Deepwater Port License Application for the

Texas Gulf Terminals Project

Volume II – Environmental Evaluation (Public)

Section 12:
Meteorology, Air Quality, and Noise

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ACRONYMS AND ABBREVIATIONS

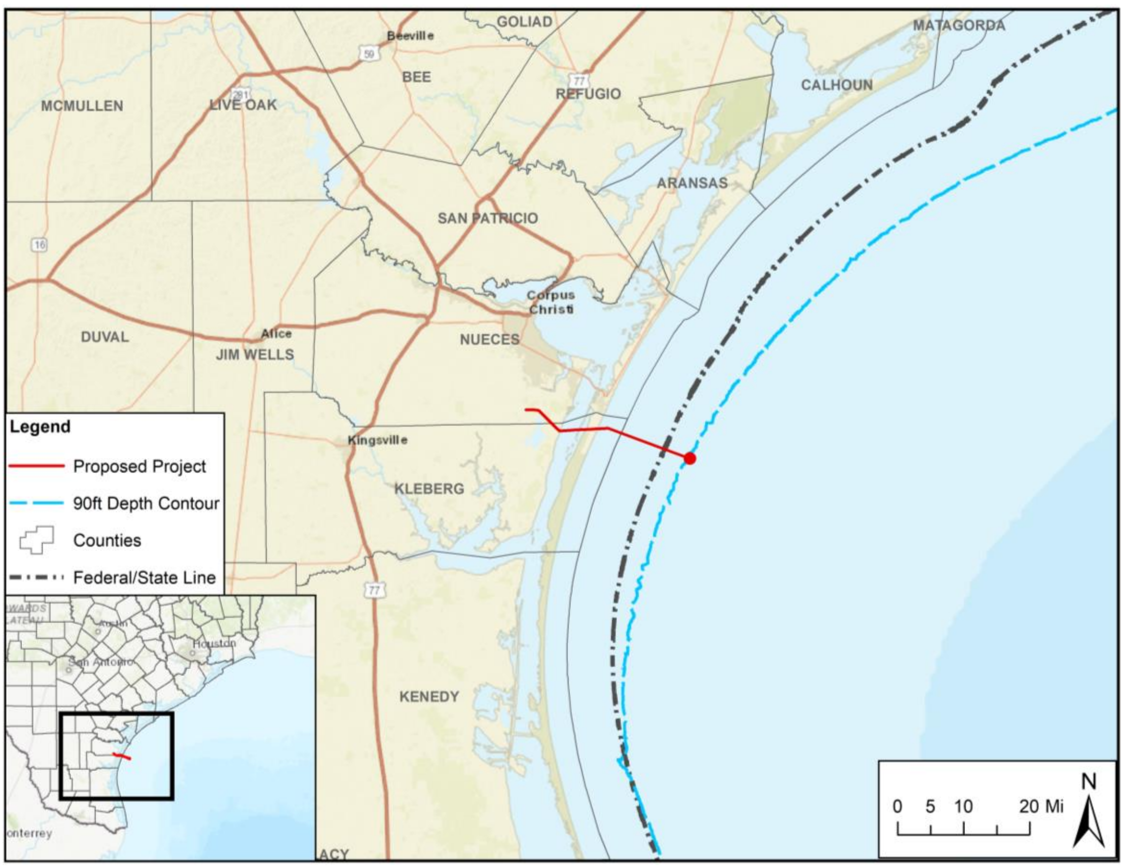
°F	degrees Fahrenheit
AQCR	Air Quality Control Region
BACT	Best Available Control Technology
BOEM	Bureau of Ocean Energy Management
CAA	Clean Air Act
CALM	Catenary Anchor Leg Mooring
CFR	Code of Federal Regulations
dB	decibel
dBA	decibels on the A-weighted scale
DWP	Deepwater port
DWPA	Deepwater Port Act of 1974
DWPL	Deepwater Port License
FHWA	Federal Highway Administration
ft	feet
GOM	Gulf of Mexico
HDD	Horizontal direction drill
hp	horsepower
HUD	United States Department of Housing and Urban Development
Hz	hertz
km	kilometer
Ldn	day-night sound level
Leq	24-hour equivalent sound level
m	meter
m/s	meters per second
MACT	maximum achievable control technology
MARAD	Maritime Administration
MHT	Mean High Tide
mi	mile
MP	milepost
NAAQS	National Ambient Air Quality Standards
NOAA	National Oceanic and Atmospheric Administration
NSA	noise sensitive area
OCS	Outer Continental Shelf
OSHA	Occupational Safety and Health Administration
OSTF	Onshore Storage Terminal Facility
PLEM	pipeline end manifold
Project	Texas Gulf Terminals Project
PSD	Prevention of Significant Deterioration
SPM	Single Point Mooring
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TGTI	Texas Gulf Terminals Inc
tpy	tons per year

TWDB	Texas Water Development Board
US	United States
USCG	US Coast Guard
USEPA	U.S. Environmental Protection Agency
VLCC	very large crude carrier
VOC	Volatile Organic Compounds

PROJECT OVERVIEW

Texas Gulf Terminals Inc. (TGTI; also referred to as Applicant) is proposing to construct and operate a deepwater port (DWP), associated pipeline infrastructure, booster station, and an onshore storage terminal facility (OSTF), collectively known as the Texas Gulf Terminals Project (Project), for the safe, efficient and cost-effective export of crude oil to support economic growth in the United States of America (U.S.). The Applicant is filing this Deepwater Port License (DWPL) application to obtain a license to construct, own, and operate the Project pursuant to the Deepwater Port Act of 1974, as amended (DWPA), and in accordance with the U.S. Coast Guard (USCG) and the Maritime Administration's (MARAD) implementing regulations.

The Applicant is proposing to construct and operate the Project to allow direct and full loading of very large crude carriers (VLCC) at the DWP, via a single point mooring (SPM) buoy system. The proposed Project consists of the construction of a DWP, onshore and inshore pipeline infrastructure, offshore pipelines, and an OSTF. The proposed DWP would be positioned outside territorial seas of the Outer Continental Shelf (OCS) Mustang Island Area TX3 (Gulf of Mexico [GOM]), within the Bureau of Ocean Energy Management (BOEM) block number 823. The proposed DWP is positioned at Latitude N27° 28' 42.60" and Longitude W97° 00' 48.43", approximately 12.7 nautical miles (nm) (14.62 statute miles [mi]) off the coast of North Padre Island in Kleberg County, Texas. Refer to the Vicinity Map depicting the location of the proposed Project.



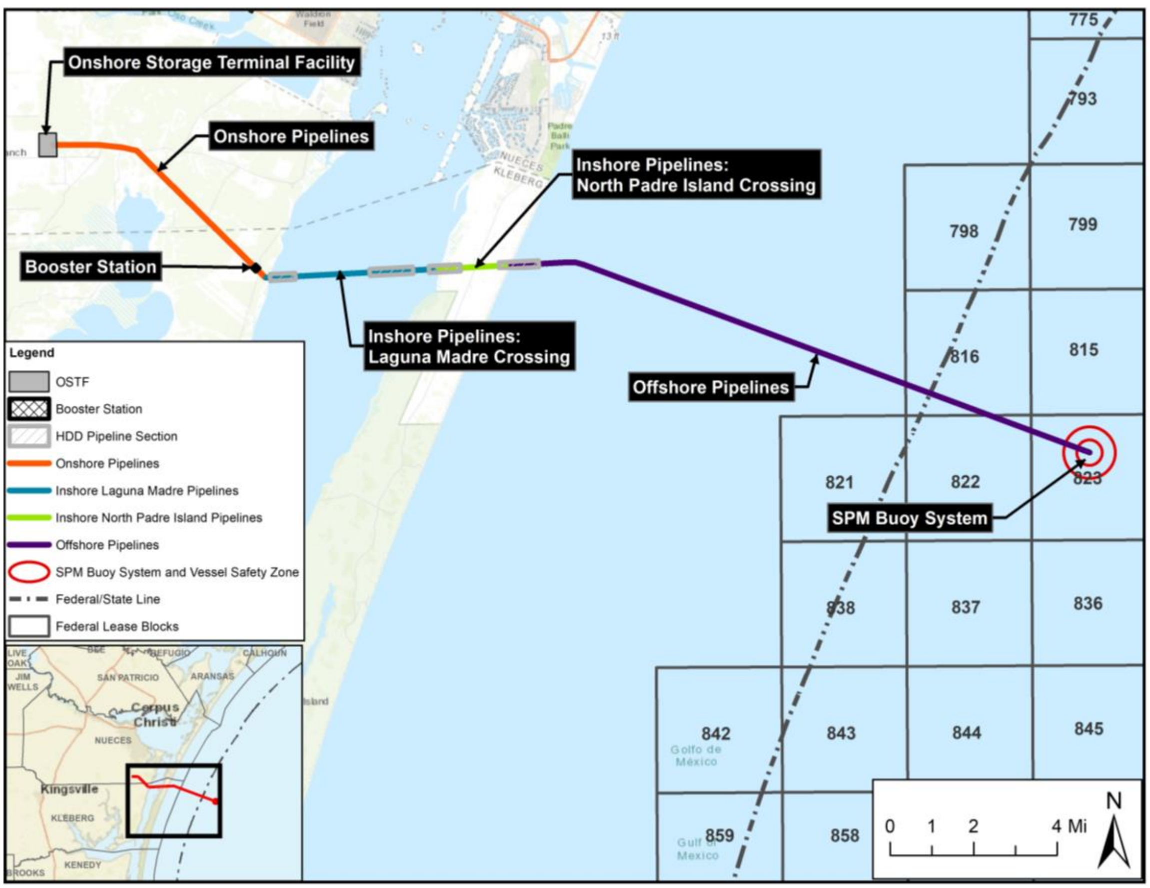
Vicinity Map

The proposed Project involves the design, engineering, and construction of a DWP, 26.81 miles of pipeline infrastructure, booster station, and an OSTF. For the purposes of this DWPL application, the proposed Project is described in three distinguishable segments by locality including "offshore", "inshore", and "onshore".

Onshore Project components includes an approximate 150-acre (ac) (60.7 hectares [ha]) OSTF, an 8.25 ac (3.3 ha) booster station, and approximately 6.36 mi of two (2) new 30-inch-diameter crude oil pipelines extending from the OSTF located in Nueces County, to the booster station located in Kleberg County, and continue to the landward side of the mean high tide (MHT) line of the Laguna Madre. The proposed OSTF will serve as the primary collection and storage terminal of crude oil to be directly pumped through the proposed pipeline infrastructure to the DWP. Outbound flow rates from the OSTF to the DWP are anticipated to be approximately 60,000 barrels per hour (bph).

Inshore components associated with the proposed Project are defined as those components located between the western Laguna Madre MHT line and the MHT line located at the interface of North Padre Island and the GOM; this includes approximately 5.74 mi of two (2) new 30-inch-diameter crude oil pipelines and an onshore block valve station located on North Padre Island. The onshore valve station will serve as the primary conjunction between the proposed onshore and offshore pipeline infrastructure.

Offshore components associated with the proposed Project include the DWP and offshore pipelines. Principle structures associated with the proposed DWP includes one SPM buoy system consisting of the SPM buoy, pipeline end manifold (PLEM), sub-marine hoses, mooring hawsers, and floating hoses to allow for the loading of crude oil to vessels moored at the proposed DWP. The proposed SPM buoy system will be of the Catenary Anchor Leg Mooring (CALM) type permanently moored with a symmetrically arranged six-leg anchor chain system extending to pile anchors fixed on the seafloor. Offshore pipeline infrastructure associated with the proposed Project consist of approximately 14.71 mi of two (2) new 30-inch-diameter pipelines extending from MHT line on North Padre Island to the SPM buoy system located at the proposed DWP. Refer to the Project Components Map below for a depiction of the location of the Project components discussed above.



Project Component Map

12.0 METEOROLOGY, AIR QUALITY, AND NOISE

This section provides a synopsis of applicable air quality and noise laws and regulations, local climate and meteorological conditions, a review of existing air quality at coastal locations in Texas, and an assessment of air quality and noise emission impacts from the proposed Texas Gulf Terminals Project (Project) on the existing environment. Due to the location of the various Project components, this section is discussed in terms of onshore, inshore and offshore areas. Onshore habitats refer to areas located landward from the western shore of the Laguna Madre. Inshore habitat refers areas located landward from the mean high tide (MHT) line of North Padre Island. Offshore habitat refers to areas located seaward into the Gulf of Mexico (GOM) from the MHT line of North Padre Island. The framework for the evaluation of environmental consequences and cumulative impacts in the Introduction of Volume II of the Deepwater Port License (DWPL) application.

Section 12, “Meteorology, Air Quality and Noise,” is structured as follows:

- Section 12.1 Applicable Laws and Regulations - includes background on applicable air quality laws and regulations;
- Section 12.2 Existing Environment - describes the existing environment;
- Section 12.3 Environmental Consequences - includes environmental consequences information;
- Section 12.4 Cumulative Impacts - describes cumulative impacts;
- Section 12.5 Mitigation Measures - discusses potential mitigation measures; and
- Section 12.6 Summary of Potential Impacts - summarizes the potential impacts.

12.1 Applicable Laws and Regulations

12.1.1 National Environmental Policy Act of 1969 (NEPA)

In compliance with 33 USC 1504(f) and 33 CFR 148.710(b), the Applicant’s DWP license application will be processed in accordance with the NEPA (44 USC 4332). 33 USC 1504(f) states that “such compliance shall fulfill the requirement of all Federal agencies in carrying out their responsibilities under the National Environmental Policy Act of 1969 pursuant to [the Deepwater Port Act of 1974].” The process by which the licensing will comply with NEPA is further set in 33 USC 1504(f) and 33 CFR Part 148.

12.1.2 Clean Air Act

In accordance with 33 CFR 148.5, the Port will be considered a “new source” for purposes of the Clean Air Act (CAA) (42 USC 7401 et seq., as amended). The DWPA dictates that the EPA has jurisdiction to enforce the CAA for Deepwater Ports. Because the Port will result in potential emissions of regulated pollutants, a CAA preconstruction permit is required. A copy of the Applicant’s CAA preconstruction permit application to EPA Region 6 and TCEQ is included in this application in Volume I. In addition to components required for a state air permit application in 30 TAC §116.111, since emissions of volatile organic compounds (VOC) will be greater than the major source threshold in 40 CFR 52.21, 250 tons per year (tpy); the application includes components required for a Prevention of Significant Deterioration (PSD) permit provided in 40 CFR 52.21. This includes a Best Available Control Technology (BACT) review and additional impacts analysis included in the application in Volume I. An air quality analysis is presented in Volume I and Volume II, Appendix L. A Case-by-Case MACT analysis is provided in Volume I and an initial Title V application filled out on Part 71 forms, as requested by EPA Region 6, is provided in Volume I. Volume I also contains the application for the on-shore equipment that will supply the DWP through subsea pipelines. As certified by this application, this proposed Project will be constructed, operated and decommissioned in compliance with the CAA.

12.1.3 Noise Pollution and Abatement Act

12.1.3.1 Federal

Noise Pollution and Abatement Act of 1972 is a statute of the United States initiating a federal program of regulating noise pollution with the intent of protecting human health and minimizing annoyance of noise to the general public. However, this program lost funding in 1981. Currently, there are no federal regulations that limit overall environmental noise levels. However, in 1974 the United States Environmental Protection Agency (USEPA) published its *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, which provides a resource for state and local governments to use in developing noise standards. The USEPA determined that a day-night sound level (Ldn) of 55 decibels on the A-weighted scale (dBA; which is equivalent to a continuous sound level of 48.6 dBA) protects the public from indoor and outdoor activity noise interference (USEPA 1974). In addition, the United States Department of Housing and Urban Development (HUD) has developed a noise abatement and control policy applicable to HUD programs codified in 24 Code of Federal Regulations (CFR) Part 51. Consistent with USEPA's guidance, it is a HUD goal that exterior noise levels not exceed 55 dBA Ldn. However, according to HUD policy, noise at or below 65 dBA is acceptable, noise between 65 and 75 dBA is generally acceptable, and noise exceeding 75 dBA is unacceptable at a given site.

In addition to public health and welfare, airborne noise from operation of the Project can affect the operational workforce. The Occupational Safety and Health Administration (OSHA) has established a requirement that sound levels should be controlled to a time-weighted sound level of 85 dBA; if that is not met, a worker hearing conservation program must be implemented (29 CFR 1910.95).

12.1.3.2 State and Local

On Padre Island, the inshore pipelines are within the boundaries of the City of Corpus Christi, Texas (between mileposts [MP] 252 and 234). Corpus Christi has established a noise ordinance limiting noise that extends beyond the property on which it is produced (Corpus Christi Code of Ordinances, Chapter 31 – Noise). Noise limits are:

- 70 dBA between the hours of 8:01 AM and 11:00 PM. Sunday through Thursday and between the hours of 7:01 AM and 12:00 midnight on Friday and Saturday; and
- 60 dBA between the hours of 11:01 PM and 8:00 AM Sunday through Thursday and between the hours of 12:01 AM and 7:00 AM on Friday and Saturday and between the hours of 12:01 AM and 8:00 AM on Sunday.

However, construction noise occurring between the hours of 7:00 AM and 8:00 PM is exempted from the ordinance. No other applicable state and/or local noise ordinances are applicable to the Project.

12.2 Existing Environment

12.2.1 General Climatology & Meteorology

The state of Texas has a humid, subtropical climate, where summers are long and hot and winters are short and mild. Climate within this region is typical of a tropical savanna. Within inland portions of the state where it is drier, ranches are prevalent across the landscape and grasslands and thick scrub-shrub flourish. The winters in the inland region are usually mild but are subject to Arctic air outbreaks from Canada. Snow is a rare occurrence due to the lack of humidity in winter, and the summers are for the most part hot and dry, but at times can be humid when winds come off the Gulf of Mexico (GOM). Along the southeastern Texas coast and offshore, climate is influenced by the GOM. The GOM moderates the influence of continental air masses to keep southeastern Texas from heating up and cooling off as quickly as the state's interior. As shown in Table 12-1, the average annual temperature for southeastern Texas is about 66 degrees Fahrenheit (°F). January is the coldest month of the year with an average temperature of 54°F. August is the hottest month of the year with an average temperature of about 82°F. September is typically the wettest month. The precipitation of southeastern Texas occurs primarily within a spring and fall rainy season. The area's total average rainfall amount is about 35 inches a year. (National Oceanic and Atmospheric Administration [NOAA] 2018; Texas Water Development Board [TWDB] 2012; Texas Commission on Environmental Quality [TCEQ] 2018)

While fog occurs throughout the year, it is much more likely in winter and early spring; February is often the foggiest month. The prevailing wind direction within the vicinity of the Project is from the south (135 degrees) (Figure 2-1). Within the eastern and northern portions of the state, thunderstorms are very common. Among the states, Texas has the most tornadoes with an average of 139 per year; however, tornadoes are more frequent inland than along the coastal areas. The southeastern coastal region of Texas can be affected by tropical storms, including hurricanes that originate in or move through the GOM, and given its location in the northwestern end of the GOM, the state is vulnerable to hurricanes. The hurricane season begins at the start of June and runs through the end of November each year. Approximately three tropical storms or hurricanes make landfall in Texas per every four years. Significant flooding can occur from stalled storm systems, and this represents the most serious threat from a tropical hurricane. (TWDB 2012; TCEQ 2018)

Table 12-1: Baseline Climate Data (1981 to 2010) for Padre Island, TX

	Precipitation (Inches)	**Min. Temperature (ºF)**	**Average Temperature (ºF)**	**Max. Temperature (ºF)**
January	1.89	46.1	54.2	62.2
February	2.08	49.8	57.3	64.7
March	2.12	55.4	63.0	70.5
April	1.86	63.7	69.9	76.0
May	3.09	70.2	75.3	80.4
June	3.21	74.6	80.3	85.9
July	2.97	75.9	82.0	88.0
August	2.15	76.0	82.1	88.1
September	5.01	71.9	79.0	86.0
October	3.76	66	73.5	81.0
November	2.17	57.1	65.1	73
December	1.63	47.7	56.5	65.2
Source: NOAA 2018				

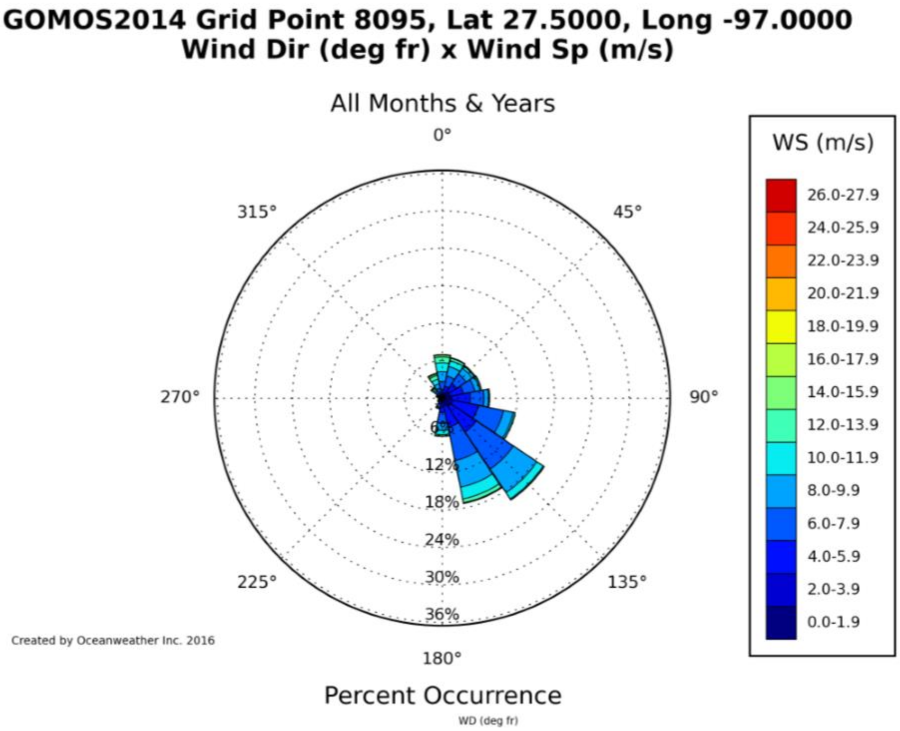


Figure 12-1: Project Location Wind Rose

12.2.2 Air Quality

Air quality is defined as a measurement of pollutants in ambient air. National Ambient Air Quality Standards (NAAQS) were developed by the EPA to protect public health (primary standards) and public welfare (secondary standards). Primary standards are based on observable human health responses and are set at levels that provide an adequate margin of safety for sensitive segments of the population. Secondary standards are intended to protect welfare interests such as structures, vegetation, and livestock. Air dispersion modeling is used by proposed new sources to demonstrate compliance with both the primary or secondary standards. States use ambient air monitoring systems to determine whether Air Quality Control Regions (AQCRs) are meeting the NAAQS. Areas meeting the NAAQS are termed attainment areas, and areas not meeting the NAAQS are termed nonattainment areas. Areas that have insufficient data to make a determination of attainment/non-attainment are unclassified or are not designated, but are treated as being attainment areas for permitting purposes. The designation of an area is made on a pollutant-specific basis.

Kleberg County and Nueces County are designated as attainment or unclassifiable for all NAAQS. For offshore locations beyond the seaward state territorial boundary, no status has been designated with respect to the NAAQS. Therefore, the NAAQS attainment status of the nearest adjacent onshore location should be considered. Kleberg County and Nueces County are the nearest onshore locations to the proposed Port are designated as attainment or undesignated for all NAAQS.

When air pollutant dispersion modeling is conducted to predict air quality impacts from a proposed source, the existing background concentrations must also be considered. Table 12-2 presents monitoring data collected by nearby ambient monitoring stations during the 3-year period of 2014 through 2016. For each pollutant, data were selected from the nearest available monitoring site to the proposed TGTI terminal. The monitor sites would also be considered as the nearest to the Port. The existing background concentrations at the proposed Port location are likely to be lower than the values shown, due to the scarcity of nearby emissions sources relative to the onshore monitoring sites. The selected monitoring sites are located in Nueces County, Texas, approximately 19 miles north of the proposed TGTI onshore terminal (36 miles from proposed offshore Port); Harris County, Texas, approximately 200 miles northeast of the proposed TGTI terminal (196 miles northeast from proposed offshore Port), and Cameron County, Texas, approximately 180 miles south of the proposed TGTI onshore terminal.

Table 12-2: Background Ambient Air Quality and Ambient Air Quality Standards

Air Pollutant	Averaging Period	Statistic	Monitor Values	Monitoring Site	Primary NAAQS
Sulfur Dioxide (SO_2)	1-hour	99th percentile of daily 1-hour maximum averaged over 3 years	4 ppb	Dona Park (48-355-0034)	75 ppb
Carbon Monoxide (CO)	1-hour	Not to be exceeded more than once per year	1.9 ppm	Brownsville Monitor (48-061-0006)	35 ppm
	8-hour		1 ppm		9 ppm
Nitrogen Dioxide (NO_2)	1-hour	98th percentile averaged over 3 years	87 µg/m^3	Channelview Monitor (48-201-0026)	188 µg/m^3
	Annual	Annual mean	18 µg/m^3		100 µg/m^3
Ozone (O_3)	8-hour	Annual fourth-highest daily maximum 8-hour concentration averaged over 3 years	64 ppb	Corpus Christi West Monitor (48-355-0025)	70 ppb
Particulate Matter (PM_{10})	24-hour	Not to be exceeded more than once per year on average over 3 years	87 µg/m^3	Dona Park (48-355-0034)	150 µg/m^3
Particulate Matter ($PM_{2.5}$)	24-hour	98th percentile averaged over 3 years	22 µg/m^3	Dona Park (48-355-0034)	35 µg/m^3
	Annual	Annual mean averaged over 3 years	8.9 µg/m^3		12 µg/m^3
Lead (Pb)	Rolling 3-month	Not to be exceeded	0.01 µg/m^3	Brownsville Monitor (48-061-0006)	0.15 µg/m^3

12.2.3 Ambient Noise

12.2.3.1 Sound Fundamentals

Sound is a physical disturbance in a medium, such as air or water, which can be detected by a human or animal ear. Sound pressure levels (intensity) are measured in units of decibels (dB) with respect to a reference pressure value on a logarithmic scale; the pitch of sound is its frequency, which is measured in hertz (Hz). Because the human ear is more sensitive to mid-frequency sounds, relative to low and high frequency sounds, airborne sound is measured on a frequency-adjusted scale that gives greater weighting to mid-frequency sounds (dBA). The threshold for the human ear to detect a change in perceptible sound is 3 dBA; a 5-dBA sound level change is clearly noticeable; and a 10-dBA change is perceived as a doubling (or halving) of sound levels (Federal Highway Administration [FHWA] 1995). The relative sound levels of some common environmental sounds, as well as human impressions of those sounds, are provided in Table 12-3.

Noise is defined as unwanted or objectionable sound, which may include sound that interferes with communication, disturbs sleep, or is intense enough to damage hearing. Ambient sound levels and human sensitivity to sound vary over time; for example, a nuisance sound (noise) generated during the night may be perceived as a greater disturbance than the same sound generated during the day. Evaluation of ambient noise levels and impacts is therefore based on measurements of sound exposure over time. Two measures of time-varying sound exposure are the 24-hour equivalent sound level (Leq) and the Ldn. The Leq is the level of steady sound with the same total (equivalent) energy as the time-varying sound, averaged over a 24-hour period. The Ldn is the Leq, weighted to account for people's greater sensitivity to nighttime sound by adding 10 dBA between the hours of 10:00 PM and 7:00 AM.

Table 12-3: Sound Levels and Relative Loudness

Noise Source or Activity	Sound Level (dBA)	Subjective Impression
Jet aircraft takeoff from carrier at 50 feet (ft; 15 meters [m])	140	Deafening (130 dBA is the threshold of pain)
Loud rock concert near stage	120	
Loud car horn 10 ft (3 m) away	100	Very loud
School cafeteria with untreated surfaces	80	Loud
Near freeway auto traffic	60	Moderate
Normal conversation	60	
Average office	50	
Average residence without stereo playing	30	Quiet
Quiet library, soft whisper	20	Very quiet
	0	Threshold of hearing

Source: HUD 1985; USEPA 1971

Airborne sound is measured in dB relative to a reference pressure of 20 micro Pascals (µPa) at 1 meter (m), which is derived from the average human hearing threshold; however, the reference pressure in water is 1 µPa at 1 m. Therefore, a given sound will produce a higher sound pressure level in water than in air, and it is difficult to make direct comparisons between sound levels in air and water. In addition, sound travels much faster through water than through air (about 1,500 m per second [m/s] in water and about 330 m/s in air) (OSPAR Commission 2009). Underwater sound is addressed in Volume II Section 7: Wildlife and Protected Resources.

12.2.3.2 Ambient Noise

The ambient sound level comprises the total sound generated within a specific environment, including natural and anthropogenic sounds. The magnitude and frequency of ambient sound at any specific location is variable in time, and that variation may be due to changing weather conditions, seasonal changes in vegetative cover, and, in developed areas, daily traffic or use patterns. Existing sources of sound in the onshore Project area may include local road traffic, high altitude aircraft overflights, vessels in nearby open water areas, and natural sounds such as wildlife vocalizations and vegetation. Land uses and their associated human activities have different ambient sound levels. Ambient sound levels in outdoor noise environments across the United States range from about 40 dBA Ldn in rural residential areas to as much as 90 dBA Ldn in congested urban settings (USEPA 1974).

Where the Project facilities will be located in the Laguna Madre and GOM, natural sources of ambient airborne sound include bird calls, water movement, and wind. Anthropogenic sources of ambient sound include commercial and recreational vessels, and helicopters transporting workers and supplies to offshore platforms and other facilities. Vessels in the Project area may include commercial vessels in the GOM travelling along shipping fairways or calling at the nearby Port of Corpus Christi, commercial vessels travelling in the Intracoastal Waterway across the Laguna Madre, and smaller, recreational boats in both the Laguna Madre and the GOM. Vessel traffic is discussed in detail in Volume II Section 13: Navigation and Navigation Safety. The occurrence of noise from vessel traffic is highly variable, and vessel-generated sound is transient and limited to the time when the vessel is passing the sound receptor. Long periods of low anthropogenic sound levels may occur when vessels are not present at a specific location. Similarly, sound from helicopter overflights is transient and intermittent.

A noise sensitive area (NSA) is a location which, because of its use by people, may be more susceptible to noise impacts. Examples of NSAs include residences, churches, and schools. NSAs in the Project area were identified based on a review of available aerial imagery. As described in Table 12-4, the nearest NSA to the Project is a residence located on one of the small islands in the Laguna Madre west of Padre Island; other residences are located on nearby islands. The residence is about 0.1-mile (mi) (0.2 kilometer [km]) north of the pipeline route; however, it is about 0.5 mi (0.7 km) from the nearest active construction, the horizontal direction drill (HDD) #2A and 2B entry/exit box. A second residence is located a similar distance south of the pipeline.

Where the onshore storage facility will be installed on the mainland in Nueces County, Texas, the nearest NSA is 0.9 mi (1.5 km) away. In addition, the unincorporated community of Chapman Ranch is located about 2.0 mi (3.3 km) west of the facility site. The facility site is on undeveloped, open land (see Volume II Section 11: Coastal Zone Uses, Recreation, and Aesthetics). No NSAs are within 2.0 mi (3.3 km) of the planned pump station in Kleberg County. Similarly, where onshore construction activities are planned on the mainland and Padre Island, the inshore pipelines will cross primarily undeveloped land. The inshore pipelines will be located greater than 2.0 mi (3.0 km) from the nearest residential development, which is located in the City of Corpus Christi along Allamanda Drive. In addition, the inshore pipelines are located about 0.5 mi (1 km) north of the boundary of the Padre Island National Seashore (see Volume II Section 11: Coastal Zone Uses, Recreation, and Aesthetics).

Table 12-4: Nearest Noise Sensitive Areas to Inshore and Onshore Project Construction

NSA Description	Distance and Direction to Construction Workspace[a] (mi/km)	Construction Method	Surrounding Land Use
Onshore Storage Facility			
Residence off County Road 43	0.9 / 1.4 southwest	Typical facility construction [b]	Open Land
Pump Station			
Residence on Unnamed Road	3.4 / 5.5 northwest	Typical facility construction [c]	Open Land
Inshore Pipelines – Laguna Madre			
Residence on an island in the Laguna Madre west of Padre Island	0.5 / 0.7 northwest	HDD #2A and 2B	Open Land, Open Water
Residence on an island in the Laguna Madre west of Padre Island	0.5 / 0.7 southeast	HDD #2A and 2B	Open Land, Open Water
Inshore Pipelines – North Padre Island			
Residences along Allamanda Drive	2.4 / 3.9 south	Typical pipeline construction	Residential, Open Land, Wetlands
	2.8 / 4.5 southwest	HDD #3A and 3B	
	2.4 / 3.9 south	HDD #4A and 4B	
Residence on Park Road 22	2.5 / 4.0 southwest	HDD #4A and 4B	Open Land, Wetlands

[a] The location presented is the approximate distance to the inshore pipelines centerline, based on a review of available aerial imagery for typical facility and pipeline construction; for HDD construction, the distance and direction are to the nearest HDD Box.

[b] The location is also about 1.4 mi (2.2 km) southwest of the pipeline.

[c] The location is also about 3.7 mi (6.0 km) northwest of HDD #1A and 1B.

12.3 Environmental Consequences

12.3.1 Air Quality

In this document, air quality is defined as a measurement of pollutants in ambient air. Air quality as described here may be affected by proposed construction, operation, and decommissioning of the project. A combination of short- and long-term predominantly minor impacts on air quality would be expected during construction, operation, and decommissioning of the proposed Project. Details of factors that may produce impacts are described in Appendix A: Construction, Operation and Decommissioning Procedures.

Appendix K presents the Air Quality Information document, supporting information for the EIS. This document is summarized in the following sections. Emissions from onshore and offshore were evaluated for the Deepwater Port License (DWPL) application and an Air Quality Analysis is presented as Appendix L of this volume. Impacts from the onshore facility are summarized in the TCEQ Authorizations for Onshore Facilities included in Volume I.

Emitted air pollutants would include nitrogen oxides, volatile organic compounds, carbon monoxide, sulfur dioxide, particulate matter with an aerodynamic diameter less than or equal to 10 microns, particulate matter with an aerodynamic diameter less than or equal to 2.5 microns, and carbon dioxide equivalent emissions. TGTI would minimize emissions during construction, operation, and decommissioning through implementation of BMPs including recommended manufacturer operation and maintenance procedures, and use of best available control technology controls

12.3.1.1 Construction

The primary sources of air for construction of the onshore storage facility and pump station will be:

- Pumps for Pressure Washing and Blast Cleaning
- Dive Boat
- Pick-up Trucks
- Generator and Air Compressor
- Welding Equipment

The duration and capacity of emissions during construction are much lower than the emissions generated during normal operation of the onshore facility. During construction of onshore equipment, air quality impacts will be intermittent, shot-term, and minor in nature.

The primary sources of air for construction of the offshore facility are identified below:

Construction-related offshore equipment that would generate air emissions includes the following:

- Three (3) Amphibious Excavators
- Three (3) Excavators
- Three (3) Side booms
- Two (2) Hydraulic Power Packs
- HDD (Horizontal Directional Drilling) Rig (minimum 1,000,000-pound pullback)
- Offshore Support Vessel for HDD back reaming and pullback operations (i.e.: Jack-Up Work Boat)
- Barge(s) or Work Platform(s) for HDD Rig and HDD support in shallow water (<6’ water depth)
- Two (2) Pipelaying Barge (minimum tension capacity of 440 kips and capacity for 30” concrete coated pipe)
- Three (3) Pulling Winch (Land Based – assumed to be 320 HP each)
- Two (2) SPM (Single Point Mooring) Installation Vessel / Tug Boats

The duration and capacity of emissions during construction are much lower than the emissions generated during normal operation of the offshore facility, as described in detail in Appendix K. During construction of offshore equipment, air quality impacts will be intermittent, shot-term, and minor in nature.

12.3.1.2 Operation

Air Quality impacts from operation of the onshore facility have been estimated in detail in the TCEQ Authorizations for Onshore Facilities. Impacts from operation of the offshore facility are also described in Appendix K and Appendix L of this volume. The direct and indirect impacts from the operation of the offshore facility are described in Appendix L.

Direct impacts to air quality are assumed to be limited to VOC emissions from marine loading operations. Initial loading of vessels at the DWP will occur at a reduced rate until all product lines are filled and the liquid level is above the discharge point within the vessel. The cargo loading officer on board the vessel will advise the DWP when full flow can begin. Full flow will occur after the submerged fill condition has been verified by the cargo loading officer.

Indirect impacts to air quality are assumed to be caused by operation of the crude carrier when moored to the SPM buoy system, and the ancillary sources on the crude carrier deck (such as crane engine, cargo pump, ballast pump, boiler, and fugitives). The air quality impact is considered to be minor and long-term based on the air dispersion modeling analysis and the BACT analysis included in these appendices. Detailed tables of air emissions are provided in Appendix K. The detailed air dispersion modeling analysis is described in Appendix L.

Since the magnitude and duration of emissions from operation of the facilities is much larger than the magnitude and duration of emissions during construction or decommissioning, it is assumed that upon demonstrating compliance with air quality standards for activities during operation, compliance is also demonstrated for the activities during construction and decommissioning.

12.3.1.3 Decommissioning

Decommissioning of the Project will include abandonment in-place of the onshore and inshore pipelines from the valve station to the onshore storage facility, removal of the onshore storage facility, and removal of the offshore pipelines and SPM buoy system. Removal of the components will result in minor air emissions increases similar to those associated with installation; underwater pipeline removal will progress along the route such that activity at any one location is of short duration.

Decommissioning activity will result in short-term air emissions increase in the immediate vicinity of the SPM buoy system due to increased vessel activity, and emissions generated during disassembly and removal of the facilities. The need for blasting to remove Project facilities is not anticipated. As mentioned previously, the duration and capacity of emissions during construction are much lower than the emissions generated during normal operation of the offshore facility, as described in detail in Appendix K. Furthermore, the duration and capacity of emissions during decommissioning is expected to be even lower since the equipment required for decommissioning is expected to be a subset of the equipment used during construction. Therefore, the air quality impacts will be intermittent, shot-term, and minor in nature during decommissioning.

12.3.2 Ambient Noise

Details of factors that may produce impacts are described in Appendix A: Construction, Operation and Decommissioning Procedures. Construction and operation of the Project are expected to result in short-term and long-term impacts on sound levels in the Project vicinity. Installation of the onshore storage facility will generate noise due to operation of construction equipment. Short-term noise during installation of the pipelines will result from typical pipeline construction, HDDs, and vessel activity (including the pipeline lay barge). Construction of the single point mooring (SPM) buoy system will also generate airborne noise from pile-driving and construction and support vessels. Because the SPM buoy system will be located about

14.6 mi (23.5 km) from shore, impacts on land-based noise sensitive receptors are anticipated to be limited to the short-term period of onshore and nearshore pipeline installation.

During operations, equipment at the onshore storage facility will result in localized noise. No airborne noise impacts will occur for pipelines and noise from the offshore and inshore underwater pipelines will be limited to the sound of liquid flow underwater (see Volume II Section 7: Wildlife and Protected Resources). Ongoing operation of equipment on the SPM buoy system, as well as loading and support vessel activity, will also generate noise. Airborne noise can adversely affect human activity; both underwater and airborne noise can interfere with biological resources including marine mammals, sea turtles, fish, and birds. Underwater noise impacts on fauna are addressed in Volume II Section 7: Wildlife and Protected Resources.

12.3.2.1 Construction

12.3.2.1.1 Onshore Storage Facility and Pump Station

The primary sources of noise for construction of the onshore storage facility and pump station will be operation of internal combustion engines in construction equipment including cranes, compressors, generators, welders, excavators. Table 12-5 identifies the sound levels associated with typical construction equipment. During construction, sound levels will temporarily increase in the immediate vicinity of the site. However, because the nearest NSA is about 0.9 mi (1.4 km) from the onshore storage facility site, construction will not significantly impact noise levels at NSAs. Further, no NSAs are within 2.0 mi (3.3 km) of the pump station and construction of the pump station will not impact noise levels at NSAs.

Table 12-5: Representative Construction Equipment Noise Sources for Onshore Construction

Equipment	Sound Pressure Level (dBA) at 50 ft (15 m)	Sound Pressure Level (dBA) at 500 ft (152 m)[a]	Sound Pressure Level (dBA) at 1,000 ft (305 m)[a]
Air compressor	82	62	56
Backhoe	78	58	52
Bulldozer	82	62	56
Dump Truck	76	56	50
Excavators	81	61	55
Front end loader	79	59	53
Generator	87	67	61
Grader	89	69	63
Crane/ side booms	85	65	59
Pickup Truck	75	55	49
Pump	81	61	55
Welder/Torch	74	54	48

[a] The sound level in dBA at 50 ft (15 m) is a measured value; the 500-foot (152 m) and 1,000-foot (305 m) results are conservative modeled estimates assuming no attenuation other than by distance.
Sources: FHWA 2006, Hoover & Keith, Inc. 2000

12.3.2.1.2 Pipelines

Sources of noise associated with construction of the pipelines are expected to include internal combustion engines of equipment supporting typical pipeline construction, HDDs, vessel activity (including the pipeline lay barge), and jetting to bury the offshore pipelines after they are laid on the seafloor.

Onshore Pipeline Installation

The primary sources of noise during onshore pipeline construction will be generated by internal combustion engines in construction equipment and the HDD drill rigs. The equipment used for installation of the pipelines will be similar to the equipment used for construction of the onshore storage facility (see Table 12-4). Onshore pipeline construction is expected to occur over a 12-week period on Padre Island and will occur over a 10-week period on the mainland between the Laguna Madre and the onshore storage facility; however, active pipeline construction at any location will be short-term. Construction will be scheduled to occur 24-hrs a day. Typical pipeline construction is expected to move along the pipeline route, such that any single area experiences only a short duration of construction noise.

HDD pipeline installation requires stationary drilling equipment to operate for a longer timeframe to allow for the drilling of a borehole and installation of the pipelines without digging a trench. HDD activities will require between 4.5 and 6.5 weeks at each location, in addition to time required for pre-laying the pipeline, and could require 24-hour construction. Sound levels for HDD construction typically range between about 75 and 90 dBA Ldn (between about 69 and 84 dBA Leq) at 50 feet (ft; 15 m), and at a distance of 500 ft the intensity drops by 20 dB.

The pipeline facilities are located 1.4 mi (2.2 km) or greater from the nearest NSAs, as described in Table 12-3. At that distance, noise levels from typical pipeline construction and HDD activities are expected to attenuate to near ambient levels. Where the pipelines are located about 0.5 mi (0.8 km) from the boundary of the Padre Island National Seashore on Padre Island, the land has not been developed for recreational use. Further, onshore pipeline installation will be short-term and limited to the period of active construction. Therefore, impacts on human receptors will be localized and negligible. Impacts of construction noise on terrestrial wildlife, including those species that may use habitat in the Padre Island National Seashore, are addressed in Volume II Section 7: Wildlife and Protected Resources.

Offshore and Shallow Water (Underwater) Pipeline Installation

Typically, installation of the pipelines in the GOM and Laguna Madre will be conducted by jetting/trenching using a pipe laying barge and support vessels. Offshore, trenching and backfilling for installation of the pipelines will be completed using a submersible pipeline jetting sled operated from a pipe-laying barge. Similar to onshore construction, underwater pipeline installation will progress along the route such that construction at any one location is of short duration. However, pipe laying may occur up to 24 hours per day.

The Project is in an area subject to noise impacts by commercial vessels operating in the Intracoastal Waterway and navigational fairways in the GOM. Airborne noise from construction and support vessels will be consistent with other vessel activity in the Project vicinity. Sound levels from the pipe laying barge are estimated to be about 90 dBA (consistent with OSHA's 8-hour permissible noise exposure level of 90 dBA), and will be consistent with other vessels operating in the GOM and Intracoastal Waterway. Therefore, nearshore underwater pipeline construction will have localized, negligible impacts on the airborne noise environment.

However, at 4 locations, as described and depicted in Appendix A, the pipeline will be installed using HDD construction. At HDDs 1A and 1B, 3A and 3B, and 4A and 4B, drilling equipment will be located on land and impacts are discussed above in Section 12.3.2.1.2.1. However, at HDDs 2A and 2B, drilling equipment will be staged on a barge to allow for installation of the pipeline across the segment of the Laguna Madre that crosses the small islands between the Laguna Madre and Padre Island. The nearest NSA, a residence, is about 0.5 mi (0.7 km) from the HDD entry box, where the drill rig will be located. At that distance, sound from HDD construction is expected to be audible. However, increased noise levels will be limited to the 4.5- to 6.5-week period of active HDD construction, and impacts will be minor.

12.3.2.1.3 SPM buoy system

Construction of the SPM buoy system will use equipment similar to that used to install other offshore platforms and structures. Installation of the facilities will occur over 5 weeks. Offshore construction of the

Project will only require that a portion of the construction equipment operate at a given time, which is expected to vary for different construction stages. Sources of noise associated with construction of the SPM buoy system are expected to include pile-driving equipment, as well as the operation of internal combustion engines used to power barges and service vessels. Sound levels are expected to be similar to the levels associated with onshore use of combustion-powered construction equipment; however, sound levels for offshore facility installation have not been measured. Vessels used to transport construction equipment and personnel will also generate airborne noise; however, limited vessel activity would occur near shore and most would be at the SPM buoy system site. Given the distance from shore, construction of the Project will not exceed the 55 dBA Ldn recommended in USEPA's guidance to minimize impacts on NSAs. Construction of the Project will result in short-term, minor noise level increases in the immediate vicinity of the SPM buoy system.

Pile-driving will be used for installation of the pipeline end manifold (PLEM) foundation and anchor piles, and will occur in depths of approximately 93 ft (28 m). The intensity of sound produced during pile-driving is dependent on the material and size of the pile, depth of water, and method of pile-driving. A total of four steel or concrete 24-inch (0.6-m)-diameter piles will be installed using an impact hydraulic hammer for the PLEM. In addition, six steel or concrete 60-inch- (1.5 m-) diameter piles will be installed using an impact hydraulic hammer for the anchor piles. Pile-driving will occur over the 5-week installation timeframe for the SPM buoy system, and only one pile will be driven at a time. The airborne sound level associated with pile-driving is estimated to be about 104 dBA at a distance of 50 ft (15 m) but, given the short-term period planned for pile-driving and the distance of the Project from shore, will not affect onshore NSAs (Hoover & Keith, Inc. 2000).

Offshore noise from installation of the SPM buoy system will be short-term and limited to the period of active construction. Given the intermittent nature of construction noise and distance from shore, impacts on human receptors will be negligible.

12.3.2.2 Operations

12.3.2.2.1 Onshore Storage Facility and Pump Station

Noise sources during operations at the onshore storage facility and pump station will include engines, pumps, and other mechanical equipment. Table 12-6 identifies the major noise-generating equipment that will be present on site at each facility. Because all of the equipment at the onshore storage facility and pump station will not be operated simultaneously, operational sound levels will vary. Noise-attenuating structures and enclosures will be used to reduce airborne noise in the working area to 85 dBA to meet OSHA standards. Because noise from operations of the onshore storage facility will be controlled to meet standards established for worker protection, and given the distance of the Project facilities from the nearest NSA (about 0.9 mi [1.4 km]), no significant noise impacts from operation of the onshore storage facility will occur. Further, the pump station is greater than 2.0 mi (3.3 km) from the nearest NSA, and will comply with OSHA standards; therefore, operations of the pump station are not anticipated to impact sound levels at the nearest NSA.

Table 12-6: Operational Noise Sources for the Onshore Storage Facility and Pump Station

Equipment	Size (horsepower [hp])	Number of Units	Sound Pressure Level (dBA) in Air at 50 ft (15 m)	Sound Pressure Level (dBA) in Air at 1,000 ft (305 m)
Onshore Storage Facility				
Oil shipping pumps (turbines)	3000	4	85	60
Gas engine generator	34	1	85	60
Pigging pump	600	1	67	41
Emergency diesel generator	400	1	87	61
Booster Station				
Oil shipping pumps (turbines)	5000	4	87	60
Gas engine generator	34	1	85	60
Pigging pump	600	1	67	41
Emergency diesel generator	400	1	87	61
Source: Hoover & Keith, Inc. 2000				

12.3.2.2.2 Pipelines

Because the SPM buoy system will be located about 14.72 mi (23.5 km) from shore, impacts on land-based noise sensitive receptors are anticipated to be limited to the short-term period of onshore and nearshore pipeline installation. No onshore operational noise impacts are anticipated for the pipelines.

12.3.2.2.3 SPM buoy system

Noise from operation of the SPM buoy system will be virtually non-existent because the SPM buoy does not contain any mechanical engines, pumps, or generators that will be running continuously during operation. The only noise sources located at the SPM buoy system would be assistant vessels such as tugs and the VLCC which is moored to the SPM buoy. Because noise from operations of the SPM buoy system will be so minimal, and any noise produced would be controlled to meet standards established for worker protection, and given the distance of the Project facilities from shore, no significant airborne noise impacts on land-based receptors from operation of the SPM buoy system will occur. While noise from operation of the vessels at the SPM buoy system could impact recreational boating and fishing in the vicinity of the site, establishment of the 760 ac (307 ha) Safety Zone around the SPM buoy system will exclude recreational vessels from the immediate area. Therefore, noise from SPM buoy system operations is not expected to impact recreational activity.

Intermittent noise will be generated by support tugs and very large crude carriers (VLCC) calling at the SPM buoy system (about 96 times per year). Noise from service vessels and VLCCs will be transient in the immediate Project vicinity, limited to the time when they are approaching, loading, and leaving the SPM buoy system. VLCCs that will call at the SPM buoy system are similar to other vessels operating in the GOM, as described in Section 12.2.3. Further, supply vessels and VLCCs transiting to the SPM buoy system will generally use established shipping lanes. A minimum of two support tugs will be on location at the SPM buoy system during operations. No significant increase in vessel or traffic is anticipated in the Project area, and therefore airborne noise impacts from vessel traffic during operations will be localized and negligible.

12.3.2.3 Decommissioning

Decommissioning of the Project will include abandonment in-place of the Onshore and Inshore Pipelines from the valve station to the onshore storage facility, removal of the onshore storage facility, and removal of the Offshore Pipelines and SPM buoy system. Removal of the components will result in minor sound level increases similar to those associated with installation; underwater pipeline removal will progress along the route such that activity at any one location is of short duration. Decommissioning activity will result in a short-term sound level increase in the immediate vicinity of the SPM buoy system due to increased vessel activity, and sound generated by disassembly and removal of the facilities. The need for blasting to remove Project facilities is not anticipated. Therefore, decommissioning of the Project will not result in significant noise impacts.

12.4 Cumulative Impacts

12.4.1 Air Quality

As described in the Volume II Introduction, Cumulative Impact Analysis methodology, cumulative impacts are the combined result of the impacts of an action that, when considered with the impacts of other actions, would result in a resource impact. The geographic and temporal range of projects considered in this cumulative impact analysis, as well as a description of each past, present, or reasonably foreseeable future project considered, is provided in the Introduction.

Of the projects identified, activities that may impact air quality within the vicinity of the proposed project possibly include other offshore platform emission sources. It is assumed that representative background concentrations for the region may account for the impacts from other offshore sources in the absence of additional information. Emissions from these sources could overlap with air quality impacts from operation of the DWP. A dispersion modeling analysis will be performed including direct, indirect, and cumulative impacts, as needed, and determined if the air quality impacts remain in compliance with all applicable air quality standards. Note that if air quality impacts from emissions sources with indirect impacts (including the crude tanker, support vessels, etc.) are greater than the US EPA's significant impact level (SIL), the Applicant will use past guidance from the Bureau of Ocean Energy Management (BOEM) and TCEQ, and add a representative background ambient monitored concentration of the pollutant exceeding the SIL and compare to the National Ambient Air Quality Standards (NAAQS) to determine the cumulative impacts from the Project. Air quality impacts from construction and decommissioning of the proposed DWP would be short-term, minor, and not adverse. Air quality impacts from operation of the proposed DWP would be long-term, minor, and not adverse.

12.4.2 Ambient Noise

As described in the Volume II Introduction, cumulative impacts were assessed based on the Framework for Cumulative Impact Analysis. Cumulative impacts are the combined result of the impacts of an action that, when considered with the impacts of other actions, would result in a resource impact. The geographic and temporal range of projects considered in this cumulative impact analysis, as well as a description of each past, present, or reasonably foreseeable future project considered, is provided in the Introduction.

Of the projects identified, the Project, offshore oil and gas exploration, waterway improvement projects, marine traffic, and the commercial and residential development projects could contribute to cumulative impacts on noise within the western GOM and in the vicinity of onshore Project components.

The primary sources of noise during construction of the proposed Project will be associated with internal combustion engines powering construction equipment required for onshore, underwater, and offshore installation. The construction period associated with on- and underwater construction of the pipelines is expected to last a short time at any one location; the longest timeframes would occur where the pipelines will be installed via HDD (up to 6.5 weeks at one location). As discussed in Section 12.3.2.1, onshore construction will typically occur during the day, while in-water pipeline installation may occur up to 24 hours per day. Construction activity at the SPM buoy system site will last about 5 weeks, and will also result in short-term, minor airborne and underwater noise level increases in the immediate vicinity of the SPM buoy system.

Operation of the onshore storage facility will result in a localized increase in noise levels; however, sound from operations is not expected to impact NSAs. Operation of the buried pipelines is not expected to impact ambient airborne sound levels. Operational noise at the SPM buoy system site will be associated with the operation of engines and pumps, and intermittent noise of approaching and docked vessels, and support vessels. Overall noise impacts from the Project will be short-term and limited to the pipeline construction period for land-based receptors and long-term on the airborne and underwater sound environment in the immediate vicinity of the onshore storage facility SPM buoy system.

Based on the limited onshore noise contribution from the Project and the localized nature of offshore noise, cumulative noise effects will only occur where another project is in close proximity to the proposed Project. The Padre Isles development is about 2.2 mi (3.5 km) from the proposed landfall location. Based on this distance, construction of the pipelines will not contribute to cumulative impacts on noise with the Padre Isles development. Given the expected attenuation of noise from operation of the onshore storage facility and SPM buoy system, as well as the distance between these facilities and NSAs, operation of the Project facilities will not contribute to cumulative noise impacts. However, vessel activity during construction and operation of the Project will contribute to cumulative sound levels. As described in Volume II Section 13: Navigation and Navigation Safety, given the level of existing commercial vessel traffic in the GOM, the contribution of the Project to cumulative vessel traffic consistent with existing uses of the waterways transited by these vessels. Therefore, associated noise impacts will be negligible.

12.5 Mitigation Measures

12.5.1 Air Quality

The DWP will be constructed and operated using the best available technology, thereby preventing or minimizing adverse impacts to the air quality to the extent possible.

12.5.2 Ambient Noise

Impacts from pipeline construction on nearby NSAs will be short-term during active construction in the immediate vicinity. Noise will be attenuated using housing structures on all pumps or mechanical engines that emit noise above the acceptable limit, meeting all regulations. Given the distance of the SPM buoy system and onshore storage facility from NSAs, impacts are not anticipated and additional noise mitigation measures are not necessary for the Project.

12.7 Summary of Potential Impacts

12.7.1 Air Quality

A combination of short- and long-term predominantly minor adverse impacts on air quality would be expected during construction, operation, and decommissioning of the proposed Project. Based on the analysis presented in the sections above, potential impacts on ambient noise are summarized in the table below.

Table 12-7: Summary of Potential Impacts to Air Quality

Project Phase	Impact	Duration	Significance	Mitigation
Construction	A negligible increase in background concentrations	Short-term	Negligible	Best Management Practices
Operation	Increase in design value of the ambient background concentration for criteria pollutants	Long-term	Minor	Best Management Practices
Decommissioning	A negligible increase in background concentrations	Short-term	Negligible	Best Management Practices
Cumulative	Increase in design value of the ambient background concentration for criteria pollutants	Long-term	Minor	Best Management Practices

12.7.2 Ambient Noise

Based on the analysis presented in the sections above, potential impacts on ambient noise are summarized in the table below.

Table 12-8: Summary of Potential Impacts to Ambient Noise

Project Phase	Impact	Duration	Significance	Mitigation
Construction	Increased noise due to operation of construction equipment, HDD activity, vessel traffic, and pile-driving	Short-term	Minor	N/A
Operation	Increased noise due to ongoing facility operations; transient noise from vessels.	Long-term	Negligible	Installation of noise attenuating housings on all components with noise above the accepted threshold
Decommissioning	Increased noise due to operation of construction equipment, vessels.	Short-term	Minor	N/A
Cumulative	Cumulative increase in noise due to incremental increase in vessel activity	Long-term	Negligible	N/A

12.8 References

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