple (and cheap) dilution of fracture treatment water in a stream can result in a more expensive treatment for disinfection of drinking water. This transfer of costs to the public should not be permitted.[201]

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Similarly, municipal treatment works typically to not treat for radioactivity, whereas produced water can have high levels of naturally occurring radioactive materials. In one examination of three samples of produced water, radioactivity (measured as gross alpha radiation) were found

[198] *Id.*; *see also* Alexis Flynn, Study Ties Fracking to Quakes in England, Wall Street Journal (Nov. 3, 2011), *available at* http://online.wsj.com/article/SB10001424052970203804204577013771109580352.html, attached to the SC Protest of Freeport Apps as Exhibit 65.

[199] Lamont-Doherty Earth Observatory, Arkansas Oil and Gas Commission, Class II Commercial Disposal Well or Class II Disposal Well Moratorium (Aug. 2, 2011), *available at* http://www.aogc.state.ar.us/Hearing%20Orders/2011/July/180A-2-2011-07.pdf, attached to the SC Protest of Freeport Apps as Exhibit 66.

[200] Ellsworth, W. L., et al., Are Seismicity Rate Changes in the Midcontinent Natural or Manmade?, Seismological Society of America, (April 2012), available at http://www2.seismosoc.org/FMPro?-db=Abstract_Submission_12&-recid=224&-format=%2Fmeetings%2F2012%2Fabstracts%2Fsessionabstractdetail.html&-lay=MtgList&-fnd, attached to the SC Protest of Freeport Apps as Exhibit 67.

[201] Comment on NY RDSGEIS, *supra* n.157, attachment 3, Report of Glen Miller, at 13.

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ranging from 18,000 pCi / L to 123,000 pCi/L, whereas the safe drinking water standard is 15 pCi/L.[202]

B. Environmental Impacts of Increased Domestic Gas Prices

Just as all observers agree that exports will increase gas production, all observers agree that exports will increase domestic gas prices. Freeport agrees with this consensus, as it must, disputing only the magnitude of the increase. As we explain elsewhere, the EIA and NERA studies, and materials submitted in connection with this application, all understate the likely price increase that would result from proposed LNG exports.

Gas price increases will significantly increase domestic use of coal for electricity generation. This effect will occur for any level of price increases, although higher price increases will cause a greater shift. The EIA Export Study predicts that the decrease in domestic gas consumption in response to exports and export-driven price increases will "primarily" occur in the electric sector, with producers replacing some gas fired generation with coal.[203] Specifically, EIA predicts that 72 percent of the decrease in gas-fired electricity production will be replaced by coal-fired production, with increased liquid fuel consumption, increased renewable generation, and decreases in total consumption (8, 9, and 11 percent, respectively) making up the remainder of the gap.[204]

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The shift from gas- to coal-fired electricity generation will increase emissions of both traditional air pollutants and greenhouse gases. Gas-fired power plants generate less than a third of the nitrogen oxides and one percent of the sulfur oxides that coal-fired plants generate.[205] Thus, the EIA Export Study demonstrates that exports will harm the environment by causing the opposite shift here.[206]

Coal-fired plants also release roughly twice the carbon dioxide combustion emissions as gas-fired plants, although, as discussed above, this combustion advantage is substantially offset by the greenhouse gases emitted during gas production. Nonetheless, the *EIA Export Study* concluded that under every scenario modeled, exports would produce a significant increase in domestic greenhouse gas emissions, as illustrated by the table below.

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[202] *Id.* at 4.
[203] EIA Export Study, *supra* n 43 at 6; *see also id.* at 17 ("[H]igher natural gas prices lead electric generators to burn more coal and less natural gas.").
[204] *Id.* at 18.
[205] EPA, Air Emissions, http://www.epa.gov/cleanenergy/energy-and-you/affect/air-emissions.html, attached to the SC Protest of Freeport Apps as Exhibit 68.
[206] The NERA report did not examine shifts within the domestic power sector in detail, and the NERA study authors acknowledge that EIA uses a more sophisticated model that is better able to predict electricity sector responses to gas prices. The NERA report explains that "EIA's NEMS model has a detailed bottom-up representation of the electricity sector, while the electricity sector in the NERA model is a nested CES function with limited technologies. This means that NEMS allows for switching from natural gas-based generation to other technology types easily, while the possibility of switching out of natural gas is more limited and controlled in the NERA model." NERA Study, *supra* n.43, at 207 (appx. D, figs. 176-78 and accompanying text). Thus, although the NERA study predicts a smaller electricity sector response to gas prices than did the EIA, *id.*, FERC should rely on the more sophisticated EIA predictions.

N2-36: The DOE has exclusive jurisdiction over the export of natural gas as a commodity. Consequently, consideration of impacts related to increased exports of LNG are not included in the Freeport LNG EIS. However, we note that studies conducted by NERA indicate that LNG exports is self-limiting, in that little or no natural gas will be exported if the price of natural gas in the US increases much above current expectations (NERA, 2014).

Table 4: Cumulative CO_2 Emissions from 2015 to 2035 With Various Export Scenarios[207]

Case	no added exports	low/slow	low/rapid	high/slow	high/rapid
Reference					
Cumulative carbon dioxide emissions	125,056	125,699	125,707	126,038	126,283
Change from baseline		643	651	982	1,227
Percentage change from baseline		0.5%	0.5%	0.8%	1.0%
High Shale EUR					
Cumulative carbon dioxide emissions	124,230	124,888	124,883	125,531	125,817
Change from baseline		656	653	1,301	1,587
Percentage change from baseline		0.5%	0.5%	1.0%	1.3%
Low Shale EUR					
Cumulative carbon dioxide emissions	125,162	125,606	125,556	125,497	125,670
Change from baseline		444	394	335	508
Percentage change from baseline		0.4%	0.3%	0.3%	0.4%
High Economic Growth					
Cumulative carbon dioxide emissions	131,675	131,862	132,016	131,957	132,095
Change from baseline		187	341	282	420
Percentage change from baseline		0.1%	0.3%	0.2%	0.3%

Source: U.S. Energy Information Administration, National Energy Modeling System, with emissions related to natural gas assumed to be consumed in the liquefaction process included

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As explained above, a substantial body of recent scientific evidence demonstrates that past estimates of emissions from natural gas production are too low. Thus, while Sierra Club has no reason to doubt EIA's assessment of the extent to which any given price increase would cause US electricity producers to switch from gas to coal, DOE/FE must take a hard look at the change in domestic greenhouse gas emissions that would result from this shift. The need for such additional analysis, however, merely underscores the importance of searching NEPA review.

C. Environmental Impacts of End User Consumption of LNG

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The draft EIS's sole discussion of effects relating to end users' consumption of LNG is the statement that "It is speculative to predict the actions that would be taken by natural gas producers and end users as a result of the No Action Alternative." DEIS 3-1. As we have noted elsewhere, NEPA requires "[r]easonable forecasting and speculation," *Scientists' Inst. for Pub. Info.*, 481 F.2d at 1092. FERC must attempt to evaluate how either granting or denying the application will likely impact receiving markets. In this evaluation, FERC must not uncritically accept Freeport's assertion that LNG may substitute for coal or other fossil fuels in end use markets.[208] Even if LNG substitutes for other fossil fuels in these markets, this substitution is

[207] From the *EIA Export Study*, *supra* n.43, at 19.
[208] See Sierra Club Protest at 44.

N-37: Gas consumption by end users is not within the scope of this EIS. However, even if consumption was evaluated here, the analysis would need to be based almost entirely on speculation. Because end uses have not been identified at this time, it is not possible to consider impacts of end use. Further, the impacts of end use in foreign, likely non-adjacent, countries is beyond the scope of a project proposed within the United States and evaluated under NEPA and CEQ regulations.

unlikely to provide significant, if any, climate benefit, because of the greenhouse gas emissions associated with natural gas production and the LNG export process.

1. NEPA Requires Consideration of The Environmental Effects of End Use of LNG Exports

As a threshold matter, FERC cannot exclude these possible actions from the scope of analysis. As explained in part III.A above, NEPA requires consideration of indirect impacts, which include the reasonably foreseeable effects that are caused by an action but that are removed in time or distance. 40 C.F.R. § 1508.8(b). FERC offers no basis for its conclusion that end user responses to exports are "speculative," nor does FERC offer any other justification for excluding these responses from the scope of the EIS. It is self-evident that LNG exported from the US will be consumed. The effects of this consumption, and thus of exports, must be measured against a baseline of what would happen if exports did not occur, *e.g.*, the no-action alternative. NEPA requires "[r]easonable forecasting and speculation." *Scientists' Inst. for Pub. Info., Inc. v. Atomic Energy Comm'n*, 481 F.2d 1079, 1092 (D.C. Cir. 1973). Thus, FERC must attempt to assess the extent to which LNG exports will cause an increase in energy consumption (*i.e.*, a decrease in conservation), substitute one supply of natural gas for another, and/or displace alternative energy sources such as other fossil fuels or renewables.

2. The Evidence Does Not Indicate That End User Consumption of LNG Is Likely to Predominantly Offset Use of Other Fossil Fuels

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Importing countries are likely to use LNG, at least in part, in place of renewable resources or conservation and efficiency measures. The International Energy Agency (IEA) concludes that increased use of natural gas is unlikely to reduce global greenhouse gas emissions. The IEA's recent *Golden Rules for a Golden Age of Gas* report predicts that international trade in LNG and other measures to increase global availability of natural gas will lead many countries to use natural gas in place of wind, solar, or other renewables, displacing these more environmentally beneficial energy sources instead of displacing other fossil fuels, and that these countries may also increase their overall energy consumption beyond the level that would occur with exports.[209] The IEA goes on to conclude that high levels of gas production and trade will produce "only a small net shift" in global greenhouse gas emissions, with atmospheric CO_2 levels stabilizing at over 650 ppm and global warming in excess of 3.5 degrees Celsius, "well above the widely accepted 2°C target."[210] Competition between LNG and renewables is likely given the growing role renewables will play in potential importing markets. For example, a June 2013 report by Bernstein Research predicts that in China, "wind and solar will expand from

[209] International Energy Agency, *Golden Rules for a Golden Age of Gas*, Ch. 2 p. 91 (2012), available at http://www.iea.org/publications/freepublications/publication/WEO2012_GoldenRulesReport.pdf, attached to the SC Protest of Freeport Apps as Exhibit 69.
[210] *Id.*

roughly 61GW and 8.3GW of installed capacity currently to 250GW and 200GW, respectively, by the end of the decade. In combination, wind and solar will account for roughly half of incremental power generation over the rest of the decade."[211] Forecasts for India are similar, with HSBC concluding that wind power is already at "parity," or cost-competitiveness, with new coal fired generation[212] and HSBC and KPMG predicting that photovoltaic power will reach parity between 2016 and 2018.[213] In Europe, renewables constitute 55% of new electric generating capacity installed since 2000, and 72% of new capacity installed in 2013, with wind power the single most installed power source in 2013.[214] Notably, China, India, and the European Union have been identified as some of the most likely markets for US LNG exports. Because renewables are already competitive with coal in these markets, there is little reason to assume that LNG imports in these markets would compete with coal but not renewables.

Notably, electric sector competition between renewables and gas in the US is fundamentally different than competition between renewables and LNG in foreign markets. This is because liquefying, transporting, and regasifying gas for LNG exports is costly, making domestic gas much more price competitive than imported LNG. Thus, while EIA predicts that the US electricity sector's primary response to exports will be a switch to increased use of domestic coal rather than a switch to increased use of renewables and conservation, this prediction does not necessarily apply to markets that heavily rely on imports for both coal and gas, making both fossil fuels relatively much more expensive than renewables

3. FERC Cannot Assume That for End Users, LNG Has Lower Greenhouse Gas Emissions than Coal

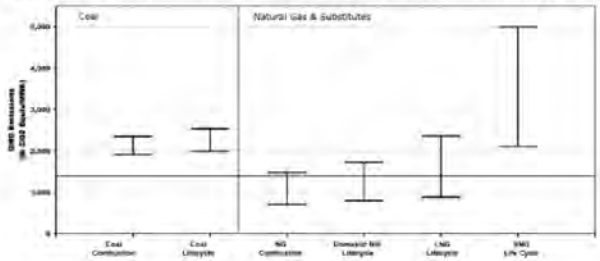
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Even where importing countries do substitute gas for coal or fuel oil, this substitution is likely to cause little, if any, reduction in global greenhouse gas emissions. As noted above, recent research indicates that natural gas production has significant greenhouse gas emissions, which drastically narrow gas's combustion climate advantage over coal. Any remaining climate advantage is further narrowed, if not completely overcome, by the additional greenhouse gas emissions inherent in the LNG export process. Liquefying natural gas is an energy intensive process. Additional energy is then consumed in the transportation of the LNG, with attendant greenhouse gas emissions. Finally, the LNG must be regasified at the import terminal, often through the use of heat generated by the burning of yet more natural gas. Paulina Jaramillo *et al.*

[211] Bernstein Research, *Asian Coal & Power: Less, Less, Less... The Beginning of the End of Coal*, 37 (June 2013), attached as Exhibit 50.
[212] Sophie Vorrath, *Wind at parity with new coal in India, solar to join by 2018: HSBC*, RenewEconomy (Jul. 11, 2013), available at http://reneweconomy.com.au/2013/wind-at-parity-with-new-coal-in-india-solar-to-join-by-2018-hsbc-14836 and attached as Exhibit 51.
[213] *Id.*, KPMG, *The Rising Sun: Grid parity gets closer*, (Sept. 2012), available at http://indiasmartgrid.org/en/knowledge-center/Reports/Rising-Sun-2%20%20KPMG%20Report%202012.pdf and attached as Exhibit 52.
[214] EWEA, *Wind in power: 2013 European statistics* (Feb. 2014), available at http://www.ewea.org/fileadmin/files/library/publications/statistics/EWEA_Annual_Statistics_2013.pdf and attached as Exhibit 53.

have estimated that these operations drastically increase the lifecycle greenhouse gas emissions of LNG relative to traditionally delivered natural gas, adding between 13.85 and 51.7 pounds of CO_2e per MMBtu on top of the emissions inherent in gas production and the 120 pounds of CO_2e per MMBtu emitted by gas combustion.[215] Jaramillo's more narrow estimates put CO_2e the emissions attributable to LNG at 19% to 23% higher than non-liquefied gas.[216] Even using what are now out-of-date estimates of traditional gas's lifecycle emissions, Jaramillo concluded LNG's lifecycle greenhouse gas emissions can bring LNG into parity with coal:

Figure 3: Life-Cycle Emissions of LNG, Natural Gas, and Coal in Electricity Generation[217]



N2-37 con't

Jaramillo's analysis understates LNG's lifecycle greenhouse gas emissions for at least two reasons. First, this analysis does not reflect recent studies that estimate greater methane leakage from gas production and greater warming impact for every pound of methane released.

[215] Paulina Jaramillo, W. Michael Griffin, H. Scott Matthews, Comparative Life-Cycle Air Emissions of Coal, Domestic Natural Gas, LNG, and SNG for Electricity Generation, 41 Environ. Sci. Technol. 6,290 (2007) ("Jaramillo 2007"), *available at* http://www.ce.cmu.edu/~gdrg/readings/2007/09/13/Jaramillo_ComparativeLCACoalNG.pdf, attached to the SC Protest of Freeport Apps as Exhibit 70. The cited estimate for the greenhouse gas emissions of liquefaction, transport, and regasification are derived by adding figures for these phases recorded in Figure 6S, p. 9 the supporting information for this article, which is available at http://pubs.acs.org/doi/suppl/10.1021/es063031o/suppl_file/es063031osi20070516_042542.pdf, and is attached to the SC Protest of Freeport Apps as Exhibit 71 ("Jaramillo Supporting Information"). An earlier, related report with some additional information is Paulina Jaramillo, W. Michael Griffin, H. Scott Matthews, *Comparative Life Cycle Carbon Emissions of LNG Versus Coal and Gas for Electricity Generation* (2005), available at http://www.ce.cmu.edu/~gdrg/readings/2005/10/12/Jaramillo_LifeCycleCarbonEmissionsFromLNG.pdf, and attached to the SC Protest of Freeport Apps as Exhibit 72. A more recent study reached a similar conclusion, suggesting that U.S. LNG may be about 15% more carbon-intensive than ordinary gas. Testimony of James Bradbury, World Resources Institute, Before the U.S. House of Representatives, Energy and Commerce Subcommittee on Energy and Power (May 7, 2013) at 15 (drawing on data from recent life cycle assessments), attached to the SC Protest of Freeport Apps as Exhibit 59, available at http://docs.house.gov/meetings/IF/IF03/20130507/100793/HHRG-113-IF03-Wstate-BradburyJ-20130507.pdf

[216] *See, e.g.*, Jaramillo Supporting Info, *supra* n.215, at 9.

[217] From Jaramillo 2007, *supra* n.215, at 6,295. "SNG," in the figure, refers to synthetic natural gas made from coal.

N2 – Sierra Club Comments

Jaramillo used pre-shale-gas-boom estimates both of gas's non-combustion, non-LNG-specific lifecycle emissions between 15.3 to 20.1 pounds CO_2e/ MMBtu.[218] As discussed above, the 2011 Worldwatch Report estimated this figure at 44 pounds CO_2e /MMBtu, and even that figure underestimates the likely volume of methane released and the global warming impact of that methane. Second, Jaramillo estimated lower transportation-related emissions than would result from US LNG exports. Jaramillo's study was concerned with the effects of imports of LNG to the US. As such, Jaramillo's estimates of transportation emissions assumed that the majority of imported LNG would come from Trinidad and Tobago, which are relatively nearby sources.[219] US LNG exports will almost exclusively go to more distant sources in Asia or Europe, entailing greater transportation emissions.

Whether by using Jaramillo's analysis as a template or by using some other methodology, FERC must take a hard look at emissions from the entire lifecycle of exported LNG. As we have explained, even if LNG exports displace coal in end use markets (an assumption that is uncertain at best), this is unlikely to reduce (and may increase) the lifecycle greenhouse gas emissions of those countries' energy use. Meanwhile, EIA modeling shows that exports are likely to increase US greenhouse gas emissions.

Finally, somewhat separate from the question of near-term responses to LNG exports, FERC must consider the longer-term impacts on global energy infrastructure. A course of action that leads other countries to build additional gas infrastructure to use imported LNG, which would likely entrench gas use for decades to come, is not the sort of action necessary to avoid serious climate impacts. Even if, contrary to IEA's predictions, imported LNG displaces other fossil fuels, the resulting emission reductions will be much less than those needed to stabilize atmospheric greenhouse gases below a catastrophic level.[220] FERC must investigate policy options that would encourage the emissions reductions necessary to avert climate disaster, such as installation of infrastructure for renewables rather than fossil fuels. Merely slowing the rate of greenhouse gas emission growth, rather than causing emission reduction, will not avert the crisis.

N2-37 con't

VII. Cumulative Effects

FERC's cumulative impacts analysis makes no mention of any other proposed LNG export projects. DEIS Part 4.12. FERC does not explain the basis for this exclusion. Presumably, other LNG export proposals were ignored in light of the geographic restriction on the cumulative impacts analysis, which is restricted to the Brazoria County area. DEIS 4-233. As explained in

N2-38

[218] Jaramillo Supporting Information, *supra* n.215, at 8.
[219] Jaramillo 2007, *supra* n.215, at 6,291.
[220] Tom Wigley, *Coal to gas: the influence of methane leakage*, 108 Climatic Change 601, 602 (2011), Exhibit 54, http://www.usclimatenetwork.org/resource-database/report-coal-to-gas-the-influence-of-methane-leakage; Mylrvold & Caldeira, *Greenhouse gases, climate change and the transition from coal to low-carbon electricity*, 7 Environmental Research Letters (2012), attached as Exhibit 55. http://iopscience.iop.org/1748-9326/7/1/014019/pdf/1748-9326_7_1_014019.pdf

N2-38: See response to N2-34 relative to the economic harm of LNG exports and N2-35 for cumulative impacts.

part VI, however, the proposed project will have severe indirect effects on gas production throughout Texas and Louisiana (if not the nation as a whole), effects on air pollution from power plants throughout the United States, and may increase greenhouse gas emissions from end use markets. Accordingly, all proposed US export projects will impact the same resources, through the same effects, as the Freeport project. Consideration of these other proposals in a cumulative effects analysis is especially important because multiple projects may have synergistic effects on, for example, gas price increases, as explained above.

The cumulative impact analysis must therefore consider the total number of proposed export projects. Applications pending or approved by DOE amount to 35.86 bcf/d of exports to non-free trade agreement countries.[221] For perspective, 35.86 bcf/d is almost 43% of current domestic gas production.[222] Multiple courts have held that agencies must consider the cumulative impacts of proposed projects together with other pending proposals. *See NRDC v. Callaway*, 524 F.2d 79, 87 (2d Cir. 1975) (holding that the cumulative impacts analysis for a proposed dredge spoil dumping project should have included another dredge spoil project that was still "subject to approval and funding by Congress"); *People ex rel. Van de Kamp v. Marsh*, 687 F. Supp. 495, 500 (N.D. Cal. 1988) (stating that, in cumulative impacts analysis, "[t]he agency must consider other proposals" and even "contemplated actions that are not yet formalized proposals"); *see also Kleppe v. Sierra Club*, 427 U.S. 390, 410 (1976) (holding, in a related context, that "when several *proposals* for . . . related actions that will have cumulative or synergistic environmental impact . . . are pending concurrently before an agency, their environmental consequences must be considered together") (emphasis added).

N2-38 con't

VIII. Conclusion

In conclusion, FERC's draft EIS fails to meet NEPA's requirements for the reasons described above. As a result, FERC must complete, at minimum, a new draft EIS and a new Biological Assessment for the Freeport projects. Among other things, the new draft EIS must incorporate complete, consistent and up to date data to take a hard look at all available alternatives as well as direct, indirect, and cumulative impacts. Similarly, the new Biological Assessment must consider the best scientific and commercial data available.

N2-39

Respectfully submitted,

---

[221] *Applications Received by DOE/FE to Export Domestically Produced LNG from the Lower-48 States (as of March 24, 2014)*, available at http://energy.gov/sites/prod/files/2014/03/f13/Summary%20of%20LNG%20Export%20Applications.pdf, attached as Exhibit 56.

[222] EIA, Monthly Natural Gas Gross Production Report (January 7, 2014), available at http://www.eia.gov/oil_gas/natural_gas/data_publications/eia914/eia914.html and attached as Exhibit 57. This report states that, for the month of October 2013, gross U.S. withdrawals (not limited to the lower 48) were 83.03 Bcf/d.

222

N-39: The EIS is consistent with NEPA and meets CEQ requirements. As described above we have taken a hard look at alternatives, and once it becomes clear that an alternative fails one or more of our evaluation criteria, it is eliminated from further consideration. This reduces the length of our environmental documents, while coming to a reasoned conclusion. The final EIS provides complete, consistent, and up-to-date data and comprehensive review of direct, indirect and cumulative impacts.

Nathan Matthews
Sierra Club Environmental Law Program
85 2nd St., Second Floor
San Francisco, CA 94105
(415) 977-5695

cc:
U.S. Department of Energy (FE–34)
Office of Natural Gas Regulatory Activities
Office of Fossil Energy
Forrestal Building, Room 3E–042
1000 Independence Avenue SW
Washington, DC 20585

Ron Curry
Regional Administrator
U.S. EPA Region 6
1445 Ross Avenue
Suite 1200
Dallas, Texas 75202

Air Permits Division
U.S. EPA Region 6
1445 Ross Avenue
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Mr. Dwayne Johnson
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Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

N2 – Sierra Club Comments

National Marine Fisheries Service
Southeast Regional Office
263 13th Ave. South
St. Petersburg, Florida 33701-5505

N2 – Sierra Club Comments

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated at San Francisco, CA this 5th day of May, 2014.

Nathan Matthews
Associate Attorney
Sierra Club Environmental Law Program
85 Second Street, Second Floor
San Francisco, CA 94105
Telephone: (415) 977-5695
Fax: (415) 977-5793
Email: Nathan.matthews@sierraclub.org

Note: Because of the lengthy attachments to this comment letter. We are only including the summary letter.

The attachments can be found under Accession No. 20140505-5239 in our E-library system.

C-1 – Coast Bend Property Development, LP, Daniel D. Rucker

Jn\e0423-0012 FERC PDF (Unofficial) 4/22/2014 3:01:20 PM

COASTAL BEND
PROPERTY DEVELOPMENT, LP

April 22, 2014

Ms. Kimberly D. Bose, Secretary
Mr. Nathaniel J. Davis, Sr., Deputy Secretary
Federal Energy Regulatory Commission
888 First Street, N.E., Room 1A
Washington, D.C. 20426

Re: Freeport LNG, Phase II Liquefication Project, Quintana Island, Texas
Docket Nos. CP12-509-000 and CP12-29-000

Dear Ms. Bose,

As an intervenor in the above described action, I am writing you today in my capacity as managing partner of Coastal Bend Property Development, L.P., which is the largest owner of lots and properties in the Bryan Beach Subdivision and as a homeowner in Section 6 of this subdivision, all within the Town of Quintana's limits.

C-1 Since March of last year, I have filed comments on five separate occasions in response to Freeport LNG's filings regarding various tests, studies and reports concerning numerous aspects of the proposed construction and eventual operation of the referenced project.

Please be advised as of this date under current circumstances I and my company withdraw any objections to this proposed facility and encourage the prompt approval and notice to proceed with construction of the project.

As has been referenced by others in more recent filings, Freeport LNG has contracted to buy the majority of homes and much of the land within the Town of Quintana's limits. In the majority of these cases including the Town's Council Members, Freeport LNG has paid a initial "impact fee" installment(s) to residents whether they have elected to sell or not. The fact of the matter is whether late in coming or not this past year the Quintana Town Council engaged in measures to better involve the residents in the specific impacts associated with this project and Freeport LNG has responded appropriately.

Sincerely,

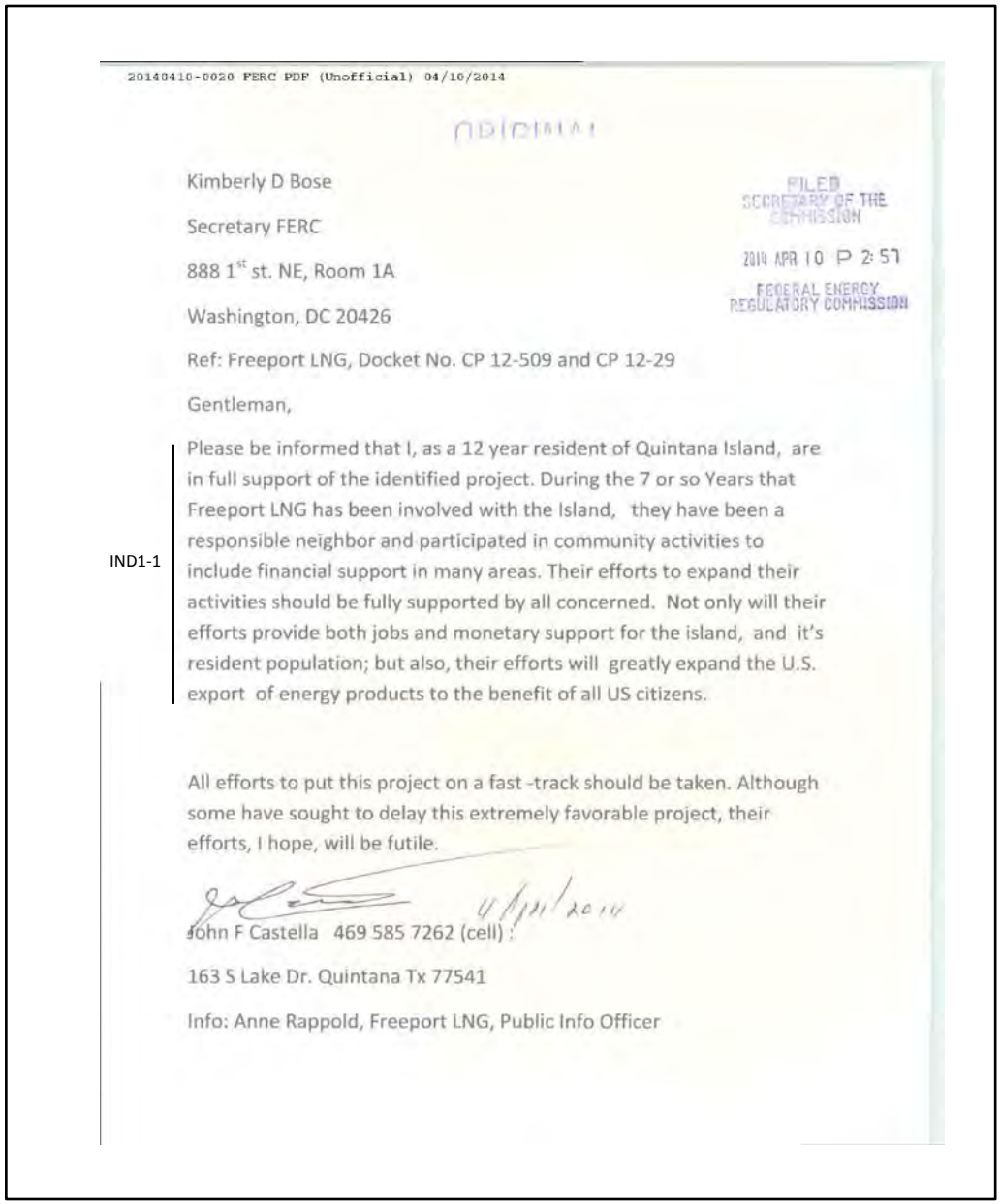
Daniel D. Rucker
General Partner

4558 FM 2351 • Friendswood, Texas 77546 • Phone (281) 648-1268 • Fax: (281) 648-0832
www.cbpd.net

C-1: Commenter's support of the Project is noted.

INDIVIDUAL COMMENTS

IND1 – John F. Castella



20140410-0020 FERC PDF (Unofficial) 04/10/2014

ORIGINAL

Kimberly D Bose

Secretary FERC

888 1st st. NE, Room 1A

Washington, DC 20426

FILED
SECRETARY OF THE
COMMISSION

2014 APR 10 P 2:57

FEDERAL ENERGY
REGULATORY COMMISSION

Ref: Freeport LNG, Docket No. CP 12-509 and CP 12-29

Gentleman,

IND1-1 Please be informed that I, as a 12 year resident of Quintana Island, are in full support of the identified project. During the 7 or so Years that Freeport LNG has been involved with the Island, they have been a responsible neighbor and participated in community activities to include financial support in many areas. Their efforts to expand their activities should be fully supported by all concerned. Not only will their efforts provide both jobs and monetary support for the island, and it's resident population; but also, their efforts will greatly expand the U.S. export of energy products to the benefit of all US citizens.

All efforts to put this project on a fast-track should be taken. Although some have sought to delay this extremely favorable project, their efforts, I hope, will be futile.

4/9/2014

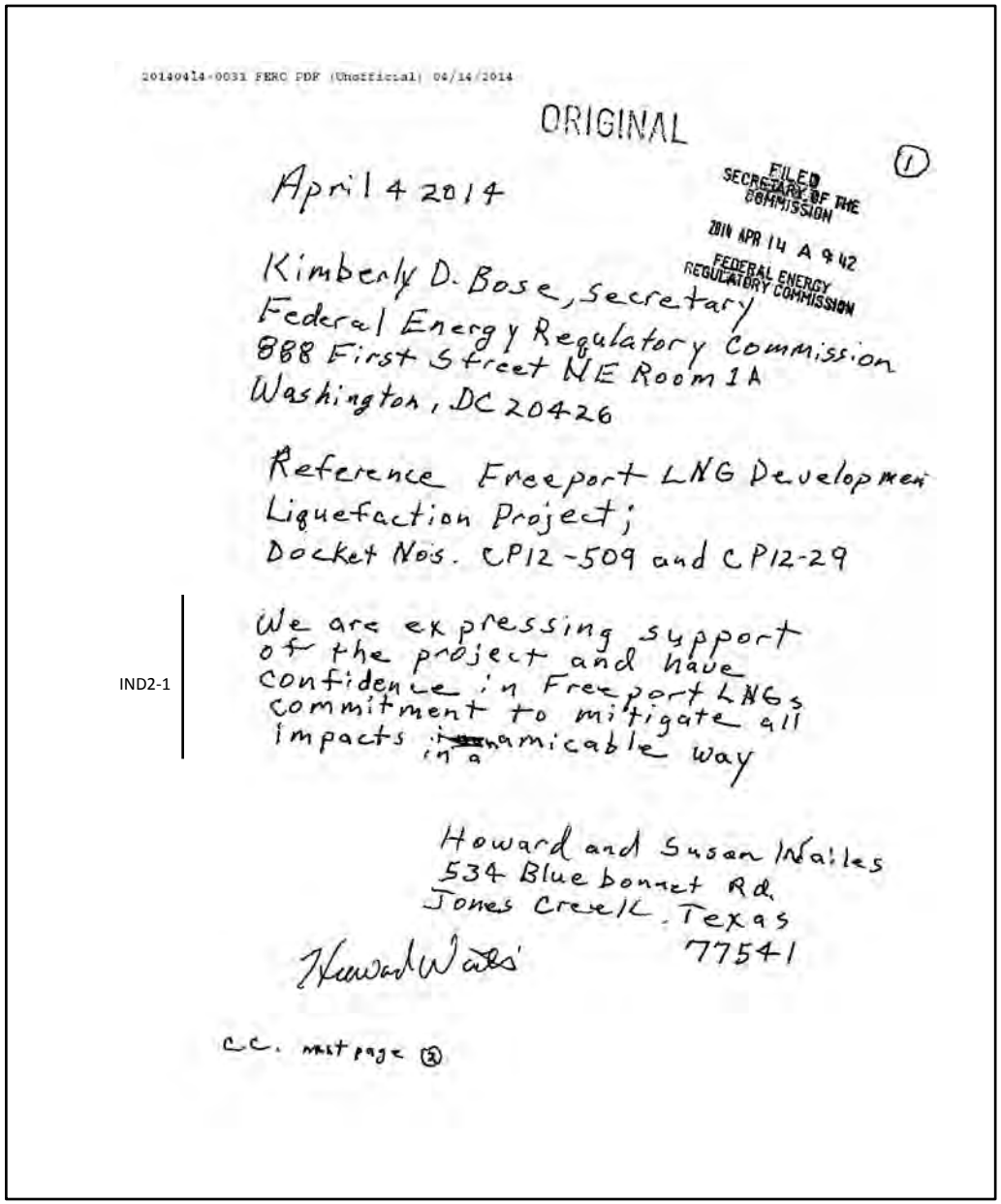
John F Castella 469 585 7262 (cell)

163 S Lake Dr. Quintana Tx 77541

Info: Anne Rappold, Freeport LNG, Public Info Officer

IND1-1: Comment acknowledged.

IND2 – Howard and Susan Wailes



20140414-0031 FERC PDF (Unofficial) 04/14/2014

ORIGINAL

(1)

April 4 2014

FILED
SECRETARY OF THE
COMMISSION

2014 APR 14 A 9:42

FEDERAL ENERGY
REGULATORY COMMISSION

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE Room 1A
Washington, DC 20426

Reference Freeport LNG Development
Liquefaction Project;
Docket Nos. CP12-509 and CP12-29

IND2-1 We are expressing support of the project and have confidence in Freeport LNGs commitment to mitigate all impacts ~~i~~ in a amicable way

Howard and Susan Wailes
534 Blue bonnet Rd.
Jones Creek, Texas
77541

Howard Wailes

cc. next page (2)

IND2-1: Comment acknowledged.

IND2 – Howard and Susan Wailes (cont'd)

20140414-5031 FERC PDF (Unofficial) 04/14/2014

Freeport LNG

cc.

(2)

Anne B. Roppold
Public Information officer
333 Clay Steet 5050
Houston, Texas
77002

Wendy Mazurkiewicz
Freeport LNG Terminal
Quintana Texas

IND3 – Miguel M. Suarez and Celia von Mering

20140414-5033 FERC PDF (Unofficial) 04/14/2014

ORIGINAL

MIGUEL M. SUAREZ
700 Burnett Street
Quintana, TX 77541-9112
Tel: 979-373-0024

FILED
SECRETARY OF THE COMMISSION
2014 APR 14 A 9:48
FEDERAL ENERGY REGULATORY COMMISSION

Quintana, Tuesday, August 09

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First street NE, Room 1A
Washington, DC 20426

CP12-509
CP12-29

RE: Freeport LNG Development LP – Liquefaction Project; Docket Nos. CP12-509 and CP12-29

To the Members of the Commission:

IND3-1

We are residents of the Island of Quintana and the purpose of this letter is to express our total and unqualified support for the approval of the above-mentioned project that has been delayed by unsubstantiated objections, some of which are motivated by greed and total ignorance of the most simple and fundamental laws of Physics and Chemistry.

The approval of this project is in the best interest of the United States and its objectives not only in the economic sense by providing new jobs but also in the interest of its foreign policies. When we are facing the aggressive greed of Mr. Vladimir Putin of Russia trying to pressure the Eastern European nations with the unavailability of natural gas, it would be a very good weapon to be used in defense of democracy and freedom to provide cheap natural gas to Eastern Europe to alleviate the pressures coming from Russia and this is precisely what this liquefaction plant will do once it is operational.

Our economy will be greatly benefited by the creation of more than 3,400 jobs in this community during its construction and more than 800 permanent well paid jobs for its operation. I pose this question to you. What it more important for this nation and this community in particular, the benefits to this country of ours and this area or the greed and avarice of a few persons?

During the past six years I have seen the conduct of Freeport LNG towards this town and, as the facts show, this Company has been very ethical and generous towards the town and its residents. On the other hand, the politicians of this town have continuously rejected most of the offers made by Freeport LNG such as low-cost internet, connections under the Intracoastal Waterway to connect this town to the sewer treatment plant of the city of Freeport, connection to the water system of Freeport – for at least five years our water has been non-compliant with the minimum standards (MCL) of the State of Texas.

The residents of Quintana have been offered $25,000.00 payable in five installments as a compensation for any hardships that the residents may suffer as a result of the process of building the new LNG plant. The first installment has already been paid and even the most rabid opponents to the new project took the money and continued to obstruct and oppose the project with a shameful and evident duplicity.

IND3-1: Comment acknowledged.

IND3 – Miguel M. Suarez and Celia von Mering (cont'd)

20140414-0033 FERC PDF (Unofficial) 04/14/2014

I have tried with no success at all to reason with some of the most vehement members of the Town government and to explain some basic elements of Physics and of Chemistry, to explain to them the Chemical phenomenon of combustion in order to put at ease the concerns about the flare and the noise pollution; but the lack of knowledge prevents them from having any basis for their objections. This is not limited to the opponents of the project but it extends also to the persons that wrote the environmental letter sent to the residents about the pollutants that may be present in the air due to the building process. For example, there is mention of Sulfuric Acid in the atmosphere. Has the person that wrote this paper ever read in a Chemistry book what the boiling point of Sulfuric Acid is? Does that person know what the surface tension of Sulfuric Acid is? By reading a book on the subject, a person can avoid such a blatant, absurd notion as Sulfuric Acid suspended in the atmosphere.

We are debating if we should publish this letter in the local newspaper in order to drum up local support for the approval of this project by the citizens living in the adjacent areas so that they will know who is in favor or who is against the creation of thousands of local jobs, available mainly to them, and who is attempting to deny the new tax revenue to their communities.

IND3-2 Please, do not delay this project any longer, dismiss all the nonsense, and conclude the approval process for the good of the United States and this community.

Respectfully Submitted,

Miguel M. Suárez Celia von Mering

IND3-2: Comment acknowledged.

IND4 – Harold Doty, Houston, TX – Page 1

20140522-5017 FERC PDF (Unofficial) 5/21/2014 9:57:44 PM

May 20, 2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First St., NE, Room 1A
Washington, DC 20426

Re: Docket CP12-509-000; Freeport LNG project in Texas; Danger to employees rather than to Residents

Ms. Bose,

On behalf of myself and other citizens of Quintana, I would like to comment and intervene in the above mentioned dockets pertaining to Freeport LNG Development, L. P. request to your department to procure a new permit to build a liquefaction plant located in Quintana, Texas.

Effect of Berm around Liquefaction Plant site

I am attaching the response to a consideration by the city council of Quintana to allow the city of Freeport, Texas to include the area containing the Freeport LNG liquefaction plant site in their Extraterritorial Jurisdiction with the promise that any agreement the City of Freeport made with Freeport LNG would contain an agreement to surround the Liquefaction site with a Berm 45 feet above sea level covered in vegetation native to the Island of Quintana.

Apparently this is the major point of disagreement with Freeport LNG and the safety of the residents of Quintana after the "Sell Out". FLNG has suggested that "Vapor barrier Fences" 20 feet tall, and sometimes three deep, would protect the areas surrounding the facility from an explosion of heavier than air refrigerant gases when there is a leak within the liquefaction plant boundaries. These fences are composed of hurricane fence 20 feet tall with plastic inserts threaded through the interstitial weaves, totally impenetrable, according to Michael Johns, the Environmental Vice President of Freeport LNG. Since the explosion would "only produce a force of 0.5 pounds per square inch", any blast from a refrigerant leak would be inconsequential anyway.

A sudden force of 0.5 pounds per square inch on the side of my house would be a total force of 30 feet times 10 feet times 144 square inches per square foot, or 43,200 pounds force instantly, which would be more than sufficient to knock it down. Hurricane fences will not even begin to withstand this kind of force. This is hardly inconsequential to me.

According to Blackburn Carter, vapor barrier fences are untested and unproven as to their effectiveness.

When we (city council members) put an item to discuss and consider, taking any action necessary, an agreement with the City of Freeport to adjust our Extraterritorial

IND4-#: Extraterritorial jurisdiction agreements are municipal issues that we will not address.

IND4-#: To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

Section 4.10.9 summarizes the FERC's conclusion that the facility designs would mitigate potential impact to the off-site public.

IND4 – Harold Doty, Houston, TX – Page 2

20140522-5017 FERC PDF (Unofficial) 5/21/2014 9:57:44 PM

Boundaries with an agreement that we, in return, would get an agreement that Freeport would ensure that we have an earthen Berm to deflect any future explosion upwards rather than outwards, we received the attached letter from Mark Mallett, Vice President of Freeport LNG. It is surprising in its clarity concerning how much more important the safety of his future employees is to him rather than the safety of any possible residents or visitors to Quintana Island.

If you would please modify your environmental impact statement to force Freeport LNG to build this safety barrier around this potentially dangerous facility, it would make overlooking the destruction of wetlands, wildlife habitat, our easy, relaxed, quiet way of life, and even our community, much easier for those of us who plan to remain after construction is complete to accept.

Sincerely,

Harold Doty
111 South Lake Drive
Quintana, Texas 77541

979-482-2540

Attachments: Letter from Mark Mallett May 12, 2014

Cc: The Facts, Houston Chronicle, residents of Quintana

IND4-#: Section 4.10.9 summarizes the FERC's conclusion that the facility designs would mitigate potential impact to the off-site public.

20140522-5017 FERC PDF (Unofficial) 5/21/2014 9:57:44 PM

FREEPORT LNG

May 12, 2015

Mayor Gary Wilson
Town of Quintana
814 N. Lamar
Quintana, Texas 77541

RE: Adjustment to Extraterritorial Jurisdiction (ETJ) Between Town of Quintana and City of Freeport

Dear Mayor Wilson:

It has come to Freeport LNG's attention that the Town of Quintana (Quintana) intends to enter into discussions with the City of Freeport (Freeport) regarding possible adjustments to their respective ETJs on Quintana Island. As we understand it, the proposed adjustments would shrink Quintana's ETJ and enlarge Freeport's ETJ in the area around Freeport LNG's existing and proposed facilities. We also understand that the proposed agreement may include provisions purporting to require construction of a berm around any industrial facility within the adjusted Freeport ETJ.

While we have an interest in the ETJ boundaries near our facilities, it is certainly within Quintana's and Freeport's prerogative to negotiate ETJ boundaries. However, the prospect of constructing a berm around Freeport LNG's facilities raises significant security and safety concerns. Freeport LNG has previously voiced these concerns with individual citizens, members of the Quintana Town Council and in the regulatory processes, but takes this opportunity to reiterate the following points:

1. The Federal Energy Regulatory Commission (FERC) concludes in its Draft Environmental Impact Statement (DEIS) that sufficient safeguards are included in the design of Freeport LNG's facilities to fully address potential public safety impacts.
2. As stated in Freeport LNG's previously filed responses to FERC data requests and in the FERC's DEIS, the building of a berm around the Freeport LNG facilities will have significant negative safety and security implications to Freeport LNG employees.
3. In accordance with Section 212.003 of the Local Government Code, neither Freeport nor Quintana can require Freeport LNG to construct a berm.
4. Neither Freeport nor Quintana can construct a berm itself, given that the Freeport LNG facilities are located on property that is not owned or controlled by them.
5. In accordance with Section 43.082 of the Local Government Code, Freeport LNG's land (which is leased from Port Freeport) cannot be annexed by Freeport or Quintana.

Freeport LNG Expansion, L.P.
333 Clay Street, Suite 5050 • Houston, Texas 77002-4173
Phone: 713-980-2888 • Fax: 713-980-2903

20140522-5017 FERC PDF (Unofficial) 5/21/2014 9:57:44 PM

FREEPORT LNG

Significant Safety and Technical Concerns Have Not Been Considered by Quintana

None of the necessary geotechnical and engineering analysis has been performed, including cone penetrometer testing, soil borings, laboratory analysis of soil samples, stability studies, load bearing failure analyses, etc., to determine whether raising the height of the existing levee is technically feasible.

Further, and more importantly, the safety effects of a higher berm have not been properly considered by Quintana. Freeport LNG and the FERC have analyzed these effects in some detail. For example, in its DEIS, FERC stated that lowering the elevation of the facility within the levee (which is functionally equivalent to building a berm) "would not provide substantial improvements in visibility and noise attenuation, and would result in ***significant*** safety … issues" (emphasis added). (See page ES-4 of the DEIS.) And with respect to the safety of the public, FERC has concluded that FLNG's current design (without any berm) "would … not have a significant impact on public safety." (See page ES-7 of the DEIS.)

Safety of the public and safety of personnel within the facility is Freeport LNG's most important obligation. And, while no material benefit (safety, noise or otherwise) would accrue to the public with a higher berm, such a berm would materially and negatively impact the safety of personnel within the facility. Freeport LNG cannot accept this, and Quintana should not either.

As mentioned above, FERC cites "significant" safety issues would result from installation of a berm. We agree with this assessment. For example, in the unlikely event of an emergency situation at the facility, a berm would impede on-site personnel's ability to promptly exit the premises and seek safe shelter. Additionally, building the berm would obstruct our personnel's ability to observe any activities occurring outside of our property that threaten our facility from a safety or security standpoint.

Neither Quintana nor Freeport Can Require Freeport LNG to Construct A Berm

Neither Quintana nor Freeport has the authority to require Freeport LNG to construct a berm around its facilities. A municipality has very limited authority over activities within ETJs, primarily limited to jurisdiction over the platting and subdividing of land. Section 212.003 of the Local Government Code states that "unless otherwise authorized by state law, ***in its extraterritorial jurisdiction a municipality shall not regulate: (1) the use of any building or property for business, industrial, residential or other purposes***" (emphasis added). As such, Freeport LNG cannot be required to construct a berm. In addition, neither Quintana nor Freeport can construct the berm itself given that Freeport LNG's facilities are on property not owned or controlled by either municipality.

Further, there are no municipal annexation rights with respect to this ETJ property such that Freeport LNG's land could be annexed and then a berm be required. Freeport LNG's land is owned by Port Freeport. Section 43.082 of the Local Government Code, which would apply to Quintana and Freeport alike, states that a "municipality with a population of less than 30,000 … and that seeks to annex land owned by a navigation district … must have the consent of the district to annex the land." Port Freeport is a navigation district, and this statute ensures that Port Freeport-owned property is not subject to the threat of annexation.

Freeport LNG Expansion, L.P.
333 Clay Street, Suite 5050 • Houston, Texas 77002-4173
Phone: 713-980-2888 • Fax: 713-980-2903

IND4 – Harold Doty, Houston, TX – Page 5

20140522-5017 FERC PDF (Unofficial) 5/21/2014 9:57:44 PM

In sum, as we understand the proposed agreement, it will do nothing more than reduce Quintana's ETJ in return for an unenforceable obligation for Freeport to require a berm to be constructed around Freeport LNG's facilities. Even if the berm could be required, it would only serve to decrease the safety of people within the facility, without any benefit to the off-site public. This provides no benefit to Quintana or its residents. We appreciate Quintana's consideration of these points.

Sincerely,

Mark W. Mallett, P.E.
Senior Vice President, Operations & Projects

cc:
Alan Petrov, Attorney for Town of Quintana (via email)
Jeff Pynes, City Manager for City of Freeport (via email)
Jason Cordoba, Attorney for Port Freeport (via email)

Freeport LNG Expansion, L.P.
333 Clay Street, Suite 5050 • Houston, Texas 77002-4173
Phone: 713-980-2888 • Fax: 713-980-2903

INDIVIDUAL COMMENTS

IND5 – Dorothy Brandt

20140414-5028 FERC PDF (Unofficial) 4/12/2014 4:56:24 PM

April 12, 2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A

Re: Freeport LNG Development, LP – Liquefaction Project, Docket Nos. CP12=509 and CP 12-29.

IND5-1 This is a letter in support of the LNG project noted above. I am a ten-year resident of Quintana, Texas, having moved to Texas from Seattle to head up a new baccalaureate program at Brazosport College.

During the construction of LNG's prior plants, I was not negatively affected. I did notice that there was additional traffic, but I am used to that during many months of the year as so many people visit our beaches. At any rate, the additional traffic did not interfere with my quality of life, and I didn't experience there being more dust in the air during that period of time.

Freeport LNG has been more than fair in addressing the concerns of the Quintana residents, with their offering to compensate us for any inconvenience and to purchase our homes at reasonable prices. Freeport LNG has been a good neighbor through funding public improvement project and community events, such as Quintana Creed Day the Beach Clean-up. I expect that they will provide even more support in the future.

The Liquefaction Project will bring a significant number of new jobs to the Brazosport area, which are very much needed. I understand that the project will employ more than 3,500 workers during the construction period and that 160 new full-time employees will be hired to manage, operate, and maintain the new facilities. I know they are a good employer, as several of the students in my baccalaureate program are employed there, and they report a high level of job satisfaction. The project with also result in a total economic stimulus to our area, estimated to be $4.3-6.2 billion per year. That is a tremendously significant positive benefit to Quintana and the entire Brazosport area.

Manufacturing is the lifeblood of our area, and this project is considered by me and the vast majority of those I have discussed it with to be making a very positive contribution to the community. I hope you will expeditiously approve their moving ahead with the project.

Sincerely,

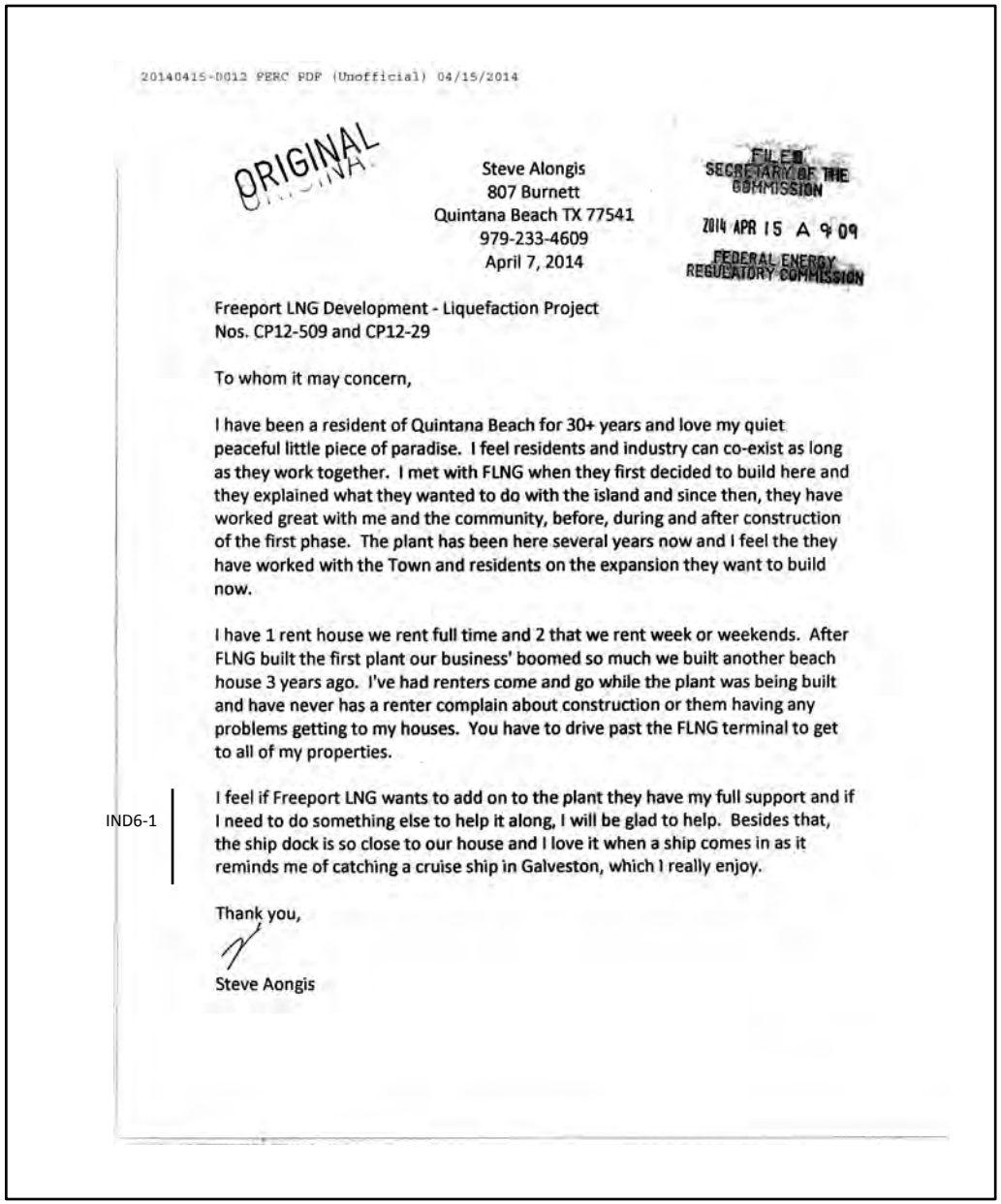
Dorothy Brandt

Dorothy M. Brandt, Ph.D.
2511 Deep Sea Drive
Quintana, TX 77541
979-239-8295
drdbrandt@sbcglobal.net

IND5-1: Comment acknowledged.

INDIVIDUAL COMMENTS

IND6 – Steve Alongis



20140415-0012 FERC PDF (Unofficial) 04/15/2014

ORIGINAL

Steve Alongis
807 Burnett
Quintana Beach TX 77541
979-233-4609
April 7, 2014

FILED
SECRETARY OF THE COMMISSION
2014 APR 15 A 9:09
FEDERAL ENERGY REGULATORY COMMISSION

Freeport LNG Development - Liquefaction Project
Nos. CP12-509 and CP12-29

To whom it may concern,

I have been a resident of Quintana Beach for 30+ years and love my quiet peaceful little piece of paradise. I feel residents and industry can co-exist as long as they work together. I met with FLNG when they first decided to build here and they explained what they wanted to do with the island and since then, they have worked great with me and the community, before, during and after construction of the first phase. The plant has been here several years now and I feel the they have worked with the Town and residents on the expansion they want to build now.

I have 1 rent house we rent full time and 2 that we rent week or weekends. After FLNG built the first plant our business' boomed so much we built another beach house 3 years ago. I've had renters come and go while the plant was being built and have never has a renter complain about construction or them having any problems getting to my houses. You have to drive past the FLNG terminal to get to all of my properties.

IND6-1 I feel if Freeport LNG wants to add on to the plant they have my full support and if I need to do something else to help it along, I will be glad to help. Besides that, the ship dock is so close to our house and I love it when a ship comes in as it reminds me of catching a cruise ship in Galveston, which I really enjoy.

Thank you,

Steve Aongis

IND6-1: Comment acknowledged.

INDIVIDUAL COMMENTS

IND7– Jim Martin

20140416-0011 FERC PDF (Unofficial) 04/16/2014

ORIGINAL

April 10, 2014

FILED
SECRETARY OF THE
COMMISSION

2014 APR 16 A 9:52

FEDERAL ENERGY
REGULATORY COMMISSION

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, D.C. 20426

RE: "Freeport LNG Development, LP - Liquefaction Project: Docket Nos. CP12-509 and CP12-29"

To Whom It May Concern:

IND7-1

I've lived on Quintana Island since 1998 and was here for Freeport LNG's 1st phase of the Liquid Gas Plant. "I had no problems with noise, traffic, dust or construction". I'm also aware of a few other people that seemed to have trouble with "minor traffic" of during which my 7 yr old granddaughter never had any trouble with catching her school bus on time. I've never heard any noises from Freeport LNG's operation that was louder than the waves from the beach.

As far as the birds, "they all seem to still be around and singing up a storm!" So, I wouldn't foresee any significant changes in the bird life or population. Freeport LNG has done a great job with mitigation, "ABOVE AND BEYOND".

Freeport LNG"S income contributions makes the Town of Quintana have the necessary Income it needs to be able to provide the residents with good drinking water, lower taxes and free trash pickup just to name a few! Quintana wouldn't survive without FLNG!!

Yes, as a resident I've chosen to sell out, because the money is good, the market is down, and this was a great opportunity to do so, "Not because I haven't loved living here, scared, or just being greedy and wanting more than what they had to offer." Plus, I will be renting my home back from Freeport LNG. I'm proud to call them my NEIGHBOR!!

There will always be negative comments on Freeport LNG, but I believe the GOOD out ways the BAD by a long shot!! I've heard that 65% or more of the home owners have chosen to sell leaving only around 11 residents even though I can't prove this, "I'm sure that Freeport LNG can prove this statement with more than just words."

I don't believe there are any NEW SIGNIFICANT FINDINGS that should be investigated by FERC and a Final EIS be published to Freeport LNG ASAP.

Thanks,

Jim Martin
910 Dewey Street
Quintana, TX 77541

IND7-1: Comment acknowledged.

IND8– Linda Martin

20140415-0052 FERC PDF (Unofficial) 04/10/2014

ORIGINAL

FILED
SECRETARY OF THE
COMMISSION

2014 APR 15 A 9 52

FEDERAL ENERGY
REGULATORY COMMISSION

April 10, 2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, D.C. 20426

RE: "Freeport LNG Development, LP - Liquefaction Project; Docket Nos. CP12-509 and CP12-29"

To Whom It May Concern:

IND8-1

First I'd like to thank you personally for sending me a copy of the Draft Environmental Impact Statement relating to Freeport LNG Liquefaction Project Phase II Modification Project. After carefully reviewing the Draft EIS , as a resident of Quintana, I could not find any significant new issues that should be investigated by FERC and a final EIS should be published to Freeport LNG ASAP.

Freeport LNG has acted as a responsible neighbor in the past, and will work hard to mitigate the impact of construction on Quintana Island, including the mitigation of any additional traffic or dust construction.

Freeport LNG has cooperated and is cooperating with the local community to address concerns. For example, Freeport LNG offered to purchase the residences on Quintana Island at above market prices with the option of leasing their property back from Freeport LNG if the owners were interested in selling and/or relocating. For those residence owners choosing not to sell and choosing to remain on the Island, Freeport LNG offered five annual impact payments of $5,000 to address any possible adverse impacts of the project. I believe most of the residents have opted to sell their property leaving only a handful of residents, but there are some that will rent back from Freeport LNG, some will rebuild on the Island with the lots they still own and did not sell. Freeport LNG has responded to various inquires from the community regarding the project, and continues to provide updated information to the community as well as Freeport LNG has been attending all council meetings for the Town of Quintana to update council and answer any questions as the project progresses.

Freeport LNG supports our community through various charitable donations, the funding of public improvement projects and community events, such as Quintana Creed Day and Beach Clean-up. I personally know that Freeport LNG will help any resident that needs help (all they have to do is ask)! Freeport LNG's support of the community will continue to grow as the company grows with the addition of the liquefaction project.

IND8-1: Comment acknowledged.

IND8 – Linda Martin (cont'd)

20140418-0013 FERC PDF (Unofficial) 04/18/2014

The project brings much-needed high paying jobs to our community. More than 3,500 workers will be employed during the four - to five - year construction period and over 160 new full time employees will be hired to manage, operate and maintain the new facilities.

In addition to the significant job creation, the total economic stimulus of the Freeport LNG liquefaction project is estimated to be between $4.3 - $6.2 billion per year. Brazoria County, where Quintana Island is located, will reap the benefits of a large portion of the economic stimulus. Not counting what this will do for our World Trade and bringing Trillions of dollars in for the United States.

Many local residents have significant ties and an appreciation for the manufacturing and oil and gas industries. Various local residents work in and rely upon the economic development generated by these industries.

IND8-2 I will and continue to Support Freeport LNG and look forward to future endeavors with Freeport LNG and their employees. They are a great neighbor!!

Sincerely,

Linda Martin
Resident
910 Dewey St.
Quintana, TX 77541

IND8-2: Comment acknowledged.

IND9 – Debbie Alongis

20140418-4001(3 FERC PDF (Unofficial) 04/18/2014

ORIGINAL

Debbie Alongis
807 Burnett
Quintana Beach, TX 77541

April 8, 2014

Kimberly D. Bose, Secretary
Federal Emergency Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

RE: Letter of Support
Freeport LNG Development, LP - Liquefaction Project; Nos. CP12-509, CP12-29

Dear Ms. Bose,

IND9-1

Since moving to Quintana in 1980, I've enjoyed the serenity this island has to offer. I soon began to be involved in the Community as a volunteer, Council Member, Mayor and City Secretary. I was in Quintana during the first Industrial District Contract and have learned many lessons through the years as more land was de-annexed and the Industrial District grew.

Seeing facilities change hands again and again, I found the "Honeymoon" phase was short lived as negotiations were completed. This has not been the case with Freeport LNG. They have continually stayed involved with our community through donations of the Town's festivals and beach cleanups, even offering to help board-up residents windows during hurricane evacuations.. Their involvement within the Brazosport area and beyond is to be congratulated.

We are not only homeowners, but owners of 4 beach houses that we rent by the week or weekend. Even during the construction phase of the terminal, our rentals have exceeded our expectations as to their success. Since the terminals existence, we built an A-Frame strictly for the overflow of our other 3 homes.

Although we did not sell our personal home, we did enter a contract with FLNG to sell 3 of our older beach houses, keeping the A-Frame. Our goal is to build more beach houses as rental property in the near future.

In the June, 2007 edition of Texas Monthly as to the best Texas beaches, Quintana Beach ranked third. As stated, Quintana has, "...a who's who of petrochemical plants watching its back, but if you continuously face the surf, as coastal vacation law requires, it doesn't matter...."

Regards,

Debbie Alongis

Debbie Alongis

FILED
SECRETARY OF THE
COMMISSION
2014 APR 16 A 9:51
FEDERAL ENERGY
REGULATORY COMMISSION

IND9-1: Comment acknowledged.

IND10 – Donald A. Centanni

20140416-0019 FERC PDF (Unofficial) 04/16/2014

ORIGINAL

Donald Centanni
2559 Compass Court
Freeport, Texas 77541

FILED
SECRETARY OF THE
COMMISSION

2014 APR 16 A 9:51

FEDERAL ENERGY
REGULATORY COMMISSION

April 9, 2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

Re: *Freeport LNG Development, LP – Liquefaction Project; Docket No. CP12-509*

Dear Ms. Bose:

IND10-1

While the outset of this letter may not appear to be the case, this letter recognizes LNG's mitigation efforts in Quintana.

My wife and I had purchased our home in Quintana as a place of retirement – a refuge. When we became aware of the expansion proposals by LNG, not surprisingly, we were very much alarmed. We had invested a considerable amount of time and money improving our home and installed features to facilitate physical therapy, including a sauna and pool. LNG's prior characterization of "temporary impacts during the construction period" was, for my aging years, a lifetime.

In response to our concerns, LNG responded fairly, cooperatively and respectfully. They presented an offer to purchase our property, which, after reasonable negotiation, we accepted. LNG has responsibly recognized that there is compensation to be made for, essentially, taking our property and impacting the quality of our lives. LNG has committed to ease these impacts by adding $5,000 annually for additional personal impacts. When we have made follow-up calls to LNG on various matters, LNG employees are responsive to our inquiries and concerns. They are cooperative and respond timely and with sincerity.

Beyond our personal concerns, recent international developments have indicated that the U.S. is on a path to increase natural gas exportation. A recent Wall Street editorial has indicated "more LNG terminals are needed". LNG's good faith offer appears to be rational in light of such future events.

Sincerely,

Donald A. Centanni

Donald A. Centanni

IND10-1 : Comment acknowledged.

IND11 – Gary Wilson and Kathy Wilson

20140417-0051 FERC PDF (Unofficial) 04/17/2014

ORIGINAL

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

FILED
SECRETARY OF THE
COMMISSION

2014 APR 17 A 9:04

FEDERAL ENERGY
REGULATORY COMMISSION

Re: Federal Energy Regulatory Commission Draft Environmental Impact Statement; Freeport LNG Development,LP –Liquefaction Project; Docket Nos. CP12-509 and CP 12-29

To The Members of the Commission:

We have been residents of Quintana Island for 16 years. We were here during Phase 1 Of the original plant construction. We are in total support of Freeport LNG. They have been nothing but good for the island. After Hurricane Ike, they offered equipment and tools and materials necessary to help with our water plant operations, water is the most Important thing needed for cleanup.

The new expansion project will not only be good for this town, but also for the community and Brazoria County. Being associated with Freeport LNG since Phase 1, We have first hand knowledge of their safety record, desire to protect the environment, Air quality in Quintana. We personally saw the measures taken to protect birding, wildlife, and nesting at the original project. Yes, they will impact this island and the residents during construction, but we feel they will do everything in their power to minimize the effects on Quintana Island. IND11-1

Freeport LNG always participates in all town functions, beach cleanups, Quintana Creed Day, Mardi Gras Parades, and bar b que cookoffs. They fund many town projects.

We are members of the Freeport CAP (Citizen Advisory Panel) which includes 8 different companies in this area. We hear all safety reports from all of the companies, With Freeport LNG having the best record.

I , Kathy Wilson, am the President of the Auxiliary Volunteers for the Brazosport Regional Hospital , ask these companies for help obtaining wheelchairs for the hospital With Freeport LNG and the Town of Quintana leading the way with enough donations For 22 wheelchairs.

In conclusion, we feel that it is in the best interest to issue the permit and start the Construction process.

Sincerely,

Gary Wilson, Mayor of Quintana

Kathy Wilson 1503 Compass Ct.Quintana, Tx.

IND11-1: Comment acknowledged.

INDIVIDUAL COMMENTS

IND12 – Connie Perlander

20140417-0012 FERC PDF (Unofficial) 04/17/2014

ORIGINAL

FILED
SECRETARY OF THE
COMMISSION

2014 APR 17 A 9 04

FEDERAL ENERGY
REGULATORY COMMISSION

April 11, 2014

Kimberly D. Base, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

RE: Freeport LNG Liquefaction Project Phase II Modification Project Draft Environmental Impact Statement Project Docket Numbers CP12-509-000 and CP12-29-000.

To Whom It May Concern:

I, Connie Perlander have been a resident of Quintana on and off since 1980. I am in favor of Freeport LNG because it insures the future of Quintana. We need to improve and utilize Liquid Natural Gas; it is our future and a large part of our World Trade.

IND12-1

When Phase I construction was going on at my end of the Island, it was no great hindrance for me. The traffic was minimal, very little noise and they always kept the residence up to date through council meetings.

Freeport LNG has proved that there safety standards were 100% since the first phase was built. I'm not afraid of any mishaps in the future or worried about traffic and noise. I'm sure if there is something major Freeport LNG will work with the residence upon their request.

Freeport LNG has been very accommodating and a great neighbor to me.

Sincerely,

Connie Perlander

Connie Perlander
715 Burnett Street
Quintana, TX 77541

IND12-1: Comment acknowledged.

IND13 – W. J. Morrison

20140421-0007 FERC PDF (Unofficial) 04/21/2014

ORIGINAL

FILED
SECRETARY OF THE COMMISSION
2014 APR 21 A 9:34
FEDERAL ENERGY REGULATORY COMMISSION

To: Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

From: W. J. Morrison

Re: Federal Energy Regulatory Commission Draft Environmental Impact Statement; Freeport LNG Development, LP-Liquefaction Project; Docket Nos. CP12-509 and CP12-29

Dear Ms Bose,

IND13-1 I want to express my agreement with FLNG to expand their present facility on Quintana Island. They have been a good neighbor in the past, so I believe that association will continue.

In their present plans for expansion they have addressed my previous safety concerns during their original construction. They seem to be doing all that they can to address concerns of the Quintana residents.

I would urge you to put the approval process on the fast track so that we can get this project started, finished, and over with, so that the island can get back to its laid back environment.

W. J. Morrison

W. J. Morrison
1968 Bella Vista Dr.
Fort Worth, TX. 76112

137 South Lake DR.
Quintana,TX.

IND13-1: Comment acknowledged.

IND14– Steve Alongis

20140421-0031 FERC PDF (Unofficial) 04/21/2014

ORIGINAL

Steve Alongis
807 Burnett
Quintana Beach TX 77541
979-233-4609
April 7, 2014

FILED
SECRETARY OF THE
COMMISSION
2014 APR 21 A 9:23
FEDERAL ENERGY
REGULATORY COMMISSION

Freeport LNG Development - Liquefaction Project
Nos. CP12-509 and CP12-29

Dear Ms Bose,

I have been a resident of Quintana Beach for 30+ years and love my quiet peaceful little piece of paradise. I feel residents and industry can co-exist as long as they work together. I met with FLNG when they first decided to build here and they explained what they wanted to do with the island and since then, they have worked great with me and the community, before, during and after construction of the first phase. The plant has been here several years now and I feel the they have worked with the Town and residents on the expansion they want to build now.

I have 1 rent house we rent full time and 2 that we rent week or weekends. After FLNG built the first plant our business' boomed so much we built another beach house 3 years ago. I've had renters come and go while the plant was being built and have never has a renter complain about construction or them having any problems getting to my houses. You have to drive past the FLNG terminal to get to all of my properties.

IND14-1 I feel if Freeport LNG wants to add on to the plant they have my full support and if I need to do something else to help it along, I will be glad to help. Besides that, the ship dock is so close to our house and I love it when a ship comes in as it reminds me of catching a cruise ship in Galveston, which I really enjoy.

Thank you,

Steve Aongis

IND14-1: Comment acknowledged.

IND15 – John F. Castella

20140421-0052 FERC PDF (Unofficial) 04/21/2014

ORIGINAL

FILED
SECRETARY OF THE COMMISSION
2014 APR 21 A 9:24
FEDERAL ENERGY REGULATORY COMMISSION

Kimberly D Bose

Secretary FERC

888 1st st. NE, Room 1A

Washington, DC 20426

Ref: Freeport LNG, Docket No. CP 12-509 and CP 12-29

Gentleman,

IND15-1

Please be informed that I, as a 12 year resident of Quintana Island, are in full support of the identified project. During the 7 or so Years that Freeport LNG has been involved with the Island, they have been a responsible neighbor and participated in community activities to include financial support in many areas. Their efforts to expand their activities should be fully supported by all concerned. Not only will their efforts provide both jobs and monetary support for the island, and it's resident population; but also, their efforts will greatly expand the U.S. export of energy products to the benefit of all US citizens.

All efforts to put this project on a fast -track should be taken. Although some have sought to delay this extremely favorable project, their efforts, I hope, will be futile.

John F Castella 469 585 7262 (cell) :

163 S Lake Dr. Quintana Tx 77541

Info: Anne Rappold, Freeport LNG, Public Info Officer

IND15-1: Comment acknowledged.

IND16 – Christopher Kall

20140421-0013 FERC PDF (Unofficial) 04/21/2014

ORIGINAL

FILED
SECRETARY OF THE
COMMISSION

2014 APR 21 A 9:22

FEDERAL ENERGY
REGULATORY COMMISSION

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

RE: Freeport LNG Development, LP
Liquefaction Project
Docket Nos. CP12-509 and CP12-29

Dear Ms. Bose,

I am writing to you as a "full-time" resident of the island of Quintana who owns two homes on the island with the first dating back to the summer of 1997. I truly wish that I was not having to write this letter and that life here on the island was as it was when I first came here. Unfortunately, things have taken a turn for the worse with the introduction of Freeport LNG to our community.

The latest project, as referenced above, has truly opened my eyes to how Freeport LNG conducts their business. I only wish I would have been more involved with their first project. Freeport LNG has asked the residents, with whom they have agreements in place to purchase their homes, to write you and tell you of all their great accomplishments, city involvement, and great things to come. It is with great deception that their story is told. They have divided the island by offering a mitigation plan that consists of two items: a "guaranteed" payout of $5,000.00 to accept the inconvenience of 4000 construction workers on our island for a period of 5 years. The first payment is guaranteed and the remaining 4 payments have stipulations tied to them. The second part of their mitigation plan is to buy your house at, what they call, fair market value. Their fair market value does not extend beyond the borders of Quintana Island. They are adamant about not paying "replacement value". Just across the jetties to the town of Surfside you will find a completely different story where home values are at their highest and still climbing. The construction of new homes in Surfside is at an all time high, yet our home values do not compare to theirs even though they are less than a mile down the coast.

IND16-1

The Freeport LNG deception tactics began with their initial release of their visual impact analysis when they presented pictures of what their plant would look like from ground level looking up at the levy they are building on.....not from our porches and balconies that are 16 feet or more off the ground which offer a dramatically different view. Freeport LNG continues this deception by asking only the people with whom they are negotiating home and property sales to write you. These people will more than likely leave the island once the construction starts and never return as either a full or part time resident. Freeport LNG will

IND16-1: Comment acknowledged.

20140421-0013 FERC PDF (Unofficial) 04/21/2014

then use the purchased properties to house construction workers and employees until they are torn down along with Texas' oldest establishment. FLNG is also telling residents that this project cannot be stopped. This fear tactic has people that would normally stay on the island considering property sales below true market/replacement value simply to get away from this project.

IND16-2 The benefits they claim will come will have very little, if any at all, impact to the island of Quintana and that is why they continue to use Brazoria County as the recipient of their benefits. Quintana will only feel the brunt of their construction along with the nuisances their plant will bring. We anticipate blockage of the jettys preventing fisherman and leisure boaters from enjoying unrestricted access to the Gulf of Mexico, increased sound, sight, light, and air pollution and vibrations from the construction, plant operation, and vessel traffic.

IND16-3 I truly hope that you and your team gets the full picture of what is happening here. I do not feel that this is the best place for their export terminal. We have several terminals around the country that would be better suited for this. I also feel that the exporting of this natural resource will causes LNG prices to increase thus causing a negative impact on our manufacturing environment costing the Unites States high paying jobs. All of the negatives that this project creates simply makes it a bad decision.

Regards,

Christopher Kall

2550 Deep Sea Drive

Quintana, TX 77541

IND16-2: Comment acknowledged. FERC staff believes that its environmental review and EIS evaluated and fairly identifies the potential environmental impacts of the proposed Project. Portions of the EIS have been revised to present information made public after the draft EIS was issued.

IND16-3: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

INDIVIDUAL COMMENTS

IND17 – James Kall, Jr.

20140422-0031 FERC PDF (Unofficial) 04/22/2014

ORIGINAL

FILED
SECRETARY OF THE
COMMISSION
2014 APR 22 A 8:59
FEDERAL ENERGY
REGULATORY COMMISSION

James Kall
707 Burnett Street
Quintana TX. 77541

Kimberly D. Bose, Secretary
Federal Emergency Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20428

Re: Freeport LNG Development, LP - Liquefaction Project; Nos. CP12-509, CP12-29

Dear Ms. Bose,
I would like to voice my opinion on the Liquefaction Project. My family and I have been on the island for over 15yrs now and we absolutely love the island and the people that we have met there. Both of my Parents retired and spent the rest of their days there. My family and I look forward to every weekend and holiday we get to enjoy the island. I have a strong passion for photography and birds. Quintana has given me some great opportunities to pursue this passion. Here is a link to my website where I have posted many of the spectacular birds that I have photographed over the years.
http://www.pbase.com/kallofthewild/birds_of_quintana_texas

I really feel that this small piece of paradise is never going to be the same if this project moves forward. 5yrs of construction on this tiny island is going to take a toll on the wildlife and the residents that are staying here. There are countless things that have yet to be addressed. There is only one way off this island and when my family and I are there I would like to know how we would get out in case of emergency. We would literally be trapped if something happens during construction of the plant or even after it is complete. All residents east of the plant will be cut off from the only way off the island. It seems to me that it would be a nightmare traveling down to our beach house during construction and the noise is going to be another issue. What viable evacuation plan could there possibly be that includes the evacuation of the 3 miles of public beach that is located within a 2 mile radius of this proposed plant? On any given weekend or during the summer, there are thousands of people on these beaches. The threat of serious injury and possible death exists even if an incident takes place at this facility that is not catastrophic. A minor event at this plant could cause panic on the beaches creating a deadly situation. Building this facility in the middle of a town, adjacent to a campground and park and in such close proximity to public beaches makes no sense.

IND17-1

IND17-1: To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

IND17 – James Kall, Jr. (cont'd)

20140422-5031 FERC PDF (Unofficial) 04/22/2014

I also find it quite a coincidence that the people who are pro LNG are involved in monetary negotiations with them that are contingent upon them being successful. We have not taken any money from them as others have. We REALLY care too much about this island and our homes to take the money they offered. Selling out to FLNG and turning Texas' oldest town into an industrial site is an absolute shame.

Sincerely

James Kall Jr.

IND18 – Susan Massey

20140422-0036 FERC PDF (Unofficial) 04/22/2014

CP 12-509
CP 12-29

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SECRETARY OF THE
COMMISSION
2014 APR 22 P 1:02
FEDERAL ENERGY
REGULATORY COMMISSION

4/16/14

FERC PUBLIC MEETING

Re: Freeport LNG Development, L.P.
Permit Nos. 100114, PSDTX 1282, and N150
Permit Nos. 104840, PSDTX1302, and N170

Dear Committee Members,

I have been battling throat cancer 5 times over the span of 18 years and in 2004 they had to take my voice box out so now I am a neck-breather. What that means is that I no longer breathe through my nose, like most people... I breathe through a hole in my neck. This has taken away my sense of smell. As a neck-breather I am very concerned with the close proximity of this FLNG plant that will be constructed if they get their permit. The prevailing winds are my concern, because as the crow flies I believe we are less than 2 miles from the proposed plant. My fear is that since I can't smell and if there are no air monitors or warning systems what do I do if there is a leak? As a

IND18-1

IND18-1: To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

IND18 – Susan Massey (cont'd)

20140422-0036 FERC PDF (Unofficial) 04/22/2014

neck-breather I can't put on a face mask.

Also, my husband and I are about ready to retire, which is why we bought a home in Oyster Creek Estates in 2010, prior to learning about FLNG's plans to build a pre-treatment plant and liquefaction facility.

IND18-2

In closing, I would request that FLNG be required to put in air monitor systems and alarms loud enough that we would be able to hear in our homes...if there was a leak.

Thank you for your time,

Susan Massey

Susan Massey
127 Kings Dr.
Freeport, Texas 77541

IND18-2: The facility has been designed, and would be required, to comply with local, state and federal (NAAQS) health based and other air regulations. In addition, see IND18-1.

We address the request for air monitoring in section 4.11.

IND19 – Bob Pratt

20140422-0037 FERC PDF (Unofficial) 04/22/2014

CP12-509, CP12-29

I wish to address the pre-treatment facility in the DEIS, FERC/EIS-0250D

The pre-treatment facility, as currently proposed is an unnecessary risk and significant detraction to the residents of Turtle Cove , Oyster Creek Estates, Hideaway on the Gulf, the community of Oyster Creek and others in the immediate area.

As has now been clearly demonstrated at Northwest Pipeline incident in Washington, the pre-treatment operation is not without significant risks! There is an interesting comparison though between the sites. That facility (Wash.) is within less than mile of a couple of homes and 2-1/2 miles from any concentration of homes. The FLNG pre-treatment facility is proposed to be located less than a mile from first homes and less than 2 miles from HUNDREDS of homes.

IND19-1

FLNG continues to address the pretreatment facility in regards to pipeline safety. The pre-treatment facility is NOT a pipeline under 49CFR192, nor is it a LNG facility under 49CFRR193 (which specifically excludes pretreatment facilities) . Since the engineering company hired by FLNG will make a specification break at the plant limits of the pre-treatment facilty, how can FLNG have any reasonable idea of the fugitive emissions quantities for systems that are not defined? Leakage rates for "Pipeline quality valves" are significantly lower than industry standard equipment. The reported numbers are obviously low compared to an actual installation.

IND19-2

Freeport LNG should have located the pretreatment facility in an already industrialized area, away from large numbers of residences and yet they continue to proceed with attempting to put us at risk. Since they are buying out residents of Quintana, they should now have more space on the island! Or,,, are they worried about possible damage to the ships or their storage facility? At the current proposed location, FLNG is building their pre-treatment plant right next to an existing residential area. DO NOT expect anyone with any sense to believe a sand pit is "an existing industrial facility".

The residents of the Community of Oyster Creek, Turtle Cove, Hideaway on the Gulf, Oyster Creek Estates and others are all now being exposed to both immediate threats of an (although un-likely) significant event and the long term health dangers of fugitive emissions. This site is too close to too many people and lies immediately upwind of all of us. (wind-rose attached) I have personally been involved in many LOPA evaluations for instrumentation and control of numerous large facilities and I clearly understand that a process of this magnitude carries many risks. In any Layer of Protection Analysis the goal is reduce the potential for anything to ever go wrong, but there is also the need to understand the proximity to large numbers of people, whether employees or general public. In any evaluation where the general public could be affected, the number of layers of protection goes much higher and the separation from people becomes larger.

Freeport LNG has "played the fringe" on every point possible to keep people from understanding the full potential threat of this pre-treatment plant . They repeatedly talk to the public about pipelines and pipeline safety. This pre-treatment plant is NOT a pipeline! This entire permit application relies on the fact that the pipeline installation already exists. The permit applications are not about building a pipeline.

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APR 22 P 1:02
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IND19-1: As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND19-2: Comment acknowledged. See IND19-1.

IND19 – Bob Pratt (cont'd)

20140422-0037 FERC PDF (Unofficial) 04/22/2014

IND19-3

FLNG constantly tells everyone how safe the pipelines are. FLNG repeatedly explains all the rules and regulations insuring the safety of our states pipelines. I have every confidence in the pipelines, pipeline monitoring protocol and pipeline inspection processes required in this state. This pre-treatment facility is NOT a pipeline. It is outside the boundaries of the pipeline regulations. The product stream is being modified and compressed to move forward to the LNG plant. The pipeline is being "opened" in a chemical processing facility. The number of potential leak points in the plant, both small and large, is numbered in at least hundreds. 49CFR192 is pipeline distribution. 49 CFR193 for LNG facilities specifically excludes pre-treatment facilities (49CFR193.2001 b (2). Basically it is a chemical plant.

The pre-treatment facility is not a simple mechanical filter installation out on the prairie!

IND19-4

They (FLNG) have claimed I am mis-informing the general public about what they are building. They claim they are NOT building a chemical plant. The term chemical plant has no specific definition other than its use of chemical processes to accomplish a task not possible with simple separation by methods such as the use of a filter. I have a lot of experience in the petro-chemical industry, doing design, engineering, construction and operation of many hydrocarbon plants, processing plants and compressor stations, so I understand clearly what they are building. They are building a plant that by means of chemical processes, will strip, clean, dry and move forward huge volumes of natural gas. Now, you can put a variety of "twists" on the naming of the facility as a pre-treatment facility, or a natural gas processing facility or whatever you like, but it is clearly using chemical processes to modify a large gas stream by means other than physical separation methods, therefore it is very easily understood to the general public as a chemical plant.

Repeatedly, when pressed for details, Freeport LNG hides behind "confidential information" and then in "weak descriptions that allow people to misunderstand statements" in whatever way is favorable to FLNG. I have heard this in both descriptions of equipment and processes. They allow misinformation to blossom during discussions and FLNG is very skilled at allowing people to misunderstand that which is favorable to FLNG.

Examples.

1. "Although this facility will strip H2S from the product, the concentrations are so low as to never be a concern to the public". I agree the H2S and sulfur product concentrations in the natural gas product stream are very low. I am also very clear about stripping contaminants from product streams. The contaminants will have to be separated and routed for disposal and that accumulation will CLEARLY be at high enough concentration levels to be a concern to the public. That accumulation (in vessels and/or for destruction in flares) will be directly upwind from my subdivision.
2. "We have made all notifications and postings as required by TCEQ". Look at the attached photographs and see if you believe they met those regulations. TCEQ did go check the installations but forgot to look and see if anyone could read them.
3. When I asked if a Baker Risk Assessment (or similar), risk analysis or vapor cloud dispersion modeling of the pretreatment facility had been done concerning blast impact pressures, I

IND19-3: Regulatory authority over Pretreatment Plant and discussion of scope of study is dscussed.in section 4.10.1.

IND19-4: Comments acknowledged. See IND19-1.

20140422-0037 FERC PDF (Unofficial) 04/22/2014

was told it had not been done yet, but it would be done and it would be confidential information. I am sure they would never want the residents of Oyster Creek to see that information. The weak information in the DEIS does not address woods, housing, obstructions and vehicles as potential collection areas.

IND19-5 I fully expect there will be a fugitive emissions monitoring program required by TCEQ, as well as emergency leak detectors within the unit for hazardous situations. Yet, we have NO existing air quality monitoring in the area to insure the fugitive emissions monitoring program is successful. And, when asked about alerting the very nearby residents of an emergency situation, FLNG has repeatedly fallen back on the CAER system as the notification methodology. CAER is too slow for Turtle Cove or Oyster Creek residents if the pre-treatment facility has a major problem! Our needed response time will be measured in seconds or maybe a couple of minutes. With normal wind velocity and direction, a gas release would be on (or over) us in 3 to 4 minutes.

Moving off the pre-treatment facility itself:

IND19-6 The entire concept of exporting LNG reduces our nation's ability to continue to flourish from this great increase in low cost natural resource available to our country. We could divorce ourselves from OPEC if the natural gas cost remains low enough to incentivize movement to this now readily available alternative fuel. Exporting the gas increases the price to Americans! Some people are trying to generate excitement about the short-term positive impact on job opportunities. One thing I have noticed very clearly is that everyone that has the potential to make money from this export endeavor is very supportive of the project,,, but none of them LIVE near this problem.

We have already seen a massive influx of people for ongoing projects in this area. We already have all the temporary jobs we can handle in this area and it has adversely impacted our traffic, stores, housing and overall quality of life. This "flash in the pan" of job growth will extinguish when construction is complete and the large numbers of real jobs will be exported to another nation's soil along with the exported LNG.

Thank you,

Bob Pratt

705 CENTER WAY
LAKE JACKSON, TX 77566

320 GALLEY, TURTLE COVE

IND19-5: The facility has been designed, and would be required, to comply with local, state and federal (NAAQS) health based and other air regulations. In addition, see IND18-1.

We address the request for air monitoring in section 4.11.

IND19-6: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

IND20– Mike Airbinder

20140422-0038 FERC PDF (Unofficial) 04/22/2014

FEDERAL ENERGY REGULATORY COMMISSION

FREEPORT LNG'S LIQUEFACTION PROJECT (DOCKET NO. CP12-509, CP12-29)

Comments can be: (1) left with a FERC representative; (2) mailed to the addresses below or (3) electronically filed[1].

Please send two copies referenced to Docket Nos. CP12-509 and CP12-29 to the addresses below.

For Official Filing (send 2 copies):	Another copy (send 1 copy):
Kimberly D. Bose, Secretary Federal Energy Regulatory Commission 888 First Street, NE, Room 1A Washington, DC 20426	Gas Branch 3, PJ-11.1 Federal Energy Regulatory Commission 888 First Street , NE Washington, DC 20426

COMMENTS: (PLEASE PRINT) *[attach an additional sheet if necessary]*

IND20-1

AS A RESIDENT OF TURTLE COVE I HAVE THIS COMMENT
I DO NOT WANT the LANDSCAPE of my "BACK YARD"
TO change due to the proposed CONSTRUCTION of
the LNG LIQUIFICATION PLANT.
I WOULD much RATHER see fields of GRASS,
flowers, & COWS than to hear the sounds
of hissing AIR & FLARES, or see the
bright lights of a facility RATHER than
clear ~~days~~ SKIES & SUNSETS.

Commentor's Name and Mailing Address (*Please Print*)

MIKE AIRBINDER
P.O. BOX 2197
TURTLE COVE, TX 77542

[1] **The Commission encourages electronic filing of comments.** See 18 Code of Federal Regulations 385.2001(a)(1)(iii) and the instructions on the Commission's Internet website at http://www.ferc.gov under the link to "Documents and Filings" and "eFiling." eFiling is a file attachment process and requires that you prepare your submission in the same manner as you would if filing on paper, and save it to a file on your hard drive. New eFiling users must first create an account by clicking on "Sign up" or "eRegister." You will be asked to select the type of filing you are making. This filing is considered a "Comment on Filing." In addition, there is a "Quick Comment" option available, which is an easy method for interested persons to submit text only comments on a project. The Quick-Comment User Guide can be viewed at http://www.ferc.gov/docs-filing/efiling/quick-comment-guide.pdf. Quick Comment does not require a FERC eRegistration account; however, you will be asked to provide a valid email address. All comments submitted under either eFiling or the Quick Comment option are placed in the public record for the specified docket or project number(s).

IND20-1: Comment acknowledged.

IND21 – Scott Johnson

20140423-5019 FERC PDF (Unofficial) 04/23/2014

ORIGINAL

Scot Johnson
923 Lamar Street
Quintana, TX 77541

FILED
SECRETARY OF THE
COMMISSION

2014 APR 23 A 9:18

FEDERAL ENERGY
REGULATORY COMMISSION

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, D.C. 20426

4/15/2014

Re: Federal Energy Regulatory Commission Draft Environmental Impact Statement; Freeport
LNG Development, LP; Docket Nos. CP12-509 and CP12-29

To Whom It May Concern:

IND21-1 As a citizen and home owner in Quintana, TX we have seen significant evidence and are confident that Freeport LNG is an environmentally responsible company. We know that during the LNG Development Project, Freeport LNG will do everything in its power to ensure there are no resulting environmental issues from the construction. If there is such an issue, we have full confidence in Freeport FNG to remediate the issue and restore the environment to its proper state.

As citizens we would like to see this project progress without any undue delay. There have been attempts to block this project without any valid argument and would like to see these attempts halted. We support Freeport FNG in their effort to expand and ask that they be granted the proper permitting to move forward.

Best regards,

Scot Johnson

IND21-1: Comment acknowledged.

IND22 – Evie Johnson

20140423-5021 FERC PDF (Unofficial) 04/23/2014

ORIGINAL

Evie Johnson
923 Lamar Street
Quintana, TX 77541

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2014 APR 23 A 9 16

FEDERAL ENERGY
REGULATORY COMMISSION

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, D.C. 20426

4/15/2014

Re: Federal Energy Regulatory Commission Draft Environmental Impact Statement;
Freeport
LNG Development, LP; Docket Nos. CP12-509 and CP12-29

To Whom It May Concern:

IND22-1 As a citizen I would like to see the Freeport LNG project progress without any undue delay. There have been attempts to block this project without any valid argument and would like to see these attempts halted. We support Freeport FNG in their effort to expand and ask that they be granted the proper permitting to move forward.

We are thankful for Freeport LNG's major contributions to the town of Quintana and their efforts to provide a safe environment for our community. We are grateful for their desire to improve our community, bring jobs to the area and ultimately being tourist traffic to our town as well.

Best regards,

Evie Johnson

IND22-1: Comment acknowledged.

IND 23– Miguel Suarez

20140428-0017 FERC PDF (Unofficial) 04/28/2014

FILED
SECRETARY OF THE COMMISSION
2014 APR 28 A 9:56
FEDERAL ENERGY REGULATORY COMMISSION

ORIGINAL

MIGUEL M. SUAREZ
700 Burnett Street
Quintana, TX 77541-9112
Tel: 979-373-0024

Quintana, Saturday, April 12, 2014

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First street NE, Room 1A
Washington, DC 20426

RE: Freeport LNG Development LP – Liquefaction Project; Docket Nos. CP12-509 and CP12-29

To the Members of the Commission:

We are residents of the Island of Quintana and the purpose of this letter is to express our total and unqualified support for the approval of the above-mentioned project that has been delayed by unsubstantiated objections, some of which are motivated by greed and total ignorance of the most simple and fundamental laws of Physics and Chemistry.

IND23-1 The approval of this project is in the best interest of the United States and its objectives not only in the economic sense by providing new jobs but also in the interest of its foreign policies. When we are facing the aggressive greed of Mr. Vladimir Putin of Russia trying to pressure the Eastern European nations with the unavailability of natural gas, it would be a very good weapon to be used in defense of democracy and freedom to provide cheap natural gas to Eastern Europe to alleviate the pressures coming from Russia and this is precisely what this liquefaction plant will do once it is operational.

Our economy will be greatly benefited by the creation of more than 3,400 jobs in this community during its construction and more than 800 permanent well paid jobs for its operation. I pose this question to you. What it more important for this nation and this community in particular, the benefits to this country of ours and this area or the greed and avarice of a few persons?

During the past six years I have seen the conduct of Freeport LNG towards this town and, as the facts show, this Company has been very ethical and generous towards the town and its residents. On the other hand, the politicians of this town have continuously rejected most of the offers made by Freeport LNG such as low-cost internet, connections under the Intracoastal Waterway to connect this town to the sewer treatment plant of the city of Freeport, connection to the water system of Freeport – for at least five years our water has been non-compliant with the minimum standards (MCL) of the State of Texas.

The residents of Quintana have been offered $25,000.00 payable in five installments as a compensation for any hardships that the residents may suffer as a result of the process of building the new LNG plant. The first installment has already been paid and even the most rabid opponents to the new project took the money and continued to obstruct and oppose the project with a shameful and evident duplicity.

IND23-1: Comment acknowledged.

IND 23– Miguel Suarez (cont'd)

20140428-0017 FERC PDF (Unofficial) 04/28/2014

I have tried with no success at all to reason with some of the most vehement members of the Town government and to explain some basic elements of Physics and of Chemistry, to explain to them the Chemical phenomenon of combustion in order to put at ease the concerns about the flare and the noise pollution; but the lack of knowledge prevents them from having any basis for their objections. This is not limited to the opponents of the project but it extends also to the persons that wrote the environmental letter sent to the residents about the pollutants that may be present in the air due to the building process. For example, there is mention of Sulfuric Acid in the atmosphere. Has the person that wrote this paper ever read in a Chemistry book what the boiling point of Sulfuric Acid is? Does that person know what the surface tension of Sulfuric Acid is? By reading a book on the subject, a person can avoid such a blatant, absurd notion as Sulfuric Acid suspended in the atmosphere.

We are debating if we should publish this letter in the local newspaper in order to drum up local support for the approval of this project by the citizens living in the adjacent areas so that they will know who is in favor or who is against the creation of thousands of local jobs, available mainly to them, and who is attempting to deny the new tax revenue to their communities.

Please, do not delay this project any longer, dismiss all the nonsense, and conclude the approval process for the good of the United States and this community.

Respectfully Submitted,

Miguel M. Suárez Celia von Mering

P.S.: Please note that this letter replaces an earlier identical letter that was sent with the incorrect date.

IND24 - Linda Martin

20140428-0047 FERC PDF (Unofficial) 04/28/2014

ORIGINAL

April 21, 2014

2014 APR 28 A 11:17
FEDERAL ENERGY REGULATORY COMMISSION
SECRETARY OF THE COMMISSION

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, D.C. 20426

RE: Federal Energy Regulatory Commission Draft Environmental Impact Statement; Freeport LNG Development, LP - Liquefaction Project; Docket Nos. CP12-509 and CP12-29

IND24-1

Thank you for your leadership at the Federal Energy Regulatory Commission and for the Commission's dedication to the development of the United States' energy infrastructure in a safe and environmentally responsible manner. I am writing you in regards to the Freeport Liquefaction Project public comments on April 16, 2014 that was held in Lake Jackson, Texas and your site walk on Quintana with some of the residents.

My name is Linda Martin and I have been a "Full Time" resident on Quintana Island for 6 years. Although I was not here during the first phase of Freeport LNG my husband was, he has been a "Full Time" resident for 17 years and his parents built the home we now own and reside in. I would like to make a few comments regarding the above meeting and from your site walk.

During the Public meeting on April 16, 2014, I was prepared to make a statement regarding Freeport LNG but, then I decided to wait and listen to the comments made from the public. It's really hard for me to sit and listen to some of the comments saying they are talking for some of the other residents. Where are these residents? If all the residents from Quintana, Freeport, Oyster Creek, Oyster Creek Estates, Hide -A -Way on the Gulf, Turtle Cove, Bridge Harbor and Surfside were that concerned why didn't they attend this meeting, or any of the other multiple Public meetings that were held prior to this meeting not only by FERC but by others. Why haven't all these individual residents sent in letters to FERC or other Licensing Agencies. Looking back on the comments on FERC's website it's always the same people and the same organizations that always have negative comments and have no positive outlook on what this brings not only to Brazoria County but to the United States.

The Freeport Liquefaction Project represents a $10 billion if not more direct investment in our nation's energy infrastructure and will create thousands of multi-year engineering, construction, and associated support jobs in Texas and the Gulf Coast region. Brazoria County, where Quintana Island is located, will reap the benefits of a large portion of the economic stimulus. One of the residents stated there would be 4,000 workers on the Island of Quintana. What was said was there would be 3,500 construction workers hired over time of the whole project (not at one time), and this will be at both sites not just on Quintana Island. I believe on Quintana it was told there would be 1700 construction

IND24-1: Comment acknowledged.

20140428-0047 FERC PDF (Unofficial) 04/28/2014

workers and this would be at the peak time, again not at one time. A comment was made that Freeport LNG has not hired any resident of Quintana. My comment to that would be the majority of Quintana's residents are retired or already have other careers elsewhere. And, I'm sure if you submitted your resume and you were qualified Freeport LNG would consider you as a potential candidate. I do know that Freeport LNG has a contract with one of the residents for mowing and taking care of some of their properties, and there were also 2 residents that were hired by their contractor during Phase I, unfortunately when the project was over Freeport LNG did not have a permanent position for them. So, I wouldn't say that Freeport LNG doesn't hire residents of Quintana Island.

Another comment made that Quintana is the oldest Town (establishment) in Texas, this is not true. Quintana's History dates back to 1528. Presidio, Texas claims it was first inhabited about 1200 AD more than 500 years before the Declaration of Independence, but Presidio's claim is weak. The principal players in this ongoing feud are a couple of East Texas cities, Nacogdoches and San Augustine and a West Texas Village, Ysleta. San Augustine also had an Ayish Indian village as early as the 1200's. So with that being said, The Oldest Town in Texas is Nacogdoches and is based on archeological research which established that mounds found in the area date from approximately 1250 AD. A historian from Stephen F. Austin University once said "Can anyone prove we aren't the oldest town?"

Safety: Freeport LNG's safety record speaks for itself. After reviewing the Draft EIS, I feel that any recommendations made by FERC Freeport LNG will adhere by. As Mayor Pro Tempore for the Town of Quintana, Freeport LNG's Emergency Management Plan is filed with the Town of Quintana. Freeport LNG has had and will continue to have mock drills for the safety of the residents on the Island. Also, it should be up to each City's Emergency Management Coordinator to encourage each resident to set-up with CAER, City Wide Blackboard and 211 if needed for assistance during Emergency Evacuations. All Emergency Management Coordinators are required to attend and receive the NIMS safety certification, make regular monthly Emergency Management meetings and report back to their City Officials and / or Business' so that they may inform their residents and / or employees. Freeport LNG has multiple NIMS Certified Employees and has 2 NIMS Instructors on staff as well. To my knowledge no other Petro Chemical Plant in this area has more than 1 NIMS Certified Employee and don't have any NIMS Certified Instructors in there plants. This should say something about how Freeport LNG feels about their safety and the safety of others!! Freeport LNG purchased a Security Vessel for the Freeport Police Department that can be used for Emergency Response. Freeport LNG also, funds Freeport Fire Department and Oyster Creek Fire Department on their training at Texas A&M. There was a statement asked if Freeport LNG has been approved by the US Coast Guards. The United States Coast Guard executes the motto "PROTECT AND SERVE" and DO NOT HAVE TO HAVE A CONTRACT WITH Freeport LNG.

Air Monitoring Sites: The U.S. Environmental Protection Agency (EPA) and the TCEQ, operates and maintains an ambient air monitoring network and is placed throughout Brazoria County this includes Lake Jackson, Clute, Freeport and Oyster Creek, Quintana

20140428-0047 FERC PDF (Unofficial) 04/28/2014

On Environmental Quality has made a decision that Freeport LNG Development, L.P. Permit Nos. 100114, PSDTX1282, and N150 Permit Nos. 104840, PSDTX1302, and N170 said such permit applications meet the requirements of applicable law, And No changes to the draft permit have been made in response to public comment. Freeport LNG is not or will not be the only dangerous facility in this area. You have BASF, GULF CHEMICAL, PHILLIPS 66, DOW and numerous of Pipelines in and around Brazoria County. There also was a comment made that there were no Petro Chemical Plants on the other side of 332, which is not correct there is Shin Tech, Air Liquide, DSM (just to name a few). What about the Land fill with all the Methane Gas that is released and you can smell it all the way to Quintana. You don't hear any residents complaining about that smell!! The Texas Gulf Coast is a Petro Chemical Mega area and yes, at times they do STINK!! And Yes, They do get fined!! You also have a CHOICE where you live and / or retire you chose to live on the Texas Gulf Coast around the Petro Chemical Area.

Noise, Vibration, Visual, Traffic and Dust: Construction of the Project will have a impact on the Residents no doubt, but they lived through Phase I why can't you live through Phase 2. Raising the Bern on the west end is not beneficial to the entire Island, therefore this is unfair for the rest of the Island, where were these residents when Phase I was built and the east end of the island had a visual impact? Why aren't these Residents complaining about what they will see / hear across the Intercoastal? Why aren't residents worried about all the other construction that has / will have a impact, why must it be just Freeport LNG? There are other Vessels, Tug boats and even the Pilot Boats that make noise and vibrate, but the residents don't complain about them just Freeport LNG and the ships that come there. Traffic, there will be some traffic, but not as much as what they are complaining about, the construction workers will be bussed in and only supervision will be allowed to bring their vehicles on the Island. Remember that most of the residents on Quintana are retired, and there are probably less then 4 children that actually rides the bus to school. Which Freeport LNG corresponded the traffic so that it did not interfere with the bus route and children getting to school on time. The lighting that Freeport LNG has now is soft yellow…..Have you seen what the other plants lights look like? They are Bright and you can see them for miles!! Freeport LNG has informed the Town Council that they will and have in the past have a detailed traffic management plan provided by Zachary Construction and Freeport LNG. In my opinion, there is not ANY NEW SIGNIFICANT FINDINGS in these areas to keep Freeport LNG in obtaining their final permitting and moving forward with construction. I'm sure Freeport LNG will abide by FERC's recommendations and if there are complaints from residents once addressed Freeport LNG will take control of the situation like they have always done in the past.

Buyouts: It is at the decision of each home owner how he/she feels that Freeport LNG made a fair market value on their property or not. This is not the opinions of others to say. I don't understand how can you compare Quintana's property value with Surfside? Surfside brings a lot more tourism then Quintana, it also has a lot more amenities (restaurants, convenience stores, gas stations, bait camps, etc…..) and lets don't forget they also clean their beaches….lets face it the majority of the public want to have clean beaches to visit / or live. Quintana doesn't have these amenities to offer perspective

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home buyers. The majority of the land on Quintana is wetlands and if you purchased property more than likely you will not be able to build, because you wouldn't be able to obtain permits from the Core of Engineers. I have also heard comments that Freeport LNG is the reason no new homes are being built. That is not the case, within the last 2 years there has been 4 houses built and 1 that just received their permit to clear their land. To my knowledge, and I don't have any proof, there are around 11 home owners on Quintana Island that didn't agree with Freeport LNG's fair market value that was offered for their property. How many of these property owners took the "Impact Payments" as a result of potential construction inconveniences? Again, your good enough to take their impact payments and are agreeing that there will be a impact, but are still complaining and wanting more!! I'm assuming that the remaining residents (property owners) felt that it was a fair market value and accepted their offers. Just because you accepted their offer of a buyout does not mean your leaving!!! There are some that will rent there home back and then there are some that just sold rental property and will continue to live on the Island. Some residents sold and will rebuild on other lots that they own. It has been said that Freeport LNG is trying to separate (divide) the Island / Residents.....this is not true, it's the ones that are not selling their property and holding grudges on the property owners that did accept the buyout. Everyone has their own reasoning for selling and should not be faulted by those who didn't sell.

Freeport LNG has always and continues to be a GREAT neighbor. Not only does the Town of Quintana receive majority of their income from Freeport LNG, they also participate in Beach Clean-up and not just their employees but their families as well. They have sponsored Quintana's Creed Day Celebration every year, by donating money, cook-off teams, water, lighting and even the man power to help with the preparation of this event. Freeport LNG actively supports a number of local civic and humanitarian organizations through the volunteer efforts of its employees and contractors and through charitable contributions.

I am writing these comments of my own free will, and have not been asked, or told what to say, I have not signed any documents not prepared by me, or have been coworsed by Freeport LNG, it's employees or families, attorneys or contractors. I have not received any monies other than the Impact Payment, and I have signed a Conflict of Interest Affidavit on file with the Town of Quintana being that I am the Mayor Pro Tempore for the Town.

According to the Draft EIS after the comments are reviewed, "ANY SIGNIFICANT NEW ISSUES WILL BE INVESTIGATED". I still haven't seen ANY SIGNIFICANT NEW ISSUES from all the comments filed that warrant a investigation that FERC hasn't already addressed.

IND24-1 I would appreciate your personal attention to ensuring the Freeport Liquefaction Project is processed expeditiously through the remaining environmental review / comment phase so that the Commission will move quickly and approve the Freeport Liquefaction Project no later than during the July 2014 Commission meeting granting the Final EIS, and allowing

IND24-1: Comment acknowledged.

IND24 - Linda Martin (Cont'd)

20140428-0047 FERC PDF (Unofficial) 04/28/2014

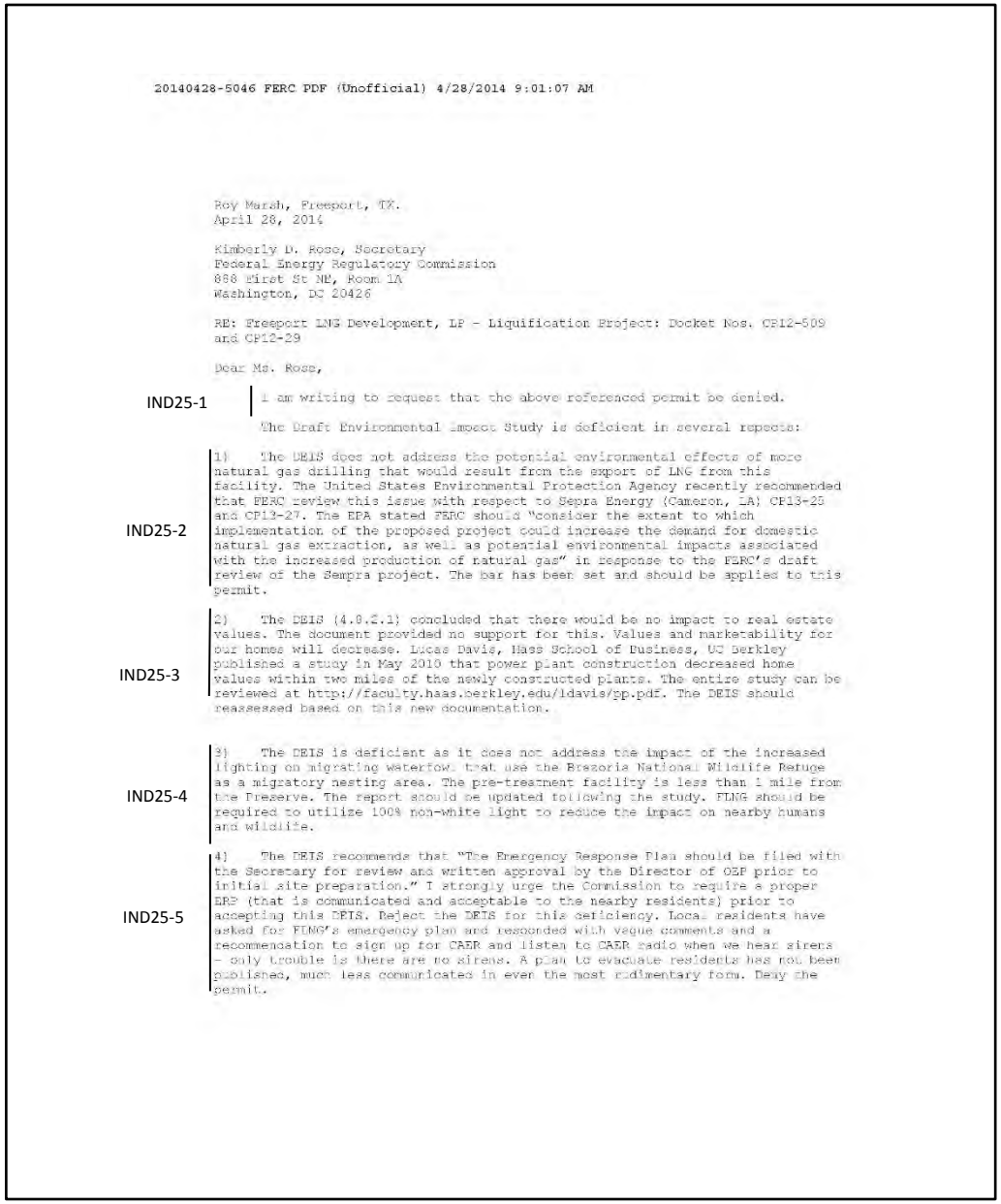
Freeport Liquefaction Project to start construction in August 2014 as requested.

Thank you in advance for your consideration.

Linda K. Martin

Linda K. Martin
910 Dewey St.
Quintana, TX 77541

IND25– Roy Marsh



20140428-5046 FERC PDF (Unofficial) 4/28/2014 9:01:07 AM

Roy Marsh, Freeport, TX.
April 28, 2014

Kimberly D. Rose, Secretary
Federal Energy Regulatory Commission
888 First St NE, Room 1A
Washington, DC 20426

RE: Freeport LNG Development, LP – Liquification Project: Docket Nos. CP12-509 and CP12-29

Dear Ms. Rose,

IND25-1 I am writing to request that the above referenced permit be denied.

The Draft Environmental Impact Study is deficient in several repects:

IND25-2 1) The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The United States Environmental Protection Agency recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to this permit.

IND25-3 2) The DEIS (4.8.2.1) concluded that there would be no impact to real estate values. The document provided no support for this. Values and marketability for our homes will decrease. Lucas Davis, Hass School of Business, UC Berkley published a study in May 2010 that power plant construction decreased home values within two miles of the newly constructed plants. The entire study can be reviewed at http://faculty.haas.berkley.edu/ldavis/pp.pdf. The DEIS should reassessed based on this new documentation.

IND25-4 3) The DEIS is deficient as it does not address the impact of the increased lighting on migrating waterfow. that use the Brazoria National Wildlife Refuge as a migratory nesting area. The pre-treatment facility is less than 1 mile from the Preserve. The report should be updated following the study. FLNG should be required to utilize 100% non-white light to reduce the impact on nearby humans and wildlife.

IND25-5 4) The DEIS recommends that "The Emergency Response Plan should be filed with the Secretary for review and written approval by the Director of OEP prior to initial site preparation." I strongly urge the Commission to require a proper ERP (that is communicated and acceptable to the nearby residents) prior to accepting this DEIS. Reject the DEIS for this deficiency. Local residents have asked for FLNG's emergency plan and responded with vague comments and a recommendation to sign up for CAER and listen to CAER radio when we hear sirens – only trouble is there are no sirens. A plan to evacuate residents has not been published, much less communicated in ever the most rudimentary form. Deny the permit.

IND25-1: Comment acknowledged.

IND25-2: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

IND25-3: As noted in section 4.8, the main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence, and we do not anticipate any impact on the value of adjacent properties or homes. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities. The Pretreatment Plant site is characterized in the EIS as a "commercial area".

IND25-4: As noted in Section 4.5.3.1 we have looked at the potential impacts from facility lighting on wildlife and have concluded that, given Freeport LNG's mitigation efforts and the Freeport LNG Facility Lighting Design Plan (FLDP), impacts to migratory and non-migratory birds will be minor. On December 6, 2013 Freeport LNG submitted a response to a data request (Docket Nos. CP12-509-000 and CP12-29-000) that addresses additional mitigation measures. Section 4.5.2 addresses the Brazoria National Wildlife Refuge. We anticipate Project related activities to have a minor impact on wildlife.

IND25-5: To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

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IND25-6

5) The DEIS addresses pollution credits from the general region be utilized for projected pollution that will be generated. The Commission needs to require that these credits be from within 10 miles of the facility. Reduction of pollution 100 miles away does not compensate local residents for the toxins that QLNG will be filling our homes and lungs with nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

In conclusion, please deny this permit or at least send the DEIS back to staff to address these deficiencies.

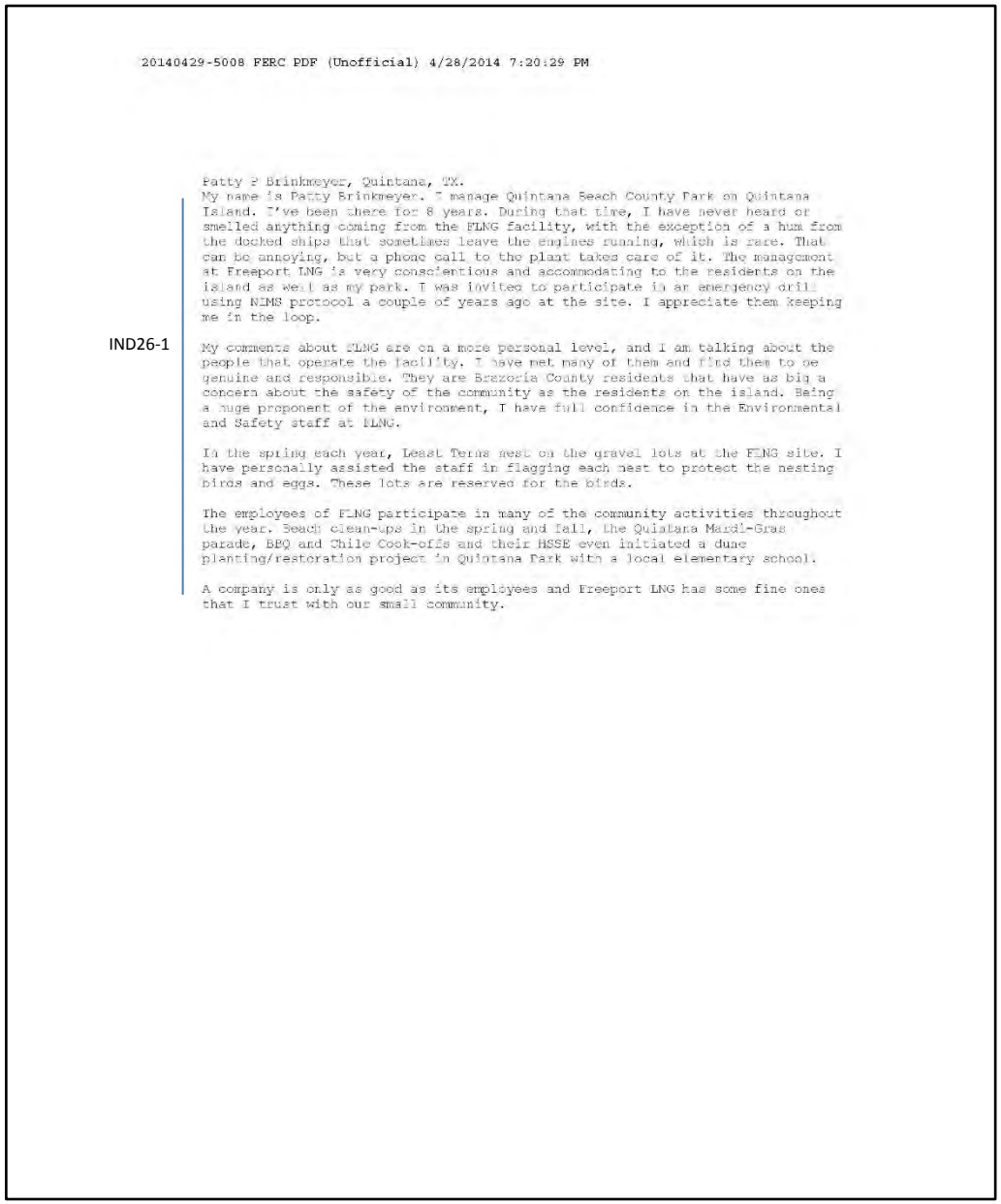
Respectfully submitted,

Roy Marsh
1675 Blue Water Dr
Freeport, TX 77541

IND25-6: Please see section 4.11.1.

INDIVIDUAL COMMENTS

IND26 – Patty Brinkmeyer



20140429-5008 FERC PDF (Unofficial) 4/28/2014 7:20:29 PM

Patty P Brinkmeyer, Quintana, TX.
My name is Patty Brinkmeyer. I manage Quintana Beach County Park on Quintana Island. I've been there for 8 years. During that time, I have never heard or smelled anything coming from the FLNG facility, with the exception of a hum from the docked ships that sometimes leave the engines running, which is rare. That can be annoying, but a phone call to the plant takes care of it. The management at Freeport LNG is very conscientious and accommodating to the residents on the island as well as my park. I was invited to participate in an emergency drill using NIMS protocol a couple of years ago at the site. I appreciate them keeping me in the loop.

IND26-1

My comments about FLNG are on a more personal level, and I am talking about the people that operate the facility. I have met many of them and find them to be genuine and responsible. They are Brazoria County residents that have as big a concern about the safety of the community as the residents on the island. Being a huge proponent of the environment, I have full confidence in the Environmental and Safety staff at FLNG.

In the spring each year, Least Terns nest on the gravel lots at the FLNG site. I have personally assisted the staff in flagging each nest to protect the nesting birds and eggs. These lots are reserved for the birds.

The employees of FLNG participate in many of the community activities throughout the year. Beach clean-ups in the spring and fall, the Quintana Mardi-Gras parade, BBQ and Chile Cook-offs and their HSSE even initiated a dune planting/restoration project in Quintana Park with a local elementary school.

A company is only as good as its employees and Freeport LNG has some fine ones that I trust with our small community.

IND26-1: Comment acknowledged.

IND27 – Glenn and Colleen Ecord, Houston, TX – Page 1

20140429-0015 FERC PDF (Unofficial) 04/29/2014

ORIGINAL

FILED
SECRETARY OF THE
COMMISSION
2014 APR 29 A 9:07
FEDERAL ENERGY
REGULATORY COMMISSION

Kimberly D. Bose, Secretary
Federal Energy RegulatoryCommission
888 First St, NE, Room 1A
Washington, DC 20426

Re: Freeport LNG Development, LP
Liquefaction Project
Docket Nos. CP12-509 and CP12-29

April 28, 2014

Dear Ms. Bose,
We have a daughter and son-in-law who invested in a house on Quintana island as a frequent retreat from the Houston area and a future home after retirement. We often visit the house ourselves for fishing, birding, kayaking, exercise and just plain relaxation. The house is in a beautiful, uncrowded area with only an active wetland between the house and beach.

IND27-1 All of the wonderful amenities that have meant so much to all of us will be compromised, if not destroyed, by the LNG plans for expansion. Undoubtedly LNG will rent houses that they buy to construction workers to recover the costs of their purchase. Temporary construction workers, typically, will care little about the island or existing resources, beauty, or community. There will be noise, dust, upheaval, horrendous traffic, and an influx of people for temporary construction work that will change the peaceful and safe aspects of living on the island or visiting there. The birds will move, fishing will become a hassle and the area will become a blight because of crowding, disinterest and abuse. The world will change for those currently living on the island for recreation, peace, and the enjoyment of the life it offers, as they had planned and hoped for when buying there.

Big money and pressure on Quintana citizens will likely win out, as usual, and sale of island homes by those who don't want to leave may become a last resort. "Fair" market value for Quintana homes does not adequately compensate anyone who is forced to leave. The replacement cost of a home of equal size and quality and comparable setting should be the "fair" basis. Quintana is on the far end of the many inhabited beaches southwest of Galveston and as distance to Galveston is decreased costs would be 2 - 3 times, or more, than the market value for Quintana. Those forced to move under current proposed arrangements stand to lose too much when considering replacement cost and loss of amenities. Of course there are a few who have always wanted to leave the island if given any kind of incentive, and they will do so.

IND27-2 We recommend that LNG provide much better incentives than they have for those who want to stay on the island. These people will have to go through a lot of discomfort and challenge while hoping for a better day when things will settle down and the island can reclaim some of its current attractiveness and amenities. Quintana will still have the potential to be a delightful, restful and enjoyable island where one would like to be at home, and it is incumbent on LNG to try to assure this. Those who stay on the island can be helpful and cooperative and should be treated especially well since they must change their plans and dreams accordingly to accommodate an LNG expansion that must be worth many millions of dollars to the company.

IND27-1: Comment acknowledged.

IND27-2: Comment acknowledged.

IND27 – Glenn and Colleen Ecord, Houston, TX – Page 2

20140429-0015 FERC PDF (Unofficial) 04/29/2014

LNG should consider that the proposed Quintana construction is not only a matter of business, but involves the emotions and happiness of persons already living on the island. The latter consideration may seem laughable to a big company, but people are also important in our world and sometimes make a big difference. It would only mean a relatively few less places available for workers. Damage to the existing environment is also a strong possibility. We believe that good relations between LNG and persons staying with homes on Quintana island could greatly mitigate potential problems during construction. LNG should actively plan for this.

Sincerely,

Glenn Ecord

Colleen S. Ecord

Glenn and Colleen Ecord
1502 Seagate Ln.
Houston, TX 77062-4508

IND28 – Patty P. Brinkmeyer, Quintana, TX

20140429-5008 FERC PDF (Unofficial) 4/28/2014 7:20:29 PM

Patty P Brinkmeyer, Quintana, TX.
My name is Patty Brinkmeyer. I manage Quintana Beach County Park on Quintana Island. I've been there for 8 years. During that time, I have never heard or smelled anything coming from the FLNG facility, with the exception of a hum from the docked ships that sometimes leave the engines running, which is rare. That can be annoying, but a phone call to the plant takes care of it. The management at Freeport LNG is very conscientious and accommodating to the residents on the island as well as my park. I was invited to participate in an emergency drill using NIMS protocol a couple of years ago at the site. I appreciate them keeping me in the loop.

My comments about FLNG are on a more personal level, and I am talking about the people that operate the facility. I have met many of them and find them to be genuine and responsible. They are Brazoria County residents that have as big a concern about the safety of the community as the residents on the island. Being a huge proponent of the environment, I have full confidence in the Environmental and Safety staff at FLNG.

In the spring each year, Least Terns nest on the gravel lots at the FLNG site. I have personally assisted the staff in flagging each nest to protect the nesting birds and eggs. These lots are reserved for the birds.

The employees of FLNG participate in many of the community activities throughout the year. Beach clean-ups in the spring and fall, the Quintana Mardi-Gras parade, BBQ and Chile Cook-offs and their HSSE even initiated a dune planting/restoration project in Quintana Park with a local elementary school.

IND28-1 A company is only as good as its employees and Freeport LNG has some fine ones that I trust with our small community.

IND28-1: Comment acknowledged.

IND29 – Louise Stohr, Freeport, TX

20140505-5004 FERC PDF (Unofficial) 5/2/2014 7:50:07 PM

Louise Stohr, Freeport, TX.
In 1986, my husband Raymond Stohr, and I purchased our home in Turtle Cove, to have a place where we could retire and live out our final days. My husband has since deceased, but I have enjoyed living and working here. I have never entertained the thought of selling my home, until the pre-treatment plant made plans to move less than a mile away. I have 12 Grandchildren and 12 Great-grandchildren that I hoped would be able to come and enjoy my home with me, but not if the plant comes in.
I have always enjoyed the peaceful nights with only the sounds of crickets or owls or maybe a dog barking. The mornings are filled with the sound of chirping birds. When the pre-treatment plant comes in that will all change.
I'm not one to stand in the way of progress if that is the only place it can be built, but that's not the case. FLNG already has a plant on 523 that is not near any homes, and property that they own where they would be able to build their pre-treatment plant without interrupting the lives of so many people.
Turtle Cove, Hideaway on the Gulf, Oyster Creek Estates, Bridge Pointe, Oyster Creek and many others will be effected if this plant is allowed to build on the Levee Road and Hwy.332.
Texas has a lot of open land, why on earth would this plant want to build in such a location that disrupts the lives of so many people! I am giving this up to God, because that is who those people will have to finally answer to.

IND29-1

IND29-1: Section 3.3.2 addresses site selection criteria considered for the Pretreatment Plant and details why the Pretreatment Plant Site was chosen and is preferable to alternative sites.

IND30 – Laura Jones, Freeport, TX – Page 1

20140505-5011 FERC PDF (Unofficial) 5/4/2014 10:13:32 AM

Laura Jones, Freeport, TX.
The DEIS puts much effort into the liquefaction facility on Quintana and only minimal focus on the larger facility at the pre-treatment site. The pre-treatment facility issues need to be more clearly separated in the context of document.

IND30-1

1) The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to the FLNG permits.

2) Page 4-119 under "Property Values" the paragraph "artfully" mixes the pre-treatment site with the liquefaction site and then mis-states that the pre-treatment site location as INDUSTRIAL. The proposed pre-treatment area is clearly in agricultural use with some dirt pits and clearly identified on County Tax records as natural pasture land. The majority of adjacent properties are residential. None are identified as Industrial and only a small section to the south has some metering/filtering/small tanks in place. On Page 4-119 under "Property Values" states there is no expected impact on value of adjacent properties. This is a ridiculous statement as this large scale pre-treatment facility made up of numerous chemical processes, noise producers, flares and visual impact will clearly reduce the values of "pleasantly remote residences". The levee does not create a barrier for the subdivisions of Turtle Cove, Hideaway, OC Estates, Bridgepointe, and Bridge Harbor. The DEIS (4.8.2.1) concludes that there would be no impact to real estate values. The document provides no support for this. Values and marketability for our homes will decrease. Lucas Davis, Hass School of Business, UC Berkley published a study in May 2010 that power plant construction decreased home values within two miles of the newly constructed plants. The entire study can be reviewed at http://faculty.haas.berkley.edu/ldavis/pp.pdf. The DEIS should reassessed based on this new documentation.

3) DEIS section 4.5.3.1 gives much attention to the habitat and migration of birds on Quintana. It proposes to use only "full cut-off lighting" at the liquefaction facility to address bird migration concerns, but does not address the impact of the increased lighting on migrating waterfowl that use the Brazoria National Wildlife Refuge as a migratory nesting area near the pre-treatment facility. The pre-treatment facility is less than 1 mile from the Preserve. The DEIS is deficient in this aspect. A study should be conducted, and the report should be updated. FLNG should be required to utilize 100% non-white light to reduce the impact on nearby humans and wildlife.

4) The DEIS recommends that "The Emergency Response Plan should be filed with the Secretary for review and written approval by the Director of OEP prior to initial site preparation." I strongly urge the Commission to require a proper ERP (that is communicated and acceptable to the nearby residents) prior to accepting this DEIS. Reject the DEIS for this deficiency. Local residents have repeatedly asked for FLNG's emergency plan. FLNG has responded with vague comments and a recommendation to sign up for CAER and listen to CAER radio when

IND30-1: Comment acknowledged.

The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

As noted in section 4.8, the main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence, and we do not anticipate any impact on the value of adjacent properties or homes. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities. The Pretreatment Plant site is characterized in the EIS as a "commercial area".

As noted in Section 4.5.3.1 we have looked at the potential impacts from facility lighting on wildlife and have concluded that, given Freeport LNG's mitigation efforts and the Freeport LNG Facility Lighting Design Plan (FLDP), impacts to migratory and non-migratory birds will be minor. On December 6, 2013 Freeport LNG submitted a response to a data request (Docket Nos. CP12-509-000 and CP12-29-000) that addresses additional mitigation measures. Section 4.5.2 addresses the Brazoria National Wildlife Refuge. We anticipate Project related activities to have a minor impact on wildlife.

To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND30 – Laura Jones, Freeport, TX – Page 2

20140505-5011 FERC PDF (Unofficial) 5/4/2014 10:13:32 AM

IND30-1 cont'd | we hear sirens; however, there are NO sirens. A plan to evacuate residents has not been published, much less communicated in even the most rudimentary form.

5) The DEIS addresses pollution credits from the general region be utilized for FLNG's projected generation of pollution. The Commission needs to require that these credits be from within 10 miles of the facility. Reduction of pollution 100 miles away does not compensate local residents for the toxins that FLNG will be filling our homes and lungs with, nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

IND30-2 | 6) The Socioeconomic information in section 4.8 is out dated. Potentially available local worker resources have already been stretched thin. Readily available housing has already been filled. Housing is already at significant premium, and workers are already commuting to reach project work already in progress. This section 4.8 does NOT reflect current conditions in the area.

IND30-3 | 7) A noise study needs to be done for Turtle Cove and Hideaway. The other Site 3 measurements are influenced by contributors that are far removed and cross-wind from the subdivisions. The subdivisions will be predominantly down-wind of the proposed pre-treatment plant whereas the other sites will be cross-wind, and the contributed values easily have the potential to double the noise level (10 dba increase) at these already quite areas. The 55 dba level allowed in the DEIS at other sample locations is totally unacceptable in quite neighborhoods.

IND30-4 | 8) DEIS, 2.1.3 states that the pre-treatment facility needs 38,000 gallons of water per day. This is a HUGE issue for the nearby communities and cities that draw their fresh water from the same aquifer. Fresh water is at a premium in the area of Texas, and this will have a detrimental effect on the residents in this area. Also, this water will be used in processes to remove contaminants. Yet, there is no discussion of waste water outfall. How will it be handled, or where will it be routed from the pre-treatment facility? There is only storm water discussed in the DEIS. What is the waste water plan? There is no pipeline demonstrated in the proposal to take waste water off the pre-treatment site to another permitted location.

IND30-5 | In conclusion, please deny the permits or at least send the DEIS back to staff to address these deficiencies.

IND30-2: This is addressed in section 4.8.2, 4.8.3, and 4.8.4 of the EIS.

IND30-3: Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

IND30-4: This is addressed in section 4.3 of the EIS.

IND30-5: Comment acknowledged.

INDIVIDUAL COMMENTS

IND31– Larry G. Jones, Freeport TX

20140505-5012 FERC PDF (Unofficial) 5/4/2014 12:53:53 PM

Larry G. Jones, Freeport, TX.
Docket CP12-509

This response is to the proposed Pre-treatment facility behind the levee. I am a ten year resident of Hide-Away on the Gulf, a planned community built in 1965 of 167 homes.

IND31-1 Here it is the beginning of summer and the Southwest wind is blowing in directly from the proposed FLNG Pre-treatment facility toward Hide-way on the Gulf. All of the particulates will be settling all over our neighborhood. Even though FLNG says that they are within the legal limits for pollution, it is pollution. I think it's ironic that FLNG's polluting estimates are just under the maximum limits for changing the pre-treatment facility from a pipeline to process plant, therefore keeping the permit requirements easy. Regardless, I didn't move here to breathe that crap. I moved here for the quietness, the clean Gulf breezes and relatively close transit to my workplace. Why doesn't FLNG build this pre-treatment plant on the West side of Highway 288 where all the other polluting facilities exist? Or why don't they build it where FLNG has bought out most residents on the adjoining Quintana island property?

IND31-2 I am also concerned about the safety and security of the pre-treatment plants operation.

First, it is a remote, stand-alone facility and easily susceptible to a terrorist act. Being moved to the protective umbrella of the main plant on Quintana would be logical.

Secondly, the original intended purpose of FLNG's pipeline from the island to the storage facility was for IMPORT of gas. The pipe specifications were for clean, pre-filtered gas. I am concerned about the dirty gas flowing through the pipeline before it is filtered of condensates.

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IND31-1: To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

IND31-2: Section 4.10.8 addresses security of the Freeport LNG facilities.

IND32– Nancy Laurie, Corpus Christi, TX – Page 1

20140505-5015 FERC PDF (Unofficial) 5/4/2014 4:07:32 PM

NANCY LAURIE, CORPUS CHRISTI, TX.
The DEIS puts much effort into the liquefaction facility on Quintana and only minimal focus on the larger facility at the pre-treatment site. The pre-treatment facility issues need to be more clearly separated in the context of document.

IND32- 1

1) The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to the FLNG permits.

2) Page 4-119 under "Property Values" the paragraph "artfully" mixes the pre-treatment site with the liquefaction site and then mis-states that the pre-treatment site location as INDUSTRIAL. The proposed pre-treatment area is clearly in agricultural use with some dirt pits and clearly identified on County Tax records as natural pasture land. The majority of adjacent properties are residential. None are identified as Industrial and only a small section to the south has some metering/filtering/small tanks in place. On Page 4-119 under "Property Values" states there is no expected impact on value of adjacent properties. This is a ridiculous statement as this large scale pre-treatment facility made up of numerous chemical processes, noise producers, flares and visual impact will clearly reduce the values of "pleasantly remote residences". The levee does not create a barrier for the subdivisions of Turtle Cove, Hideaway, OC Estates, Bridgepointe, and Bridge Harbor. The DEIS (4.8.2.1) concludes that there would be no impact to real estate values. The document provides no support for this. Values and marketability for our homes will decrease. Lucas Davis, Hass School of Business, UC Berkley published a study in May 2010 that power plant construction decreased home values within two miles of the newly constructed plants. The entire study can be reviewed athttp://faculty.haas.berkley.edu/ldavis/pp.pdf. The DEIS should reassessed based on this new documentation.

3) DEIS section 4.5.3.1 gives much attention to the habitat and migration of birds on Quintana. It proposes to use only "full cut-off lighting" at the liquefaction facility to address bird migration concerns, but does not address the impact of the increased lighting on migrating waterfowl that use the Brazoria National Wildlife Refuge as a migratory nesting area near the pre-treatment facility. The pre-treatment facility is less than 1 mile from the Preserve. The DEIS is deficient in this aspect. A study should be conducted, and the report should be updated. FLNG should be required to utilize 100% non-white light to reduce the impact on nearby humans and wildlife.

4) The DEIS recommends that "The Emergency Response Plan should be filed with the Secretary for review and written approval by the Director of OEP prior to initial site preparation." I strongly urge the Commission to require a proper ERP (that is communicated and acceptable to the nearby residents) prior to accepting this DEIS. Reject the DEIS for this deficiency. Local residents have repeatedly asked for FLNG's emergency plan. FLNG has responded with vague comments and a recommendation to sign up for CAER and listen to CAER radio when

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IND32-1: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

As noted in section 4.8, the main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence, and we do not anticipate any impact on the value of adjacent properties or homes. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities. The Pretreatment Plant site is characterized in the EIS as a "commercial area".

As noted in Section 4.5.3.1 we have looked at the potential impacts from facility lighting on wildlife and have concluded that, given Freeport LNG's mitigation efforts and the Freeport LNG Facility Lighting Design Plan (FLDP), impacts to migratory and non-migratory birds will be minor. On December 6, 2013 Freeport LNG submitted a response to a data request (Docket Nos. CP12-509-000 and CP12-29-000) that addresses additional mitigation measures. Section 4.5.2 addresses the Brazoria National Wildlife Refuge. We anticipate Project related activities to have a minor impact on wildlife.

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As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

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we hear sirens; however, there are NO sirens. A plan to evacuate residents has not been published, much less communicated in even the most rudimentary form.

IND32- 1 cont'd

5) The DEIS addresses pollution credits from the general region be utilized for FLNG's projected generation of pollution. The Commission needs to require that these credits be from within 10 miles of the facility. Reduction of pollution 100 miles away does not compensate local residents for the toxins that FLNG will be filling our homes and lungs with, nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

6) The Socioeconomic information in section 4.8 is out dated. Potentially available local worker resources have already been stretched thin. Readily available housing has already been filled. Housing is already at significant premium, and workers are already commuting to reach project work already in progress. This section 4.8 does NOT reflect current conditions in the area.

IND32-2

7) A noise study needs to be done for Turtle Cove and Hideaway. The other Site 3 measurements are influenced by contributors that are far removed and cross-wind from the subdivisions. The subdivisions will be predominantly down-wind of the proposed pre-treatment plant whereas the other sites will be cross-wind, and the contributed values easily have the potential to double the noise level (10 dba increase) at these already quite areas. The 55 dba level allowed in the DEIS at other sample locations is totally unacceptable in quite neighborhoods.

8) DEIS, 2.1.3 states that the pre-treatment facility needs 38,000 gallons of water per day. This is a HUGE issue for the nearby communities and cities that draw their fresh water from the same aquifer. Fresh water is at a premium in the area of Texas, and this will have a detrimental effect on the residents in this area. Also, this water will be used in processes to remove contaminants. Yet, there is no discussion of waste water outfall. How will it be handled, or where will it be routed from the pre-treatment facility? There is only storm water discussed in the DEIS. What is the waste water plan? There is no pipeline demonstrated in the proposal to take waste water off the pre-treatment site to another permitted location.

IND32-3

In conclusion, please deny the permits or at least send the DEIS back to staff to address these deficiencies.

IND32-2: This is addressed in section 4.8.2, 4.8.3, and 4.8.4 of the EIS.

Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

This is addressed in section 4.3 of the EIS.

IND32-3: Comment acknowledged.

IND33– James Moon, Freeport, TX – Page 1

20140505-5017 FERC PDF (Unofficial) 5/4/2014 5:54:38 PM

James Moon, Freeport, TX.

1) The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to the FLNG permits.

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IND33-1

3) DEIS section 4.5.3.1 gives much attention to the habitat and migration of birds on Quintana. It proposes to use only "full cut-off lighting" at the liquefaction facility to address bird migration concerns, but does not address the impact of the increased lighting on migrating waterfowl that use the Brazoria National Wildlife Refuge as a migratory nesting area near the pre-treatment facility. The pre-treatment facility is less than 1 mile from the Preserve. The DEIS is deficient in this aspect. A study should be conducted, and the report should be updated. FLNG should be required to utilize 100% non-white light to reduce the impact on nearby humans and wildlife.

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5) The DEIS addresses pollution credits from the general region be utilized for FLNG's projected generation of pollution. The Commission needs to require that these credits be from within 10 miles of the facility. Reduction of pollution

280

IND33-1: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

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As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND33– James Moon, Freeport, TX – Page2

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IND33-1 cont'd

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IND33-2

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IND33-2

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IND33-2: This is addressed in section 4.8.2, 4.8.3, and 4.8.4 of the EIS.

Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

This is addressed in section 4.3 of the EIS.

IND33-2: Comment acknowledged.

IND34– Harold Hendricks, Freeport, TX – Page 1

20140505-5018 FERC PDF (Unofficial) 5/4/2014 5:56:28 PM

Harold Hendricks, Freeport, TX.

1) The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to the FLNG permits.

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IND34-1: Comment acknowledged.

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IND34– Harold Hendricks, Freeport, TX – Page 2

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IND34-1 cont'd

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IND34-2

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IND34-3

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IND34-3: Comment acknowledged.

IND35– Chuck Owens, Freeport, TX – Page 1

20140505-5019 FERC PDF (Unofficial) 5/4/2014 6:52:30 PM

Chuck Owens, Freeport, TX.

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As noted in Section 4.5.3.1 we have looked at the potential impacts from facility lighting on wildlife and have concluded that, given Freeport LNG's mitigation efforts and the Freeport LNG Facility Lighting Design Plan (FLDP), impacts to migratory and non-migratory birds will be minor. On December 6, 2013 Freeport LNG submitted a response to a data request (Docket Nos. CP12-509-000 and CP12-29-000) that addresses additional mitigation measures. Section 4.5.2 addresses the Brazoria National Wildlife Refuge. We anticipate Project related activities to have a minor impact on wildlife.

To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND35– Chuck Owens, Freeport, TX – Page 2

20140505-5019 FERC PDF (Unofficial) 5/4/2014 6:52:30 PM

IND35-1 cont'd

100 miles away does not compensate local residents for the toxins that FLNG will be filling our homes and lungs with, nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

6) The Socioeconomic information in section 4.8 is out dated. Potentially available local worker resources have already been stretched thin. Readily available housing has already been filled. Housing is already at significant premium, and workers are already commuting to reach project work already in progress. This section 4.8 does NOT reflect current conditions in the area.

IND35-2

7) A noise study needs to be done for Turtle Cove and Hideaway. The other Site 3 measurements are influenced by contributors that are far removed and cross-wind from the subdivisions. The subdivisions will be predominantly down-wind of the proposed pre-treatment plant whereas the other sites will be cross-wind, and the contributed values easily have the potential to double the noise level (10 dba increase) at these already quite areas. The 55 dba level allowed in the DEIS at other sample locations is totally unacceptable in quite neighborhoods.

8) DEIS, 2.1.3 states the pre-treatment facility needs 38,000 gallons of water per day. This is a HUGE issue for the nearby communities and cities that draw their fresh water from the same aquifer. Fresh water is at a premium in the area of Texas, and this will have a detrimental effect on the residents in this area. Also, this water will be used in processes to remove contaminants. Yet, there is no discussion of waste water outfall. How will it be handled, or where will it be routed from the pre-treatment facility? There is only storm water discussed in the DEIS. What is the waste water plan? There is no pipeline demonstrated in the proposal to take waste water off the pre-treatment site to another permitted location.

IND35-3

In conclusion, please deny the permits or at least send the DEIS back to staff to address these deficiencies.

IND35-2: This is addressed in section 4.8.2, 4.8.3, and 4.8.4 of the EIS.

Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

This is addressed in section 4.3 of the EIS

IND35-3: Comment acknowledged.

IND36– Robert Pratt, Lake Jackson, TX

20140505-5020 FERC PDF (Unofficial) 5/4/2014 7:21:45 PM

Robert Pratt, Lake Jackson, TX.

IND36-1 I object to the proposed location of the pretreatment facility.

IND36-2 I have worked in the petro-chemical industry for 35 years. I design and build the safety systems that Management and Public Relations people talk about. I know the numerous levels of protection available and how to implement them. I also know that in any evaluation of risks, the number of potentially affected employees or ANY possibility of impact on general public is a key consideration. This pretreatment plant is being sited too close to too many residents of the general public. When compared to Plymouth Washington, an easy comparison is available. The Plymouth plant was a mile from one residence and 3 miles from the first group of residences. This proposed FLNG pretreatment location is 1 mile from many residences and there are hundreds of residences with 3 miles. More appropriate locations to the north (Site A, B, C, 1A, 1B, 2A, 3A) may be difficult to obtain, but FLNG should be forced to prove they are completely impossible. Although acquisition may be difficult or expensive, that is part of being in that business. FERC should demand that FLNG prove (full disclosure) any and all efforts made to acquire those locations.

Thank You,
Robert Pratt

IND36-1: Comment acknowledged.

IND36-2: This is addressed in section 4.8.2, 4.8.3, and 4.8.4 of the EIS.

To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND37– Robert Pratt, Lake Jackson, TX

20140505-5022 FERC PDF (Unofficial) 5/4/2014 7:29:32 PM

Robert Pratt, Lake Jackson, TX.
I am opposed to the proposed location of the pretreatment facility.

IND37-1 In the DEIS section 4.5.1.1 only the wildlife on Quintana is addressed. The clearly rural, "natural pasture" land on which the proposed pre-treatment facility is to be sited has more wildlife issues than Quintana and the area is not addressed at all in the DEIS. Therefore, the DEIS cannot be approved.

IND37-2 In the DEIS section 4.5.3.1 the proposal includes to use only "full cut-off lighting" at the liquefaction facility to address bird migration concerns on Quintana, but does not address at all the lighting at pre-treatment facility location to address bird migration concerns adjacent to the much larger Brazoria National Wildlife Refuge. Therefore, the DEIS cannot be approved.

Thnak you,
Robert Pratt

IND37-1: Section 4.5.1.1 addresses potential impacts and mitigation for wildlife in the Pretreatment Plant site under "Liquefaction Project Impacts" .

IND37-2: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

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IND38– Robert Pratt, Lake Jackson, TX

20140505-5023 FERC PDF (Unofficial) 5/4/2014 7:58:33 PM

Robert Pratt, Lae Jackon, TX.
I am opposed to the location of the pretreatment plant.

IND38-1

In general, the DEIS puts much effort into the liquefaction facility on Quintana and only minimal focus on the larger facility at the pre-treatment site. The pre-treatment facility issues need to be more clearly separated in context of document. Some sections in document discuss pre-treatment clearly, in other portions it is a sideline discussion of liquefaction. This causes unreasonable confusion and needs to be revised in the DEIS.

These two components (Liquefaction and Pretreatment) need to be separated. Particularly, now that FLNG is buying the support of departing residents of Quintana, there needs to be clarity of the completely different issues between the liquefaction unit at Quintana and the pretreatment facility near residences in the Oyster Creek area.
We are not being bought out! We are going to have to live with the consequences of this currently proposed location of the pretreatment plant. The issues (noise, water, waste water, air emissions) at the pretreatment plant location need more attention.

Thank you,
Robert Pratt

IND38-1: Section 2.1.2 describes the Pretreatment Plant components. In the EIS Pretreatment Plant impacts and mitigation are addressed.

IND39 – Robert Pratt, Lake Jackson, TX

20140505-5024 FERC PDF (Unofficial) 5/4/2014 8:09:47 PM

Robert Pratt, Lake Jackson, TX.

IND39-1 The Socioeconomic information in section 4.8 is over 4 years old and out of date. The referenced cumulative project influences in the area have already absorbed the potentially available local worker resources. Readily available housing has already been filled. The City of Lake Jackson has (since 2013) closed down a large area of housing and displaced many existing residents. Housing is already at significant premium. People are already commuting from remote areas (Angleton, Pearland, West Columbia, etc) to reach project work already in progress.

This section 4.8 does NOT reflect current conditions in the area and needs to be revisited with current information.

Thank You,
Robert Pratt

IND39-1: We have updated the data in section 4.8.2 of the EIS.

IND40– Patty Heidel, Freeport, TX – Page 1

20140505-5025 FERC PDF (Unofficial) 5/4/2014 8:21:47 PM

Patty Heidel, Freeport, TX.
Respectfully submitted, is this request to do the right thing for "We, the people," and not the big industry with the big dollars and big legal teams. These items have been discussed in public and in writing. Take a moment and think about this from "We, the people's view." Please. At the very least,

IND40-1 consider requiring air monitoring and noise monitoring stations as a method of protecting our wildlife and people who call this area home. I don't even know who to give credit to for writing most of the words below, but I can't write them better.

1. DEIS, 2.1.3 states that the pre-treatment facility needs 38,000 gallons of water per day. This is a HUGE because "WE" draw fresh water from the same aquifer. Also, this water will be used in processes to remove contaminants. Yet,there is no discussion of waste water outfall. How will it be handled, or

IND40-2 where will it be routed from the pre-treatment facility? There is only storm water discussed in the DEIS. What is the waste water plan? There is no pipeline demonstrated in the proposal to take waste water off the pre-treatment site to another permitted location.

2. The DEIS addresses pollution credits from the general region be utilized

IND40-3 for FLNG's projected generation of pollution. Wow. Did we admit to causing pollution? The Commission needs to require that these credits be within 25 miles of the facility. Reduction of pollution 100 miles away does not compensate local residents for the toxins that FLNG will be filling our homes and lungs with, nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

3. The DEIS recommends that "The Emergency Response Plan should be filed with the Secretary for review and written approval by the Director of OEP prior to initial site preparation." I strongly urge the Commission to require a proper ERP (that is communicated and acceptable to the nearby residents) prior to accepting this DEIS. Reject the DEIS for this deficiency. Local residents have

IND40-4 repeatedly asked for FLNG's emergency plan. FLNG has responded with vague comments and a recommendation to sign up for CAER and listen to CAER radio when we hear sirens; however, there are NO sirens. A plan to evacuate residents has not been published, much less communicated in even the most rudimentary form. We've learned from Hurricane Ike how important the emergency plans are. Had Ike struck when WE were stuck on the roads while the scared residents as far away as Houston clogged the roads eveacuating, the outcome would have been many more dead. Plan correctly, first!

4. DEIS section 4.5.3.1 gives much attention to the habitat and migration of birds on Quintana. Since none are arguing for the birds, WE are. It proposes to use only "full cut-off lighting" at the liquefaction facility to address bird migration concerns, but does not address the impact of the increased lighting on

IND40-5 migrating waterfowl that use the Brazoria National Wildlife Refuge as a migratory nesting area near the pre-treatment facility. The pre-treatment facility is less than 1 mile from the Preserve. The DEIS is deficient in this aspect. A study should be conducted, and the report should be updated. FLNG should be required to utilize 100% non-white light to reduce the impact on nearby humans and wildlife. Some of these species are hurting and have nothing left to give.

5. Page 4-119 under "Property Values" the paragraph "artfully" mixes the

IND40-6 pre-treatment site with the liquefaction site and then mis-states that the pre-treatment site location as INDUSTRIAL. The proposed pre-treatment area is clearly in agricultural use with some dirt pits and clearly identified on County Tax records as natural pasture land. The majority of adjacent properties are residential. None are identified as Industrial and only a small section to the south has some metering/filtering/small tanks in place. On Page 4-119 under

IND40-1: This is addressed in section 4.11 of the EIS.

Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

IND40-2: This is addressed in section 4.3 of the EIS.

IND40-3: To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10

IND40-4: As noted in section 4.8, the main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence, and we do not anticipate any impact on the value of adjacent properties or homes. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities. The Pretreatment Plant site is characterized in the EIS as a "commercial area".

IND40-5: As noted in Section 4.5.3.1 we have looked at the potential impacts from facility lighting on wildlife and have concluded that, given Freeport LNG's mitigation efforts and the Freeport LNG Facility Lighting Design Plan (FLDP), impacts to migratory and non-migratory birds will be minor. On December 6, 2013 Freeport LNG submitted a response to a data request (Docket Nos. CP12-509-000 and CP12-29-000) that addresses additional mitigation measures. Section 4.5.2 addresses the Brazoria National Wildlife Refuge. We anticipate Project related activities to have a minor impact on wildlife.

IND40-6: See IND40-4.

IND40– Patty Heidel, Freeport, TX – Page 2

20140505-5025 FERC PDF (Unofficial) 5/4/2014 8:21:47 PM

"Property Values" states there is no expected impact on value of adjacent properties. This is a ridiculous statement as this large scale pre-treatment facility made up of numerous chemical processes, noise producers, flares and visual impact will clearly reduce the values of "pleasantly remote residences". The levee does not create a barrier for the subdivisions of Turtle Cove, Hideaway, OC Estates, Bridgepointe, and Bridge Harbor. The DEIS (4.8.2.1) concludes that there would be no impact to real estate values. The document provides no support for this. Values and marketability for our homes will decrease. Lucas Davis, Hass School of Business, UC Berkley published a study in May 2010 that power plant construction decreased home values within two miles of the newly constructed plants. The entire study can be reviewed at http://faculty.haas.berkley.edu/ldavis/pp.pdf. The DEIS should reassessed based on this new documentation.

IND40-7

6. The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to the FLNG permits.

Please do the right thing for the people.

IND40-7: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination

IND41– Robert Pratt, Lake Jackson, TX

20140505-5026 FERC PDF (Unofficial) 5/4/2014 8:27:07 PM

Robert Pratt, Lake Jackson, TX.
I have worked 35 years towards retirement. I found the quietest, most peaceful, waterfront location, in the Brazosport area that I enjoy, to develop my retirement home. I rented in the location since the 1980's and have since bought multiple lots on which to retire. I would NEVER have bought property next door to a chemical plant, but this proposed facility is trying to move in next door to me.

On page 4-119 under "Property Values" the paragraph states no expected impact on value of adjacent properties. This is a ridiculous statement as this large scale pre-treatment facility made up of numerous chemical processes, noise producers, flares and visual impact will clearly reduce the values of pleasantly quite, remote residences. This has proven out many times across the nation. The levee does not create a barrier from the subdivisions (TC, Hideaway, OC Estates Bridge Pointe , etc) which total many times more people than Quintana. A clearly wrong statement cannot be used in the basis for approval of the DEIS.

IND41-1 On page 4-119 under "Property Values" the paragraph "artfully" mixes the pre-treatment site with the liquefaction site and then mis-states that the pre-treatment site location as INDUSTRIAL. The proposed pre-treatment area is clearly in agricultural use with some dirt pits and clearly identified on County Tax records as natural pasture land. Adjacent properties are residential, misc and other. None are identified as Industrial and only a small section to the south has some metering/filtering/small tanks in place. Due to this improper designation of the proposed pretreatment plant location, the DEIS cannot be approved.

IND41-2 In the DEIS under section 4.7.1 "Land Use" the paragraph states that land uses in the "REGIONAL VACINITY" include industrial uses. This definition is obviously considering industrial installations very remote from the proposed pretreatment plant location. A small tank farm nearby is not even reasonably comparable to world scale pre-treatment processing facility. This over-reaching definition of "REGIONAL VACINITY" makes an unreasonable basis for the DEIS evaluation.

IND41-3 In DEIS, under Executive Summary, conclusion paragraph states that the "project would result in mostly temporary and short term environmental impacts". Since FLNG has already ruined Quintana, that statement may be true for that portion of the project. The proposed pre-treatment plant location is a significant change of usage for the local area and a permanent degradation of; the value of area resident properties, enjoyment of existing lifestyle and feeling of security in their homes. This untrue statement should be struck from the DEIS.

Thank You,
Robert Pratt

IND41-1: As noted in section 4.8, the main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence, and we do not anticipate any impact on the value of adjacent properties or homes. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities. The Pretreatment Plant site is characterized in the EIS as a "commercial area".

IND41-2: The EIS has been edited to describe this area as "commercial."

IND41-3: Comment acknowledged. FERC staff believes that its environmental review and EIS evaluated and fairly identifies the potential environmental impacts of the proposed Project. Portions of the EIS have been revised to present information made public after the draft EIS was issued.

IND42 – Robert Pratt, Lake Jackson, TX

20140505-5027 FERC PDF (Unofficial) 5/4/2014 8:40:08 PM

Robert Pratt, Lake Jackson, TX.
Water and waste water concerns about the pretreatment facility.

IND42-1 In the DEIS, under 2.1.3 it is stated that the pre-treatment facility needs 38,000 gallons per day of water. The processes are to remove water and other contaminants. Yet, there is no discussion of waste water outfall in the DEIS or the TCEQ permit application. The waste water handling or where it will be routed from the pre-treatment facility is not addressed. There is only storm water discussed in the DEIS. What is the waste water plan? There is no pipeline demonstrated in the proposal to take waste water off the pre-treatment site to another permitted location. The DEIS needs to evaluate this issue.

In the DEIS , under 2.1.3 regarding fresh water usage. Even if the existing water well can be forced to draw 38,000 gals per day from the aquifer, it will have a detrimental effect on the small water wells supplying other people in the area. This needs further clarification in the DEIS.

Thank you,
Robert Pratt

IND42-1: Section 2.1.3 addresses Freeport LNG's continued evaluation of potential water sources.

IND43 – Bill & Susan Massey, Oyster Creek, TX

20140505-5028 FERC PDF (Unofficial) 5/4/2014 8:45:31 PM

Bill & Susan Massey, Oyster Creek, TX.
Sunday - May 4th, 2014
Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First St NE, Room 1A
Washington, DC 20426

RE: Freeport LNG Development, LP - Liquification Project
Docket Nos: CP12-509 and CP12-29

Dear Ms. Bose,

IND43-1 We are writing to request that the above permit be denied and feel that the Draft Environmental Impact Study is deficient in many ways such as:
Not clearly separating the Quintana facility and the pre-treatment facility.

IND43-2 The pre-treatment facility needs 38,000 gallons of water per day. This is a HUGE issue for the nearby communities and cities that draw their fresh water from the same aquifer. Fresh water is at a premium in the area of Texas, and this will have a detrimental effect on the residents in this area.
We strongly urge the Commission, if the permit is granted, to require a proper ERP (that is communicated and acceptable to the nearby residents). Local

IND43-3 residents have repeatedly asked for FLNG's emergency plan. FLNG has responded with vague comments and a recommendation to sign up for CAER and listen to CAER radio when we hear sirens; however, THERE ARE NO SIRENS. A plan to evacuate residents has not been published, much less communicated in even the most rudimentary form.
In conclusion, there are many other discrepancies in this report that we have not gone into so please deny this permit or at least send the DEIS back to address these deficiencies.
Respectfully submitted,
Bill & Susan Massey
127 Kings Dr.
Oyster Creek, Texas 77541

IND43-1: Commenter's opposition to the Project is noted.

IND43-2: Section 2.1.3 addresses Freeport LNG's continued evaluation of potential water sources.

IND43-3: To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

IND44– Robert Pratt, Lake Jackson, TX

20140505-5029 FERC PDF (Unofficial) 5/4/2014 9:27:02 PM

Robert Pratt, Lake Jackson, TX.
The areas North and north east of the proposed pretreatment area are naturally quiet. With my own dba meter I measure 34-36 regularly at the entrance to our subdivision and on my deck. The "loud stuff" is passing cars/boats or the Purple Martins and Whistler ducks. We can hear the waves on Surfside beach on our normal breezes. The birds will spike the meter to 44-45 occassionally. A rough wind will do the same. This proposed plant will obliterate all that peace and quiet.

A noise study needs to be done for Turtle Cove and/or Hideaway subdivision areas. The other Site 3 measurements are influenced by noise contributors that are far removed and cross-wind from the subdivisions of Turtle Cove, Hideaway and others. The subdivisions will be predominantly down-wind of the proposed pre-treatment plant whereas the other sites will be cross-wind. The contributed noise values could easily have the potential to double the noise level (10 dba increase) at these already quite (35-44) dba areas.

IND44-1

The 55 dba level allowed in the DEIS at other sample locations is totally unacceptable in a quite neighborhood. This is too large an environmental impact to be allowed in the approval and should be demonstrated in the DEIS.

Since the listed equipment does not include a cooling tower and there are compressors in the list of pretreatment facility equipment, there will need to be cooling/inter-cooling exchangers. The "proposed view" at E-11 appears to show a large bank of fin-fans located at the top of structure approximately 35 to 40 feet in the air. Fin-fans are noisy and in some facilities are purposely located high to reduce noise inside the plant itself. Fin-fans will function well at only 1.5 times blade diameter elevation above ground and the noise will not be as broadly broadcast to the surrounding areas. I have employed this method before on my projects. The DEIS needs to address any fin-fans in the plant equipment.

All previous public communications have expounded on the concept that the pre-treatment facility was using electric motor drivers in lieu of much louder turbine drivers. Many of the positive public comments have made note of this provision favorably. The equipment list now includes a gas turbine heat recovery generator (Co-gen unit) and therefore all positive support letters and comments referencing the quieter electric motors need to be removed from record and not considered favorably in the DEIS information.

Thank You,
Robert Pratt

IND44-1: Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

IND45– Glenda Muir, Freeport, TX

20140505-5031 FERC PDF (Unofficial) 5/5/2014 1:05:32 AM

Glenda Muir, Freeport, TX.

IND45-1

On page 4-119 under "Property Values" the paragraph "artfully" mixes the pre-treatment site with the liquefaction site and then mis-states that the pre-treatment site location as INDUSTRIAL. The proposed pre-treatment area is clearly in agricultural use with some dirt pits and clearly identified on County Tax records as natural pasture land. Adjacent properties are residential, misc and other. None are identified as Industrial and only a small section to the south has some metering/filtering/small tanks in place. Due to this improper designation of the proposed pretreatment plant location, the DEIS cannot be approved

On page 4-119 under "Property Values" the paragraph states no expected impact on value of adjacent properties. This is a ridiculous statement as this large scale pre-treatment facility made up of numerous chemical processes, noise producers, flares and visual impact will clearly reduce the values of pleasantly quite, remote residences. This has proven out many times across the nation. The levee does not create a barrier from the subdivisions (TC, Hideaway, OC Estates Bridge Pointe , etc) which total many times more people than Quintana. A clearly wrong statement cannot be used as basis for approval of the DEIS.

IND45-1: As noted in section 4.8, the main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence, and we do not anticipate any impact on the value of adjacent properties or homes. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities. The Pretreatment Plant site is characterized in the EIS as a "commercial area".

IND46 – Gilbert Muir, Richwood, TX

20140505-5032 FERC PDF (Unofficial) 5/5/2014 1:12:01 AM

Gilbert Muir, Richwood, TX.

IND46-1 In the DEIS under 4.5.3.1 there is much attention to habitat and migration of birds on Quintana, but no attention to the bird habitats on and nearby the proposed pre-treatment facility. The existing wetlands, adjacent wetlands and nearby Wildlife refuge need to be addressed in the DEIS.

IND46-2 In the DEIS, under 2.1.3 it is stated that the pre-treatment facility needs 38,000 gallons per day of water. The processes are to remove water and other contaminants. Yet, there is no discussion of waste water outfall in the DEIS or the TCEQ permit application. How it will be handled or where it will be routed from the pre-treatment facility is not addressed. There is only storm water discussed in the DEIS. What is the waste water plan? There is no pipeline demonstrated in the proposal to take waste water off the pre-treatment site to another permitted location. The DEIS needs to evaluate this issue.

IND46-3 Noise study needs to be done for Turtle Cove and/or Hideaway subdivision areas. The other Site 3 measurements are influenced by contributors that are far removed and cross-wind from the subdivisions. The subdivisions will be predominantly down-wind of the proposed pre-treatment plant whereas the other sites will be cross-wind and the contributed values could easily have the potential to double the noise level (10 dba increase) at these already quite (35-44) dba areas. The 55 dba level allowed in the DEIS at other sample locations is totally unacceptable in a quite neighborhood. This is too large an environmental impact to be allowed in the approval and should be demonstrated in the DEIS.

IND46-4 EIS; Environmental Impact Statement; A document stating the impact of a proposed installation on the surrounding environment. The environment is not only measured in PPM, pounds, gallons and dba. The overall CHANGE of an environment from calm, quite, rural residences to "right next door to a chemical plant" is a significant environmental impact. This is a fundamental step change in the environmental utilization of the immediate area. The DEIS should recognize this concern.

IND46-5 In the DEIS , under 2.1.3 regarding fresh water usage. Even if the existing water well can be forced to draw 38,000 gals per day from the aquifer, it will have a detrimental effect on the small water wells supplying other people in the area. This needs further clarification in the DEIS.
The levee system is currently under repair and has concerns with stability issues from the impact of the previous harbor dredging project. There is nothing in the DEIS discussing the cumulative impact of the desired new dredging for the new terminal, the levee upgrade project and existing problems on the ability of the Corps of Engineers to secure the existing levee system for the Brazosport area. Until a cumulative evaluation is conducted by Corps of Engineers, the DEIS cannot be approved.

IND46-1: As noted in Section 4.5.3.1 we have looked at the potential impacts from facility lighting on wildlife and have concluded that, given Freeport LNG's mitigation efforts and the Freeport LNG Facility Lighting Design Plan (FLDP), impacts to migratory and non-migratory birds will be minor. On December 6, 2013 Freeport LNG submitted a response to a data request (Docket Nos. CP12-509-000 and CP12-29-000) that addresses additional mitigation measures. Section 4.5.2 addresses the Brazoria National Wildlife Refuge. We anticipate Project related activities to have a minor impact on wildlife.

IND46-2: This is addressed in section 4.3 of the EIS.

IND46-3: Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

IND46-4: Comment acknowledged. FERC staff believes that its environmental review and EIS evaluated and fairly identifies the potential environmental impacts of the proposed Project. Portions of the EIS have been revised to present information made public after the draft EIS was issued.

IND46-5: There are no modifications to the levee system.

IND47 – James T. Maher, Freeport, TX – Page 1

20140505-5038 FERC PDF (Unofficial) 5/5/2014 7:20:27 AM

James T. Maher, Freeport, TX.
When I retired several years ago I searched for a home close to my daughter so I could be near her and help watch my grandson grow up. Hideaway in Freeport seemed like the perfect place. I could be nearby, enjoy the lifestyle and open space and the investment would make for a nice inheritance for them in the future.

I have severe allergies am a and a cancer survivor. I feel that my dreams and future are being taken away by what is being proposed here with respect to FLNG.

IND47-1 The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project

IND47-2 Page 4-119 under "Property Values" the paragraph "artfully" mixes the pre-treatment site with the liquefaction site and then mis-states that the pre-treatment site location as INDUSTRIAL. The proposed pre-treatment area is clearly in agricultural use with some dirt pits and clearly identified on County Tax records as natural pasture land. The majority of adjacent properties are residential. None are identified as Industrial and only a small section to the south has some metering/filtering/small tanks in place.

My property value will decrease as it is less than 2 miles from the proposed facility. The DEIS (4.8.2.1) concludes that there would be no impact to real estate values. The document provides no support for this. Values and marketability for our homes will decrease. Lucas Davis, Hass School of Business, UC Berkley published a study in May 2010 that power plant construction decreased home values within two miles of the newly constructed plants. The entire study can be reviewed at http://faculty.haas.berkley.edu/ldavis/pp.pdf. The DEIS should reassessed based on this new documentation.

IND47-3 A noise study needs to be done for Turtle Cove and Hideaway. The other Site 3 measurements are influenced by contributors that are far removed and cross-wind from the subdivisions. The subdivisions will be predominantly down-wind of the proposed pre-treatment plant whereas the other sites will be cross-wind, and the contributed values easily have the potential to double the noise level (10 dba increase) at these already quite areas. The 55 dba level allowed in the DEIS at other sample locations is totally unacceptable in quite neighborhoods.

IND47-4 DEIS, 2.1.3 states that the pre-treatment facility needs 38,000 gallons of water per day. This is a HUGE issue for the nearby communities and cities that draw their fresh water from the same aquifer. Fresh water is at a premium in the area of Texas, and this will have a detrimental effect on the residents in this area. Also, this water will be used in processes to remove contaminants. Yet, there is no discussion of waste water outfall. How will it be handled, or where will it be routed from the pre-treatment facility? There is only storm water discussed in the DEIS. What is the waste water plan? There is no pipeline demonstrated in the proposal to take waste water off the pre-treatment site to another permitted location.

IND47-1: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

IND47-2: As noted in section 4.8, the main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence, and we do not anticipate any impact on the value of adjacent properties or homes. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities. The Pretreatment Plant site is characterized in the EIS as a "commercial area".

IND47-3: Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

IND47-4: See section 4.3 of the EIS.

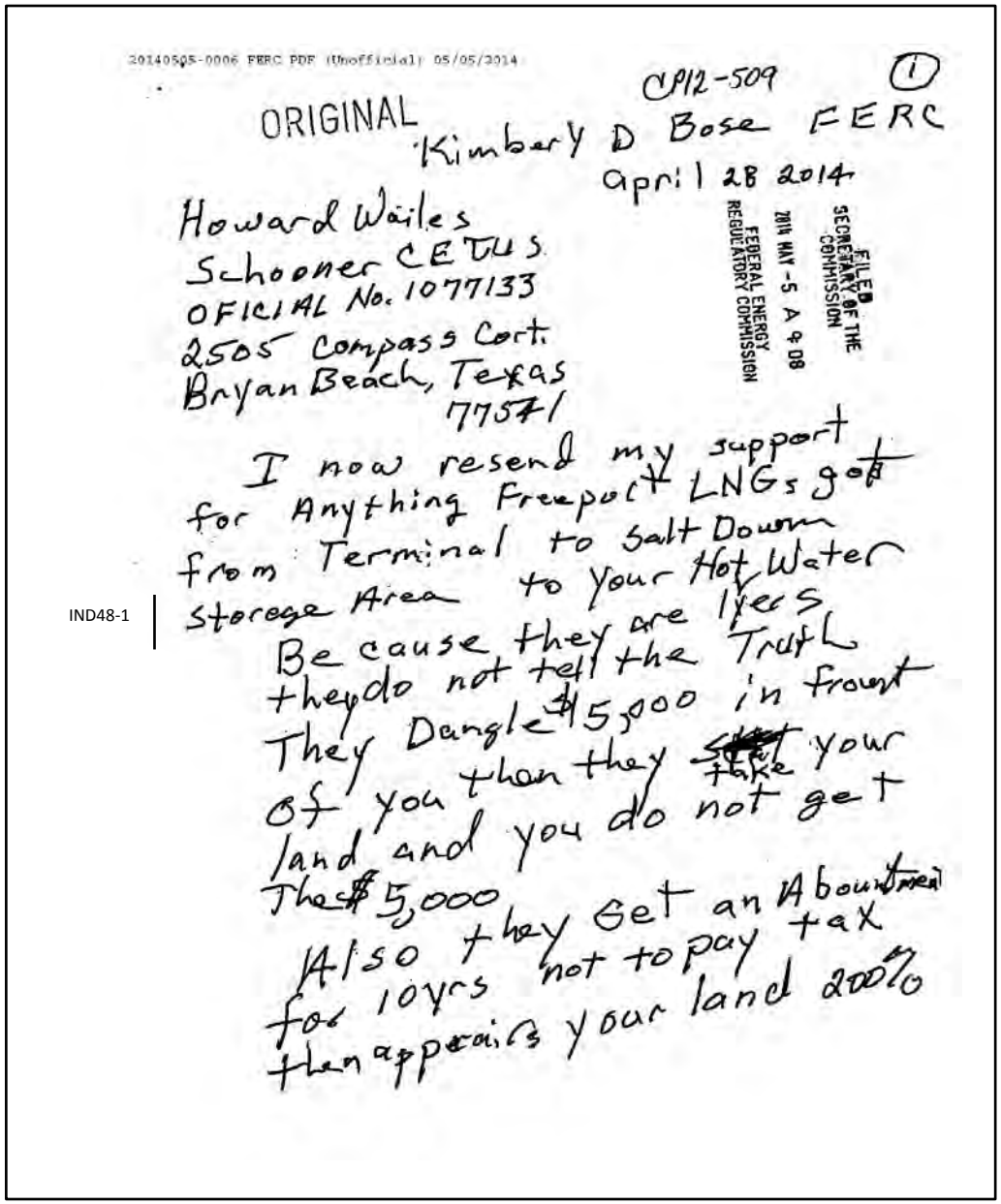
IND47 – James T. Maher, Freeport, TX – Page 2

20140505-5038 FERC PDF (Unofficial) 5/5/2014 7:20:27 AM

IND47-5 In conclusion I strongly feel that my health will strongly be impacted by this facility and there are numerous other locations that would lessen the negative impact of the voters and citizens of my community.

IND47-5: Comment acknowledged.

IND48 – Howard Wailes, Bryan Beach, TX – Page 1



20140505-0006 FERC PDF (Unofficial) 05/05/2014

CP12-509 (1)

ORIGINAL Kimbery D Bose FERC

April 28 2014

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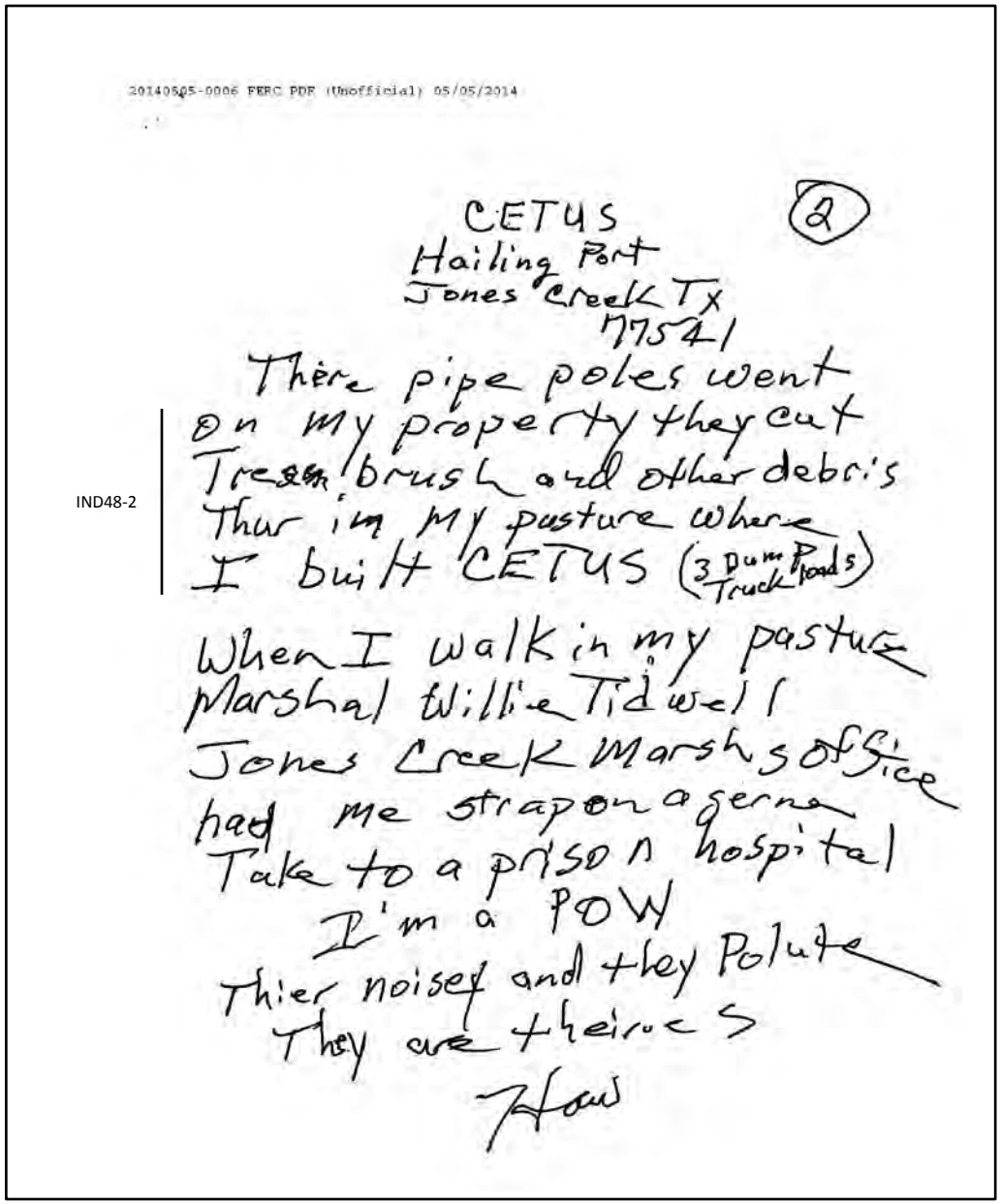
Howard Wailes
Schooner CETUS
OFICIAL No. 1077133
2505 Compass Cort.
Bryan Beach, Texas
77571

I now resend my support for Anything Freeport LNGs got from Terminal to Salt Dowm storege Area to your Hot Water

IND48-1 Because they are lyers they do not tell the Truth They Dangle $5,000 in frount of you than they take your land and you do not get The $5,000

Also they Get an Abountment tax for 10yrs not to pay than appraise your land 200%

IND48-1: Comment acknowledged.



20140505-0006 FERC PDF (Unofficial) 05/05/2014

CETUS (2)
Hailing Port
Jones Creek TX
77541

There pipe poles went
on my property they cut
Trees, brush and other debris
Thur in my pasture where
I built CETUS (3 Dump Truck Loads)

When I walk in my pasture
Marshal Willie Tidwell
Jones Creek Marshs office
had me strap on a gerna
Take to a prison hospital
I'm a POW
Thier noisey and they Polute
They are theives

Thank You

IND48-2

IND48-2: Comment acknowledged.

20140505-0006 FERC PDF (Unofficial) 05/05/2014

(3)

CETUS

Schooner CETUS is rigged the same way as Schooner Lively is that boat ~~Aston~~ S.F Auston brout in the orgigial 300

The Dock I ~~bo~~ bought from J.P. Brain A decindent of Steven F Auston

Kimberly D Bose
FERC
Washington DC

Howard Waile

would you like to buy some resort land in the middle of a Chemial Plant

IND49 – Suzanne Coots, Freeport, TX

20140506-5000 FERC PDF (Unofficial) 5/5/2014 5:16:54 PM

Suzanne Coots, Freeport, TX.

IND49-1 I am commenting as a concerned home owner at Hide A Way on the Gulf, Freeport Texas. The construction and operation of FLNG's Pretreatment Plant will result in significant and unavoidable impacts on our community. I am not going to go into all of the detail that the DEIS does not address regarding our community, my neighbors and the members of the core team have already done an excellent job outlining the specifics. I am in total agreement with the concerns they have mentioned...our water supply, home values will decrease, our safety, clean air to breathe, quietness of the neighborhood are just a few of the many concerns already addressed.

Please deny the permits.

Suzanne Coots
174 Sky Sail Rd
Freeport Texas 77541

IND49-1: Comment acknowledged.

IND50 – Hanh Nguyen, Lake Jackson, TX

20140506-5001 FERC PDF (Unofficial) 5/5/2014 5:27:28 PM

hanh Nguyen, lake jackson, TX.
My name is Hanh Nguyen I want to protest the LNG project I have worked in the Petro-chemical for 25 years as Engineer. I design and build plant; I have no desire to look at another plant from my back yard property on Quintana when I retire. I owned the property in Quintana since 1994 with every plan to retire to enjoy my retirement on the beach. LNG project will have direct impact on my home property value and my retirement living with the extra noise and safety risk it imposed on the resident just to name a few. IND50-1
LNG offer fair market value for home owner, I've asked proof of the study of the area and LNG never produced.
Noise will have direct impact on community. IND50-2
Most importantly the safety of town people and hundreds of visitor come to the beach and park daily Currently I see no evacuation plan from LNG that address the safety for the people that live there and visiting Quintana if and when LNG have problems.
Constrain with housing in the Brazoria area during the project construction. The study address in DEIS are outdate and not base on current housing demand.

IND50-1: As noted in section 4.8, the main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence, and we do not anticipate any impact on the value of adjacent properties or homes. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities. The Pretreatment Plant site is characterized in the EIS as a "commercial area".

IND50-2: To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND51 – Anita Bontekoe, Freeport, TX – Page 1

20140506-5003 FERC PDF (Unofficial) 5/5/2014 5:47:18 PM

Anita Bontekoe, Freeport, TX.

IND51-1

1) The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to the FLNG permits.

2) Page 4-119 under "Property Values" the paragraph "artfully" mixes the pre-treatment site with the liquefaction site and then mis-states that the pre-treatment site location as INDUSTRIAL. The proposed pre-treatment area is clearly in agricultural use with some dirt pits and clearly identified on County Tax records as natural pasture land. The majority of adjacent properties are residential. None are identified as Industrial and only a small section to the south has some metering/filtering/small tanks in place. On Page 4-119 under "Property Values" states there is no expected impact on value of adjacent properties. This is a ridiculous statement as this large scale pre-treatment facility made up of numerous chemical processes, noise producers, flares and visual impact will clearly reduce the values of "pleasantly remote residences". The levee does not create a barrier for the subdivisions of Turtle Cove, Hideaway, OC Estates, Bridgepointe, and Bridge Harbor. The DEIS (4.8.2.1) concludes that there would be no impact to real estate values. The document provides no support for this. Values and marketability for our homes will decrease. Lucas Davis, Haas School of Business, UC Berkley published a study in May 2010 that power plant construction decreased home values within two miles of the newly constructed plants. The entire study can be reviewed at http://faculty.haas.berkley.edu/ldavis/pp.pdf. The DEIS should reassessed based on this new documentation.

3) DEIS section 4.5.3.1 gives much attention to the habitat and migration of birds on Quintana. It proposes to use only "full cut-off lighting" at the liquefaction facility to address bird migration concerns, but does not address the impact of the increased lighting on migrating waterfowl that use the Brazoria National Wildlife Refuge as a migratory nesting area near the pre-treatment facility. The pre-treatment facility is less than 1 mile from the Preserve. The DEIS is deficient in this aspect. A study should be conducted, and the report should be updated. FLNG should be required to utilize 100% non-white light to reduce the impact on nearby humans and wildlife.

4) The DEIS recommends that "The Emergency Response Plan should be filed with the Secretary for review and written approval by the Director of OEP prior to initial site preparation." I strongly urge the Commission to require a proper ERP (that is communicated and acceptable to the nearby residents) prior to accepting this DEIS. Reject the DEIS for this deficiency. Local residents have repeatesly asked for FLNG's emergency plan. FLNG has responded with vague comments and a recommendation to sign up for CAER and listen to CAER radio when we hear sirens; however, there are NO sirens. A plan to evacuate residents has not been published, much less communicated in even the most rudimentary form.

5) The DEIS addresses pollution credits from the general region be utilized for FLNG's projected generation of pollution. The Commission needs to require that these credits be from within 10 miles of the facility. Reduction of pollution

IND51-1: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

As noted in section 4.8, the main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence, and we do not anticipate any impact on the value of adjacent properties or homes. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities. The Pretreatment Plant site is characterized in the EIS as a "commercial area".

As noted in Section 4.5.3.1 we have looked at the potential impacts from facility lighting on wildlife and have concluded that, given Freeport LNG's mitigation efforts and the Freeport LNG Facility Lighting Design Plan (FLDP), impacts to migratory and non-migratory birds will be minor. On December 6, 2013 Freeport LNG submitted a response to a data request (Docket Nos. CP12-509-000 and CP12-29-000) that addresses additional mitigation measures. Section 4.5.2 addresses the Brazoria National Wildlife Refuge. We anticipate Project related activities to have a minor impact on wildlife.

To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND51 – Anita Bontekoe, Freeport, TX – Page 2

20140506-5003 FERC PDF (Unofficial) 5/5/2014 5:47:18 PM

100 miles away does not compensate local residents for the toxins that FLNG will be filling our homes and lungs with, nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

6) The Socioeconomic information in section 4.8 is out dated. Potentially available local worker resources have already been stretched thin. Readily available housing has already been filled. Housing is already at significant premium, and workers are already commuting to reach project work already in progress. This section 4.8 does NOT reflect current conditions in the area.

IND51-2

7) A noise study needs to be done for Turtle Cove and Hideaway. The other Site 3 measurements are influenced by contributors that are far removed and cross-wind from the subdivisions. The subdivisions will be predominantly down-wind of the proposed pre-treatment plant whereas the other sites will be cross-wind, and the contributed values easily have the potential to double the noise level (10 dba increase) at these already quite areas. The 35 dba level allowed in the DEIS at other sample locations is totally unacceptable in quite neighborhoods.

8) DEIS, 2.1.3 states that the pre-treatment facility needs 38,000 gallons of water per day. This is a HUGE issue for the nearby communities and cities that draw their fresh water from the same aquifer. Fresh water is at a premium in the area of Texas, and this will have a detrimental effect on the residents in this area. Also, this water will be used in processes to remove contaminants. Yet, there is no discussion of waste water outfall. How will it be handled, or where will it be routed from the pre-treatment facility? There is only storm water discussed in the DEIS. What is the waste water plan? There is no pipeline demonstrated in the proposal to take waste water off the pre-treatment site to another permitted location.

IND51-3

In conclusion, please deny the permits or at least send the DEIS back to staff to address these deficiencies.

306

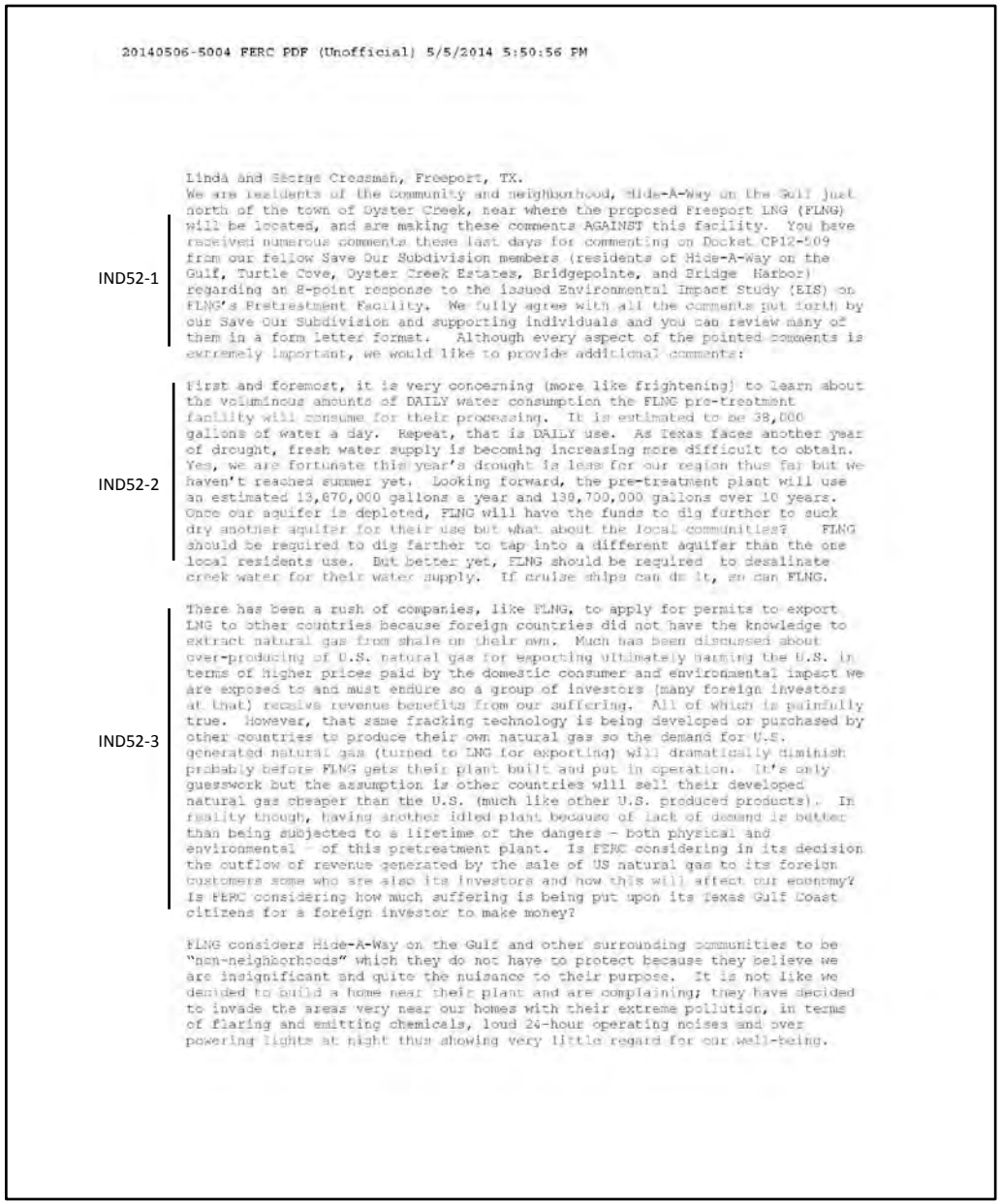
IND51-2: This is addressed in section 4.8.2, 4.8.3, and 4.8.4 of the EIS.

Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

This is addressed in section 4.3 of the EIS

IND51-3: Comment acknowledged.

IND52 – Linda and George Cressman, Freeport, TX – Page 1



20140506-5004 FERC PDF (Unofficial) 5/5/2014 5:50:56 PM

Linda and George Cressman, Freeport, TX.

IND52-1 We are residents of the community and neighborhood, Hide-A-Way on the Gulf just north of the town of Oyster Creek, near where the proposed Freeport LNG (FLNG) will be located, and are making these comments AGAINST this facility. You have received numerous comments these last days for commenting on Docket CP12-509 from our fellow Save Our Subdivision members (residents of Hide-A-Way on the Gulf, Turtle Cove, Oyster Creek Estates, Bridgepointe, and Bridge Harbor) regarding an 8-point response to the issued Environmental Impact Study (EIS) on FLNG's Pretreatment Facility. We fully agree with all the comments put forth by our Save Our Subdivision and supporting individuals and you can review many of them in a form letter format. Although every aspect of the pointed comments is extremely important, we would like to provide additional comments:

IND52-2 First and foremost, it is very concerning (more like frightening) to learn about the voluminous amounts of DAILY water consumption the FLNG pre-treatment facility will consume for their processing. It is estimated to be 38,000 gallons of water a day. Repeat, that is DAILY use. As Texas faces another year of drought, fresh water supply is becoming increasing more difficult to obtain. Yes, we are fortunate this year's drought is less for our region thus far but we haven't reached summer yet. Looking forward, the pre-treatment plant will use an estimated 13,870,000 gallons a year and 138,700,000 gallons over 10 years. Once our aquifer is depleted, FLNG will have the funds to dig further to suck dry another aquifer for their use but what about the local communities? FLNG should be required to dig farther to tap into a different aquifer than the one local residents use. But better yet, FLNG should be required to desalinate creek water for their water supply. If cruise ships can do it, so can FLNG.

IND52-3 There has been a rush of companies, like FLNG, to apply for permits to export LNG to other countries because foreign countries did not have the knowledge to extract natural gas from shale on their own. Much has been discussed about over-producing of U.S. natural gas for exporting ultimately harming the U.S. in terms of higher prices paid by the domestic consumer and environmental impact we are exposed to and must endure so a group of investors (many foreign investors at that) receive revenue benefits from our suffering. All of which is painfully true. However, that same fracking technology is being developed or purchased by other countries to produce their own natural gas so the demand for U.S. generated natural gas (turned to LNG for exporting) will dramatically diminish probably before FLNG gets their plant built and put in operation. It's only guesswork but the assumption is other countries will sell their developed natural gas cheaper than the U.S. (much like other U.S. produced products). In reality though, having another idled plant because of lack of demand is better than being subjected to a lifetime of the dangers – both physical and environmental – of this pretreatment plant. Is FERC considering in its decision the outflow of revenue generated by the sale of US natural gas to its foreign customers some who are also its investors and how this will affect our economy? Is FERC considering how much suffering is being put upon its Texas Gulf Coast citizens for a foreign investor to make money?

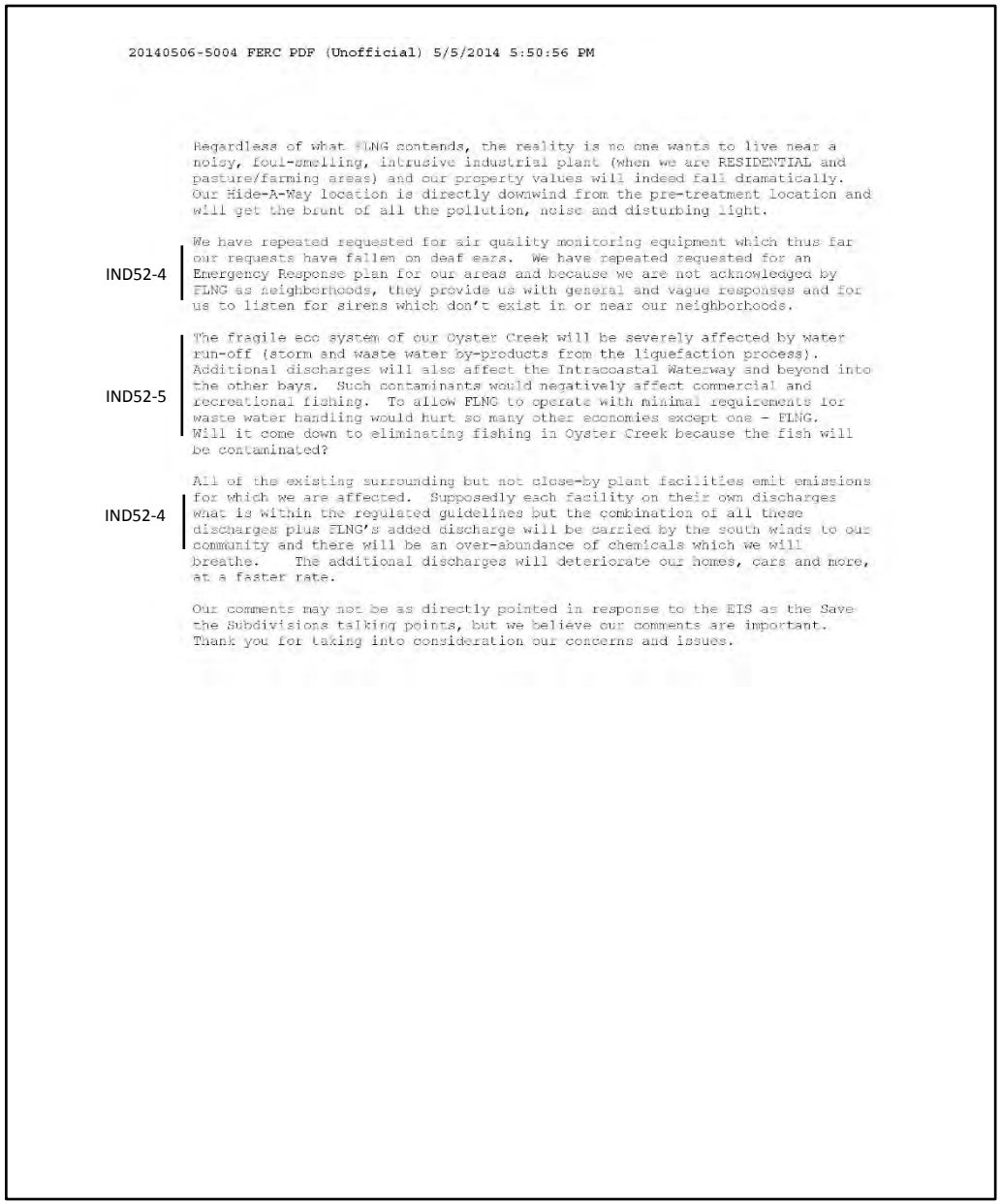
FLNG considers Hide-A-Way on the Gulf and other surrounding communities to be "non-neighborhoods" which they do not have to protect because they believe we are insignificant and quite the nuisance to their purpose. It is not like we decided to build a home near their plant and are complaining; they have decided to invade the areas very near our homes with their extreme pollution, in terms of flaring and emitting chemicals, loud 24-hour operating noises and over powering lights at night thus showing very little regard for our well-being.

IND52-1: Comment acknowledged.

IND52-2: This is addressed in section 4.3 of the EIS.

IND52-3: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination

IND52 – Linda and George Cressman, Freeport, TX – Page 2



20140506-5004 FERC PDF (Unofficial) 5/5/2014 5:50:56 PM

Regardless of what FLNG contends, the reality is no one wants to live near a noisy, foul-smelling, intrusive industrial plant (when we are RESIDENTIAL and pasture/farming areas) and our property values will indeed fall dramatically. Our Hide-A-Way location is directly downwind from the pre-treatment location and will get the brunt of all the pollution, noise and disturbing light.

IND52-4 We have repeated requested for air quality monitoring equipment which thus far our requests have fallen on deaf ears. We have repeated requested for an Emergency Response plan for our areas and because we are not acknowledged by FLNG as neighborhoods, they provide us with general and vague responses and for us to listen for sirens which don't exist in or near our neighborhoods.

IND52-5 The fragile eco system of our Oyster Creek will be severely affected by water run-off (storm and waste water by-products from the liquefaction process). Additional discharges will also affect the Intracoastal Waterway and beyond into the other bays. Such contaminants would negatively affect commercial and recreational fishing. To allow FLNG to operate with minimal requirements for waste water handling would hurt so many other economies except one - FLNG. Will it come down to eliminating fishing in Oyster Creek because the fish will be contaminated?

IND52-4 All of the existing surrounding but not close-by plant facilities emit emissions for which we are affected. Supposedly each facility on their own discharges what is within the regulated guidelines but the combination of all these discharges plus FLNG's added discharge will be carried by the south winds to our community and there will be an over-abundance of chemicals which we will breathe. The additional discharges will deteriorate our homes, cars and more, at a faster rate.

Our comments may not be as directly pointed in response to the EIS as the Save the Subdivisions talking points, but we believe our comments are important. Thank you for taking into consideration our concerns and issues.

IND52-4: See section 4.11.1. To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND52-5: Section 4.7.2.1 addresses impacts to recreational activity in the area.

IND53 – David Cole, Freeport, TX

20140506-5007 FERC PDF (Unofficial) 5/5/2014 10:08:26 PM

David Cole, Freeport, TX.
As a layman there is little to write that has not been covered yet there is still so much to say with so much at stake. No credentials, represent no company or agency but I know this area very well. My grandfather was a roughneck for Humble Oil Co. after Spindletop right along this Texas coast before World War I. My father was born here in Brazoria County in 1922 and moved around living in a tent because that was the life of a driller and his family so I am quite familiar with the oil and gas industry.
IND53-1 Those that are insisting this project is quickly approved do not live near it. Freeport LNG has spent hundreds of millions on lobbists, engineering consultants, contractors, law firms, and elected officials but not one dollar has been invested by them to provide any monitoring safeguards for the surrounding residents that would be affected. With that said, I request FERC deny this application until more studies have been conducted and more information is provided to the public.
Respectfully,

David Cole

IND53-1: Comment acknowledged.

IND54 – Henry McClendon, Freeport, TX – Page 1

20140506-5009 FERC PDF (Unofficial) 5/5/2014 11:11:18 PM

Henry McClendon, Freeport, TX.

IND54-1 The DEIS puts much effort into the liquefaction facility on Quintana and only minimal focus on the larger facility at the pre-treatment site. The pre-treatment facility issues need to be more clearly separated in the context of document. The DEIS is deficient in several respects:

IND54-2 1) The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to the FLNG permits.

2) Page 4-119 the "Property Values" paragraph "artfully" mixes the pre-treatment site with the liquefaction site and then misstates the pre-treatment location as INDUSTRIAL. The proposed pre-treatment area is clearly in agricultural use and identified on County Tax records as natural pasture land. The majority of adjacent properties are residential. None are identified as Industrial and only a small section to the south has some metering/filtering/small tanks in place. Page 4-119, "Property Values" state there is no expected impact on value of adjacent properties. This is a ridiculous statement as this large scale pre-treatment chemical contains numerous chemical processes, noise producers, and flares. The visual impact will clearly reduce the values of "pleasantly remote residences". The levee will NOT create a barrier for Turtle Cove, Hideaway, OC Estates, Bridgepointe, and Bridge Harbor. The DEIS (4.8.2.1) concludes that there will be no impact to real estate values but provides NO support for this. Values and marketability for our homes will decrease. Lucas Davis, Haas School of Business, UC Berkley published a study in May 2010 that power plant construction decreased home values within two miles of the newly constructed plants. The entire study can be reviewed at http://faculty.haas.berkley.edu/ldavis/pp.pdf. The DEIS should be reassessed based on this new documentation.

3) DEIS section 4.5.3.1 gives much attention to the habitat and migration of birds on Quintana. It proposes to use only "full cut-off lighting" at the liquefaction facility to address bird migration concerns, but does not address the impact of the increased lighting on migrating waterfowl using the Brazoria National Wildlife Refuge near the pretreatment plant as a migratory nesting area. The pre-treatment facility is less than 1 mile from the Preserve. The DEIS is deficient in this aspect. A study should be conducted, and the report should be updated. FLNG should be required to utilize 100% non-white light to reduce the impact on nearby humans and wildlife.

4) The DEIS recommends that "The Emergency Response Plan should be filed with the Secretary for review and written approval by the Director of OEP prior to initial site preparation." I strongly urge the Commission to require a proper ERP (that is communicated and acceptable to the nearby residents) prior to accepting this DEIS. Reject the DEIS for this deficiency. Local residents have repeatedly asked for FLNG's emergency plan. FLNG has responded with vague comments and a recommendation to sign up for CAER and listen to CAER radio when we hear sirens; however, there are NO sirens. A plan to evacuate residents has

IND54-1: Comment acknowledged.

IND54-2: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

As noted in section 4.8, the main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence, and we do not anticipate any impact on the value of adjacent properties or homes. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities. The Pretreatment Plant site is characterized in the EIS as a "commercial area".

As noted in Section 4.5.3.1 we have looked at the potential impacts from facility lighting on wildlife and have concluded that, given Freeport LNG's mitigation efforts and the Freeport LNG Facility Lighting Design Plan (FLDP), impacts to migratory and non-migratory birds will be minor. On December 6, 2013 Freeport LNG submitted a response to a data request (Docket Nos. CP12-509-000 and CP12-29-000) that addresses additional mitigation measures. Section 4.5.2 addresses the Brazoria National Wildlife Refuge. We anticipate Project related activities to have a minor impact on wildlife.

To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND54 – Henry McClendon, Freeport, TX – Page 2

20140506-5009 FERC PDF (Unofficial) 5/5/2014 11:11:18 PM

not been published, much less communicated in even the most rudimentary form. Deny the permit.

IND54-2 cont'd

5) The DEIS addresses pollution credits from the general region be utilized for FLNG's projected generation of pollution. The Commission needs to require that these credits be from within 10 miles of the facility. Reduction of pollution 100 miles away does not compensate local residents for the toxins that FLNG will be filling our homes and lungs with, nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

IND54-3

6) The Socioeconomic information in section 4.8 is out dated. Local worker resources have already been stretched thin. Readily available housing is already filled. The City of Lake Jackson recently closed down a large area of housing displacing many existing residents. Housing is already at significant premium, and workers are already commuting to reach project work already in progress. Section 4.8 does NOT reflect current conditions in the area.

7) A noise study needs to be done for Turtle Cove and Rideaway. The other Site 3 measurements are influenced by contributors that are far removed and cross-wind from the subdivisions. The subdivisions will be predominantly down-wind of the proposed pretreatment plant whereas the other sites will be cross-wind, and the contributed values easily have the potential to double the noise level (10 dba increase) at these already quite areas. The 55 dba level allowed in the DEIS at other sample locations is totally unacceptable in quite neighborhoods.

8) DEIS, 2.1.2 states the pre-treatment facility needs 30,000 gallons of water per day. This is a HUGE issue for the nearby communities that pump their DRINKING water from the same aquifer. Fresh water is at a premium in this area of Texas. This will have a detrimental effect on area residents. Also, this water will be used in a process to remove contaminants. Yet, there is no discussion of waste water outfall, how it will be handled, or where it will be routed from the pretreatment plant. Only storm water is discussed in the DEIS. What is the waste water plan? No pipeline is demonstrated in the proposal to take waste water off the pre-treatment site to another permitted location.

IND54-4

In conclusion, please deny the permits or send the DEIS back to staff to address these deficiencies.

IND54-3: Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

This is addressed in section 4.3 of the EIS.

IND54-4: Comment acknowledged.

IND55 – James McConnell, Freeport, TX – Page 1

20140506-5010 FERC PDF (Unofficial) 5/5/2014 11:40:49 PM

James McConnell, Freeport, TX.
The DEIS puts much effort into the liquefaction facility on Quintana and only minimal focus on the facility at the pre-treatment site. The pre-treatment facility issues need to be more clearly separated in the context of document.

1) The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to the FLNG permits.

2) Page 4-119 under "Property Values" the paragraph "artfully" mixes the pre-treatment site with the liquefaction site and then mis-states that the pre-treatment site location as INDUSTRIAL. The proposed pre-treatment area is clearly in agricultural use with some dirt pits and clearly identified on County Tax records as natural pasture land. The majority of adjacent properties are residential. None are identified as industrial and only a small section to the south has some metering/filtering/small tanks in place. On Page 4-119 under "Property Values" states there is no expected impact on value of adjacent properties. This is a ridiculous statement as this large scale pre-treatment facility made up of numerous chemical processes, noise producers, flares and visual impact will clearly reduce the values of "pleasantly remote residences". The levee does not create a barrier for the subdivisions of Turtle Cove, Hideaway, OC Estates, Bridgepointe, and Bridge Harbor. The DEIS (4.8.2.1) concludes that there would be no impact to real estate values. The document provides no support for this. Values and marketability for our homes will decrease. Lucas Davis, Hass School of Business, UC Berkley published a study in May 2010 that power plant construction decreased home values within two miles of the newly constructed plants. The entire study can be reviewed at http://faculty.haas.berkley.edu/ldavis/pp.pdf. The DEIS should reassessed based on this new documentation.

IND55-1

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4) The DEIS recommends that "The Emergency Response Plan should be filed with the Secretary for review and written approval by the Director of OEP prior to initial site preparation." I strongly urge the Commission to require a proper ERP (that is communicated and acceptable to the nearby residents) prior to accepting this DEIS. Reject the DEIS for this deficiency. Local residents have repeatedly asked for FLNG's emergency plan. FLNG has responded with vague comments and a recommendation to sign up for CAER and listen to CAER radio when we hear sirens; however, there are NO sirens. A plan to evacuate residents has not been published, much less communicated in even the most rudimentary form.

IND55-1: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

As noted in section 4.8, the main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence, and we do not anticipate any impact on the value of adjacent properties or homes. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities. The Pretreatment Plant site is characterized in the EIS as a "commercial area".

As noted in Section 4.5.3.1 we have looked at the potential impacts from facility lighting on wildlife and have concluded that, given Freeport LNG's mitigation efforts and the Freeport LNG Facility Lighting Design Plan (FLDP), impacts to migratory and non-migratory birds will be minor. On December 6, 2013 Freeport LNG submitted a response to a data request (Docket Nos. CP12-509-000 and CP12-29-000) that addresses additional mitigation measures. Section 4.5.2 addresses the Brazoria National Wildlife Refuge. We anticipate Project related activities to have a minor impact on wildlife.

To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND55 – James McConnell, Freeport, TX – Page 2

20140506-5010 FERC PDF (Unofficial) 5/5/2014 11:40:49 PM

IND55-1 cont'd

5) The DEIS addresses pollution credits from the general region be utilized for FLNG's projected generation of pollution. The Commission needs to require that these credits be from within 10 miles of the facility. Reduction of pollution 100 miles away does not compensate local residents for the toxins that FLNG will be filling our homes and lungs with, nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

6) The Socioeconomic information in section 4.8 is out dated. Potentially available local worker resources have already been stretched thin. Readily available housing has already been filled. Housing is already at significant premium, and workers are already commuting to reach project work already in progress. This section 4.8 does NOT reflect current conditions in the area.

IND55-2

7) A noise study needs to be done for Turtle Cove and Hideaway. The other Site 3 measurements are influenced by contributors that are far removed and cross-wind from the subdivisions. The subdivisions will be predominantly down-wind of the proposed pre-treatment plant whereas the other sites will be cross-wind, and the contributed values easily have the potential to double the noise level (10 dba increase) at these already quite areas. The 55 dba level allowed in the DEIS at other sample locations is totally unacceptable in quite neighborhoods.

8) DEIS, 2.1.3 states that the pre-treatment facility needs 38,000 gallons of water per day. This is a HUGE issue for the nearby communities and cities that draw their fresh water from the same aquifer. Fresh water is at a premium in the area of Texas, and this will have a detrimental effect on the residents in this area. Also, this water will be used in processes to remove contaminants. Yet, there is no discussion of waste water outfall. How will it be handled, or where will it be routed from the pre-treatment facility? There is only storm water discussed in the DEIS. What is the waste water plan? There is no pipeline demonstrated in the proposal to take waste water off the pre-treatment site to another permitted location.

IND55-3

In conclusion, please deny the permits or at least send the DEIS back to staff to address these deficiencies.

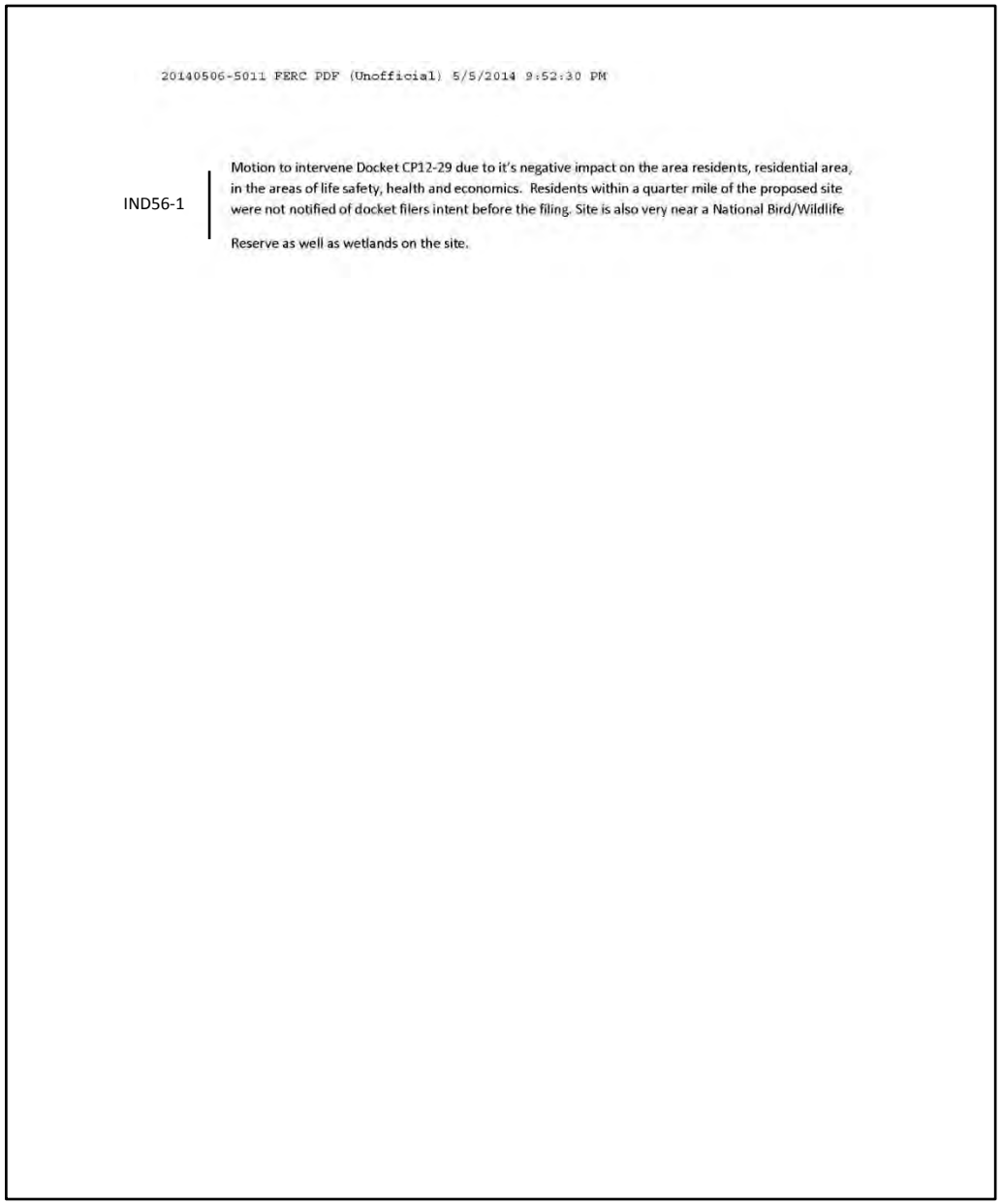
IND55-2: This is addressed in section 4.8.2, 4.8.3, and 4.8.4 of the EIS.

Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

This is addressed in section 4.3 of the EIS

IND55-3: Comment acknowledged.

IND56 – Unknown

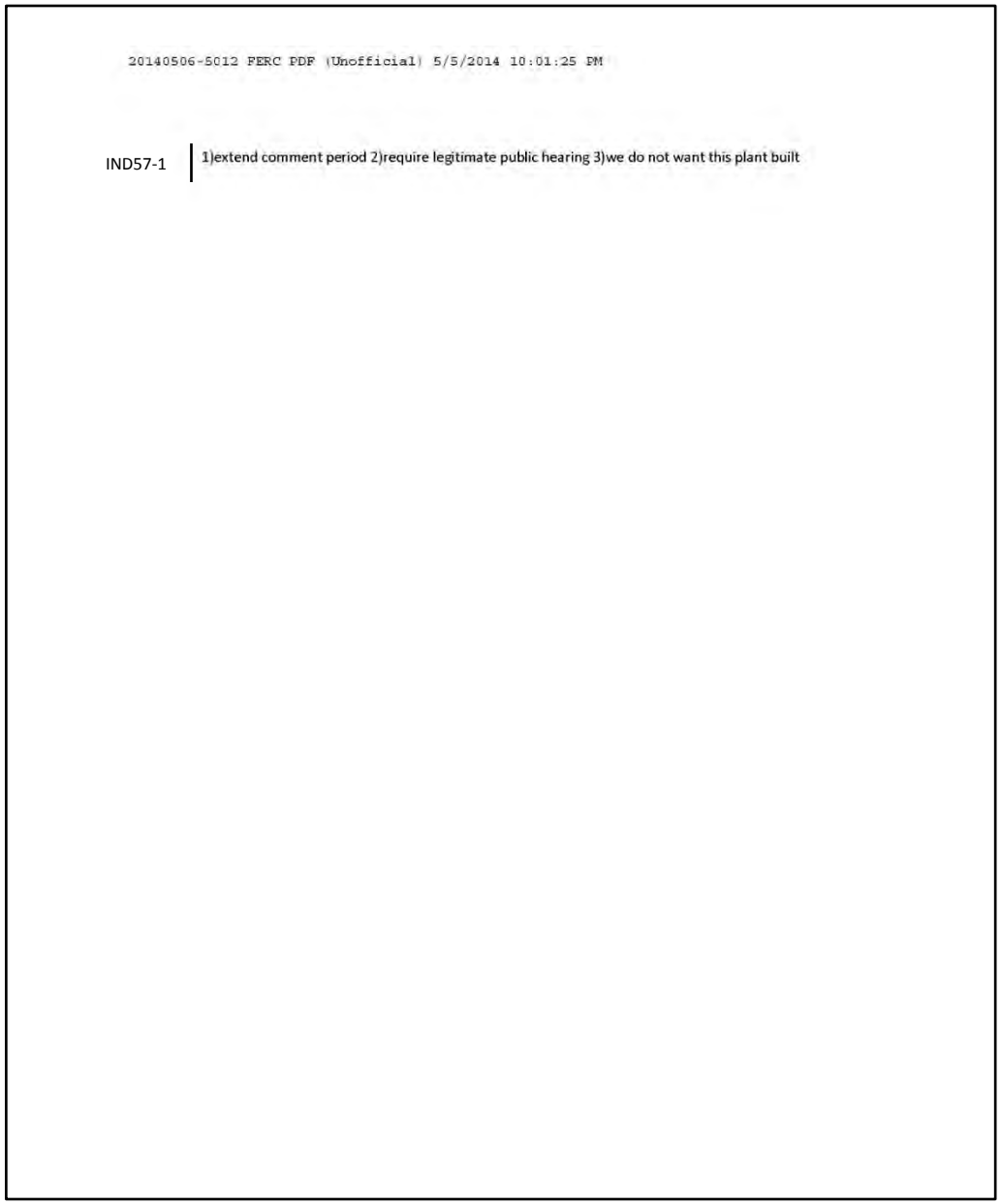


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IND56-1 | Motion to intervene Docket CP12-29 due to it's negative impact on the area residents, residential area, in the areas of life safety, health and economics. Residents within a quarter mile of the proposed site were not notified of docket filers intent before the filing. Site is also very near a National Bird/Wildlife Reserve as well as wetlands on the site.

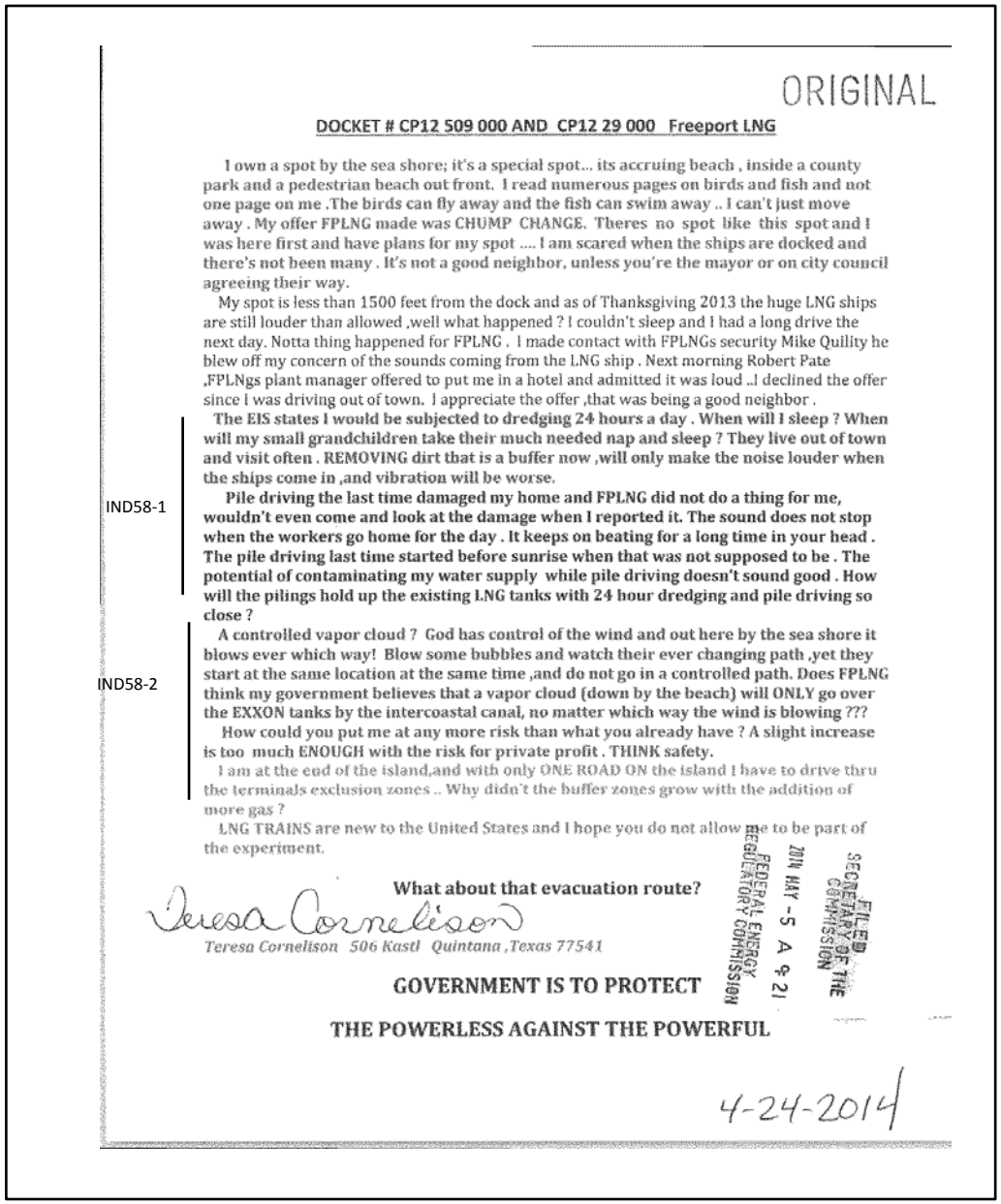
IND56-1: Comment acknowledged.

IND57 – Unknown



IND57-1: Section 1.4.4 of the EIS details the draft EIS comment meeting and addresses extending the comment period.

IND58 – Teresa Cornelison



ORIGINAL

DOCKET # CP12 509 000 AND CP12 29 000 Freeport LNG

I own a spot by the sea shore; it's a special spot... its accruing beach , inside a county park and a pedestrian beach out front. I read numerous pages on birds and fish and not one page on me .The birds can fly away and the fish can swim away .. I can't just move away . My offer FPLNG made was CHUMP CHANGE. Theres no spot like this spot and I was here first and have plans for my spot .... I am scared when the ships are docked and there's not been many . It's not a good neighbor, unless you're the mayor or on city council agreeing their way.

My spot is less than 1500 feet from the dock and as of Thanksgiving 2013 the huge LNG ships are still louder than allowed ,well what happened ? I couldn't sleep and I had a long drive the next day. Notta thing happened for FPLNG . I made contact with FPLNGs security Mike Quility he blew off my concern of the sounds coming from the LNG ship . Next morning Robert Pate ,FPLNgs plant manager offered to put me in a hotel and admitted it was loud ..I declined the offer since I was driving out of town. I appreciate the offer ,that was being a good neighbor .

The EIS states I would be subjected to dredging 24 hours a day . When will I sleep ? When will my small grandchildren take their much needed nap and sleep ? They live out of town and visit often . REMOVING dirt that is a buffer now ,will only make the noise louder when the ships come in ,and vibration will be worse.

IND58-1

Pile driving the last time damaged my home and FPLNG did not do a thing for me, wouldn't even come and look at the damage when I reported it. The sound does not stop when the workers go home for the day . It keeps on beating for a long time in your head . The pile driving last time started before sunrise when that was not supposed to be . The potential of contaminating my water supply while pile driving doesn't sound good . How will the pilings hold up the existing LNG tanks with 24 hour dredging and pile driving so close ?

IND58-2

A controlled vapor cloud ? God has control of the wind and out here by the sea shore it blows ever which way! Blow some bubbles and watch their ever changing path ,yet they start at the same location at the same time ,and do not go in a controlled path. Does FPLNG think my government believes that a vapor cloud (down by the beach) will ONLY go over the EXXON tanks by the intercoastal canal, no matter which way the wind is blowing ???

How could you put me at any more risk than what you already have ? A slight increase is too much ENOUGH with the risk for private profit . THINK safety.

I am at the end of the island,and with only ONE ROAD ON the island I have to drive thru the terminals exclusion zones .. Why didn't the buffer zones grow with the addition of more gas ?

LNG TRAINS are new to the United States and I hope you do not allow me to be part of the experiment.

What about that evacuation route?

Teresa Cornelison

Teresa Cornelison 506 Kastl Quintana ,Texas 77541

FEDERAL ENERGY REGULATORY COMMISSION 2014 MAY -5 A 9:21 FILED SECRETARY OF THE COMMISSION

GOVERNMENT IS TO PROTECT

THE POWERLESS AGAINST THE POWERFUL

4-24-2014

IND58-1: Sections 4.11.2, 5.13.1, and 5.13.2 address noise and vibration during construction and operation of the facility. We acknowledge in the EIS that there would be a significant and unavoidable adverse impact on the residents of the Town of Quintana during construction.

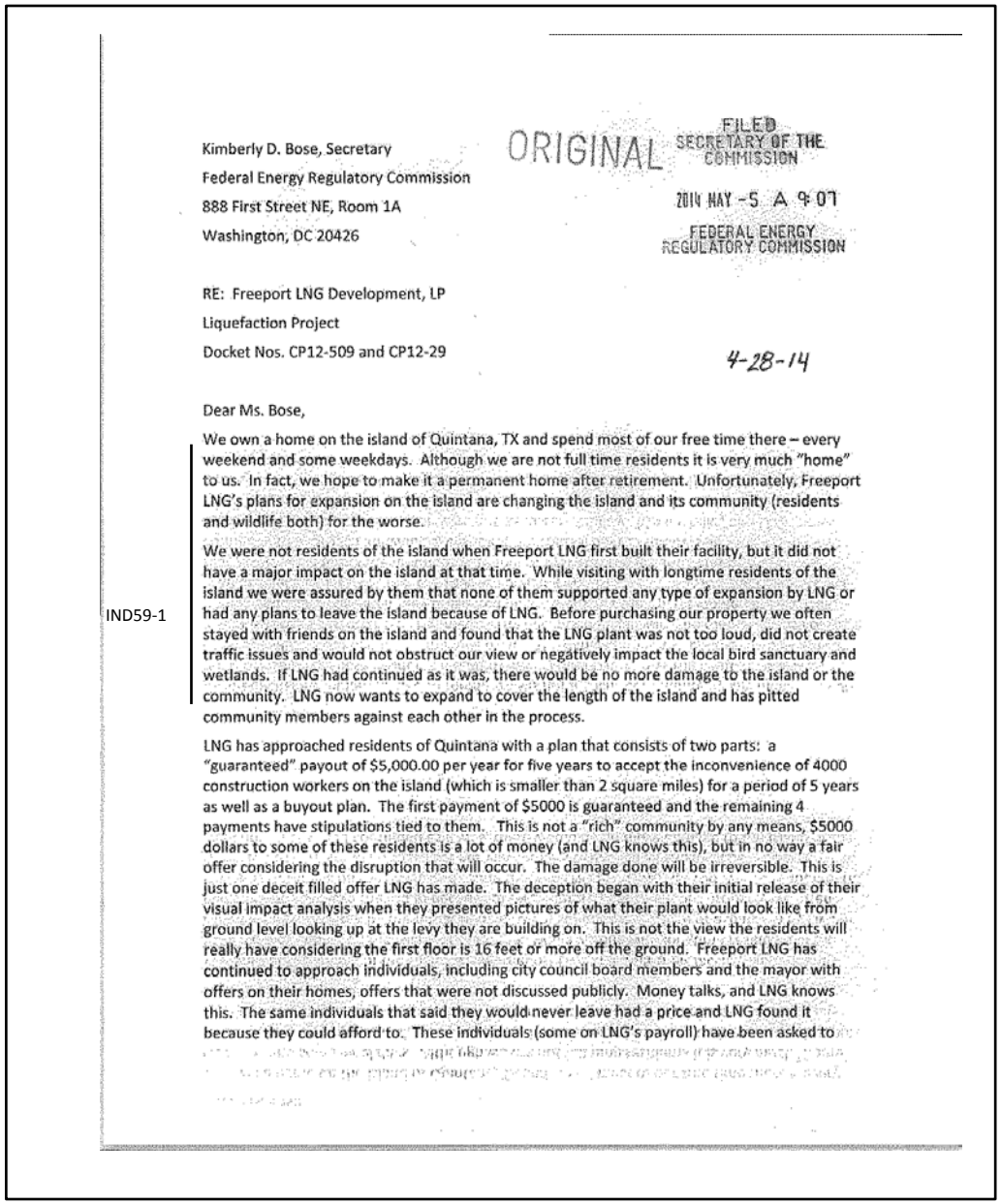
IND58-2: To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND59 – Michelle and Mark Napier, League City, TX – Page 1



Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

ORIGINAL

FILED
SECRETARY OF THE
COMMISSION

2014 MAY -5 A 9:07

FEDERAL ENERGY
REGULATORY COMMISSION

RE: Freeport LNG Development, LP
Liquefaction Project
Docket Nos. CP12-509 and CP12-29

4-28-14

Dear Ms. Bose,

We own a home on the island of Quintana, TX and spend most of our free time there – every weekend and some weekdays. Although we are not full time residents it is very much "home" to us. In fact, we hope to make it a permanent home after retirement. Unfortunately, Freeport LNG's plans for expansion on the island are changing the island and its community (residents and wildlife both) for the worse.

IND59-1

We were not residents of the island when Freeport LNG first built their facility, but it did not have a major impact on the island at that time. While visiting with longtime residents of the island we were assured by them that none of them supported any type of expansion by LNG or had any plans to leave the island because of LNG. Before purchasing our property we often stayed with friends on the island and found that the LNG plant was not too loud, did not create traffic issues and would not obstruct our view or negatively impact the local bird sanctuary and wetlands. If LNG had continued as it was, there would be no more damage to the island or the community. LNG now wants to expand to cover the length of the island and has pitted community members against each other in the process.

LNG has approached residents of Quintana with a plan that consists of two parts: a "guaranteed" payout of $5,000.00 per year for five years to accept the inconvenience of 4000 construction workers on the island (which is smaller than 2 square miles) for a period of 5 years as well as a buyout plan. The first payment of $5000 is guaranteed and the remaining 4 payments have stipulations tied to them. This is not a "rich" community by any means, $5000 dollars to some of these residents is a lot of money (and LNG knows this), but in no way a fair offer considering the disruption that will occur. The damage done will be irreversible. This is just one deceit filled offer LNG has made. The deception began with their initial release of their visual impact analysis when they presented pictures of what their plant would look like from ground level looking up at the levy they are building on. This is not the view the residents will really have considering the first floor is 16 feet or more off the ground. Freeport LNG has continued to approach individuals, including city council board members and the mayor with offers on their homes, offers that were not discussed publicly. Money talks, and LNG knows this. The same individuals that said they would never leave had a price and LNG found it because they could afford to. These individuals (some on LNG's payroll) have been asked to

IND59-1: Comment acknowledged.

IND59 – Michelle and Mark Napier, League City, TX – Page 2

write you about the wonderful things LNG is doing for the island and how they have had a positive impact on the community. These people will more than likely leave the island once the construction starts and never return as either full or part time residents. LNG has continued to approach other residents with "fair market value" (on Quintana) for their homes. Fair market value is not anywhere near what these homes are worth anywhere else along the coast. Our home is on 2 lots, overlooks the Gulf of Mexico and is surrounded on two sides by wetlands. LNG refuses to pay "replacement" value for our homes. "Fair market value" on Quintana will not allow us to replace, or even come close to replacing, what we have within an hour of our current fulltime residence. Not to mention we do not want to leave this beautiful island. Quintana has the historical distinction of being the site of a Confederate fort during the Civil War as well as a stop on the Columbia-to-Galveston mail route during the Republic of Texas. It is the site of a county park, pristine wetlands and beautiful beaches. It is home to a bird sanctuary and known as a major migratory resting and feeding site for hundreds of migratory birds.

Freeport LNG promises benefits will come our way, but any benefits will go to Brazoria County as a whole and Freeport. Quintana is unlikely to receive any benefits that will outweigh the damage done to the island. It will destroy the natural environment as well as interfere with recreational access to the jetties, the intracoastal waterway, the bird sanctuary (if it survives the increased sound, light and air pollution the construction and operation of this plant will bring) as well as the county park.

IND59-2 We want you and your team to get the full picture of what is happening here. We do not feel that this is the best place for LNG's export terminal. There are several terminals around the country that would be better suited for this where less environmental damage would occur.

Sincerely,

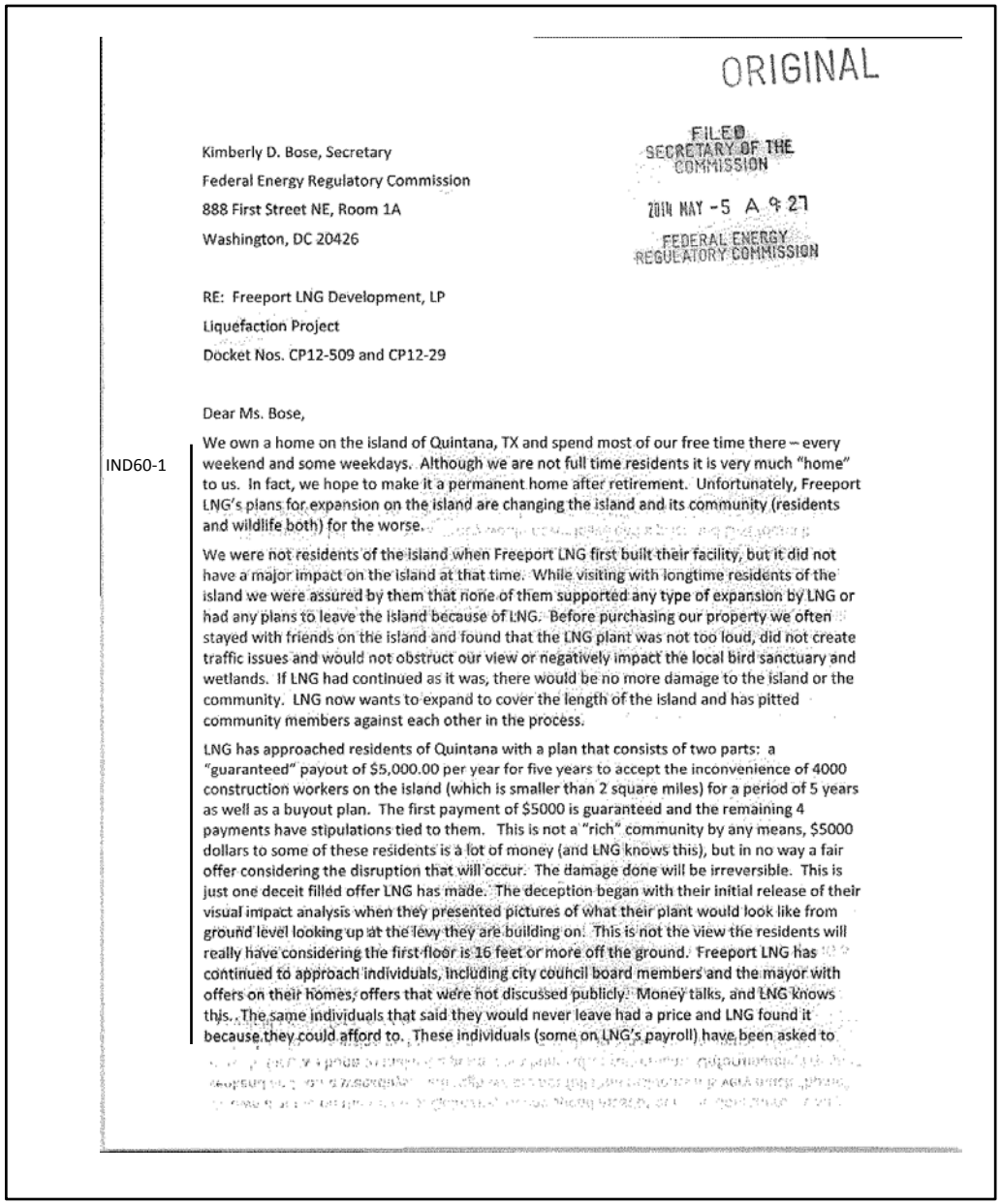
Michelle and Mark Napier

2356 Autumn Mist Lane

League City, TX 77573

IND59-2: Comment acknowledged.

IND60 – Michelle and Mark Napier, League City, TX – Page 1



ORIGINAL

FILED
SECRETARY OF THE
COMMISSION

2014 MAY -5 A 9:27

FEDERAL ENERGY
REGULATORY COMMISSION

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

RE: Freeport LNG Development, LP
Liquefaction Project
Docket Nos. CP12-509 and CP12-29

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IND60-1 We own a home on the island of Quintana, TX and spend most of our free time there – every weekend and some weekdays. Although we are not full time residents it is very much "home" to us. In fact, we hope to make it a permanent home after retirement. Unfortunately, Freeport LNG's plans for expansion on the island are changing the island and its community (residents and wildlife both) for the worse.

We were not residents of the island when Freeport LNG first built their facility, but it did not have a major impact on the island at that time. While visiting with longtime residents of the island we were assured by them that none of them supported any type of expansion by LNG or had any plans to leave the island because of LNG. Before purchasing our property we often stayed with friends on the island and found that the LNG plant was not too loud, did not create traffic issues and would not obstruct our view or negatively impact the local bird sanctuary and wetlands. If LNG had continued as it was, there would be no more damage to the island or the community. LNG now wants to expand to cover the length of the island and has pitted community members against each other in the process.

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IND60-1: Comment acknowledged.

IND60 – Michelle and Mark Napier, League City, TX – Page 2

write you about the wonderful things LNG is doing for the island and how they have had a positive impact on the community. These people will more than likely leave the island once the construction starts and never return as either full or part time residents. LNG has continued to approach other residents with "fair market value" (on Quintana) for their homes. Fair market value is not anywhere near what these homes are worth anywhere else along the coast. Our home is on 2 lots, overlooks the Gulf of Mexico and is surrounded on two sides by wetlands. LNG refuses to pay "replacement" value for our homes. "Fair market value" on Quintana will not allow us to replace, or even come close to replacing, what we have within an hour of our current fulltime residence. Not to mention we do not want to leave this beautiful island. Quintana has the historical distinction of being the site of a Confederate fort during the Civil War as well as a stop on the Columbia-to-Galveston mail route during the Republic of Texas. It is the site of a county park, pristine wetlands and beautiful beaches. It is home to a bird sanctuary and known as a major migratory resting and feeding site for hundreds of migratory birds.

Freeport LNG promises benefits will come our way, but any benefits will go to Brazoria County as a whole and Freeport. Quintana is unlikely to receive any benefits that will outweigh the damage done to the island. It will destroy the natural environment as well as interfere with recreational access to the jetties, the intracoastal waterway, the bird sanctuary (if it survives the increased sound, light and air pollution the construction and operation of this plant will bring) as well as the county park.

We want you and your team to get the full picture of what is happening here. We do not feel that this is the best place for LNG's export terminal. There are several terminals around the country that would be better suited for this where less environmental damage would occur.

Sincerely,

Michelle and Mark Napier

2356 Autumn Mist Lane

League City, TX 77573

IND61 – Richard D. Linn, Freeport, TX

20140430-5155 FERC PDF (Unofficial) 4/30/2014 11:52:18 AM

Richard D Linn, Freeport, TX.
I do not live on Quintana Island but I am a property owner in the affected area of the proposed Freeport LNG Plant. I've been made aware of the safety and evacuation drills that FLNG has proposed for the residents of Quintana Island. However I have big concerns and so should FERC regarding the many families that visit Quintana Beach on any given day, I'm included. On long week-ends in the summer months the island can see thousands of beach goers and campers. Is FLNG going have safety drills for the visitors? Does FLNG and FERC think all beach goers and residents are going to evacuate in an orderly fashion from one (1) exit should an alarm sound or an evacuation ordered? What I see is panic, chaos, injuries and God forbid the worst case scenario, deaths. I don't think the current proposed location of this plant is safe for the residents as well as public beach visitors and campers. Plant should relocate to a more viable location.

IND61-1

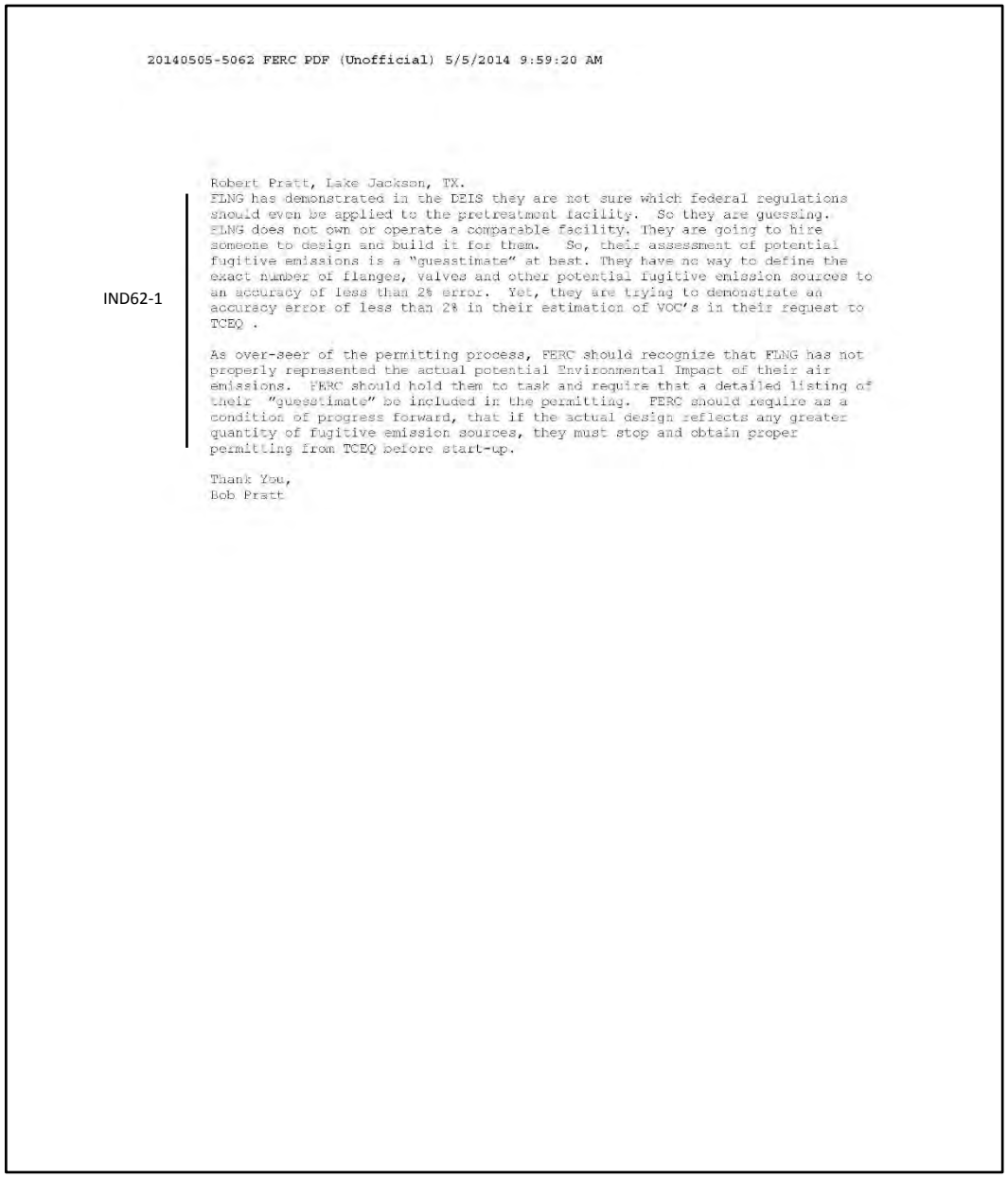
Sincerely,
Richard Linn

IND61-1: Comment acknowledged. To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

IND62 – Robert Pratt, Lake Jackson, TX



20140505-5062 FERC PDF (Unofficial) 5/5/2014 9:59:20 AM

Robert Pratt, Lake Jackson, TX.

IND62-1

FLNG has demonstrated in the DEIS they are not sure which federal regulations should even be applied to the pretreatment facility. So they are guessing. FLNG does not own or operate a comparable facility. They are going to hire someone to design and build it for them. So, their assessment of potential fugitive emissions is a "guesstimate" at best. They have no way to define the exact number of flanges, valves and other potential fugitive emission sources to an accuracy of less than 2% error. Yet, they are trying to demonstrate an accuracy error of less than 2% in their estimation of VOC's in their request to TCEQ .

As over-seer of the permitting process, FERC should recognize that FLNG has not properly represented the actual potential Environmental Impact of their air emissions. FERC should hold them to task and require that a detailed listing of their "guesstimate" be included in the permitting. FERC should require as a condition of progress forward, that if the actual design reflects any greater quantity of fugitive emission sources, they must stop and obtain proper permitting from TCEQ before start-up.

Thank You,
Bob Pratt

IND62-1: The facility has been designed, and would be required, to comply with local, state and federal (NAAQS) health based and other air regulations. In addition, see IND18-1..

We address the request for air monitoring in section 4.11**.**

The Pretreatment Plant portion of the project is covered under 49 CFR 192 and is being addressed as part of the review of the entire Freeport LNG Projects.

To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

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As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND63 – Margeret Pratt, Lake Jackson, TX

20140505-5077 FERC PDF (Unofficial) 5/5/2014 10:23:45 AM

Margeret Pratt, Lake Jackson, TX.

IND63-1 I am vehemently opposed to allowing FLNG to build a large plant at the currently proposed pretreatment plant location.

My husband and I first discovered Turtle Cove in 1987. It is a small, quiet subdivision on the waterfront of Oyster Creek. We love it out there! We rented for years and then started buying and working on building our retirement property. We now have a nice little place on the waterfront where we can enjoy the solitude of looking out to the Brazoria National Wildlife refuge. Currently, we are still employed and anxiously await the 2 to 4 days a week we get to spend at Turtle Cove, while looking forward to the ability to be there full time. The waterfront gives us a place to play with our boat, the community is friendly and down to earth and my husband has become very involved with the community. We love the outdoors and spend hours out in yard or entertaining friends on the deck. It is so quiet and peaceful. Occasionally, a car or boat passes by, or maybe a motorcycle headed to the pub at the end of the road, but primarily we listen to the fish popping in the water or the birds around us. While enjoying a sunrise or moonrise, we can generally hear the surf-sounds from the beach. When it is night, it is dark! The moon and stars from our deck are as close to being in the wilderness as you can get and still get to work in the morning.

IND63-2 I DO NOT want to have this PEACEFUL ENVIRONMENT destroyed by FLNG with the installation of a large plant, noisy equipment, glaring lights and constant threat of an accident, located less than a mile from my property. We have both worked in the chemical plants in the local area for years and are fully aware of just how disruptive the impact will be. For people that live in big, noisy cities, our chosen property location would be considered a vacation destination. The FLNG pretreatment facility is going to destroy it. FERC should make them locate at an industrial area, not in pasture-land next door to a large number of people's peaceful homes and home to much of the local flora and fauna.

IND63-3 Please deny the proposed FLNG pretreatment location site.
Respectfully,
Margaret Pratt

IND63-1: Comment acknowledged.

IND63-2: Comment acknowledged.

IND63-3: Comment acknowledged.

IND64 – Robert Pratt, Lake Jackson, TX

20140505-5088 FERC PDF (Unofficial) 5/5/2014 10:35:02 AM

Robert Pratt, Lake Jackson, TX.
A matter of scientific protocol referenced from TCEQ approval to FERC.

A mistake has been made. FLNG DOES need a VOC permit. The target threshold requiring VOC permitting is 25 tpy, not 25.00 tpy. The reported quantity from FLNG to TCEQ is 24.96 tpy, which demonstrated in proper significant digits would clearly be 25 tpy, which triggers required VOC permitting. IND64-1

The FERC DEIS should therefore be refused for lack of proper VOC permitting.

ThankYou,
Robert Pratt

IND64-1: Comment acknowledged.

To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

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As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

The EIS clearly delineates all emissions, including VOC emissions which are summed correctly and detailed in section 4.11.1 of the EIS.

IND65 – Robert Pratt, Lake Jackson, VI

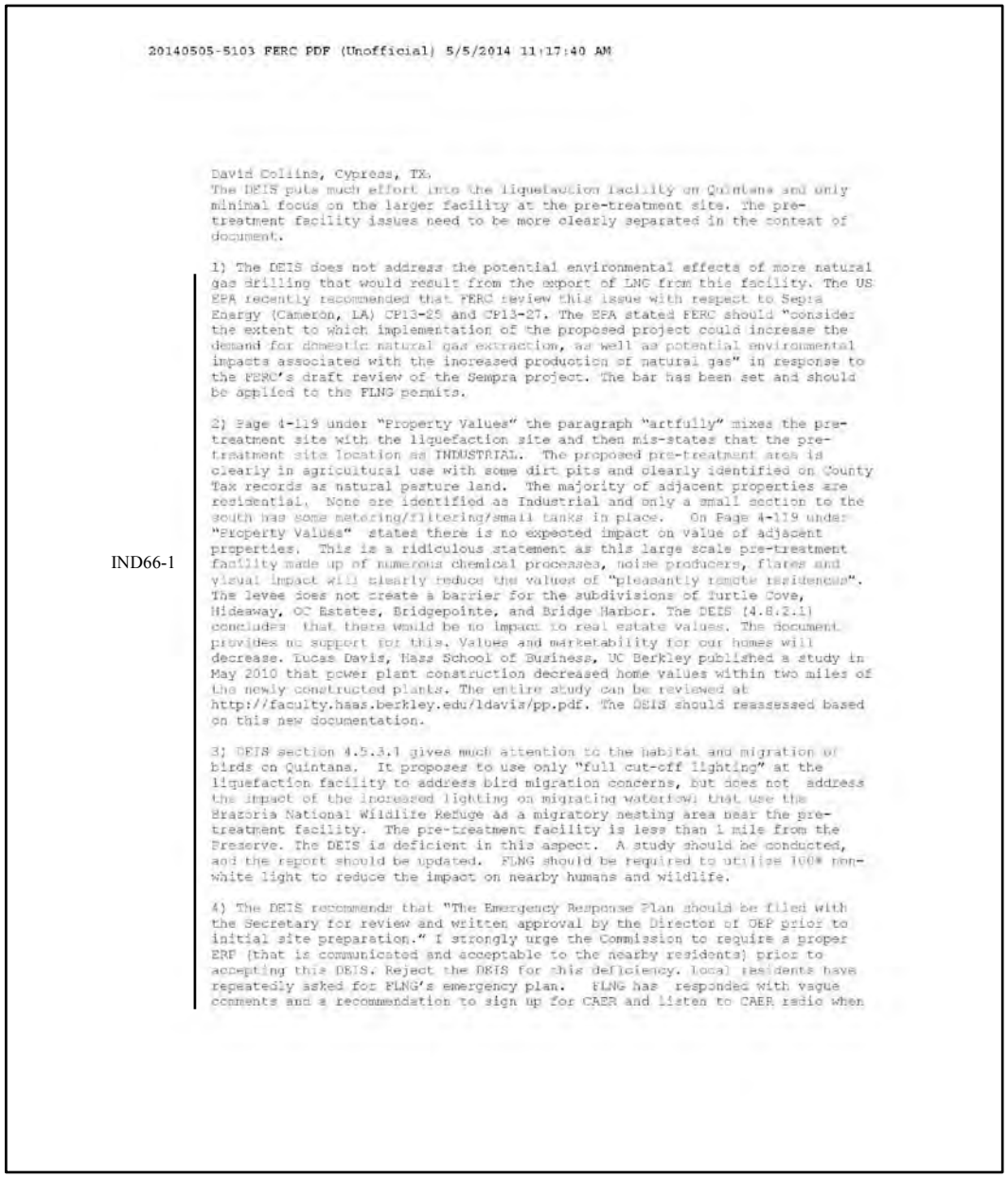
20140505-5089 FERC PDF (Unofficial) 5/5/2014 10:39:44 AM

Robert Pratt, Lake Jackson, TX.
The Brazosport Area levee system is currently under revision and repair. The Corps of Engineers has concerns with stability issues from the impact of the previous harbor dredging projects. There is nothing in the DEIS discussing the
IND65-1 cumulative impact of the desired new dredging for the new terminal, the levee upgrade project and existing problems in regards to the ability of the Corps of Engineers to secure the existing levee system for the Brazosport area. Until a cumulative evaluation is conducted by Corps of Engineers, the DEIS cannot be approved.

Thank You,
Robert Pratt

IND65-1: The USACE authorizes dredging activities and the disposal of dredging materials; see section 2.4.1. Dredging noise is discussed in section 4.11.2 of the EIS.

IND66– David Collins, Cypress, TX – Page 1



20140505-5103 FERC PDF (Unofficial) 5/5/2014 11:17:40 AM

David Collins, Cypress, TX.
The DEIS puts much effort into the liquefaction facility on Quintana and only minimal focus on the larger facility at the pre-treatment site. The pre-treatment facility issues need to be more clearly separated in the context of document.

1) The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to the FLNG permits.

IND66-1

2) Page 4-119 under "Property Values" the paragraph "artfully" mixes the pre-treatment site with the liquefaction site and then mis-states that the pre-treatment site location as INDUSTRIAL. The proposed pre-treatment area is clearly in agricultural use with some dirt pits and clearly identified on County Tax records as natural pasture land. The majority of adjacent properties are residential. None are identified as Industrial and only a small section to the south has some metering/filtering/small tanks in place. On Page 4-119 under "Property Values" states there is no expected impact on value of adjacent properties. This is a ridiculous statement as this large scale pre-treatment facility made up of numerous chemical processes, noise producers, flares and visual impact will clearly reduce the values of "pleasantly remote residences". The levee does not create a barrier for the subdivisions of Turtle Cove, Hideaway, OC Estates, Bridgepointe, and Bridge Harbor. The DEIS (4.8.2.1) concludes that there would be no impact to real estate values. The document provides no support for this. Values and marketability for our homes will decrease. Lucas Davis, Haas School of Business, UC Berkley published a study in May 2010 that power plant construction decreased home values within two miles of the newly constructed plants. The entire study can be reviewed at http://faculty.haas.berkley.edu/ldavis/pp.pdf. The DEIS should reassessed based on this new documentation.

3) DEIS section 4.5.3.1 gives much attention to the habitat and migration of birds on Quintana. It proposes to use only "full cut-off lighting" at the liquefaction facility to address bird migration concerns, but does not address the impact of the increased lighting on migrating waterfowl that use the Brazoria National Wildlife Refuge as a migratory nesting area near the pre-treatment facility. The pre-treatment facility is less than 1 mile from the Preserve. The DEIS is deficient in this aspect. A study should be conducted, and the report should be updated. FLNG should be required to utilize 100% non-white light to reduce the impact on nearby humans and wildlife.

4) The DEIS recommends that "The Emergency Response Plan should be filed with the Secretary for review and written approval by the Director of OEP prior to initial site preparation." I strongly urge the Commission to require a proper ERP (that is communicated and acceptable to the nearby residents) prior to accepting this DEIS. Reject the DEIS for this deficiency. Local residents have repeatedly asked for FLNG's emergency plan. FLNG has responded with vague comments and a recommendation to sign up for CAER and listen to CAER radio when

IND66-1: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

As noted in section 4.8, the main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence, and we do not anticipate any impact on the value of adjacent properties or homes. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities. The Pretreatment Plant site is characterized in the EIS as a "commercial area".

As noted in Section 4.5.3.1 we have looked at the potential impacts from facility lighting on wildlife and have concluded that, given Freeport LNG's mitigation efforts and the Freeport LNG Facility Lighting Design Plan (FLDP), impacts to migratory and non-migratory birds will be minor. On December 6, 2013 Freeport LNG submitted a response to a data request (Docket Nos. CP12-509-000 and CP12-29-000) that addresses additional mitigation measures. Section 4.5.2 addresses the Brazoria National Wildlife Refuge. We anticipate Project related activities to have a minor impact on wildlife.

To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

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As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND66– David Collins, Cypress, TX – Page 2

20140505-5103 FERC PDF (Unofficial) 5/5/2014 11:17:40 AM

we hear sirens; however, there are NO sirens. A plan to evacuate residents has not been published, much less communicated in even the most rudimentary form.

IND66-1 cont'd

5) The DEIS addresses pollution credits from the general region be utilized for FLNG's projected generation of pollution. The Commission needs to require that these credits be from within 10 miles of the facility. Reduction of pollution 100 miles away does not compensate local residents for the toxins that FLNG will be filling our homes and lungs with, nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

IND66-2

6) The Socioeconomic Information in section 4.8 is out dated. Potentially available local worker resources have already been stretched thin. Readily available housing has already been filled. Housing is already at significant premium, and workers are already commuting to reach project work already in progress. This section 4.8 does NOT reflect current conditions in the area.

7) A noise study needs to be done for Turtle Cove and Hideaway. The other Site 3 measurements are influenced by contributors that are far removed and cross-wind from the subdivisions. The subdivisions will be predominantly down-wind of the proposed pre-treatment plant whereas the other sites will be cross-wind, and the contributed values easily have the potential to double the noise level (10 dba increase) at these already quite areas. The 55 dba level allowed in the DEIS at other sample locations is totally unacceptable in quite neighborhoods.

8) DEIS, 2.1.3 states that the pre-treatment facility needs 38,000 gallons of water per day. This is a HUGE issue for the nearby communities and cities that draw their fresh water from the same aquifer. Fresh water is at a premium in the area of Texas, and this will have a detrimental effect on the residents in this area. Also, this water will be used in processes to remove contaminants. Yet, there is no discussion of waste water outfall. How will it be handled, or where will it be routed from the pre-treatment facility? There is only storm water discussed in the DEIS. What is the waste water plan? There is no pipeline demonstrated in the proposal to take waste water off the pre-treatment site to another permitted location.

IND66-3

In conclusion, please deny the permits or at least send the DEIS back to staff to address these deficiencie

IND66-2: This is addressed in section 4.8.2, 4.8.3, and 4.8.4 of the EIS.

Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

This is addressed in section 4.3 of the EIS

IND66-3: Comment acknowledged.

IND67– Robert Pratt, Lake Jackson, TX – Page 1

20140505-5112 FERC PDF (Unofficial) 5/5/2014 11:28:48 AM

Robert Pratt, Lake Jackson, TX.
Further Information that the Socio-economic Impact demonstrated in the DEIS is out of date and needs revisiting.
Thank You,
Robert Pratt

IND67-1

Bloomberg Businessweek
News From Bloomberg
http://www.businessweek.com/news/2014-04-17/midnight-welding-picks-up-labor-slack-that-imperils-shale-boom
Labor Shortage Threatens to Bust the Shale Boom
By Isaac Arnsdorf, Dan Murtaugh and Jack Kaskey April 17, 2014
How high is demand for welders to work in the shale boom on the U.S. Gulf Coast? So high that "you can take every citizen in the region of Lake Charles between the ages of 5 and 85 and teach them all how to weld and you're not going to have enough welders," said Peter Huntsman, chief executive officer of chemical maker Huntsman Corp. (HUN:US)
So high that San Jacinto College in Pasadena, Texas, offers a four-hour welding class in the middle of the night. So high that local employers say they're worried there won't be adequate supply of workers of all kinds. Just for construction, Gulf Coast oil, gas and chemical companies will have to find 36,000 new qualified workers by 2016, according to Industrial Info Resources Inc. in Sugar Land, Texas. Regional estimates call for even more new hires once those projects are built. The processing and refining industries need so many workers to build new facilities in Texas and Louisiana because of the unprecedented rise over the last three years in U.S. oil and gas production, much of it due to shale. Labor shortages, causing delays in construction, threaten to slow the boom and push back the date when the country can meet its own energy needs, estimated by BP Plc to be in 2035.
Worker scarcities are already evident in the unemployment rates of Texas (5.7 percent) and Louisiana (4.5 percent), both below the national average of 6.7 percent, according to the Bureau of Labor Statistics. The lowest jobless rate of any area in the U.S. in February was 2.8 percent in Houma-Bayou Cane-Thibodaux, Louisiana, because of offshore-oil exploration in the Gulf of Mexico.

Building Projects
Companies will spend $35 billion, more than ever, on expansion projects along the Houston Ship Channel by next year, creating a total of 265,800 jobs, a 2012 Greater Houston Port Bureau survey shows. Louisiana, where $60 billion in building projects are planned through 2016, will need 86,300 workers over that time, according to the state's Workforce Commission.
"This is an exponentially larger investment period than Louisiana has ever seen," said Tom Guarisco, a spokesman for the Workforce Commission in Baton Rouge. The biggest shortages will be for welders, electricians, instrumentation technicians, fabricators and pipe fitters, according to Roger Blackburn, executive account manager at Infinity Construction Services LP, which employs about 2,500 workers on the Gulf Coast. The scale of the projects means costs and delays will probably escalate, he said.

Wages Rose
Labor scarcity can erode profit. Cost run-ups and labor shortages have hindered recent energy-boom projects in Canada and Australia. Wages for oil and gas workers in Canada rose to as much as 60

IND67-1: See revisions to section 4.8.

IND67– Robert Pratt, Lake Jackson, TX– Page 2

20140505-5112 FERC PDF (Unofficial) 5/5/2014 11:28:48 AM

percent higher than U.S. counterparts, labor data show. In Australia, cooks at offshore projects are earning more than A$350,000 ($328,000) a year while laundry hands get more than A$325,000 and barge welders almost A$400,000, imperiling investments in liquefied natural gas, according to the Australian Petroleum Production & Exploration Association.
Enterprise Products Partners LP (EPD:US) said March 18 that permitting for a facility east of Houston, in Mont Belvieu, Texas, that turns propane into propylene is running three months behind. In December, Royal Dutch Shell Plc canceled a $20 billion gas-to-liquids plant slated for Louisiana, citing potential cost overruns. Construction for three new U.S. natural-gas-processing plants could go as much as 40 percent over budget and finish nine months late, Sergey Vasnetsov, senior vice president of strategic planning at LyondellBasell Industries NV in Houston, said at a March 12 conference in New York.

'Tight Availability'
"There was some tight availability of qualified labor, and so we expect it to be a significant issue for the industry, in particular in 2016, 2017, where the bulk of the heavy construction will take place in the U.S.," Vasnetsov said at the conference. Chevron Phillips Chemical Co., a venture between Chevron Corp. and Phillips 66 (PSX:US) based in The Woodlands, Texas, broke ground near Houston this month on ethylene and polyethylene plastics plants whose budget will go $1 billion over the original $5 billion estimate, primarily because of labor costs, Chief Executive Officer Peter Cella said in an interview.

IND67-1 cont'd

"Where are the workers going to come from?" Cella asked.
The answer: from Canada and other countries, and employers are sweetening benefit packages to attract and retain them. These include higher contributions to retirement savings and tuition reimbursement, said Dani Grant, a human resources manager at chemical maker Noltex LLC in La Porte, Texas.

Plush Toilets
Other companies are tempting workers with gourmet dining, retention bonuses and smoking areas, which are usually not allowed at chemical facilities, said Russell Heinen, a senior director at IHS Inc. (IHS:US), an energy company advisory firm in Englewood, Colorado. Bechtel Corp., the biggest U.S. construction contractor, offers the amenity of running-water toilets, according to Jim Ivany, executive vice president at the San Francisco-based company's oil, gas andchemicals unit.

When projects in engineering and permitting stages start construction late this year, wages will rise 15 to 20 percent "almost overnight," similar to what happened in 2006 and 2007 before the global recession, according to Peter Huntsman of Salt Lake City-based Huntsman Corp. Pay started to rise in the fourth quarter of 2013, said Mike Bergen, an executive executive vice president at IHR.

IND68– Robert Pratt, Lake Jackson, TX

20140505-5114 FERC PDF (Unofficial) 5/5/2014 11:40:23 AM

Robert Pratt, Lake Jackson, TX.
With all the huge labor needs being created on the Gulf Coast, there will have to be prioritization of projects.

IND68-1 Those projects benefitting the United States as a whole should take priority over projects exporting to non FTA countries and benefitting only a few people in the US.

This Socioeconomic impact is clear, FLNG export needs to take the back seat and wait!

Thank You,
Robert Pratt

Bloomberg Businessweek
News From Bloomberg
http://www.businessweek.com/news/2014-04-17/midnight-welding-picks-up-labor-slack-that-imperils-shale-boom
Labor Shortage Threatens to Bust the
Shale Boom
By Isaac Arnsdorf, Dan Murtaugh and Jack Kaskey April 17, 2014

IND68-1: See revisions to section 4.8.

IND69 – Richard D. Linn, Freeport, TX – Page 1

20140505-5144 FERC PDF (Unofficial) 5/5/2014 12:50:56 PM

Richard D Linn, Freeport, TX.
Further review needed,

IND69-1

The DEIS puts much effort into the liquefaction facility on Quintana and only minimal focus on the larger facility at the pre-treatment site. The pre-treatment facility issues need to be more clearly separated in the context of document.

1) The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to the FLNG permits.

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4) The DEIS recommends that "The Emergency Response Plan should be filed with the Secretary for review and written approval by the Director of OEP prior to initial site preparation." I strongly urge the Commission to require a proper ERP [that is communicated and acceptable to the nearby residents] prior to accepting this DEIS. Reject the DEIS for this deficiency. Local residents have repeatedly asked for FLNG's emergency plan. FLNG has responded with vague

IND69-1: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

As noted in section 4.8, the main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence, and we do not anticipate any impact on the value of adjacent properties or homes. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities. The Pretreatment Plant site is characterized in the EIS as a "commercial area".

As noted in Section 4.5.3.1 we have looked at the potential impacts from facility lighting on wildlife and have concluded that, given Freeport LNG's mitigation efforts and the Freeport LNG Facility Lighting Design Plan (FLDP), impacts to migratory and non-migratory birds will be minor. On December 6, 2013 Freeport LNG submitted a response to a data request (Docket Nos. CP12-509-000 and CP12-29-000) that addresses additional mitigation measures. Section 4.5.2 addresses the Brazoria National Wildlife Refuge. We anticipate Project related activities to have a minor impact on wildlife.

To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

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comments and a recommendation to sign up for CAER and listen to CAER radio when we hear sirens; however, there are NO sirens. A plan to evacuate residents has not been published, much less communicated in even the most rudimentary form.

IND69-1 cont'd

5) The DEIS addresses pollution credits from the general region be utilized for FLNG's projected generation of pollution. The Commission needs to require that these credits be from within 10 miles of the facility. Reduction of pollution 100 miles away does not compensate local residents for the toxins that FLNG will be filling our homes and lungs with, nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

6) The Socioeconomic information in section 4.8 is out dated. Potentially available local worker resources have already been stretched thin. Readily available housing has already been filled. Housing is already at significant premium, and workers are already commuting to reach project work already in progress. This section 4.8 does NOT reflect current conditions in the area.

IND69-2

7) A noise study needs to be done for Turtle Cove and Hideaway. The other Site 3 measurements are influenced by contributors that are far removed and cross-wind from the subdivisions. The subdivisions will be predominantly down-wind of the proposed pre-treatment plant whereas the other sites will be cross-wind, and the contributed values easily have the potential to double the noise level (10 dba increase) at these already quite areas. The 55 dba level allowed in the DEIS at other sample locations is totally unacceptable in quite neighborhoods.

8) DEIS, 2.1.3 states that the pre-treatment facility needs 38,000 gallons of water per day. This is a HUGE issue for the nearby communities and cities that draw their fresh water from the same aquifer. Fresh water is at a premium in the area of Texas, and this will have a detrimental effect on the residents in this area. Also, this water will be used in processes to remove contaminants. Yet, there is no discussion of waste water outfall. How will it be handled, or where will it be routed from the pre-treatment facility? There is only storm water discussed in the DEIS. What is the waste water plan? There is no pipeline demonstrated in the proposal to take waste water off the pre-treatment site to another permitted location.

IND69-3

In conclusion, please deny the permits or at least send the DEIS back to staff to addr

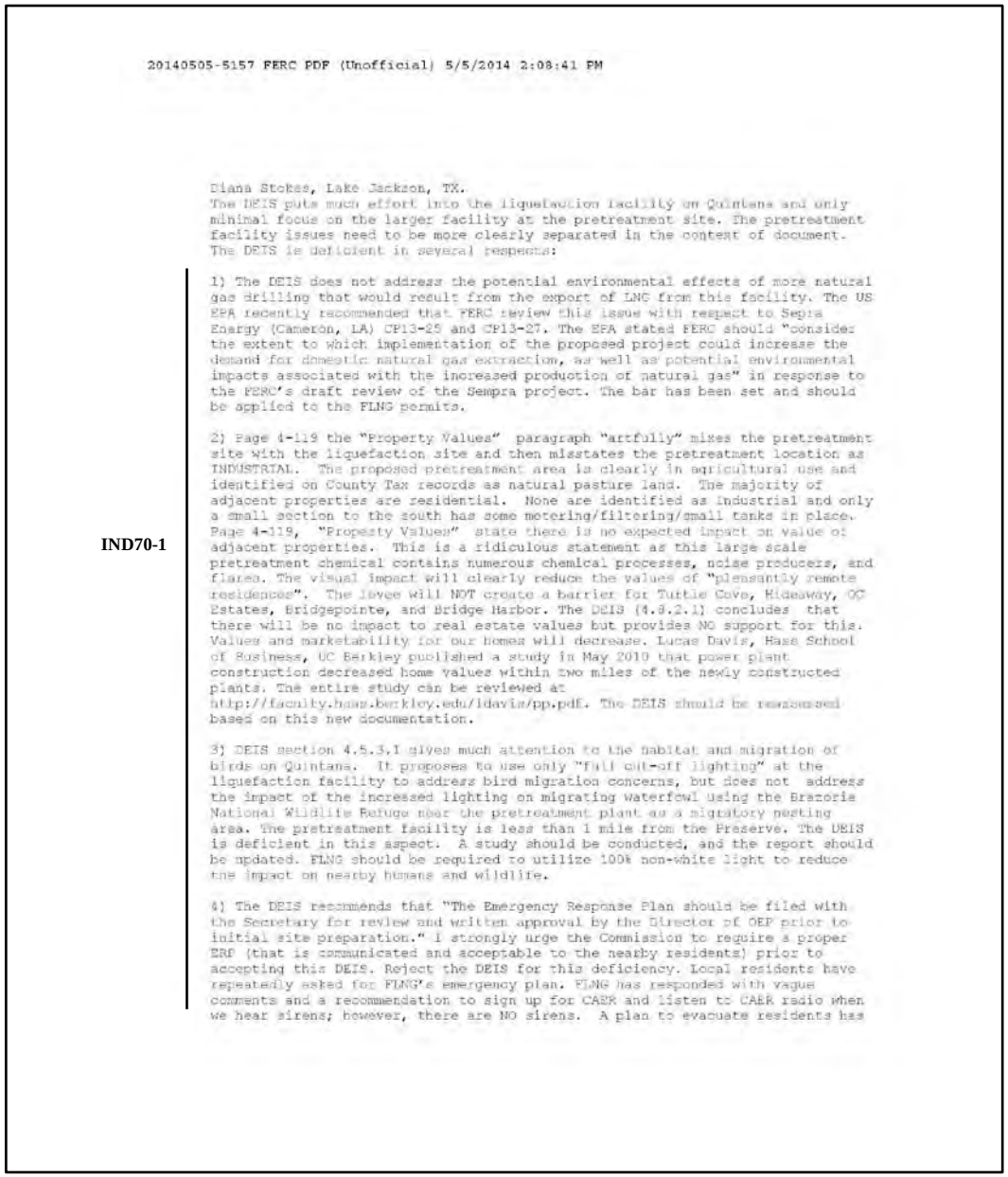
IND69-2: This is addressed in section 4.8.2, 4.8.3, and 4.8.4 of the EIS.

Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

This is addressed in section 4.3 of the EIS

IND69-3: Comment acknowledged.

IND70 – Diana Stokes, Lake Jackson, TX – Page 1



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Diana Stokes, Lake Jackson, TX.
The DEIS puts much effort into the liquefaction facility on Quintana and only minimal focus on the larger facility at the pretreatment site. The pretreatment facility issues need to be more clearly separated in the context of document. The DEIS is deficient in several respects:

IND70-1

1) The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to the FLNG permits.

2) Page 4-119 the "Property Values" paragraph "artfully" mixes the pretreatment site with the liquefaction site and then misstates the pretreatment location as INDUSTRIAL. The proposed pretreatment area is clearly in agricultural use and identified on County Tax records as natural pasture land. The majority of adjacent properties are residential. None are identified as industrial and only a small section to the south has some metering/filtering/small tanks in place. Page 4-119, "Property Values" state there is no expected impact on value of adjacent properties. This is a ridiculous statement as this large scale pretreatment chemical contains numerous chemical processes, noise producers, and flares. The visual impact will clearly reduce the values of "pleasantly remote residences". The levee will NOT create a barrier for Tuttle Cove, Hideaway, OC Estates, Bridgepointe, and Bridge Harbor. The DEIS (4.8.2.1) concludes that there will be no impact to real estate values but provides NO support for this. Values and marketability for our homes will decrease. Lucas Davis, Haas School of Business, UC Berkley published a study in May 2010 that power plant construction decreased home values within two miles of the newly constructed plants. The entire study can be reviewed at http://faculty.haas.berkley.edu/ldavis/pp.pdf. The DEIS should be reassessed based on this new documentation.

3) DEIS section 4.5.3.1 gives much attention to the habitat and migration of birds on Quintana. It proposes to use only "full cut-off lighting" at the liquefaction facility to address bird migration concerns, but does not address the impact of the increased lighting on migrating waterfowl using the Brazoria National Wildlife Refuge near the pretreatment plant as a migratory nesting area. The pretreatment facility is less than 1 mile from the Preserve. The DEIS is deficient in this aspect. A study should be conducted, and the report should be updated. FLNG should be required to utilize 100% non-white light to reduce the impact on nearby humans and wildlife.

4) The DEIS recommends that "The Emergency Response Plan should be filed with the Secretary for review and written approval by the Director of OEP prior to initial site preparation." I strongly urge the Commission to require a proper ERP (that is communicated and acceptable to the nearby residents) prior to accepting this DEIS. Reject the DEIS for this deficiency. Local residents have repeatedly asked for FLNG's emergency plan. FLNG has responded with vague comments and a recommendation to sign up for CAER and listen to CAER radio when we hear sirens; however, there are NO sirens. A plan to evacuate residents has

IND70-1: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

As noted in section 4.8, the main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence, and we do not anticipate any impact on the value of adjacent properties or homes. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities. The Pretreatment Plant site is characterized in the EIS as a "commercial area".

As noted in Section 4.5.3.1 we have looked at the potential impacts from facility lighting on wildlife and have concluded that, given Freeport LNG's mitigation efforts and the Freeport LNG Facility Lighting Design Plan (FLDP), impacts to migratory and non-migratory birds will be minor. On December 6, 2013 Freeport LNG submitted a response to a data request (Docket Nos. CP12-509-000 and CP12-29-000) that addresses additional mitigation measures. Section 4.5.2 addresses the Brazoria National Wildlife Refuge. We anticipate Project related activities to have a minor impact on wildlife.

To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND70 – Diana Stokes, Lake Jackson, TX – Page 2

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not been published, much less communicated in even the most rudimentary form. Deny the permit.

IND70-1 cont'd 5) The DEIS addresses pollution credits from the general region be utilized for FLNG's projected generation of pollution. The Commission needs to require that these credits be from within 10 miles of the facility. Reduction of pollution 100 miles away does not compensate local residents for the toxins that FLNG will be filling our homes and lungs with, nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

6) The Socioeconomic information in section 4.8 is out dated. Local worker resources have already been stretched thin. Readily available housing is already filled. The City of Lake Jackson recently closed down a large area of housing displacing many existing residents. Housing is already at significant premium, and workers are already commuting to reach project work already in progress. Section 4.8 does NOT reflect current conditions in the area.

IND70-2 7) A noise study needs to be done for Turtle Cove and Hideaway. The other Site 3 measurements are influenced by contributors that are far removed and cross-wind from the subdivisions. The subdivisions will be predominantly down-wind of the proposed pretreatment plant whereas the other sites will be cross-wind, and the contributed values easily have the potential to double the noise level (10 dba increase) at these already quite areas. The 55 dba level allowed in the DEIS at other sample locations is totally unacceptable in quite neighborhoods.

8) DEIS, 2.1.3 states the pretreatment facility needs 38,000 gallons of water per day. This is a HUGE issue for the nearby communities that pump their DRINKING water from the same aquifer. Fresh water is at a premium in this area of Texas. This will have a detrimental effect on area residents. Also, this water will be used in a process to remove contaminants. Yet, there is no discussion of waste water outfall, how it will be handled, or where it will be routed from the pretreatment plant. Only storm water is discussed in the DEIS. What is the waste water plan? No pipeline is demonstrated in the proposal to take waste water off the pretreatment site to another permitted location.

IND70-3 In conclusion, please deny the permits or send the DEIS back to staff to address these deficiencies.

IND70-2: This is addressed in section 4.8.2, 4.8.3, and 4.8.4 of the EIS.

Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

This is addressed in section 4.3 of the EIS

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IND70-3: Comment acknowledged.

IND71 – David Lynsavage, Freeport, TX – Page 1

20140505-5161 FERC PDF (Unofficial) 5/5/2014 2:13:59 PM

David Lynsavage, Freeport, TX.
The DEIS puts much effort into the liquefaction facility on Quintana and only minimal focus on the larger facility at the pre-treatment site. The pre-treatment facility issues need to be more clearly separated in the context of document.

1) The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to the FLNG permits.

2) Page 4-119 under "Property Values" the paragraph "artfully" mixes the pre-treatment site with the liquefaction site and then mis-states that the pre-treatment site location as INDUSTRIAL. The proposed pre-treatment area is clearly in agricultural use with some dirt pits and clearly identified on County Tax records as natural pasture land. The majority of adjacent properties are residential. None are identified as Industrial and only a small section to the south has some metering/filtering/small tanks in place. On Page 4-119 under "Property Values" states there is no expected impact on value of adjacent properties. This is a ridiculous statement as this large scale pre-treatment facility made up of numerous chemical processes, noise producers, flares and visual impact will clearly reduce the values of "pleasantly remote residences". The levee does not create a barrier for the subdivisions of Turtle Cove, Hideaway, OC Estates, Bridgepointe, and Bridge Harbor. The DEIS (4.8.2.1) concludes that there would be no impact to real estate values. The document provides no support for this. Values and marketability for our homes will decrease. Lucas Davis, Haas School of Business, UC Berkley published a study in May 2010 that power plant construction decreased home values within two miles of the newly constructed plants. The entire study can be reviewed at http://faculty.haas.berkley.edu/ldavis/pp.pdf. The DEIS should reassessed based on this new documentation.

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IND71 – David Lynsavage, Freeport, TX – Page 2

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we hear sirens; however, there are NO sirens. A plan to evacuate residents has not been published, much less communicated in even the most rudimentary form.

IND71-1 cont'd

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IND71-2

7) A noise study needs to be done for Turtle Cove and Hideaway. The other Site 3 measurements are influenced by contributors that are far removed and cross-wind from the subdivisions. The subdivisions will be predominantly down-wind of the proposed pre-treatment plant whereas the other sites will be cross-wind, and the contributed values easily have the potential to double the noise level (10 dba increase) at these already quite areas. The 55 dba level allowed in the DEIS at other sample locations is totally unacceptable in quite neighborhoods.

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IND71-3

In conclusion, please deny the permits or at least send the DEIS back to staff to address these deficiencie

IND71-2: This is addressed in section 4.8.2, 4.8.3, and 4.8.4 of the EIS.

Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

This is addressed in section 4.3 of the EIS

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IND71-3: Comment acknowledged.

IND72 – Michelle and Mark Napier, League City, TX – Page 1

20140505-5173 FERC PDF (Unofficial) 5/5/2014 2:20:50 PM

Michelle Napier, League City, TX.
RE: Freeport LNG Development, LP
Liquefaction Project
Docket Nos. CP12-509 and CP12-29

Dear Ms. Bose,
We own a home on the island of Quintana, TX and spend most of our free time there – every weekend and some weekdays. Although we are not full time residents it is very much "home" to us. In fact, we hope to make it a permanent home after retirement. Unfortunately, Freeport LNG's plans for expansion on the island are changing the island and its community (residents and wildlife both) for the worse.

IND72-1

We were not residents of the island when Freeport LNG first built their facility, but it did not have a major impact on the island at that time. While visiting with longtime residents of the island we were assured by them that none of them supported any type of expansion by LNG or had any plans to leave the island because of LNG. Before purchasing our property we often stayed with friends on the island and found that the LNG plant was not too loud, did not create traffic issues and would not obstruct our view or negatively impact the local bird sanctuary and wetlands. If LNG had continued as it was, there would be no more damage to the island or the community. LNG now wants to expand to cover the length of the island and has pitted community members against each other in the process.

LNG has approached residents of Quintana with a plan that consists of two parts: a "guaranteed" payout of $5,000.00 per year for five years to accept the inconvenience of 4000 construction workers on the island (which is smaller than 2 square miles) for a period of 5 years as well as a buyout plan. The first payment of $5000 is guaranteed and the remaining 4 payments have stipulations tied to them. This is not a "rich" community by any means, $5000 dollars to some of these residents is a lot of money (and LNG knows this), but in no way a fair offer considering the disruption that will occur. The damage done will be irreversible. This is just one deceit filled offer LNG has made. The deception began with their initial release of their visual impact analysis when they presented pictures of what their plant would look like from ground level looking up at the levy they are building on. This is not the view the residents will really have considering the first floor is 16 feet or more off the ground. Freeport LNG has continued to approach individuals, including city council board members and the mayor with offers on their homes, offers that were not discussed publicly. Money talks, and LNG knows this. The same individuals that said they would never leave had a price and LNG found it because they could afford to. These individuals (some on LNG's payroll) have been asked to write you about the wonderful things LNG is doing for the island and how they have had a positive impact on the community. These people will more than likely leave the island once the construction starts and never return as either full or part time residents. LNG has continued to approach other residents with "fair market value" (on Quintana) for their homes. Fair market value is not anywhere near what these homes are worth anywhere else along the coast. Our home is on 2 lots, overlooks the Gulf of Mexico and is surrounded on two sides by wetlands. LNG refuses to pay "replacement" value for our homes. "Fair market value" on Quintana will not allow us to replace, or even come close to replacing, what we have within an hour of our current fulltime residence. Not to mention we do not want to leave this beautiful island.

IND72-1: Comment acknowledged.

IND72 – Michelle and Mark Napier, League City, TX – Page 2

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Quintana has the historical distinction of being the site of a Confederate fort during the Civil War as well as a stop on the Columbia-to-Galveston mail route during the Republic of Texas. It is the site of a county park, pristine wetlands and beautiful beaches. It is home to a bird sanctuary and known as a major migratory resting and feeding site for hundreds of migratory birds. Freeport LNG promises benefits will come our way, but any benefits will go to Brazoria County as a whole and Freeport. Quintana is unlikely to receive any benefits that will outweigh the damage done to the island. It will destroy the natural environment as well as interfere with recreational access to the jetties, the intracoastal waterway, the bird sanctuary (if it survives the increased sound, light and air pollution the construction and operation of this plant will bring) as well as the county park.

IND72-2 If construction is approved, there will be thousands of workers and hundreds to thousands of beach goers, campers and homeowners on any given day that will have to evacuate the island if an accident were to happen. This would be impossible to do at this time as the access road would be next to LNG and the traffic would be at a stand still.

We want you and your team to get the full picture of what is happening here. We do not feel that this is the best place for LNG's export terminal. There are several terminals and locations around the country that would be better suited for this where less environmental damage would occur and thousands of lives are not put at risk.

Sincerely,

Michelle and Mark Napier
2356 Autumn Mist Lane
League City, TX 77573

IND72-2: See section 4.8.4 and 4.8.5 of the EIS.

IND73 – Michelle Oldham, Freeport, TX

20140505-5248 FERC PDF (Unofficial) 5/5/2014 4:43:49 PM

Melanie Oldham, Freeport, TX.
I, Melanie Oldham, live in Freeport, Texas about 5 miles from the FLNG proposed Pretreatment plant and feel my health and safety would be adversely affected by this chemical plant.FERC staff/consultants have spent time/effort on this draft EIS, but not all critical facts have been considered, such as:
1.particulate matter...a full PSD increment analysis was required for PM2.5 for both 24-hr and annual time periods, However, Brazoria Co does not have a PM monitor with data and modeling was done from monitors in Corpus Christi and Baytown, which are different areas in some ways without PM monitor in our area how will we know if FLNG complies with the emission limit?
IND73-1 2. were VOCs from the FLNG expansion properly calculated?.. FLNG proposed they would emit 24.96tpy of VOC,s which is barely less than the 25tpy threshold?... What about the VOCs from the 115 pressure relief valves at the Pretreatment plant?
Why is FLNG refusing to use Carbon Capture with piping of CO2 to the Denbury CO2 pipeline near Pearland,Tx?...this would significantly decrease this greenhouse gas in southern Brazoria Co which has numerous other sources of CO2 from multiple chemical plants and their projects. One option is for FLNG to share the cost with DOW chemical which is building a large ethylene cracker about a mile from the proposed Pretreatment plant...inorder to build a CO2 pipeline about 47 miles from our area to the Denbury Green pipeline in Pearland...can this be done to fully protect the health and safety of myself and other citizens?
Finally, are the modeled /predicted ESLs a true picture of whether or not these ESL from TCEQ are protective of human health?

IND73-1: This is addressed in section 4.12.4 under the subheading Climate Change.

IND74 – Cooksey & Marcin, PLLC *for* Patricia and Victor Ruiz

20140505-5265 FERC PDF (Unofficial) 5/5/2014 4:51:35 PM

COOKSEY & MARCIN, PLLC

Casey P. Marcin, Partner

25511 Budde Road #2202
The Woodlands, Texas 77380
Tel: (281) 719-5881 Fax: (281) 719-5847
Email: cmarcin@cookseymarcinlaw.com
Think Outside the Box

May 5, 2014

Via Electronic Mail
Kimberly D. Rose, Secretary
Federal Energy Regulatory Commission
888 First St NE, Room 1A
Washington, DC 20426

Re: *Freeport LNG Development, LP-Liquification Project: Docket Nos. CP12-509 and CP12-29*

To Whom It May Concern:

I represent Laura Patricia Ruiz and Victor Ruiz, landowners affected by the above-entitled project. My clients request more information and post the following comment to the Draft Environmental Impact Study (hereafter "DEIS"):

IND74-1 The DEIS maintains that there will be no impact to real estate values. However, there is no support or analysis for this statement. The statement is conclusory at best and provides no analysis that leads to the statement being made in the DEIS.

My client would request more expansion on the ideology behind the statement that there will be no impact on real estate values.

Yours very truly,
COOKSEY & MARCIN, PLLC

/Casey P. Marcin/

Casey P. Marcin

CPM/MPS/VR

IND74-1: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

IND75 – Richard D. Linn, Freeport, TX

20140507-5026 FERC PDF (Unofficial) 5/7/2014 9:05:28 AM

Richard D Linn, Freeport, TX.

IND75-1 There are some IMPORTANT issues that have not been addressed or answered about the Pretreatment Plant/Chemical Plant. One monumental issue is WATER. The pre-treatment process will use 38,000 gallons of water daily. The 38,000 gallons will be drawn from the same aquifer used by the surrounding communities - our water. This water will be used to remove contaminants in FLNG's plant; yet, the DEIS has no discussion of waste water outfall, how it will be handled, or where it will be routed from the pre-treatment plant. Only storm water is discussed in the DEIS.

IND75-2 Another important issue is that of safety. Residents have repeatedly asked for ELNG's emergency plan. FLNG has responded with vague comments and a recommendation to sign up for CAER and listen to CAER radio when we hear sirens; however, there are NO sirens. A plan to evacuate residents near the pre-treatment plant has not been developed

These issues needs further evaluation before plant proceeds.

IND75-1: This is addressed in section 4.3 of the EIS.

IND75-2: To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

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As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND76 – Randall Valk, Houston, TX – Page 1

20140507-5112 FERC PDF (Unofficial) 5/7/2014 2:21:56 PM

Randall Valk, Houston, TX.
I am property owner of 119 Admiral, Freeport Texas in the Hide-Away-On-The-Gulf subdivision. This is and has been a resort community since established in the 1960's. Regarding the proposed pre-treatment facility approximately 1.5 miles from my resort home and property, I respectfully ask for consideration of the safety, health and property valuation of my family and other members of the community the following:

IND76-1

1) Safety & Air Pollution
I work in the oil and gas industry and am knowledgeable of the chemical content of natural gas. In particular, the typical gas properties from East Texas fields contain high levels of Hydrogen Sulfide and can vary from well to well. The pre-treatment operator will have almost no control over the chemical content of the incoming gas and therefore the ability to predict the effectiveness of the plant operation. With the current proposal,residents in the area have no possibility of knowing what level pollution is occurring at any given time. There are no effective warning systems in place to protect the community. Pollution credits do nothing for the people and animals in this community. The DEIS addresses pollution credits from the general region be utilized for FLNG's projected generation of pollution. The Commission needs to require that these credits be from within 10 miles of the facility. Reduction of pollution 100 miles away does not compensate local residents for the toxins that FLNG will be filling our homes and lungs with, nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

IND76-2

2) Property Values:
Sales of existing properties in Hide-Away-On-The-Gulf have stalled while other areas of Brazoria County are booming. I believe the stall is due to the applications for the proposed LNG pre-treatment facility. Property values could fall dramatically if the plant is approved, destroying what many of us intented to be a family gathering place and investment to be passed down to our future generations. Page 4-119 under "Property Values" the paragraph "artfully" mixes the pre-treatment site with the liquefaction site and then mis-states that the pre-treatment site location as INDUSTRIAL. The proposed pre-treatment area is clearly in agricultural use with some dirt pits and clearly identified on County Tax records as natural pasture land. The majority of adjacent properties are residential. None are identified as Industrial and only a small section to the south has some metering/filtering/small tanks in place. On Page 4-119 under "Property Values" states there is no expected impact on value of adjacent properties. This is a ridiculous statement as this large scale pre-treatment facility made up of numerous chemical processes, noise producers, flares and visual impact will clearly reduce the values of "pleasantly remote residences". The levee does not create a barrier for the subdivisions of Turtle Cove, Hideaway, OC Estates, Bridgepointe, and Bridge Harbor. The DEIS (4.8.2.1) concludes that there would be no impact to real estate values. The document provides no support for this. Values and marketability for our homes will decrease. Lucas Davis, Hass School of Business, UC Berkley published a study in May 2010 that power plant construction decreased home values within two miles of the newly constructed plants. The entire study can be reviewed at http://faculty.haas.berkley.edu/ldavis/pp.pdf. The DEIS should reassessed based on this new documentation.

3) Destruction of ground water resource: DEIS, 2.1.3 states that the pre-treatment facility needs 38,000 gallons of water per day. This is a significant

IND76-1 To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

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As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

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IND76-2: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

IND76 – Randall Valk, Houston, TX – Page 2

20140507-5112 FERC PDF (Unofficial) 5/7/2014 2:21:56 PM

IND76-3

issue for the nearby communities and cities that draw their fresh water from the same aquifer. Fresh water is at a premium in the area of Texas,and this will have a detrimental effect on the residents in this area. Also, this water will be used in processes to remove contaminants. Yet, there is no discussion of waste water outfall. How will it be handled, or where will it be routed from the pre-treatment facility? There is only storm water discussed in the DEIS. What is the waste water plan? There is no pipeline demonstrated in the proposal to take waste water off the pre-treatment site to another permitted location.

4)Noise Pollution: A noise study needs to be done for Turtle Cove and Hideaway. The other Site 3 measurements are influenced by contributors that are far removed and cross-wind from the subdivisions. The subdivisions will be predominantly down-wind of the proposed pre-treatment plant whereas the other sites will be cross-wind, and the contributed values easily have the potential to double the noise level (10 dba increase) at these already quite areas. The 55 dba level allowed in the DEIS at other sample locations is totally unacceptable in quite neighborhoods.

IND76-4

Conclusion:
As a member of the Oil and Gas Industry, I appreciate the business objectives but am not willing to sacrifice my property, the safety of my family and neighbors and the animals that live and migrate through this community so that FLNG can make a profit from polluting Texas air and lands to sell LNG to foreign entities. In conclusion, please deny the permits or at least send the DEIS back to staff to address these deficiencies.

Thank You for immediate conderation of these concerns,
Randall Valk

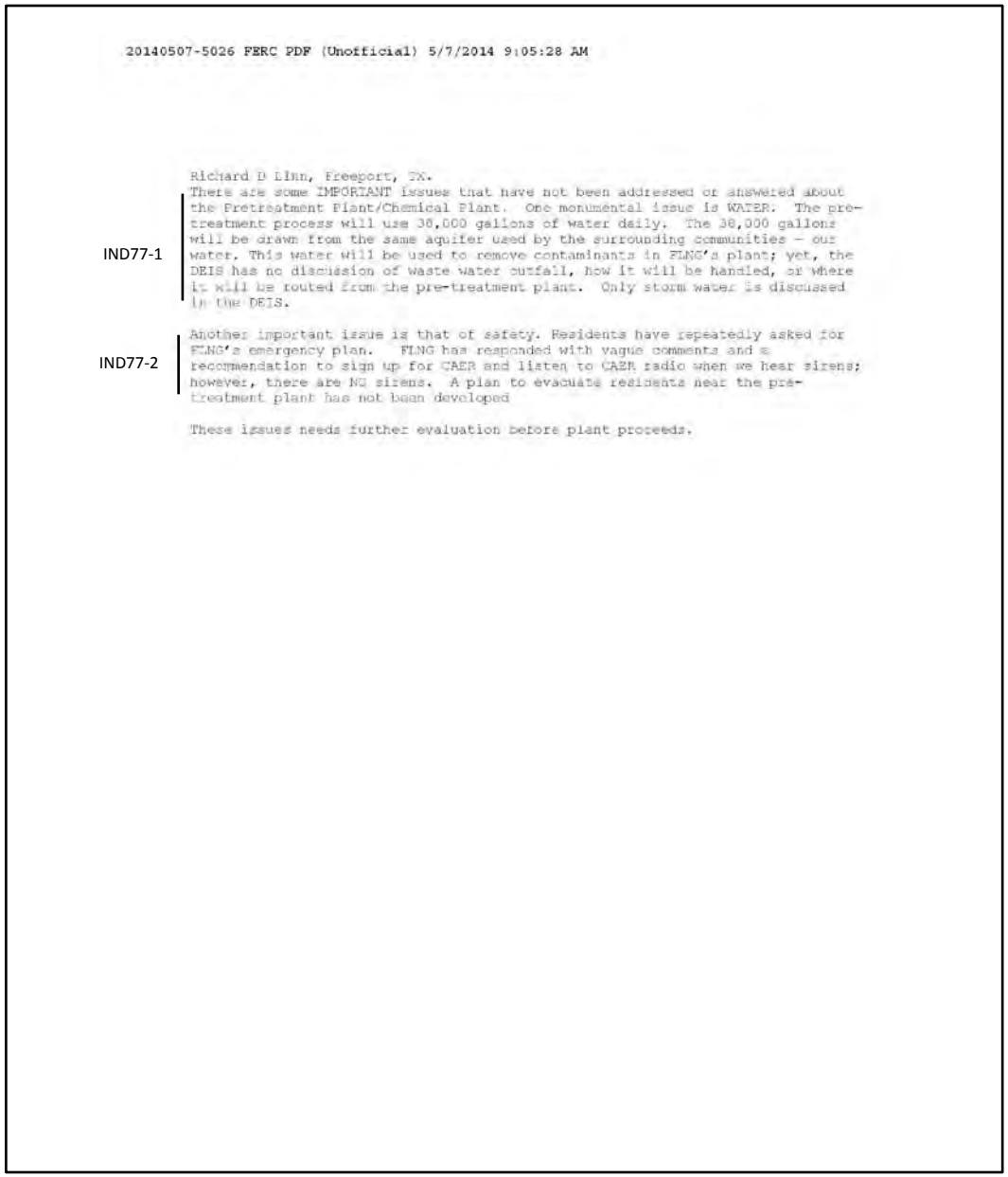
IND76-3: Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

This is addressed in section 4.3 of the EIS.

IND76-4: Comment acknowledged.

INDIVIDUAL COMMENTS

IND77 – Richard D. Linn, Freeport, TX



20140507-5026 FERC PDF (Unofficial) 5/7/2014 9:05:28 AM

Richard D Linn, Freeport, TX.

IND77-1 There are some IMPORTANT issues that have not been addressed or answered about the Pretreatment Plant/Chemical Plant. One monumental issue is WATER. The pre-treatment process will use 30,000 gallons of water daily. The 30,000 gallons will be drawn from the same aquifer used by the surrounding communities – our water. This water will be used to remove contaminants in FLNG's plant; yet, the DEIS has no discussion of waste water outfall, how it will be handled, or where it will be routed from the pre-treatment plant. Only storm water is discussed in the DEIS.

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These issues needs further evaluation before plant proceeds.

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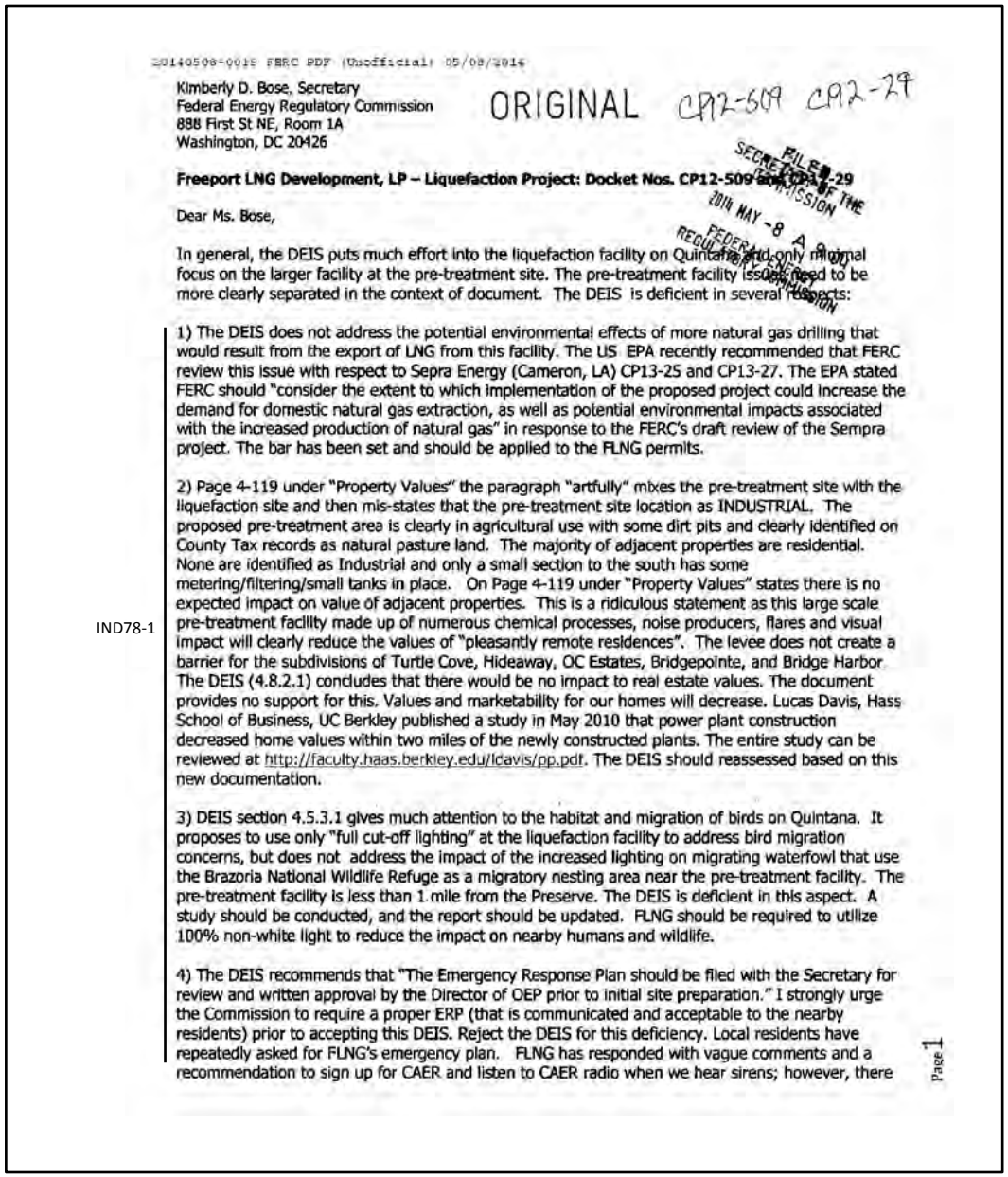
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As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND78 – Robert J. Maddison, Freeport, TX – Page 1



20140508-0019 FERC PDF (Unofficial) 05/08/2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First St NE, Room 1A
Washington, DC 20426

ORIGINAL CP12-509 CP12-29

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COMMISSION
2014 MAY -8 A 9:00
FEDERAL ENERGY
REGULATORY COMMISSION

Freeport LNG Development, LP – Liquefaction Project: Docket Nos. CP12-509 and CP12-29

Dear Ms. Bose,

In general, the DEIS puts much effort into the liquefaction facility on Quintana and only minimal focus on the larger facility at the pre-treatment site. The pre-treatment facility issues need to be more clearly separated in the context of document. The DEIS is deficient in several respects:

IND78-1

1) The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to the FLNG permits.

2) Page 4-119 under "Property Values" the paragraph "artfully" mixes the pre-treatment site with the liquefaction site and then mis-states that the pre-treatment site location as INDUSTRIAL. The proposed pre-treatment area is clearly in agricultural use with some dirt pits and clearly identified on County Tax records as natural pasture land. The majority of adjacent properties are residential. None are identified as Industrial and only a small section to the south has some metering/filtering/small tanks in place. On Page 4-119 under "Property Values" states there is no expected impact on value of adjacent properties. This is a ridiculous statement as this large scale pre-treatment facility made up of numerous chemical processes, noise producers, flares and visual impact will clearly reduce the values of "pleasantly remote residences". The levee does not create a barrier for the subdivisions of Turtle Cove, Hideaway, OC Estates, Bridgepointe, and Bridge Harbor The DEIS (4.8.2.1) concludes that there would be no impact to real estate values. The document provides no support for this. Values and marketability for our homes will decrease. Lucas Davis, Hass School of Business, UC Berkley published a study in May 2010 that power plant construction decreased home values within two miles of the newly constructed plants. The entire study can be reviewed at http://faculty.haas.berkley.edu/ldavis/pp.pdf. The DEIS should reassessed based on this new documentation.

3) DEIS section 4.5.3.1 gives much attention to the habitat and migration of birds on Quintana. It proposes to use only "full cut-off lighting" at the liquefaction facility to address bird migration concerns, but does not address the impact of the increased lighting on migrating waterfowl that use the Brazoria National Wildlife Refuge as a migratory nesting area near the pre-treatment facility. The pre-treatment facility is less than 1 mile from the Preserve. The DEIS is deficient in this aspect. A study should be conducted, and the report should be updated. FLNG should be required to utilize 100% non-white light to reduce the impact on nearby humans and wildlife.

4) The DEIS recommends that "The Emergency Response Plan should be filed with the Secretary for review and written approval by the Director of OEP prior to initial site preparation." I strongly urge the Commission to require a proper ERP (that is communicated and acceptable to the nearby residents) prior to accepting this DEIS. Reject the DEIS for this deficiency. Local residents have repeatedly asked for FLNG's emergency plan. FLNG has responded with vague comments and a recommendation to sign up for CAER and listen to CAER radio when we hear sirens; however, there

Page 1

IND78-1: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

As noted in section 4.8, the main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence, and we do not anticipate any impact on the value of adjacent properties or homes. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities. The Pretreatment Plant site is characterized in the EIS as a "commercial area".

As noted in Section 4.5.3.1 we have looked at the potential impacts from facility lighting on wildlife and have concluded that, given Freeport LNG's mitigation efforts and the Freeport LNG Facility Lighting Design Plan (FLDP), impacts to migratory and non-migratory birds will be minor. On December 6, 2013 Freeport LNG submitted a response to a data request (Docket Nos. CP12-509-000 and CP12-29-000) that addresses additional mitigation measures. Section 4.5.2 addresses the Brazoria National Wildlife Refuge. We anticipate Project related activities to have a minor impact on wildlife.

To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

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As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND78 – Robert J. Maddison, Freeport, TX – Page 2

20140506-0019 FERC PDF (Unofficial) 05/06/2014

are NO sirens. A plan to evacuate residents has not been published, much less communicated in even the most rudimentary form. Deny the permit.

IND78-1 cont'd

5) The DEIS addresses pollution credits from the general region be utilized for FLNG's projected generation of pollution. The Commission needs to require that these credits be from within 10 miles of the facility. Reduction of pollution 100 miles away does not compensate local residents for the toxins that FLNG will be filling our homes and lungs with, nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

6) The Socioeconomic information in section 4.8 is out dated. Potentially available local worker resources have already been stretched thin. Readily available housing has already been filled. The City of Lake Jackson has recently finished closing down a large area of housing and displaced many existing residents. Housing is already at significant premium, and workers are already commuting to reach project work already in progress. This section 4.8 does NOT reflect current conditions in the area.

IND78-2

7) A noise study needs to be done for Turtle Cove and Hideaway. The other Site 3 measurements are influenced by contributors that are far removed and cross-wind from the subdivisions. The subdivisions will be predominantly down-wind of the proposed pre-treatment plant whereas the other sites will be cross-wind, and the contributed values easily have the potential to double the noise level (10 dba increase) at these already quite areas. The 55 dba level allowed in the DEIS at other sample locations is totally unacceptable in quite neighborhoods.

8) DEIS, 2.1.3 states that the pre-treatment facility needs 38,000 gallons of water per day. This is a HUGE issue for the nearby communities and cities that draw their fresh water from the same aquifer. Fresh water is at a premium in the area of Texas, and this will have a detrimental effect on the residents in this area. Also, this water will be used in processes to remove contaminants. Yet, there is no discussion of waste water outfall. How it will be handled, or where it will be routed from the pre-treatment facility? There is only storm water discussed in the DEIS. What is the waste water plan? There is no pipeline demonstrated in the proposal to take waste water off the pre-treatment site to another permitted location.

IND78-3

In conclusion, please deny the permits or at least send the DEIS back to staff to address these deficiencies.

Signed,

Signature

151 SAND SHOALS RD.

Street Address **(Optional)**

ROBERT J. MADDISON

Printed Name

FREEPORT, TX 77541

City, State and Zip Code **(Optional)**

5/3/14

Date

Page 2

IND78-2: This is addressed in section 4.8.2, 4.8.3, and 4.8.4 of the EIS.

Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

This is addressed in section 4.3 of the EIS.

IND78-3: Comment acknowledged.

IND79 – Donald & Ruby Davis, Freeport, TX – Page 1

20140512-0050 FERC PDF (Unofficial) 05/12/2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First St NE, Room 1A
Washington, DC 20426

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2014 MAY 12 A 9:40
FEDERAL ENERGY
REGULATORY COMMISSION

Freeport LNG Development, LP – Liquefaction Project: Docket Nos. CP12-509-000; CP12-29-000

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IND79-1

1) The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to the FLNG permits.

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Page 1

347

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IND79 – Donald & Ruby Davis, Freeport, TX – Page 2

20140512-0050 FERC PDF (Unofficial) 05/12/2014

are NO sirens. A plan to evacuate residents has not been published, much less communicated in even the most rudimentary form. Deny the permit.

IND79-1 cont'd

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IND79-2

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IND79-3

In conclusion, please deny the permits or at least send the DEIS back to staff to address these deficiencies.

Signed,

Donald & Ruby Davis — Signature

504 Marine Way — Street Address **(Optional)**

Donald & Ruby Davis — Printed Name

Freeport, TX 77541 — City, State and Zip Code **(Optional)**

May 3, 2014 — Date

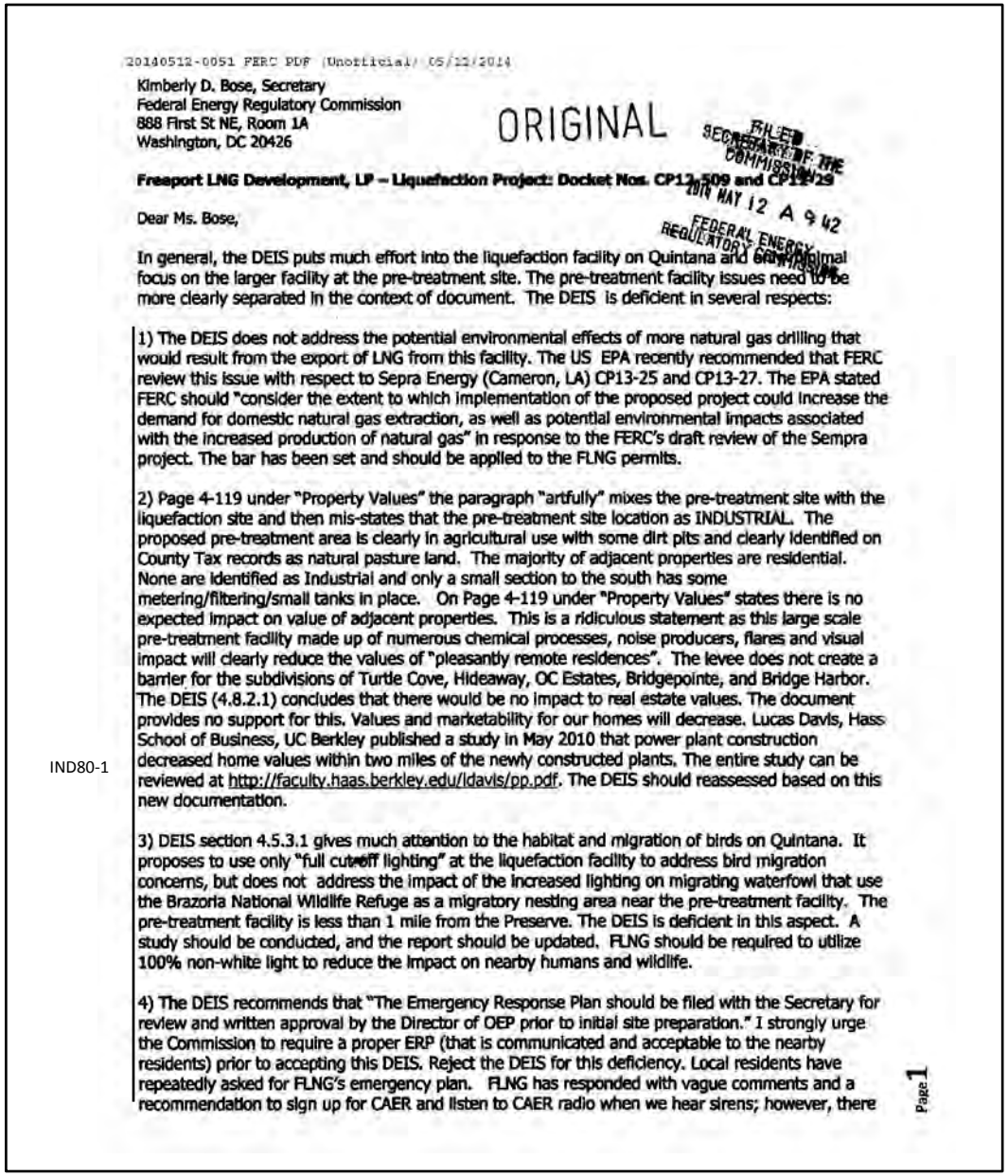
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IND79-3: Comment acknowledged.

IND80 – Ronald E. McClung, Freeport, TX – Page 1



20140512-0051 FERC PDF (Unofficial) 05/12/2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First St NE, Room 1A
Washington, DC 20426

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COMMISSION
2014 MAY 12 A 9:42
FEDERAL ENERGY
REGULATORY COMMISSION

Freeport LNG Development, LP – Liquefaction Project: Docket Nos. CP12-509 and CP12-29

Dear Ms. Bose,

In general, the DEIS puts much effort into the liquefaction facility on Quintana and minimal focus on the larger facility at the pre-treatment site. The pre-treatment facility issues need to be more clearly separated in the context of document. The DEIS is deficient in several respects:

1) The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to the FLNG permits.

2) Page 4-119 under "Property Values" the paragraph "artfully" mixes the pre-treatment site with the liquefaction site and then mis-states that the pre-treatment site location as INDUSTRIAL. The proposed pre-treatment area is clearly in agricultural use with some dirt pits and clearly identified on County Tax records as natural pasture land. The majority of adjacent properties are residential. None are identified as Industrial and only a small section to the south has some metering/filtering/small tanks in place. On Page 4-119 under "Property Values" states there is no expected impact on value of adjacent properties. This is a ridiculous statement as this large scale pre-treatment facility made up of numerous chemical processes, noise producers, flares and visual impact will clearly reduce the values of "pleasantly remote residences". The levee does not create a barrier for the subdivisions of Turtle Cove, Hideaway, OC Estates, Bridgepointe, and Bridge Harbor. The DEIS (4.8.2.1) concludes that there would be no impact to real estate values. The document provides no support for this. Values and marketability for our homes will decrease. Lucas Davis, Hass School of Business, UC Berkley published a study in May 2010 that power plant construction decreased home values within two miles of the newly constructed plants. The entire study can be reviewed at http://faculty.haas.berkley.edu/ldavis/pp.pdf. The DEIS should reassessed based on this new documentation.

3) DEIS section 4.5.3.1 gives much attention to the habitat and migration of birds on Quintana. It proposes to use only "full cutoff lighting" at the liquefaction facility to address bird migration concerns, but does not address the impact of the increased lighting on migrating waterfowl that use the Brazoria National Wildlife Refuge as a migratory nesting area near the pre-treatment facility. The pre-treatment facility is less than 1 mile from the Preserve. The DEIS is deficient in this aspect. A study should be conducted, and the report should be updated. FLNG should be required to utilize 100% non-white light to reduce the impact on nearby humans and wildlife.

4) The DEIS recommends that "The Emergency Response Plan should be filed with the Secretary for review and written approval by the Director of OEP prior to initial site preparation." I strongly urge the Commission to require a proper ERP (that is communicated and acceptable to the nearby residents) prior to accepting this DEIS. Reject the DEIS for this deficiency. Local residents have repeatedly asked for FLNG's emergency plan. FLNG has responded with vague comments and a recommendation to sign up for CAER and listen to CAER radio when we hear sirens; however, there

Page 1

IND80-1

349

IND80-1: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

As noted in section 4.8, the main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence, and we do not anticipate any impact on the value of adjacent properties or homes. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities. The Pretreatment Plant site is characterized in the EIS as a "commercial area".

As noted in Section 4.5.3.1 we have looked at the potential impacts from facility lighting on wildlife and have concluded that, given Freeport LNG's mitigation efforts and the Freeport LNG Facility Lighting Design Plan (FLDP), impacts to migratory and non-migratory birds will be minor. On December 6, 2013 Freeport LNG submitted a response to a data request (Docket Nos. CP12-509-000 and CP12-29-000) that addresses additional mitigation measures. Section 4.5.2 addresses the Brazoria National Wildlife Refuge. We anticipate Project related activities to have a minor impact on wildlife.

To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND80 – Ronald E. McClung, Freeport, TX – Page 2

20140512-0051 FERC PDF (Unofficial) 05/12/2014

IND80-1 cont'd

are NO sirens. A plan to evacuate residents has not been published, much less communicated in even the most rudimentary form. Deny the permit.

5) The DEIS addresses pollution credits from the general region be utilized for FLNG's projected generation of pollution. The Commission needs to require that these credits be from within 10 miles of the facility. Reduction of pollution 100 miles away does not compensate local residents for the toxins that FLNG will be filling our homes and lungs with, nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

6) The Socioeconomic information in section 4.8 is out dated. Potentially available local worker resources have already been stretched thin. Readily available housing has already been filled. The City of Lake Jackson has recently finished closing down a large area of housing and displaced many existing residents. Housing is already at significant premium, and workers are already commuting to reach project work already in progress. This section 4.8 does NOT reflect current conditions in the area.

IND80-2

7) A noise study needs to be done for Turtle Cove and Hideaway. The other Site 3 measurements are influenced by contributors that are far removed and cross-wind from the subdivisions. The subdivisions will be predominantly down-wind of the proposed pre-treatment plant whereas the other sites will be cross-wind, and the contributed values easily have the potential to double the noise level (10 dba increase) at these already quite areas. The 55 dba level allowed in the DEIS at other sample locations is totally unacceptable in quite neighborhoods.

8) DEIS, 2.1.3 states that the pre-treatment facility needs 38,000 gallons of water per day. This is a HUGE issue for the nearby communities and cities that draw their fresh water from the same aquifer. Fresh water is at a premium in the area of Texas, and this will have a detrimental effect on the residents in this area. Also, this water will be used in processes to remove contaminants. Yet, there is no discussion of waste water outfall. How it will be handled, or where it will be routed from the pre-treatment facility? There is only storm water discussed in the DEIS. What is the waste water plan? There is no pipeline demonstrated in the proposal to take waste water off the pre-treatment site to another permitted location.

IND80-3

In conclusion, please deny the permits or at least send the DEIS back to staff to address these deficiencies.

Signed, Ronald E McClung

Signature	430 Marine Way Street Address **(Optional)**
Ronald E. McClung Printed Name	Freeport, Tx 77 City, State and Zip Code **(Optional)**
5-1-14 Date	

Page 2

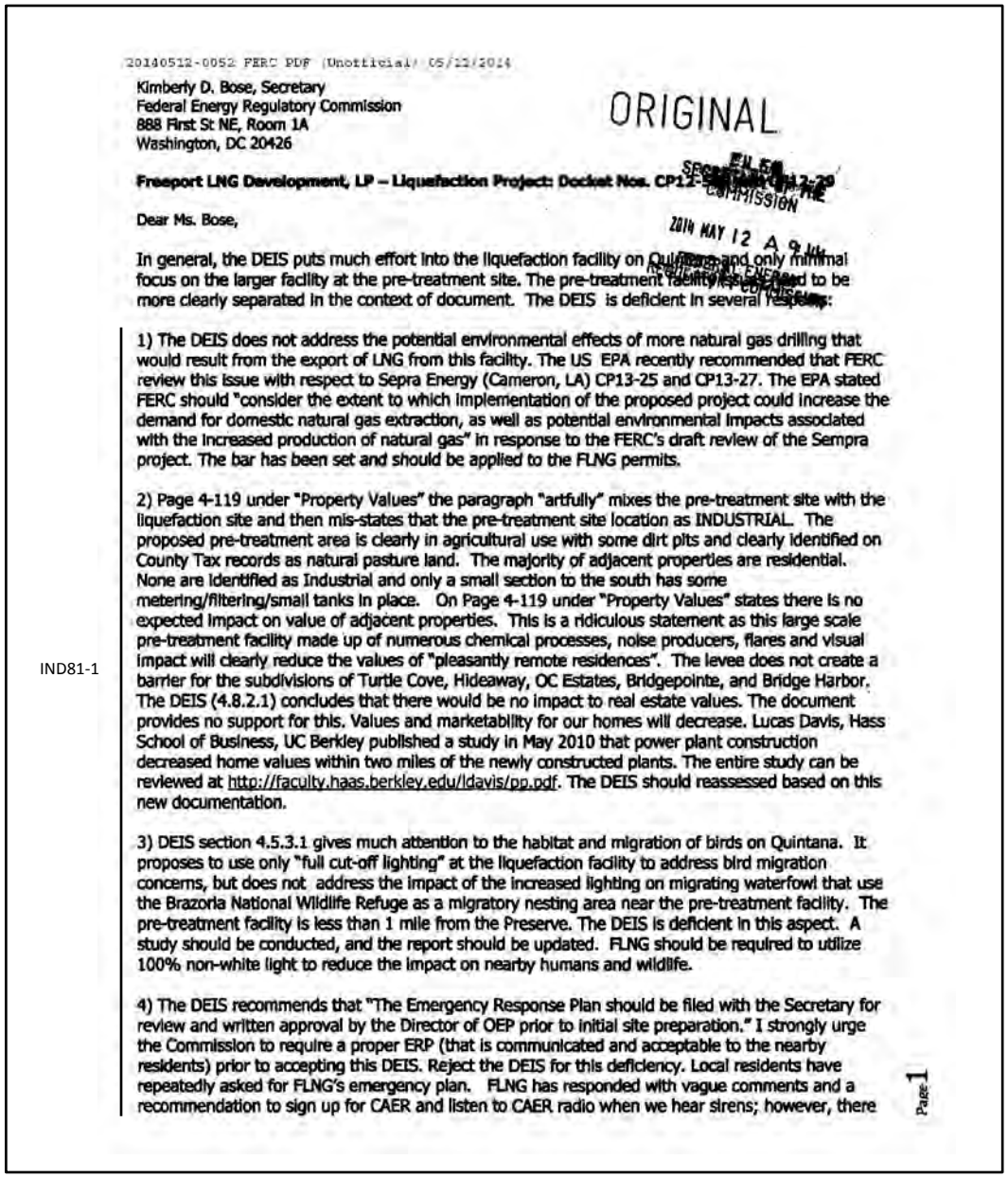
IND80-2: This is addressed in section 4.8.2, 4.8.3, and 4.8.4 of the EIS.

Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

This is addressed in section 4.3 of the EIS.

IND80-3: Comment acknowledged.

IND81 – A. Paul & Starlet Zuma, Freeport, TX – Page 1



20140512-0052 FERC PDF (Unofficial) 05/12/2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First St NE, Room 1A
Washington, DC 20426

ORIGINAL

Freeport LNG Development, LP – Liquefaction Project: Docket Nos. CP12-

Dear Ms. Bose,

2014 MAY 12 A 9

In general, the DEIS puts much effort into the liquefaction facility on Quintana and only minimal focus on the larger facility at the pre-treatment site. The pre-treatment facility needs to be more clearly separated in the context of document. The DEIS is deficient in several respects:

1) The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to the FLNG permits.

IND81-1

2) Page 4-119 under "Property Values" the paragraph "artfully" mixes the pre-treatment site with the liquefaction site and then mis-states that the pre-treatment site location as INDUSTRIAL. The proposed pre-treatment area is clearly in agricultural use with some dirt pits and clearly identified on County Tax records as natural pasture land. The majority of adjacent properties are residential. None are identified as Industrial and only a small section to the south has some metering/filtering/small tanks in place. On Page 4-119 under "Property Values" states there is no expected impact on value of adjacent properties. This is a ridiculous statement as this large scale pre-treatment facility made up of numerous chemical processes, noise producers, flares and visual impact will clearly reduce the values of "pleasantly remote residences". The levee does not create a barrier for the subdivisions of Turtle Cove, Hideaway, OC Estates, Bridgepointe, and Bridge Harbor. The DEIS (4.8.2.1) concludes that there would be no impact to real estate values. The document provides no support for this. Values and marketability for our homes will decrease. Lucas Davis, Hass School of Business, UC Berkley published a study in May 2010 that power plant construction decreased home values within two miles of the newly constructed plants. The entire study can be reviewed at http://faculty.haas.berkley.edu/ldavis/pp.pdf. The DEIS should reassessed based on this new documentation.

3) DEIS section 4.5.3.1 gives much attention to the habitat and migration of birds on Quintana. It proposes to use only "full cut-off lighting" at the liquefaction facility to address bird migration concerns, but does not address the impact of the increased lighting on migrating waterfowl that use the Brazoria National Wildlife Refuge as a migratory nesting area near the pre-treatment facility. The pre-treatment facility is less than 1 mile from the Preserve. The DEIS is deficient in this aspect. A study should be conducted, and the report should be updated. FLNG should be required to utilize 100% non-white light to reduce the impact on nearby humans and wildlife.

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Page 1

351

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As noted in section 4.8, the main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence, and we do not anticipate any impact on the value of adjacent properties or homes. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities. The Pretreatment Plant site is characterized in the EIS as a "commercial area".

As noted in Section 4.5.3.1 we have looked at the potential impacts from facility lighting on wildlife and have concluded that, given Freeport LNG's mitigation efforts and the Freeport LNG Facility Lighting Design Plan (FLDP), impacts to migratory and non-migratory birds will be minor. On December 6, 2013 Freeport LNG submitted a response to a data request (Docket Nos. CP12-509-000 and CP12-29-000) that addresses additional mitigation measures. Section 4.5.2 addresses the Brazoria National Wildlife Refuge. We anticipate Project related activities to have a minor impact on wildlife.

To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

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As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND81 – A. Paul & Starlet Zuma, Freeport, TX – Page 2

20140512-0052 FERC PDF (Unofficial) 05/12/2014

are NO sirens. A plan to evacuate residents has not been published, much less communicated in even the most rudimentary form. Deny the permit.

IND81-1 cont'd

5) The DEIS addresses pollution credits from the general region be utilized for FLNG's projected generation of pollution. The Commission needs to require that these credits be from within 10 miles of the facility. Reduction of pollution 100 miles away does not compensate local residents for the toxins that FLNG will be filling our homes and lungs with, nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

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IND81-2

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IND81-3

In conclusion, please deny the permits or at least send the DEIS back to staff to address these deficiencies.

Signed

Signature

Starlet Zuma

Printed Name

APRIL ZUMA

5-5-14

Date

107 DRIFTWOOD RD. FREEPORT, TX 77541

Street Address **(Optional)**

same

City, State and Zip Code **(Optional)**

Page 2

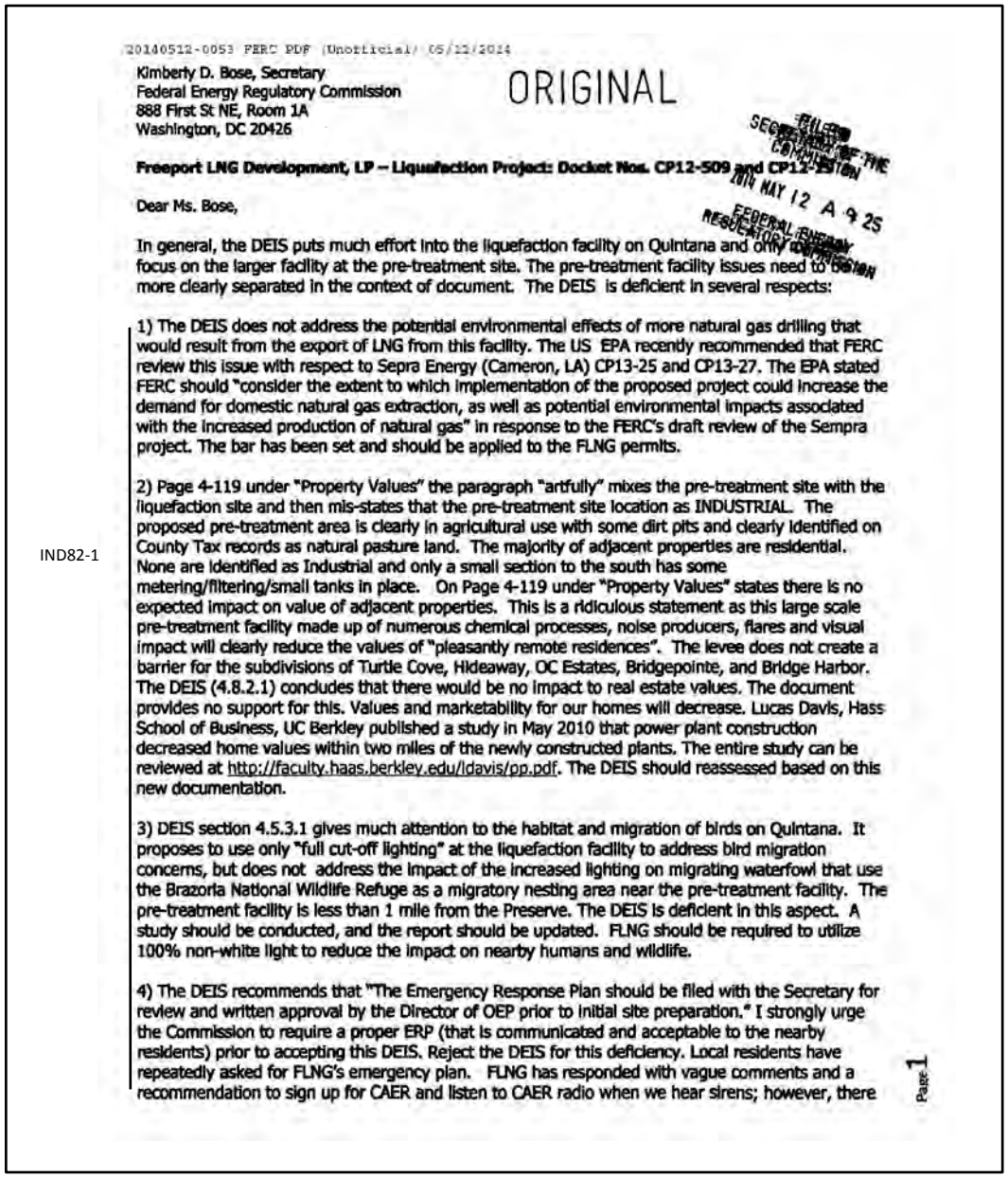
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Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

This is addressed in section 4.3 of the EIS

IND81-3: Comment acknowledged.

IND82 – Anne del Prado, Freeport, TX – Page 1



20140512-0053 FERC PDF (Unofficial) 05/12/2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First St NE, Room 1A
Washington, DC 20426

ORIGINAL

FILED SECRETARY OF THE COMMISSION 2014 MAY 12 A 9:25 FEDERAL ENERGY REGULATORY COMMISSION

Freeport LNG Development, LP – Liquefaction Project: Docket Nos. CP12-509 and CP12-29

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IND82-1

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353

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As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND82 – Anne del Prado, Freeport, TX – Page 2

20140512-0053 FERC PDF (Unofficial) 05/12/2014

are NO sirens. A plan to evacuate residents has not been published, much less communicated in even the most rudimentary form. Deny the permit.

IND82-1 cont'd

5) The DEIS addresses pollution credits from the general region be utilized for FLNG's projected generation of pollution. The Commission needs to require that these credits be from within 10 miles of the facility. Reduction of pollution 100 miles away does not compensate local residents for the toxins that FLNG will be filling our homes and lungs with, nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

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IND82-2

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IND82-3

In conclusion, please deny the permits or at least send the DEIS back to staff to address these deficiencies.

Signed,

_____	110 E BRAZ
Signature	Street Address **(Optional)**
Anne del Prado	FREEPORT TX. 77541
Printed Name	City, State and Zip Code **(Optional)**
MAY 4-2014	
Date	

Page 2

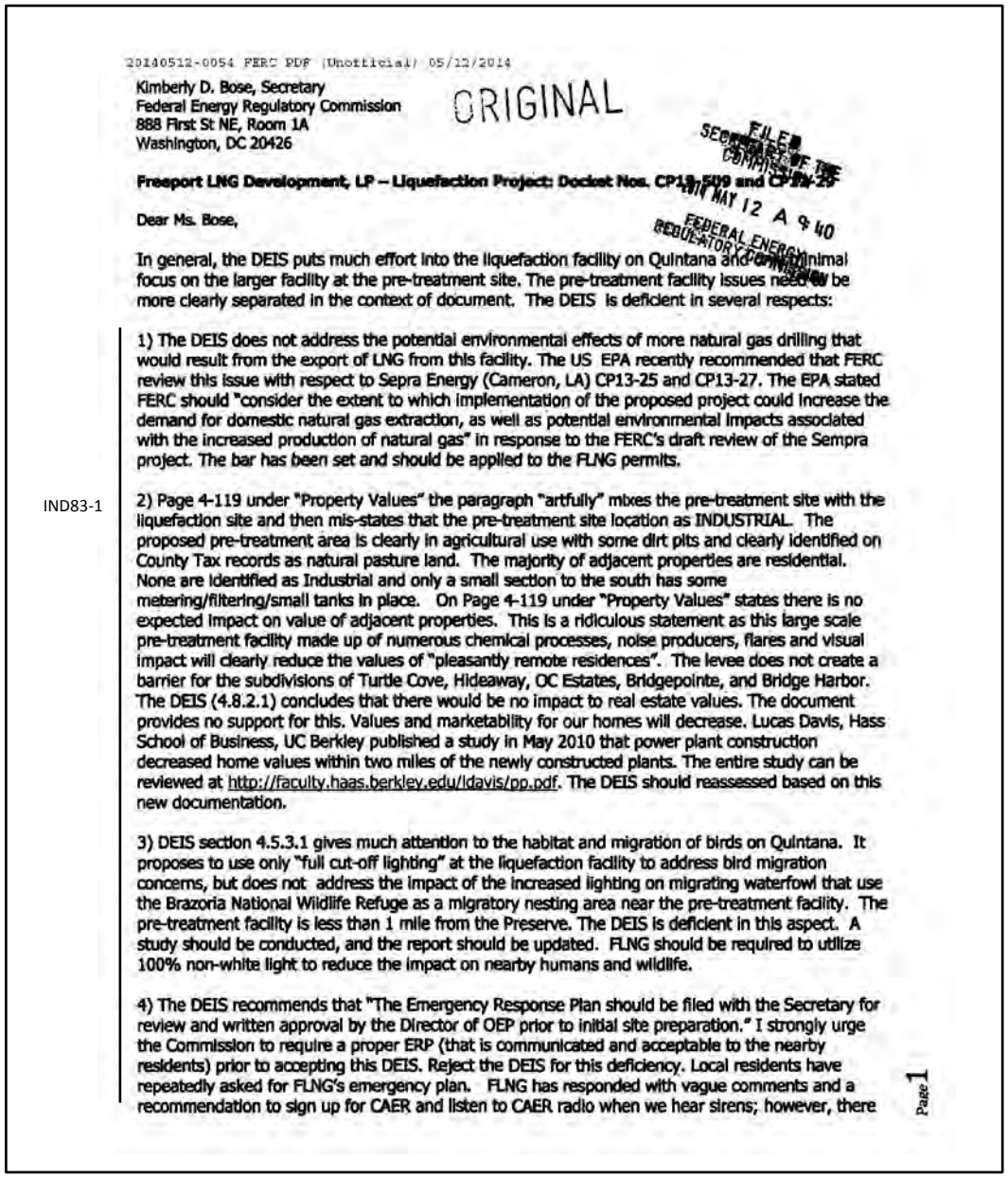
IND82-2: This is addressed in section 4.8.2, 4.8.3, and 4.8.4 of the EIS.

Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

This is addressed in section 4.3 of the EIS

IND82-3: Comment acknowledged.

IND83 – Malinda Barber, Freeport, TX – Page 1



20140512-0054 FERC PDF (Unofficial) 05/12/2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First St NE, Room 1A
Washington, DC 20426

ORIGINAL

FILED
SECRETARY OF THE COMMISSION
2014 MAY 12 A 9:40
FEDERAL ENERGY REGULATORY COMMISSION

Freeport LNG Development, LP – Liquefaction Project: Docket Nos. CP13-509 and CP13-25

Dear Ms. Bose,

In general, the DEIS puts much effort into the liquefaction facility on Quintana and minimal focus on the larger facility at the pre-treatment site. The pre-treatment facility issues need to be more clearly separated in the context of document. The DEIS is deficient in several respects:

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IND83-1

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4) The DEIS recommends that "The Emergency Response Plan should be filed with the Secretary for review and written approval by the Director of OEP prior to initial site preparation." I strongly urge the Commission to require a proper ERP (that is communicated and acceptable to the nearby residents) prior to accepting this DEIS. Reject the DEIS for this deficiency. Local residents have repeatedly asked for FLNG's emergency plan. FLNG has responded with vague comments and a recommendation to sign up for CAER and listen to CAER radio when we hear sirens; however, there

Page 1

IND83-1: The Department of Energy (DOE) has exclusive jurisdiction over the export of natural gas as a commodity. DOE has delegated to the FERC the authority to approve or disapprove the construction and operation of particular facilities the site at which such facilities would be located with respect to natural gas, that involves the construction of new domestic facilities, the place of entry for imports or exit for exports. However, the Secretary of the DOE has not delegated to the FERC any authority to approve or disapprove the import or export of the commodity itself or to consider the type of issues raised by the commenter as part of the FERC's public interest determination.

As noted in section 4.8, the main operational footprint of the Pretreatment Plant is located at least 0.5 mile from the nearest residence, and we do not anticipate any impact on the value of adjacent properties or homes. The Liquefaction Plant would be adjacent to the terminal site would be constructed and operated on undeveloped, industrial-zoned property available to Freeport LNG through existing lease agreements. The area is already utilized for LNG import and other industrial activities. The Pretreatment Plant site is characterized in the EIS as a "commercial area".

As noted in Section 4.5.3.1 we have looked at the potential impacts from facility lighting on wildlife and have concluded that, given Freeport LNG's mitigation efforts and the Freeport LNG Facility Lighting Design Plan (FLDP), impacts to migratory and non-migratory birds will be minor. On December 6, 2013 Freeport LNG submitted a response to a data request (Docket Nos. CP12-509-000 and CP12-29-000) that addresses additional mitigation measures. Section 4.5.2 addresses the Brazoria National Wildlife Refuge. We anticipate Project related activities to have a minor impact on wildlife.

To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

On May 14, 2014 Freeport LNG filed an updated Quintana Island Evacuation Plan (Docket Nos. CP12-509-000 and CP12-29-000) in responses to a FERC Data Request.

The existing ERP for the Freeport LNG terminal has been in place since the beginning of operations in July of 2008. In order to ensure that the ERP is up-to-date, the FERC has recommended that Freeport LNG should file its updated ERP which includes the Projects, as well as instructions to handle on-site hazardous fluid emergencies.

As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

20140512-0054 FERC PDF (Unofficial) 05/12/2014

are NO sirens. A plan to evacuate residents has not been published, much less communicated in even the most rudimentary form. Deny the permit.

IND83-1 cont'd

5) The DEIS addresses pollution credits from the general region be utilized for FLNG's projected generation of pollution. The Commission needs to require that these credits be from within 10 miles of the facility. Reduction of pollution 100 miles away does not compensate local residents for the toxins that FLNG will be filling our homes and lungs with, nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

6) The Socioeconomic information in section 4.8 is out dated. Potentially available local worker resources have already been stretched thin. Readily available housing has already been filled. The City of Lake Jackson has recently finished closing down a large area of housing and displaced many existing residents. Housing is already at significant premium, and workers are already commuting to reach project work already in progress. This section 4.8 does NOT reflect current conditions in the area.

IND83-2

7) A noise study needs to be done for Turtle Cove and Hideaway. The other Site 3 measurements are influenced by contributors that are far removed and cross-wind from the subdivisions. The subdivisions will be predominantly down-wind of the proposed pre-treatment plant whereas the other sites will be cross-wind, and the contributed values easily have the potential to double the noise level (10 dba increase) at these already quite areas. The 55 dba level allowed in the DEIS at other sample locations is totally unacceptable in quite neighborhoods.

8) DEIS, 2.1.3 states that the pre-treatment facility needs 38,000 gallons of water per day. This is a HUGE issue for the nearby communities and cities that draw their fresh water from the same aquifer. Fresh water is at a premium in the area of Texas, and this will have a detrimental effect on the residents in this area. Also, this water will be used in processes to remove contaminants. Yet, there is no discussion of waste water outfall. How it will be handled, or where it will be routed from the pre-treatment facility? There is only storm water discussed in the DEIS. What is the waste water plan? There is no pipeline demonstrated in the proposal to take waste water off the pre-treatment site to another permitted location.

IND83-3

In conclusion, please deny the permits or at least send the DEIS back to staff to address these deficiencies.

Signed,

Malinda Barber — Signature

143 Driftwood — Street Address **(Optional)**

Malinda Barber — Printed Name

Freeport, Tx 77531 — City, State and Zip Code **(Optional)**

5/5/14 — Date

Page 2

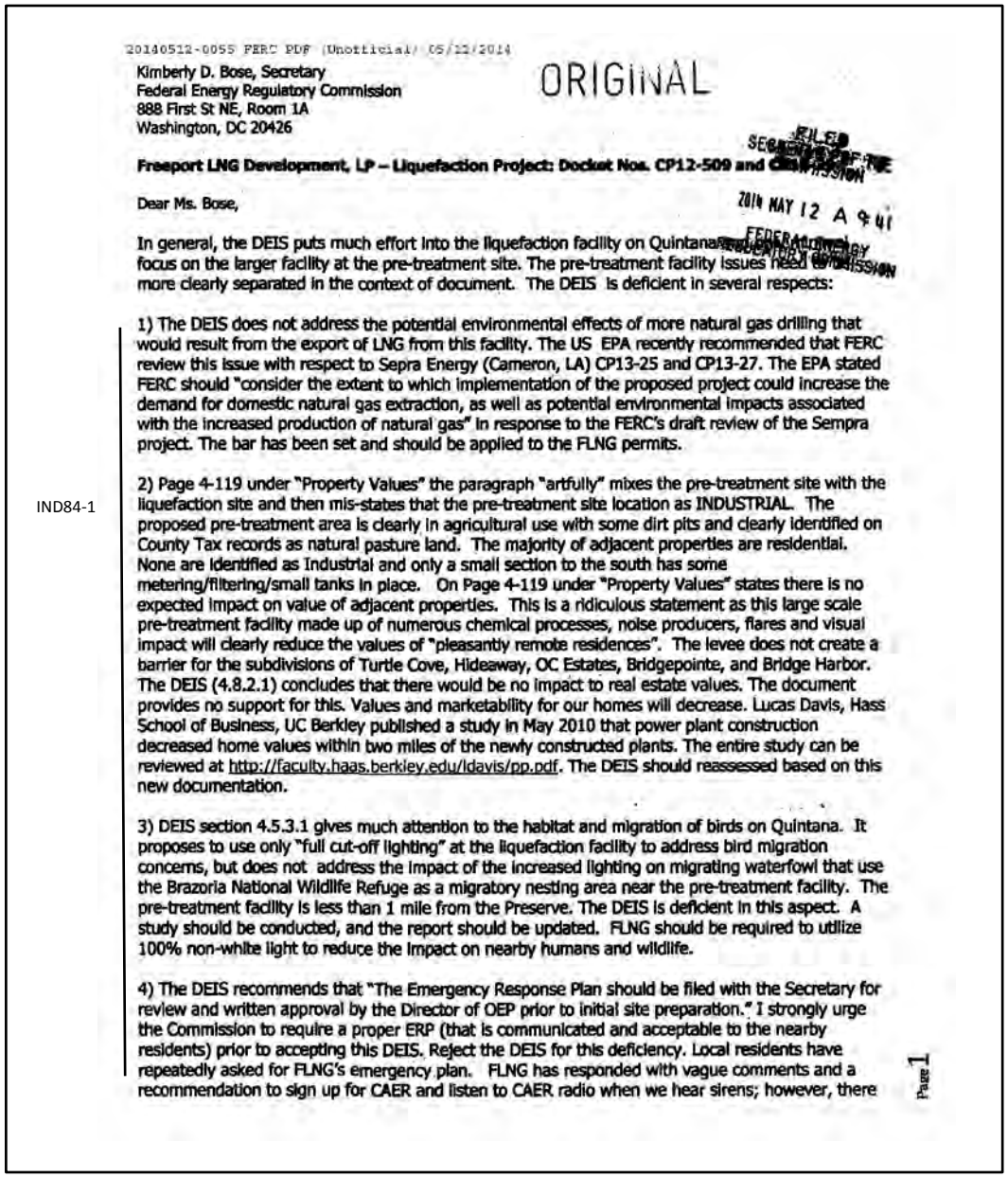
IND83-2: This is addressed in section 4.8.2, 4.8.3, and 4.8.4 of the EIS.

Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

This is addressed in section 4.3 of the EIS.

IND83-3: Comment acknowledged.

IND84 – Dianne G. Maddison, TX – Page 1



20140512-0055 FERC PDF (Unofficial) 05/12/2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First St NE, Room 1A
Washington, DC 20426

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2014 MAY 12 A 9:41
FEDERAL ENERGY REGULATORY COMMISSION

Freeport LNG Development, LP – Liquefaction Project: Docket Nos. CP12-509 and

Dear Ms. Bose,

In general, the DEIS puts much effort into the liquefaction facility on Quintana [illegible] focus on the larger facility at the pre-treatment site. The pre-treatment facility issues need [illegible] more clearly separated in the context of document. The DEIS is deficient in several respects:

1) The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to the FLNG permits.

IND84-1

2) Page 4-119 under "Property Values" the paragraph "artfully" mixes the pre-treatment site with the liquefaction site and then mis-states that the pre-treatment site location as INDUSTRIAL. The proposed pre-treatment area is clearly in agricultural use with some dirt pits and clearly identified on County Tax records as natural pasture land. The majority of adjacent properties are residential. None are identified as Industrial and only a small section to the south has some metering/filtering/small tanks in place. On Page 4-119 under "Property Values" states there is no expected impact on value of adjacent properties. This is a ridiculous statement as this large scale pre-treatment facility made up of numerous chemical processes, noise producers, flares and visual impact will clearly reduce the values of "pleasantly remote residences". The levee does not create a barrier for the subdivisions of Turtle Cove, Hideaway, OC Estates, Bridgepointe, and Bridge Harbor. The DEIS (4.8.2.1) concludes that there would be no impact to real estate values. The document provides no support for this. Values and marketability for our homes will decrease. Lucas Davis, Hass School of Business, UC Berkley published a study in May 2010 that power plant construction decreased home values within two miles of the newly constructed plants. The entire study can be reviewed at http://faculty.haas.berkley.edu/ldavis/pp.pdf. The DEIS should reassessed based on this new documentation.

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Page 1

357

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As part of our analysis, we evaluated the safety of the proposed pipeline and LNG facilities associated with the Projects, related facilities, and safety systems. For other pipeline safety concerns, see section 4.10.

IND84 – Dianne G. Maddison, TX – Page 2

20140512-0055 FERC PDF (Unofficial) 05/12/2014

are NO sirens. A plan to evacuate residents has not been published, much less communicated in even the most rudimentary form. Deny the permit.

IND84-1 cont'd

5) The DEIS addresses pollution credits from the general region be utilized for FLNG's projected generation of pollution. The Commission needs to require that these credits be from within 10 miles of the facility. Reduction of pollution 100 miles away does not compensate local residents for the toxins that FLNG will be filling our homes and lungs with, nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

IND84-2

6) The Socioeconomic information in section 4.8 is out dated. Potentially available local worker resources have already been stretched thin. Readily available housing has already been filled. The City of Lake Jackson has recently finished closing down a large area of housing and displaced many existing residents. Housing is already at significant premium, and workers are already commuting to reach project work already in progress. This section 4.8 does NOT reflect current conditions in the area.

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IND84-3

In conclusion, please deny the permits or at least send the DEIS back to staff to address these deficiencies.

Signed,

Dianne G. Maddison

Signature

Street Address **(Optional)**

DIANNE G. MADDISON

Printed Name

City, State and Zip Code **(Optional)**

5/4/14

Date

Page 2

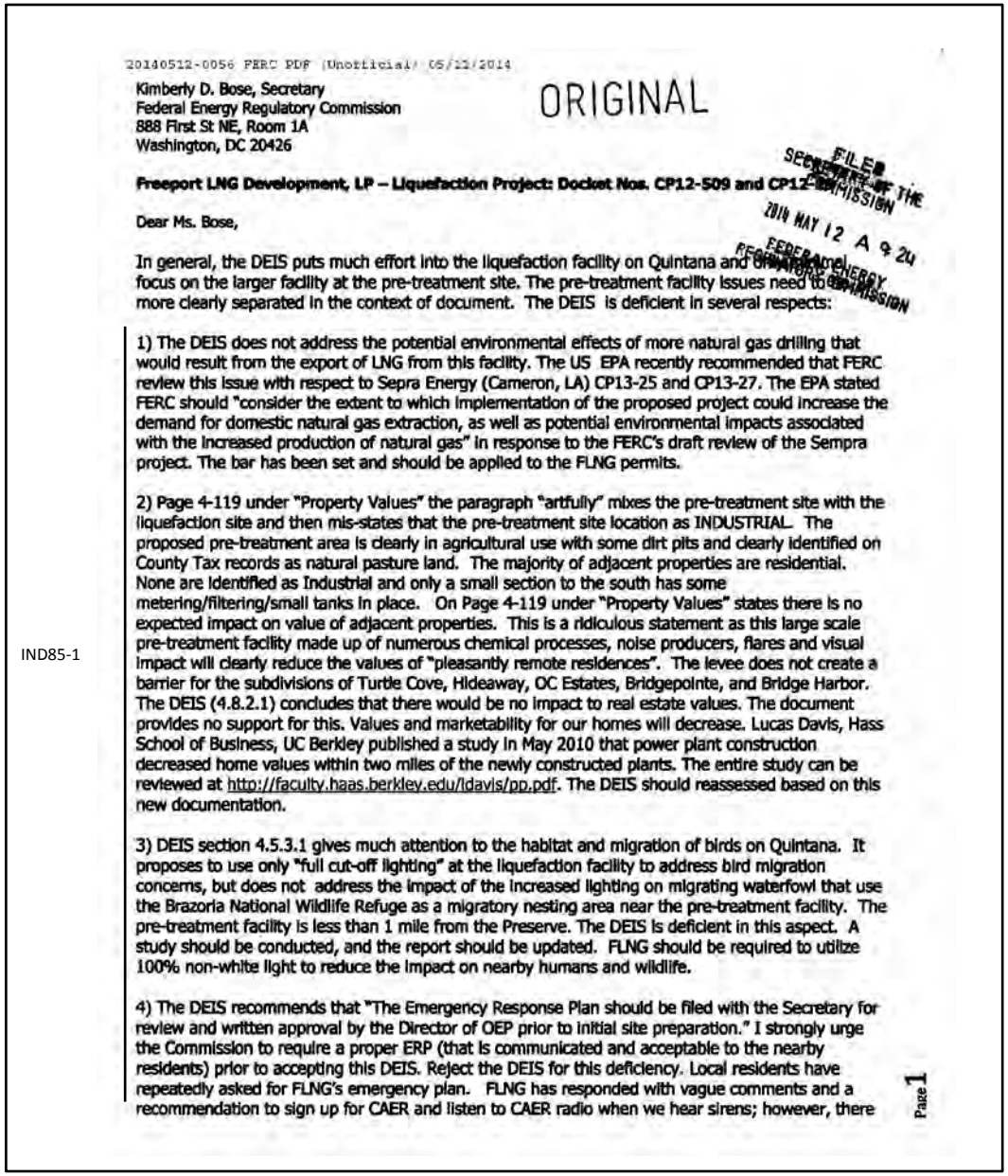
IND84-2: This is addressed in section 4.8.2, 4.8.3, and 4.8.4 of the EIS.

Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

This is addressed in section 4.3 of the EIS.

IND84-3: Comment acknowledged.

IND85 – Greg Smith, Freeport, TX – Page 1



20140512-0056 FERC PDF (Unofficial) 05/12/2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First St NE, Room 1A
Washington, DC 20426

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2014 MAY 12 A 9:24
FEDERAL ENERGY
REGULATORY
COMMISSION

Freeport LNG Development, LP – Liquefaction Project: Docket Nos. CP12-509 and CP12-29

Dear Ms. Bose,

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IND85-1

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20140512-0056 FERC PDF (Unofficial) 05/12/2014

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IND85-1 cont'd

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IND85-2

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IND85-3

In conclusion, please deny the permits or at least send the DEIS back to staff to address these deficiencies.

Signed,

Greg Smith — Signature

115 JOLLY BOAT — Street Address **(Optional)**

GREG SMITH — Printed Name

FREEPORT TX 77541 — City, State and Zip Code **(Optional)**

5-4-14 — Date

Page 2

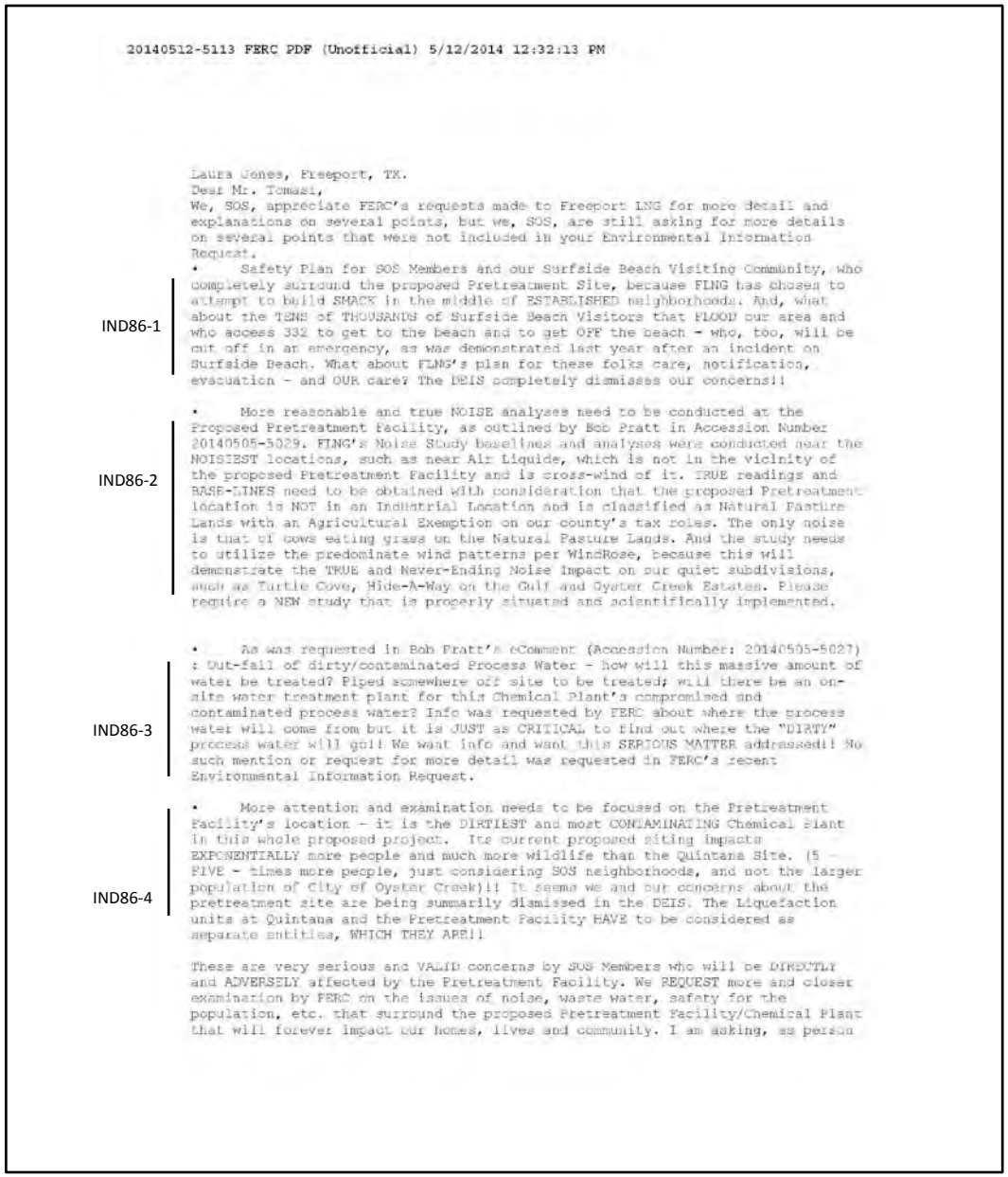
IND85-2: This is addressed in section 4.8.2, 4.8.3, and 4.8.4 of the EIS.

Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

This is addressed in section 4.3 of the EIS

IND85-3: Comment acknowledged.

IND86– Laura Jones, Freeport, TX – Page 1



20140512-5113 FERC PDF (Unofficial) 5/12/2014 12:32:13 PM

Laura Jones, Freeport, TX.
Dear Mr. Tomasi,
We, SOS, appreciate FERC's requests made to Freeport LNG for more detail and explanations on several points, but we, SOS, are still asking for more details on several points that were not included in your Environmental Information Request.

IND86-1
- Safety Plan for SOS Members and our Surfside Beach Visiting Community, who completely surround the proposed Pretreatment Site, because FLNG has chosen to attempt to build SMACK in the middle of ESTABLISHED neighborhoods. And, what about the TENS of THOUSANDS of Surfside Beach Visitors that FLOOD our area and who access 332 to get to the beach and to get OFF the beach - who, too, will be cut off in an emergency, as was demonstrated last year after an incident on Surfside Beach. What about FLNG's plan for these folks care, notification, evacuation - and OUR care? The DEIS completely dismisses our concerns!!

IND86-2
- More reasonable and true NOISE analyses need to be conducted at the Proposed Pretreatment Facility, as outlined by Bob Pratt in Accession Number 20140505-5029. FLNG's Noise STudy baselines and analyses were conducted near the NOISIEST locations, such as near Air Liquide, which is not in the vicinity of the proposed Pretreatment Facility and is cross-wind of it. TRUE readings and BASE-LINES need to be obtained with consideration that the proposed Pretreatment location is NOT in an Industrial Location and is classified as Natural Pasture Lands with an Agricultural Exemption on our county's tax roles. The only noise is that of cows eating grass on the Natural Pasture Lands. And the study needs to utilize the predominate wind patterns per WindRose, because this will demonstrate the TRUE and Never-Ending Noise Impact on our quiet subdivisions, such as Turtle Cove, Hide-A-Way on the Gulf and Oyster Creek Estates. Please require a NEW study that is properly situated and scientifically implemented.

IND86-3
- As was requested in Bob Pratt's eComment (Accession Number: 20140505-5027) : Out-fall of dirty/contaminated Process Water - how will this massive amount of water be treated? Piped somewhere off site to be treated; will there be an on-site water treatment plant for this Chemical Plant's compromised and contaminated process water? Info was requested by FERC about where the process water will come from but it is JUST as CRITICAL to find out where the "DIRTY" process water will go!! We want info and want this SERIOUS MATTER addressed!! No such mention or request for more detail was requested in FERC's recent Environmental Information Request.

IND86-4
- More attention and examination needs to be focused on the Pretreatment Facility's location - it is the DIRTIEST and most CONTAMINATING Chemical Plant in this whole proposed project. Its current proposed siting impacts EXPONENTIALLY more people and much more wildlife than the Quintana Site. (5 - FIVE - times more people, just considering SOS neighborhoods, and not the larger population of City of Oyster Creek)!! It seems we and our concerns about the pretreatment site are being summarily dismissed in the DEIS. The Liquefaction units at Quintana and the Pretreatment Facility HAVE to be considered as separate entities, WHICH THEY ARE!!

These are very serious and VALID concerns by SOS Members who will be DIRECTLY and ADVERSELY affected by the Pretreatment Facility. We REQUEST more and closer examination by FERC on the issues of noise, waste water, safety for the population, etc. that surround the proposed Pretreatment Facility/Chemical Plant that will forever impact our homes, lives and community. I am asking, as perso

IND86-1: To ensure safety and reliability, we identified specific recommendations for the Projects to be addressed by Freeport LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service (see section 5.15).

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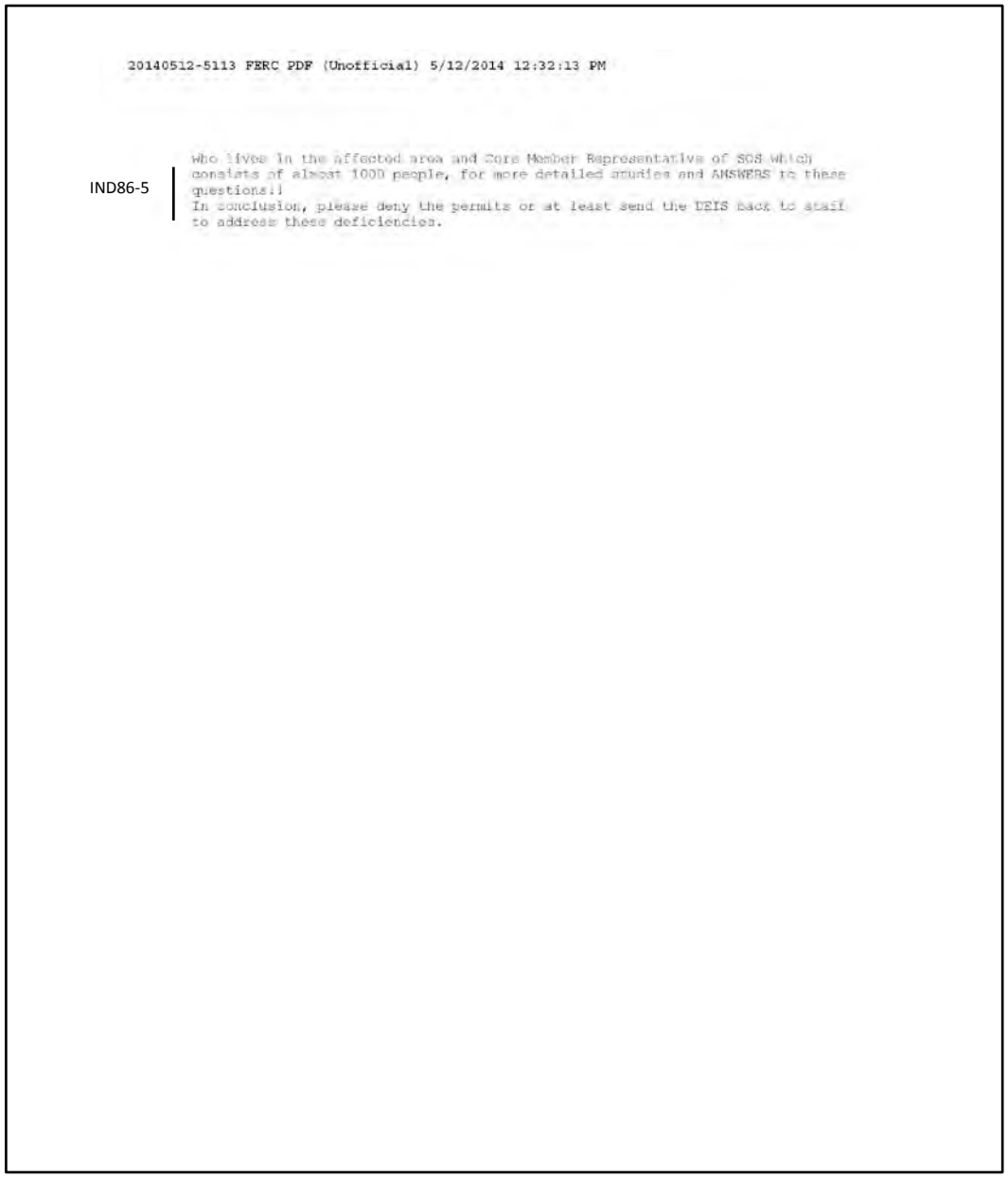
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IND86-2: Sections 4.11.2, 5.13.1, and 5.13.2 address ambient noise quality during construction and operations of the facility.

IND86-3: Under Section 402 of the Clean Water Act (CWA) Freeport would be required to acquire industrial storm water permits and storm water construction permits. See section 4.3.2.

IND86-4: The SWPPP Plan and SPCC Plan ensure the avoidance of indirect impacts from stormwater runoff and/or accidental spills on uplands and wetlands where wildlife dwell. See section 4.3.2.

IND86 – Laura Jones, Freeport, TX – Page 2



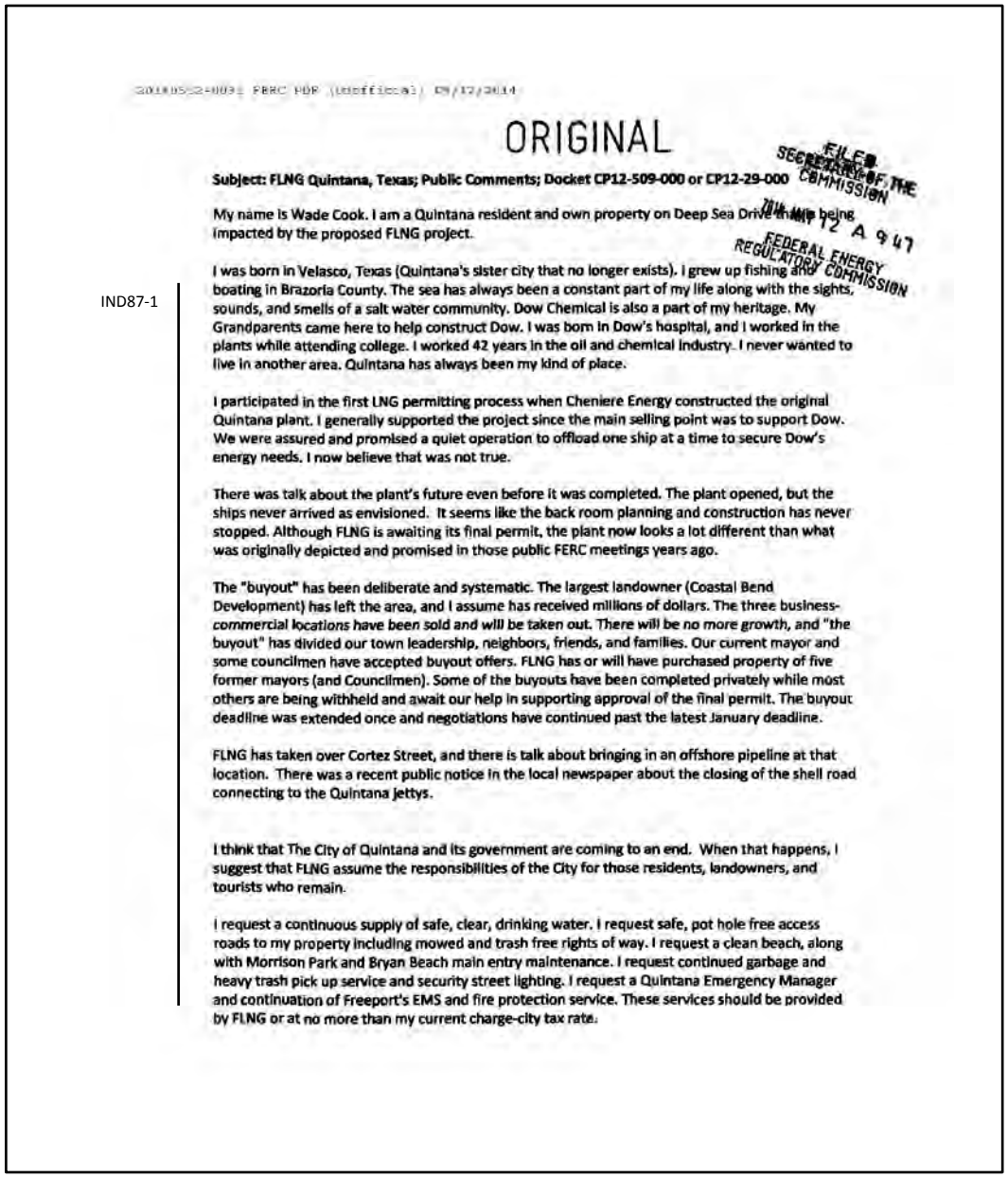
20140512-5113 FERC PDF (Unofficial) 5/12/2014 12:32:13 PM

IND86-5

who lives in the affected area and Core Member Representative of SOS which consists of almost 1000 people, for more detailed studies and ANSWERS to these questions!!
In conclusion, please deny the permits or at least send the DEIS back to staff to address these deficiencies.

IND86-5: Comment acknowledged.

IND87 – Wade Cook, Quintana, TX – Page 1



20140522-0031 FERC PDF (Unofficial) 05/12/2014

ORIGINAL

FILED
SECRETARY OF THE
COMMISSION
2014 MAY 12 A 9:47
FEDERAL ENERGY
REGULATORY COMMISSION

Subject: FLNG Quintana, Texas; Public Comments; Docket CP12-509-000 or CP12-29-000

My name is Wade Cook. I am a Quintana resident and own property on Deep Sea Drive that will be being impacted by the proposed FLNG project.

IND87-1

I was born in Velasco, Texas (Quintana's sister city that no longer exists). I grew up fishing and boating in Brazoria County. The sea has always been a constant part of my life along with the sights, sounds, and smells of a salt water community. Dow Chemical is also a part of my heritage. My Grandparents came here to help construct Dow. I was born in Dow's hospital, and I worked in the plants while attending college. I worked 42 years in the oil and chemical industry. I never wanted to live in another area. Quintana has always been my kind of place.

I participated in the first LNG permitting process when Cheniere Energy constructed the original Quintana plant. I generally supported the project since the main selling point was to support Dow. We were assured and promised a quiet operation to offload one ship at a time to secure Dow's energy needs. I now believe that was not true.

There was talk about the plant's future even before it was completed. The plant opened, but the ships never arrived as envisioned. It seems like the back room planning and construction has never stopped. Although FLNG is awaiting its final permit, the plant now looks a lot different than what was originally depicted and promised in those public FERC meetings years ago.

The "buyout" has been deliberate and systematic. The largest landowner (Coastal Bend Development) has left the area, and I assume has received millions of dollars. The three business-commercial locations have been sold and will be taken out. There will be no more growth, and "the buyout" has divided our town leadership, neighbors, friends, and families. Our current mayor and some councilmen have accepted buyout offers. FLNG has or will have purchased property of five former mayors (and Councilmen). Some of the buyouts have been completed privately while most others are being withheld and await our help in supporting approval of the final permit. The buyout deadline was extended once and negotiations have continued past the latest January deadline.

FLNG has taken over Cortez Street, and there is talk about bringing in an offshore pipeline at that location. There was a recent public notice in the local newspaper about the closing of the shell road connecting to the Quintana Jettys.

I think that The City of Quintana and its government are coming to an end. When that happens, I suggest that FLNG assume the responsibilities of the City for those residents, landowners, and tourists who remain.

I request a continuous supply of safe, clear, drinking water. I request safe, pot hole free access roads to my property including mowed and trash free rights of way. I request a clean beach, along with Morrison Park and Bryan Beach main entry maintenance. I request continued garbage and heavy trash pick up service and security street lighting. I request a Quintana Emergency Manager and continuation of Freeport's EMS and fire protection service. These services should be provided by FLNG or at no more than my current charge-city tax rate.

IND87-1: Comment acknowledged.

IND87 – Wade Cook, Quintana, TX – Page 2

20140523-0031 FERC PDF (Unofficial) 05/12/2014

IND87-1 cont'd

I am being told that they do not want me to leave but have offered me their market value for the house that I have been constructing over the last twelve years. I am not being compensated for the loss of my friends and neighbors or for the TAKING of my retirement life here on Quintana island.

Sincerely,

Wade Cook

Wade Cook
5-1-2014

20140515-0033 FERC PDF (Unofficial) 05/15/2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First St NE, Room 1A
Washington, DC 20426

ORIGINAL

SECRETARY OF THE COMMISSION
2014 MAY 15 PM 12:25
FEDERAL ENERGY REGULATORY COMMISSION

Freeport LNG Development, LP – Liquefaction Project: Docket Nos. CP12-509 and CP12-29

Dear Ms. Bose,

In general, the DEIS puts much effort into the liquefaction facility on Quintana and only minimal focus on the larger facility at the pre-treatment site. The pre-treatment facility issues need to be more clearly separated in the context of document. The DEIS is deficient in several respects.

IND88-1 | 1) The DEIS does not address the potential environmental effects of more natural gas drilling that would result from the export of LNG from this facility. The US EPA recently recommended that FERC review this issue with respect to Sepra Energy (Cameron, LA) CP13-25 and CP13-27. The EPA stated FERC should "consider the extent to which implementation of the proposed project could increase the demand for domestic natural gas extraction, as well as potential environmental impacts associated with the increased production of natural gas" in response to the FERC's draft review of the Sempra project. The bar has been set and should be applied to the FLNG permits.

IND88-2 | 2) Page 4-119 under "Property Values" the paragraph "artfully" mixes the pre-treatment site with the liquefaction site and then mis-states that the pre-treatment site location as INDUSTRIAL. The proposed pre-treatment area is clearly in agricultural use with some dirt pits and clearly identified on County Tax records as natural pasture land. The majority of adjacent properties are residential. None are identified as Industrial and only a small section to the south has some metering/filtering/small tanks in place. On Page 4-119 under "Property Values" states there is no expected impact on value of adjacent properties. This is a ridiculous statement as this large scale pre-treatment facility made up of numerous chemical processes, noise producers, flares and visual impact will clearly reduce the values of "pleasantly remote residences". The levee does not create a barrier for the subdivisions of Turtle Cove, Hideaway, OC Estates, Bridgepointe, and Bridge Harbor. The DEIS (4.8.2.1) concludes that there would be no impact to real estate values. The document provides no support for this. Values and marketability for our homes will decrease. Lucas Davis, Hass School of Business, UC Berkley published a study in May 2010 that power plant construction decreased home values within two miles of the newly constructed plants. The entire study can be reviewed at http://faculty.haas.berkley.edu/ldavis/pp.pdf. The DEIS should reassessed based on this new documentation.

IND88-3 | 3) DEIS section 4.5.3.1 gives much attention to the habitat and migration of birds on Quintana. It proposes to use only "full cut-off lighting" at the liquefaction facility to address bird migration concerns, but does not address the impact of the increased lighting on migrating waterfowl that use the Brazoria National Wildlife Refuge as a migratory nesting area near the pre-treatment facility. The pre-treatment facility is less than 1 mile from the Preserve. The DEIS is deficient in this aspect. A study should be conducted, and the report should be updated. FLNG should be required to utilize 100% non-white light to reduce the impact on nearby humans and wildlife.

IND88-4 | 4) The DEIS recommends that "The Emergency Response Plan should be filed with the Secretary for review and written approval by the Director of OEP prior to initial site preparation." I strongly urge the Commission to require a proper ERP (that is communicated and acceptable to the nearby residents) prior to accepting this DEIS. Reject the DEIS for this deficiency. Local residents have repeatedly asked for FLNG's emergency plan. FLNG has responded with vague comments and a recommendation to sign up for CAER and listen to CAER radio when we hear sirens; however, there

Page 1

IND88-1: See section 4.12.1 of the EIS.

IND88-2: See section 4.8.2.1.

IND88-3: A previous study showed no impact to FWS designated migratory birds of concern. See section 4.5.3.

IND88-4: See section 4.8.3.1, 4.10.7 and appendix J.

20140515-0033 FERC PDF (Unofficial) 05/15/2014

are NO sirens. A plan to evacuate residents has not been published, much less communicated in even the most rudimentary form. Deny the permit.

5) The DEIS addresses pollution credits from the general region be utilized for FLNG's projected generation of pollution. The Commission needs to require that these credits be from within 10 miles of the facility. Reduction of pollution 100 miles away does not compensate local residents for the toxins that FLNG will be filling our homes and lungs with, nor does it compensate the wildlife in Brazoria National Wildlife Refuge.

6) The Socioeconomic information in section 4.8 is out dated. Potentially available local worker resources have already been stretched thin. Readily available housing has already been filled. The City of Lake Jackson has recently finished closing down a large area of housing and displaced many existing residents. Housing is already at significant premium, and workers are already commuting to reach project work already in progress. This section 4.8 does NOT reflect current conditions in the area.

IND88-5

7) A noise study needs to be done for Turtle Cove and Hideaway. The other Site 3 measurements are influenced by contributors that are far removed and cross-wind from the subdivisions. The subdivisions will be predominantly down-wind of the proposed pre-treatment plant whereas the other sites will be cross-wind, and the contributed values easily have the potential to double the noise level (10 dba increase) at these already quite areas. The 55 dba level allowed in the DEIS at other sample locations is totally unacceptable in quite neighborhoods.

IND88-6

8) DEIS, 2.1.3 states that the pre-treatment facility needs 38,000 gallons of water per day. This is a HUGE issue for the nearby communities and cities that draw their fresh water from the same aquifer. Fresh water is at a premium in the area of Texas, and this will have a detrimental effect on the residents in this area. Also, this water will be used in processes to remove contaminants. Yet, there is no discussion of waste water outfall. How it will be handled, or where it will be routed from the pre-treatment facility? There is only storm water discussed in the DEIS. What is the waste water plan? There is no pipeline demonstrated in the proposal to take waste water off the pre-treatment site to another permitted location.

In conclusion, please deny the permits or at least send the DEIS back to staff to address these deficiencies.

Signed,

Rodney W Posey

Signature

518 Marine Way

Street Address **(Optional)**

Rod + Denise Posey

Printed Name

Freeport, TX 77541

City, State and Zip Code **(Optional)**

4-29-14

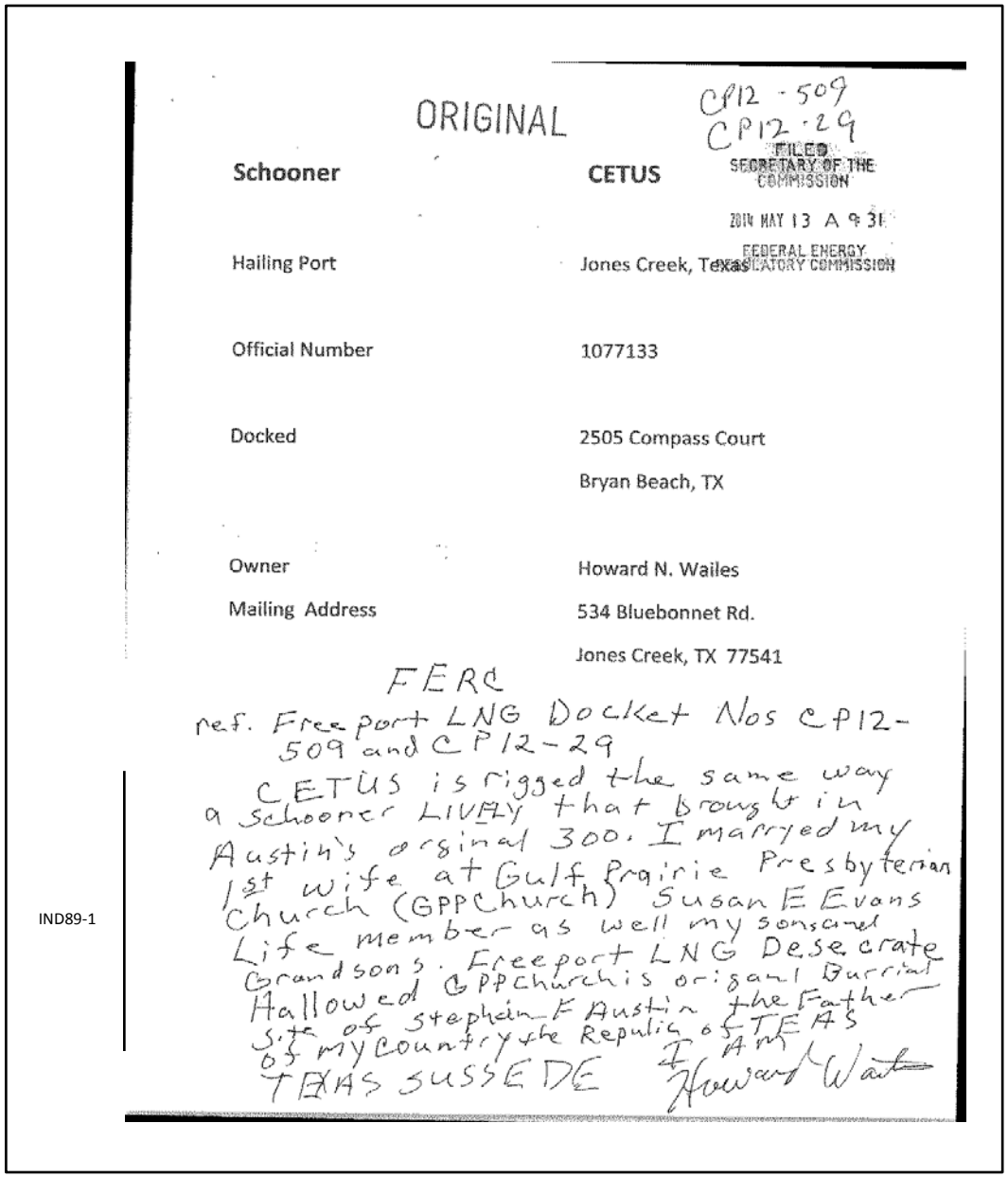
Date

Page 2

IND88-5: See section 4.8.4.

IND88-6: See section 4.11.2.

IND89 – Howard N. Wailes, Jones Creek, TX – Page 1



ORIGINAL

CP12-509
CP12-29

FILED
SECRETARY OF THE
COMMISSION

2014 MAY 13 A 9:31

FEDERAL ENERGY
REGULATORY COMMISSION

Schooner	CETUS
Hailing Port	Jones Creek, Texas
Official Number	1077133
Docked	2505 Compass Court Bryan Beach, TX
Owner	Howard N. Wailes
Mailing Address	534 Bluebonnet Rd. Jones Creek, TX 77541

FERC

ref. Freeport LNG Docket Nos CP12-509 and CP12-29

CETUS is rigged the same way a schooner LIVELY that brought in Austin's orginal 300. I married my 1st wife at Gulf Prairie Presbyterian Church (GPPChurch) Susan E Evans Life member as well my sons and Grandsons. Freeport LNG Desecrate Hallowed GPPchurch is orignal burrial S.te of stephan F Austin the Father of my Country the Republic of TEXAS TEXAS SUSSEDE I Am Howard Wailes

IND89-1

IND89-1: Comment acknowledged.

In the last couple of decades fantastic industrial expansion has come to the Brazosport area. Dow Chemical Company was the first giant to move in and take advantage of the fabulous resources of Brazoria County: gas, oil, sulphur, salt, oyster shell, marine minerals, cotton, starch, multitudinous other materials, and superb harbor facilities. Stauffer Chemical, Phillips Petroleum and other colossal combines followed. Of late have arrived an increasing number of firms dependent on base materials processed by these on-the-spot colossi.

Resultant population pressures have more or less impelled the Bryan family to yield up in the public interest their virginal seacoast for home building. But family spokesman J. P. Bryan of Lake Jackson imposed an inviolable restriction. "The erection of safe residences at *ground level without* the use of unsightly piling or 'stilts' as routinely used in other coastline building programs is a *must*. We shall insist on beauty and utility not ordinarily found in beach or waterfront projects," he emphasizes.

A succession of real estate developers hungering for a crack at Bryan Beach looked the situation over in relation to the automatic restriction and bowed out. Meanwhile, two Houstonites, George V. Lister, Jr. and Stephen R. Wilhelm, had separately reached the same conclusion: a Gulfcoast waterfront development of major proportions encompassing the highest standards of land planning and construction would be enthusiastically received and supported by boatsmen, outdoorsmen, fishermen and others who love salt water recreation.

The two "pioneers" discovered their mutual conviction and teamed up for an exhaustive feasibility study of the entire Gulf Coast. They became satisfied that Bryan Beach was the proper locale for testing their belief. A brief glimpse at their careers helps in understanding their daring in tackling this unique development which will involve eventual construction of 6,000 prestige homes!

George V. Lister, Jr. serves as president of Bryan Beach, Inc. Although a native of Seattle, Washington, he is well dug in already in the Lone Star State and a major booster thereof. He comes from a family of major status in real estate and real estate development. After transferring his activities to Texas, he built an enviable reputation as a leading developer of prestige residential properties in the distinctive sections of the Houston region. He has also participated in numerous other commercial real estate enterprises. His background in major project financing is extremely knowledgeable. It combines with his hallmark of developments of utility with beauty to fulfill the demand of the Bryans.

Steve Wilhelm, the project's executive vice president who ushered Lister into the development at Bryan Beach, is a well-known Texas personality and a nationally known executive in the advertising and public relations field. For some 20 years the advertising agency formed by Wilhelm supervised the advertising for all Howard Hughes [illegible] he served as public relations director for the billion dollar firm. Prior to an interim retirement several years ago, from which he has since returned, Wilhelm also served for several years as president of one of Howard Hughes



Aerial view shows Gulf beach in foreal Canal and floating marina bey

giant corporations in addition to other corporate duties in the petroleum and petrochemical fields. His many [illegible] His five [illegible] on Texas—the latest being "Calva of Texas"—emphasize his [illegible] efforts to proclaim Texas greatest place on earth. Defeatin heretofore insurmountable health p lem, his reentry into active business hailed by both the medical profes and the Texas business community well. Bryan Beach affords him the mate in making, with his partner Ge Lister, Jr., a lasting contribution to as prestige in the nation. His many y of service to the business communit Houston and Texas have built for enviable prestige. His many years the NBC radio network stations in as as the Grand Prize commer have rewarded him with recogn as a somewhat legendary historia the Lone Star State.

The construction challenges ofl by Bryan Beach were known to be n Some unsuspected ones have cro up. The first that had to be met bea was the hurricane bugaboo.

I don't think what we have now is what Howard had in mind

Modern dredges rush construction of salt water lake on first unit. With permanent depth of 30 feet, lake will be an angler's paradise.

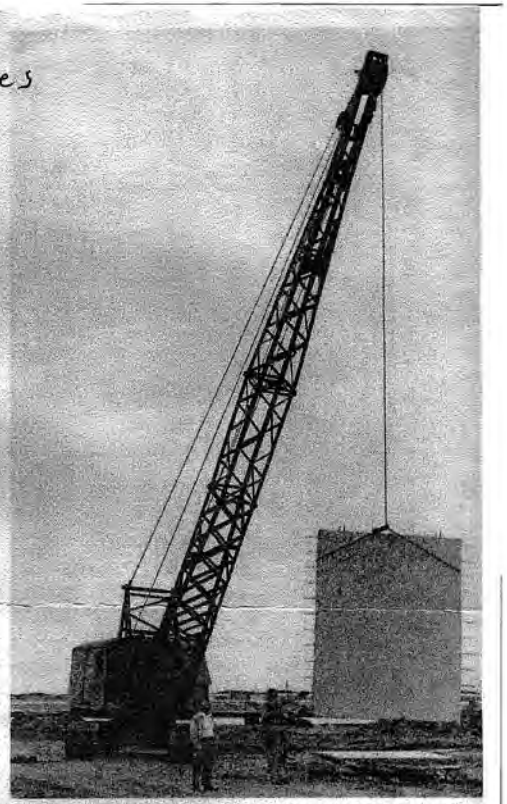


Better Homes and Garden

BRYAN BEACH- AN AMERICAN VENICE

An ingenious system of canals gives plush vacation homes all the advantages and none of the hazards of frontage on salt water.

By WILLIAM CX HANCOCK



These final concrete bulkheads completed initial Bryan Beach tide-proof canals.

ALONG one of Texas' most beautiful beaches a prestige waterfront residential community is abuilding. It is best described as a Utopian American Venice. At Bryan Beach, just out of Freeport, each house is on one of several sheltered man-made canals, seven foot deep at mean low tide, connecting with the Gulf of Mexico and thence with the seven seas.

The development of Bryan Beach has run up an imposing list of "firsts" that holds veteran Gulf Coast real estate people in awe.

Here is the first hurricane-proof cen-

age to boats by high winds. The location further affords an inland waterway "escape" route from storms and high winds wherein boats can be safely moored miles away from the Gulf in river harbors at the first sign of danger!

The 3,000 acres comprising Bryan Beach are contained by five miles of unsurpassed seafront on the Golden Gulf. These alluring sands constitute the last major expanse of regional beach open for private development. This land

The area is highly accessible, bein adjacent to Freeport (a part of Brazo port). It can be reached by a networ of fine highways including the new $8 million Freeway from Houston. Th long-sought direct highway from Brown ville to Galveston on around the Gu to Florida is under construction.

Access to the development by boat via the Intracoastal Canal from eithe the Gulf approach or from the mout of the New Brazos River.



concrete bulkheaded lake and canals. Intracoastal initial Bryan Beach complex as it appears today.

ally controlled, allowance has been made for custom construction by private contractors for property owners who prefer other materials. But the material must be of a permanent nature. "We wouldn't build waterfront houses on stilts even if allowed to," declared Lister and Wilhelm. "There's no beauty to them. No matter how much you spend on them, they still look like a gathering of long-legged spider crabs."

This American Venice puts every boat-owning Texan on the threshold of the world. The canals are being dug 78 feet wide, 2,200 feet long and deep enough—7 feet at mean low tide—to accommodate any size pleasure craft. They are bulkheaded with steel-reinforced concrete. The construction is much like tilt-up as the slabs are precast and set up between cast in place "columns." These are supported by tiebacks anchored to concrete "dead men." A concrete cap is cast on top of the bulkhead wall. The resultant strength equals that of commercial harbor bulkheading, guaranteeing a permanent waterfront line, beauty, and safety.

Simultaneously, a 25-acre salt water lake is being dredged adjacent to the Gulf. It will connect with the Gulf via the Intracoastal Canal. The excavation is proceeding under the eyes of a marine biologist seeking to insure proper depths and bottom conformation to attract large numbers of in-shore game fish. The lake is also designed for water sports. It is bulkheaded with corrugated cement-asbestos sheets. They are jetted into place and capped with concrete—a very enduring containment. Plans have been completed for a plush private club on the lakeshores. More than 2,000 feet of adjacent frontage on the Gulf is being readied for homesites.

In general, the development has been planned to proceed by units. Unit I with which we are mostly concerned here is a 200-acre, $5 million water community. It includes the already finished floating 150-boat marina of special design, complete with sales and repair divisions and a fine restaurant. The unit includes five of the described canals, a horizon lot area, and the seashore residential reserve. Each row of lots is flanked by paved streets with concrete curbing and run-off gutters.

Crystal clear potable water in abundance is provided. Across the way is Dow

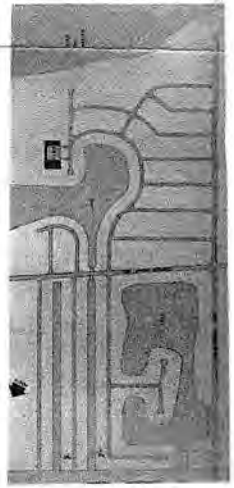
place, available to each building s

Two residences have been comp in Unit I. Twelve more are in v stages of construction. The comp residences range in value from 000 to $35,000.

Bryan Beach possesses many magnetic factors. Potential re thinking in terms of year-round will be pleased to learn that Braz has a community-wide system of s centering in Freeport which is among the best in the state. The ar long on religious opportunities churches), library facilities, art, d and music outlets. It is a sports community in the mild climate ave ing 71 degrees. But it contains a hi percentage of Ph.D's than any locality in the state.

In addition to the numberless re tional opportunities for children ty of a modern community, youngste Bryan Beach play in the presenc

Plat shows layout of streets, waterw and lakes in initial unit of the comp



plans were developed by architectural research and employ the principles of storm resistance.

In this area, Lister and Wilhelm decided that mere common sense theory was insufficient and accordingly commissioned one of the leading architects and land planners in the nation to establish the formula. Clovis B. Heimsath, AIA of Houston, was selected for his background and achievement in water community projects throughout the U.S. Added to the exceptionally brilliant background of the architect chosen is the plus factor that Heimsath was chosen by the Architectural Department of Rice University as Design Critic—an extremely high honor in the profession. Heimsath heads architectural control for Bryan Beach, Inc., and is also a member of the restrictions committee.

As a result all houses will be built on ground level. Those under the site development plan (that is, constructed under Bryan Beach, Inc., supervision) will be of steel-reinforced concrete. The companies of the Portland Cement Association have developed an endless array of attractive materials for concrete floors, walls, and roofs. This all-concrete construction will eliminate another [illegible]



Gracious living is a way of life in residential areas. Shown here is one of the Hunter's Room in the Kilburn Moore home which is a prestige construction.

history. History will live vividly for them as they unearth an occasional ancient coin or rotted musket, or as they dig in ruins around Quintana. Across these sands strode men of the Spanish Main; the *Conquistadores;* the colonists of Moses Austin and later of his son Stephen F.—"Father of Texas;" Jean LaFitte and his pirate crews. Just over the way Sam Houston and his gallant if small and motley force won Texas independence from Mexico by defeating Santa Anna at San Jacinto.

For adults there are numberless organized recreational activities, two nearby superb golf courses and every type of water sport. But in the final analysis the appeal of most seacoast developments relate to the quality of their fishing.

Bryan Beach is in the very center of the finest fishing on the fish-blessed Gulf Coast. There is no "season" except the fish run bigger in the winter. People fishing in the surf or off the jetties make fine catches of trout, red-fish, bull reds, croaker, sheepshead, drum, gaff topsail, and other species. Those preferring quiet waters have countless miles of bays, inlets, creeks, and rivers for top fishing. Flounders are gigged by the thousands on the flats. Black bass abound in the nearby lakes.

Reefs are easily accessible for those who prefer to gather their own oysters.

Beauty and permanence of concrete construction are features in Heimsath home designs.



This region is the shrimp co Gulf. A novice can catch a succulent crabs.

At the south end of Bryan ver tarpon leap and frolick i of the Brazos River. Throug gather to watch when this kin fish is running. This is one spots in the nation where men take tarpon.

Offshore in the Gulf, spor fabulous catches of kingfish mackerel, warsaw, jackfish, bonito, barracuda, and dolp not distant 1,000-fathom cu sailfish, and tuna abound. Ou out, begin the famous red sn which draw people from a continent to fish.

Upon completion of a thor tion tour of Bryan Beach, I e the marina restaurant. Since connected with Bryan Beac urely friendly as a dachsh the cordiality of the proprie cafe might almost have bee Still it was heartwarming wh of the place fixed a special sa in honor of my ulcer. The sh (made with the tiny wh abounding in the region) this world. The lady found bread. She brought me som hot corn muffins to replace toasted crackers. While p apple pie almost too oven-fa studied a copy of a letter C. Hedrick, dean of architec planners in Texas.

The theme presented Bry the most highly restricted an conceived facility of its k Golden Gulf. Then I snuck partial list of the lot owne Beach. It read like a Who's as high finance.

"If ever I'm lucky enou Bryan Beach again, the pla ably be too high-toned fo cornbread and too ritzy for anyway," I mourned.

"Don't bet on that," re gineer seated with me. W going on here at Bryan B

IND90– Wilma & Johnny Morrison

20140428-0046 FERC PDF (Unofficial) 04/28/2014
William Morrison 6174516676 p.1

To: Tammi Cimiotta
city secretary
Town of Quintana

From: W.J. Morrison

Subject: Petition to stop using public money for needless attorney fees.

As a non resident property owner, we have very little contact with the city government. However, I want to make our position clear on this matter:

IND90-1

1. We have signed with FLNG.
2. We believe that FLNG has been very fair to us and to the town of Quintana.
3. The main question that we hear when we are at Quintana is "What is the city government doing (and what are they going to do) with all the money that they have gotten (and will get) from FLNG".
4. Since we have signed with FLNG, we will support their effort to expand.
5. Also, it seems that anyone signing with FLNG has a moral obligation to support their expansion.

Wilma & Johnny Morrison

DOCKet # CP 12-509
CP 12-29

Freeport LNG, LIQUEFACTION PROJECT

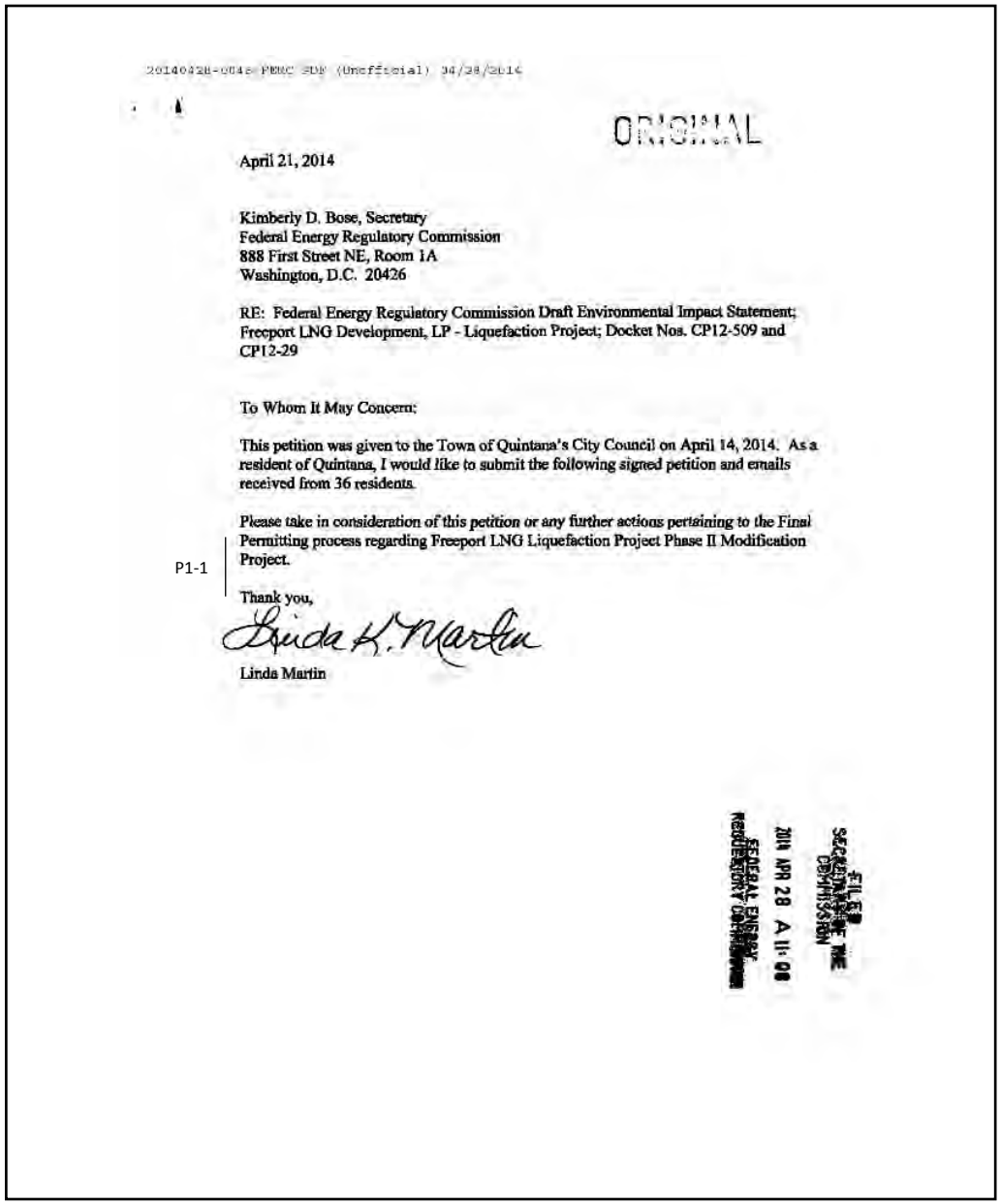
(2) Signatures

RECEIVED
APR 10 2014
BY

IND90-1: Comment acknowledged.

PETITIONS

P1– Linda Martin



20140428-0048 FERC PDF (Unofficial) 04/28/2014

ORIGINAL

April 21, 2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, D.C. 20426

RE: Federal Energy Regulatory Commission Draft Environmental Impact Statement; Freeport LNG Development, LP - Liquefaction Project; Docket Nos. CP12-509 and CP12-29

To Whom It May Concern:

This petition was given to the Town of Quintana's City Council on April 14, 2014. As a resident of Quintana, I would like to submit the following signed petition and emails received from 36 residents.

P1-1 Please take in consideration of this petition or any further actions pertaining to the Final Permitting process regarding Freeport LNG Liquefaction Project Phase II Modification Project.

Thank you,

Linda K. Martin

Linda Martin

FILED
SECRETARY OF THE COMMISSION
2014 APR 28 A 11:08
FEDERAL ENERGY REGULATORY COMMISSION

P1-1: Petition signers' support of the Project is noted.

P1– Linda Martin (Cont'd)

20140428-5046 FERC PDF (Unofficial) 04/28/2014

FREEPORT LNG LIQUEFACTION PROJECT Docket # CP 12-509 CP 12-29

Stop Council from spending any more money on Attorneys

To: Town of Quintana, City Council

Petition created by: Linda Martin,

Council Continues to spend more money on Attorneys to stop Freeport FLNG permitting process. FERC has already issued their draft, its just a matter of time that they receive their final permitting. But, council continues to spend thousands of dollars of the Town's income without any significant new issues to try and stop Freeport LNG final permitting. There are council members that have signed a Conflict of Interest Affidavit and should not be making motions or voting, and then there are some council members that have not filed the Conflict of Interest and that's a Class A misdemeanor. Also, Why would council continue to make motions and vote on Freeport LNG issues when they received their inconvience money. Your good enough to take their money but then your Greed wants little bit more and your using the Town's Income for your personal outcome. This must be stopped. If Quintana didn't receive any income from FLNG we wouldn't have the money to try and stop them. Let's do something to stop this madness!!!!

P1-2

Why is this important?

Spending Town funds on trying to stop and or delay the permitting process using Town's income on Attorneys that is eventually going to happen anyway. We can be using the Town's income on other significant projects. Also, the delay on the final permitting causes the delay of buyouts for the residents that sold out. Freeport LNG has always been a good neighbor to the Town of Quintana and if we needed anything they are always willing to HELP!! Let's keep a good neighbor and work together to make Quintana a better place to live by signing this petition. And, please come to the next council meeting a voice your opinion.

P1-2: Comment Acknowledged.

P1– Linda Martin (Cont'd)

20140428-0046 FERC PDF (Unofficial) 04/25/2014

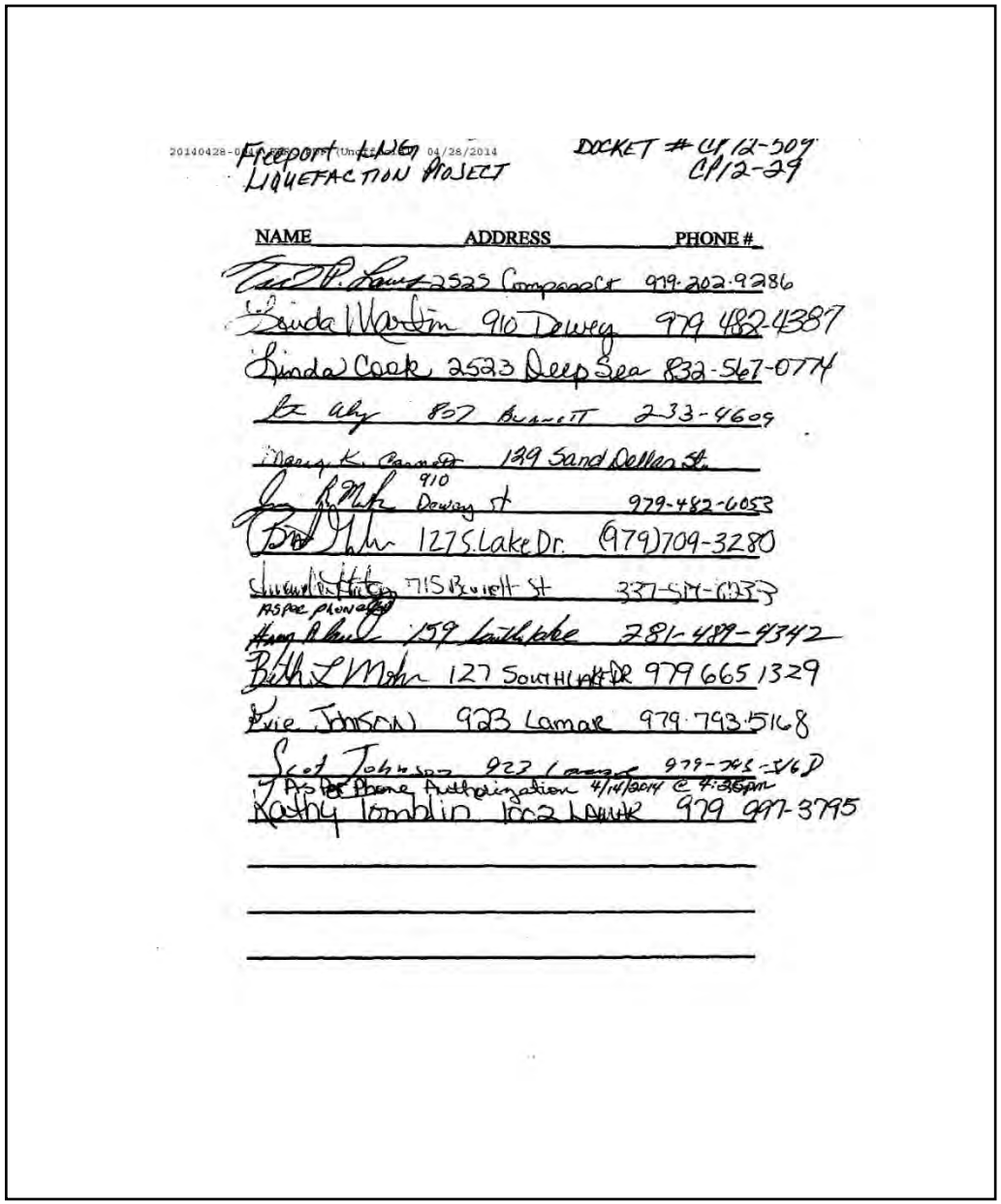
FREEPORT LNG LIQUEFACTION PROJECT

DOCKET # CP 12-509 CP 12-29

NAME	ADDRESS	PHONE #
Connie De Lalander	715 Burnett St	979 481-935
Holly Hunter	715 Burnett st	337-849-2014
Kathy Weber	2503 Compass	979-230 0319
Susan P Jones	2525 Compass Ct	979 201 3532
Mistan Morgan	2503 compass crt	979-239-41
Madeleine Johnson	2567 Compass Court	979 415 06
Brian J Johnson	2567 Compass Ct	979-915-05
Jean Hatfield	2653 CR 723	979-665-5910
Gary Nelson	2503 compass CT	979 230 0319
Jeffrie A Mohr	127 S. LAKE DR.	979-709-2942
Debbie Arango	807 Burnett	979-233-4609
Patricia Palomo	702 Burnett St	972-987-0811
Jorge L. Palomo	702 Burnett St	214926-2002
[illegible]	122 [illegible]	9752013378
Barbara H Garrett	2603 Fm 1495	Quintana, TX 77541
[illegible]	2603 Fm 1495	Quintana, TX 77541

PETITIONS

P1– Linda Martin (Cont'd)



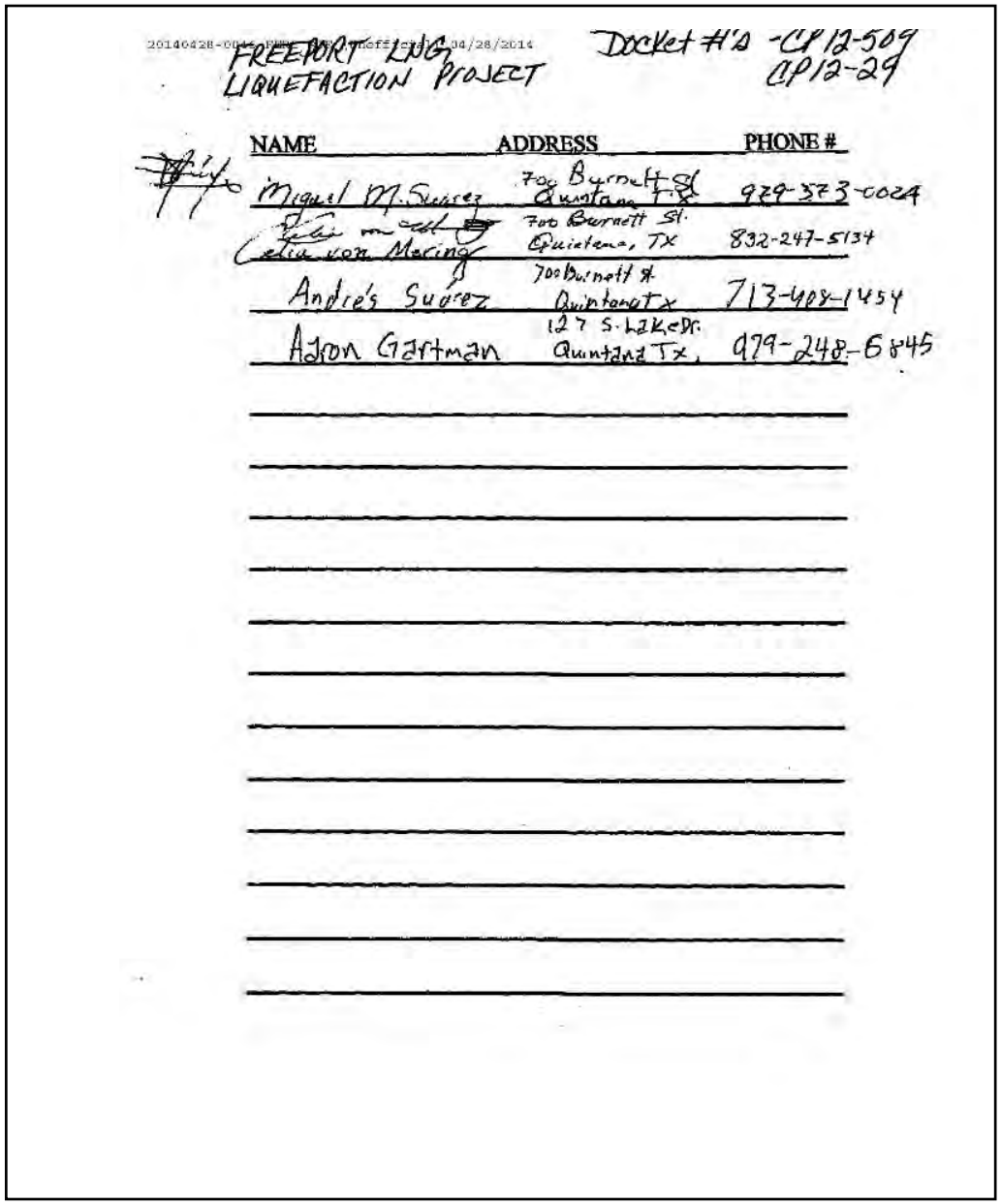
20140428-000159 Freeport (Undesignated) 04/28/2014

Freeport LNG
LIQUEFACTION PROJECT

DOCKET # CP12-507
CP12-29

NAME	ADDRESS	PHONE #
Ted P. Lowe	2525 Compass Ct	979-202-9286
Linda Martin	910 Dewey	979 482-4387
Linda Cook	2523 Deep Sea	832-567-0774
[illegible]	807 Burnett	233-4609
Mary K. Cannon	139 Sand Dollar St.	
[illegible]	910 Dewey St	979-482-6053
[illegible]	127 S. Lake Dr.	(979)709-3280
[illegible]	715 Bowie St	337-514-6353
[illegible]	159 Lakeside	281-489-9342
Beth L Mohr	127 SOUTHSHORE DR	979 665 1329
Evie Johnson	923 Lamar	979-793-5168
Scot Johnson	923 Lamar	979-345-1169
As per Phone Authorization 4/14/2014 @ 4:36pm		
Kathy Tomblin	1002 Lamar	979 997-3795

P1– Linda Martin (Cont'd)



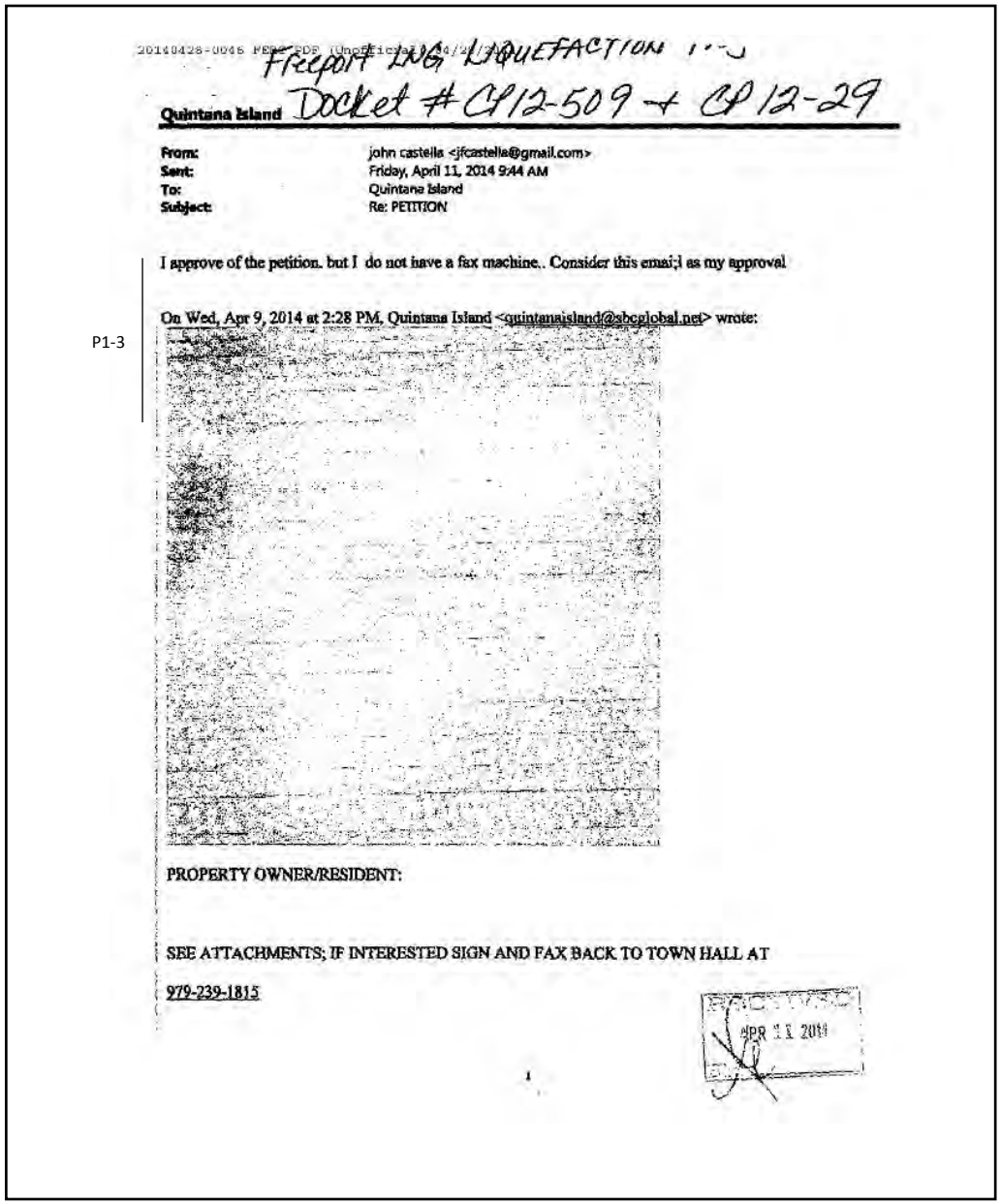
20140428-0045 FERC PDF (Unofficial) 04/28/2014

FREEPORT LNG
LIQUEFACTION PROJECT

Docket #'s -CP12-509
CP12-29

NAME	ADDRESS	PHONE #
Miguel M. Suarez	700 Burnett St Quintana TX	979-373-0024
Celia von Maring	700 Burnett St. Quintana, TX	832-247-5134
Andres Suarez	700 Burnett St Quintana TX	713-408-1454
Aaron Gartman	127 S. Lake Dr. Quintana Tx,	979-248-6845

P1– Linda Martin (Cont'd)



20140428-0046 FERC PDF (Unofficial) 4/28/2014

Freeport LNG LIQUEFACTION ...

Quintana Island Docket # CP12-509 + CP12-29

From: john castella <jfcastella@gmail.com>
Sent: Friday, April 11, 2014 9:44 AM
To: Quintana Island
Subject: Re: PETITION

I approve of the petition. but I do not have a fax machine.. Consider this email as my approval

On Wed, Apr 9, 2014 at 2:28 PM, Quintana Island <quintanaisland@sbcglobal.net> wrote:

P1-3

PROPERTY OWNER/RESIDENT:

SEE ATTACHMENTS; IF INTERESTED SIGN AND FAX BACK TO TOWN HALL AT

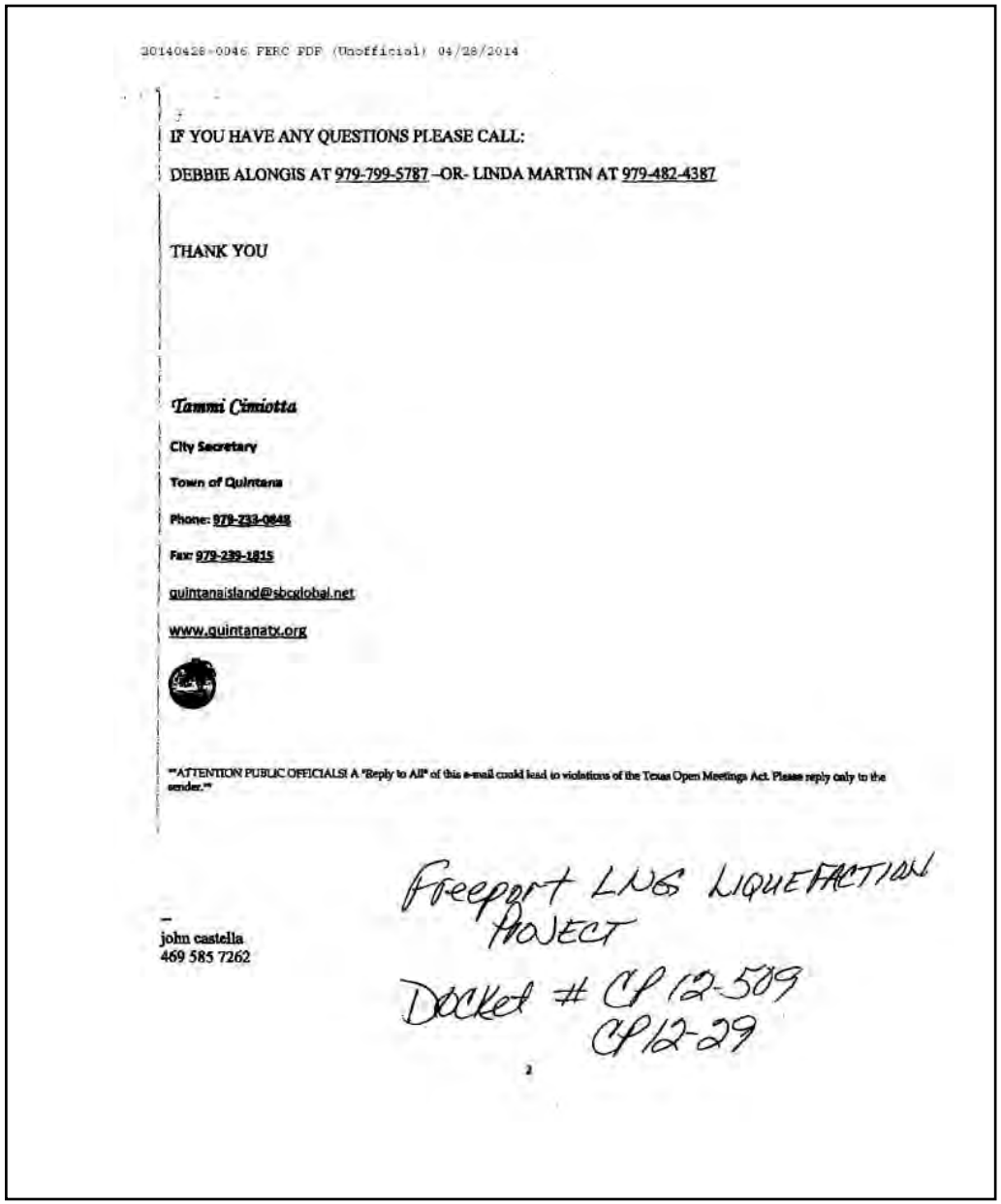
979-239-1815

RECEIVED
APR 11 2014

P1-3: Comment acknowledged.

PETITIONS

P1– Linda Martin (Cont'd)



20140428-0046 FERC PDF (Unofficial) 04/28/2014

IF YOU HAVE ANY QUESTIONS PLEASE CALL:

DEBBIE ALONGIS AT 979-799-5787 –OR- LINDA MARTIN AT 979-482-4387

THANK YOU

Tammi Ciniotta

City Secretary

Town of Quintana

Phone: 979-233-0648

Fax: 979-239-1815

quintanaisland@sbcglobal.net

www.quintanatx.org

"ATTENTION PUBLIC OFFICIALS! A "Reply to All" of this e-mail could lead to violations of the Texas Open Meetings Act. Please reply only to the sender."

Freeport LNG LIQUEFACTION PROJECT

Docket # CP 12-509
CP 12-29

john castella
469 585 7262

2

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