Appendix K

Delfin LNG Draft Operations Manual (with Emergency Response Plan and Foul Weather Plan)

DELFIN LNG LLC

PORT DELFIN FLNGV

Draft Port Operations Manual

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Acronyms and Abbreviations

ASD	Azimuth Stern Drive
AIS	Automatic identification system
CFR	Code of Federal Regulations
Delfin LNG	Delfin LNG LLC
DWPA	Deep Water Port Act of 1974
FEED	Front end engineering design
FiFi	Firefighting
FLNGV	Floating liquefied natural gas vessel(s)
FTA	Free trade agreement
HIOS	High Island Offshore System
hp	Horsepower
LNG	Liquefied natural gas
LNGC	Liquefied natural gas carrier
MSDS	Material Safety Data Sheet
nm	Nautical miles
O&M	Operations and Maintenance
Port Delfin	The offshore component of the Port Delfin FLNGV Project consisting of the floating liquefied natural gas vessels, foundations, and underwater elements
Port Delfin FLNGV Project	Delfin LNG LLC's floating liquefied natural gas vessels project, including all onshore and offshore components
Project	Port Delfin FLNGV Project
STS	Ship to ship
TYMS	Tower yoke mooring system
U.S.	United States
USCG	U.S. Coast Guard
UTOS	U-T Offshore System

1 Introduction

1.1 Background

Delfin LNG LLC, a Louisiana limited liability company (Delfin LNG), plans to construct, own, and operate a Deepwater Port (DWP) terminal (referred to herein as Port Delfin) in the Gulf of Mexico to serve the global liquefied natural gas (LNG) market. The purpose of the project would be to provide a safe and reliable facility to liquefy natural gas for export to free trade agreement (FTA) and non-FTA nations.

The Port Delfin offshore terminal consists of four (4) Floating Liquefied Natural Gas Vessels (FLNGVs), each attached to a separate Tower Yoke Mooring System (TYMS). Existing 42-inch natural gas pipelines with new 30-inch pipeline laterals will supply natural gas from the U.S. pipeline grid directly to the FLNGVs. Each FLNGV is designed to process 575 million standard cubic feet per day of feed gas equivalent to approximately 3.3 million metric tonnes per annum of LNG production (including maintenance and down time). Each FLNGV has the ability to independently process and liquefy natural gas into LNG including the storage of up to 210,000 cubic meters of LNG within on board storage tanks.

Standard LNG carriers (LNGCs) will call at Port Delfin to receive and subsequently export LNG from the FLNGVs. The LNGCs will maneuver alongside the designated FLNGV, under the control of a Mooring Master (term described in Section 3.3) and with tug assistance, and moor next to the FLNGV in a side-by-side arrangement with appropriate fenders in between the vessels. The LNG will be transferred from FLNGV to the LNGC via ship-to-ship (STS) transfer through loading arms or cryogenic hoses.

1.2 Purpose

This document describes Delfin LNG's policies and procedures for operating the FLNGVs, visiting Liquefied Natural Gas Carriers (LNGCs) tugs, crewboats, helicopters, and other vessels and equipment associated with operations at the Port Delfin offshore facilities. This manual describes the procedures, requirements, regulations, personnel, and information for the arrival, transit, berthing, cargo transfer, and departure of LNGCs receiving LNG for export from Port Delfin FLNGVs. This Port Operations Manual (the "Manual") is also intended to provide information to LNGC owners, LNGC operators, charterers, cargo owners and Masters of LNGCs with regard to safety regulations, general conditions, terminal facilities, mooring/departure from the FLNGVs, and cargo transfer operations at the Port Delfin terminal.

1.3 Scope

The scope of this manual includes all identified activities, requirements, regulations and responsibilities associated with the marine aspects of the Port Delfin offshore terminal. With regard to the LNGC receiving cargo at Port Delfin, this manual covers activities that begin with the first notification of planned arrival from the LNGC to FLNGV and terminates when the Mooring Master departs from the LNGC following cargo transfer and the LNGC's departure from the FLNGVs. The contents of this Manual is intended to meet the requirements described at 33 CFR 150.15.

1.4 Responsibilities and Authorities

Maritime Administration (MARAD). The Port Delfin DWP is owned and operated by Delfin LNG, under a license granted by the U.S. Maritime Administration (MARAD). The laws of the United States

govern Port Delfin in the same manner as if the port were an area of exclusive federal jurisdiction located within a state. The Deepwater Port license issued by MARAD contains conditions related to safety, operations, environmental protection and emergency response.

United States Coast Guard (USCG). The United States Coast Guard (USCG) Headquarters Deepwater Port Standards Branch, the Eighth District Office in New Orleans, Louisiana, and other USCG commands have jurisdiction over Port Delfin. Basic requirements for activities at Deepwater Port are described at 33 CFR Subchapter NN (148-150).

Port Delfin Terminal Manager. The Port Delfin Terminal Manager has overall day-to-day authority over the operations of the offshore port complex. This encompasses all personnel at Port Delfin, including contract personnel, and all vessel (LNGC and support vessels) and aircraft operations at Port Delfin. In the event of an emergency, the terminal management will direct all response activities at Port Delfin. This may include the shutdown of LNGC cargo transfer, and removal of the LNGC from the moorings. Emergency conditions are those that in the judgment of the Terminal Manager involve, or could involve, LNG release and/or other environmental incidents, injury to personnel or damage to the equipment of the Port Delfin, support vessels or LNGC.

LNG Carrier (LNGC) Owner/Operator. The LNGC Owner/Operator is at all times responsible for meeting the requirements of the vessel's flag state and the USCG for a vessel calling in U.S. waters and receiving a cargo of LNG. This includes but is not limited to the following:

1. Designation of an appropriate U.S. Agent. Delfin LNG will not serve as the U.S. agent for any LNGC.

2. Compliance with all USCG Advance Notice of Arrival (NOA) regulations in 33 CFR 146 and 160.

3. Compliance with applicable U.S. regulations for a vessel carrying LNG as cargo in U.S. waters including obtaining and maintaining a current Certificate of Compliance pursuant to 46 CFR 154 Subpart A through F. Delfin LNG will not be responsible for scheduling necessary inspections with the USCG to maintain the currency of the visiting LNGC's Certificate of Compliance.

4. Compliance with applicable flag state and classification society requirements related to construction, operation, and maintenance of the LNGC to authorize carriage, transportation, and transfer of LNG as cargo.

5. Compliance with all other applicable U.S. regulations related to vessel safety, security, operations, and pollution prevention and response including but not limited to the following:

    a. 33 CFR 101-107 – Maritime Security

    b. 33 CFR 151 and 153 – Pollution Prevention and Response Requirements

    c. 33 CFR 155 and 156 Oil and Hazardous Material Transfer Regulations

    d. 33 CFR 164 – Navigation Safety Regulations

LNGC Master Responsibility. The information contained in this manual should not in any way be construed as affecting the responsibilities of the LNGC's Master, the LNGC's owner or operator with regard to the safety and integrity of the LNGC, crew, cargo or the environment. Safety of personnel, facilities, cargo and the environment are considered to be top priority with regard to all operations at Port Delfin.

[End of Section]

2 General information

The Port Delfin DWP is located in federal waters within the Outer Continental Shelf (OCS) West Cameron Area, West Addition Protraction Area (Gulf of Mexico), approximately 40 nautical miles (nm) off the coast of Cameron Parish, Louisiana, in water depths approximately 64 to 72 feet as shown in **Figure 2-1**.

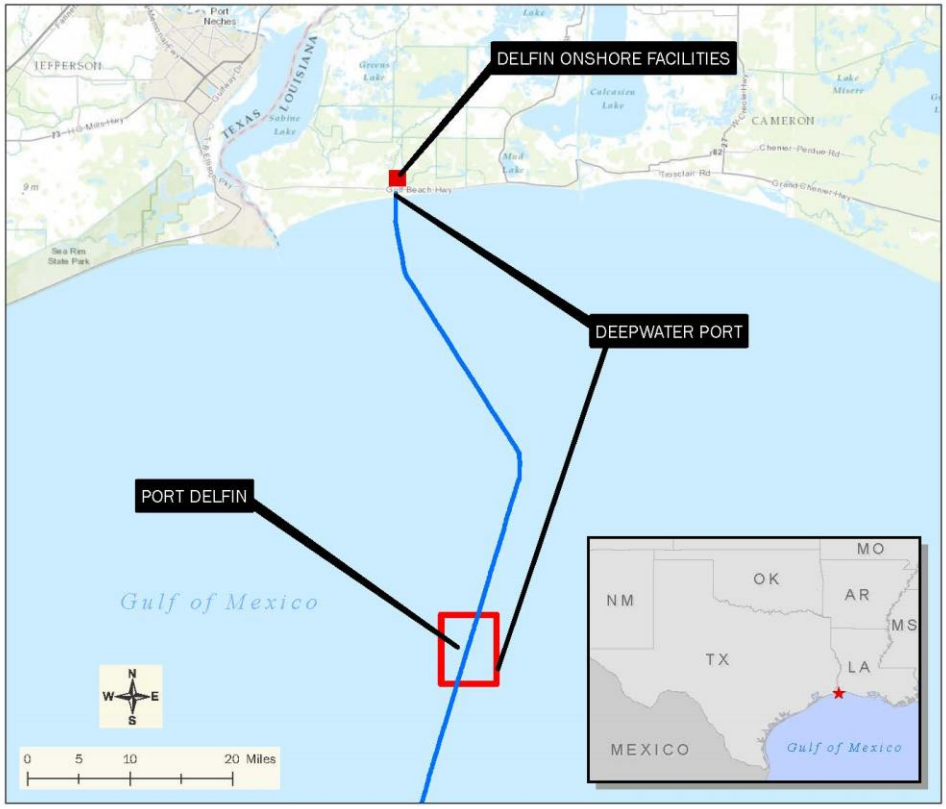

Figure 2-1 Project Vicinity

Standard LNGCs will call at Port Delfin to receive LNG from the FLNGVs and subsequently export LNG from the United States of America. The LNGCs will maneuver alongside the designated FLNGV, under the control of a Mooring Master and with tug assistance, and moor next to the FLNGV in a side-by-side arrangement with appropriate fenders in between the fenders. The LNG would be transferred from FLNGV to the LNGC via STS transfer through loading arms or cryogenic hoses (to be determined following completion of project Front End Engineering Design – FEED).

2.1 Basic Port Delfin information

CORPORATE LOCATION: Delfin LNG LLC
1100 Louisiana Street, Suite 3550, Houston, TX, 77002

MAILING ADDRESS:
Delfin LNG LLC
1100 Louisiana Street, Suite 3550
Houston, TX 77002

REQUESTS FOR PORT INFORMATION: Delfin LNG LLC
Attn: To be determined
1100 Louisiana Street, Suite 3550
Houston, TX 77002

TELEPHONE NUMBER:
Corporate Office (713) 714-2278
Operations Center (to be determined)
Marine Terminal (to be determined)

RADIO CONTACT:
Call Sign (to be determined)

FREQUENCIES:
VHF-FM

- US Channel 10 156.500 MHz - Commercial
- US Channel 16 156.800 MHz – International Distress, Safety and Calling
- US Channel 74 156.725 MHz – Port Operations

TIME ZONE:
Local-Central Standard Time
(CST). Minus 6 hours Greenwich Mean Time (GMT) of Zone +6.

Note: Daylight Savings time is in effect in US. From the second Sunday in March to the first Sunday in November, this is modified by use of Daylight Savings Time to minus 5 hours GMT or Zone +5.

OFFICIAL AND EXCLUSIVE LANGUAGE FOR ALL COMMUNICATIONS:
English

HOURS OF OPERATIONS:
The Port Delfin FLNGVs operate on a 24-hour/7-day a week schedule. Berthing of "accepted" LNGCs, cargo discharge and un-berthing of LNGCs are dictated by weather conditions, LNG storage capacity, approval of Port Delfin management and the USCG Captain of the Port (COTP).

2.3 Port Delfin location

Port Delfin is located in federal waters within the OCS West Cameron Area, West Addition Protraction Area (Gulf of Mexico) and in water depths of approximately 64 to 72 feet (19.5 to 21.9 meters) Moorings #1, #2, #3, and #4 are located in WC 319, 327, 328, and 334 blocks, respectively as shown in **Figure 2-2**, below). **Table 2-1** presents the proposed Port Delfin mooring locations.

Table 2-1 Port Delfin FLNGV mooring locations

	Easting (UTM U.S. Survey feet)	Northing (UTM U.S. Survey feet)	Latitude (degrees minutes seconds)	Longitude (degrees minutes seconds)	Water Depth in Feet
Mooring #1	1470015	10575039	29° 8' 13.1" N	93° 32' 2.2" W	63.6
Mooring #2	1466394	10562993	29° 6' 13.6" N	93° 32' 42.4" W	67.6
Mooring #3	1479912	10565664	29° 6' 40.7" N	93° 30' 10.1" W	65.8
Mooring #4	1476164	10553587	29° 4' 40.9" N	93° 30' 51.8" W	71.6

Note: Geodetic Information - Universal Transverse Mercator (UTM) Zone 15N, North American Datum (NAD) 1983 Geodetic Reference System 1980 (GRS80).

[Figure 2-2 listed in following page]

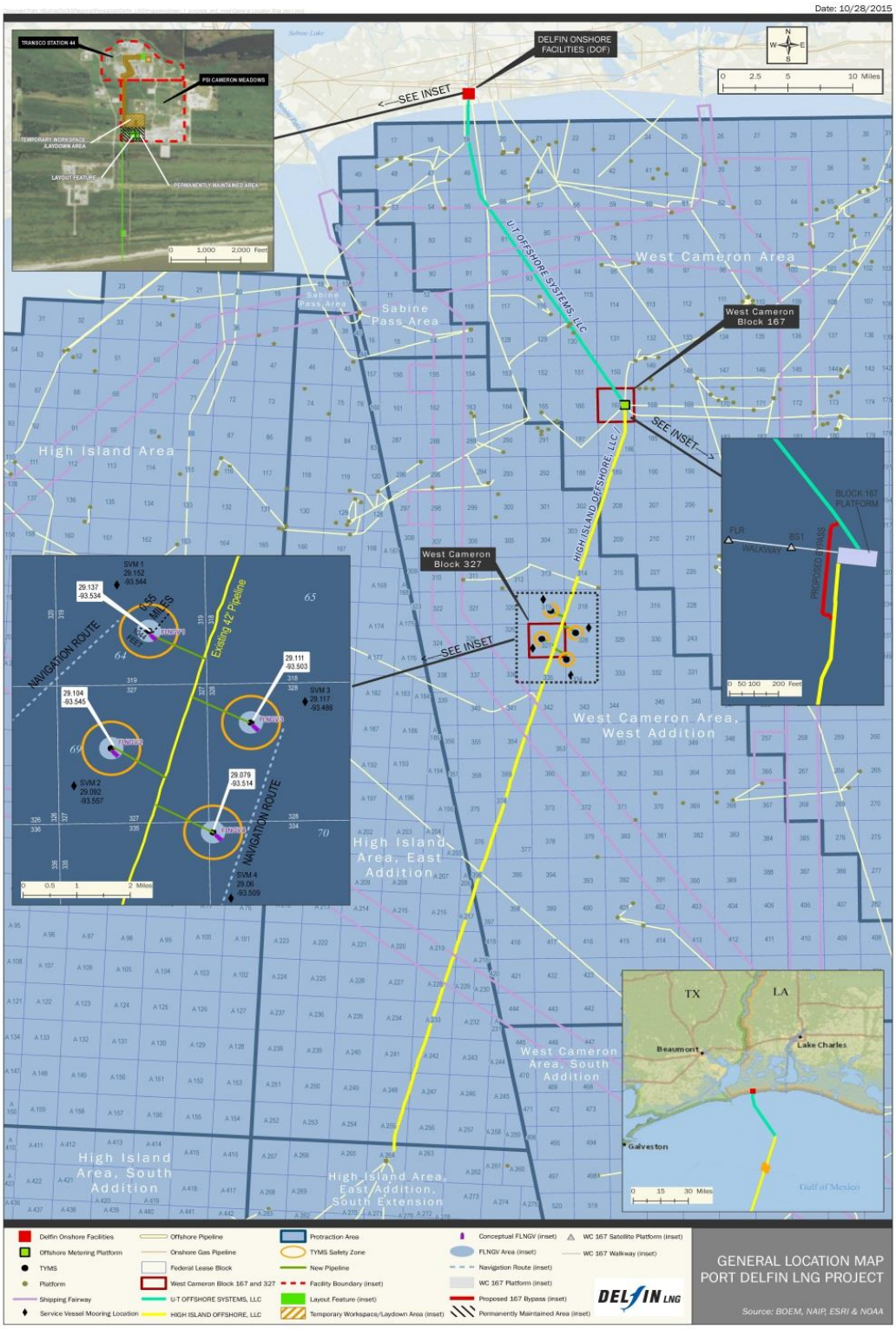

Figure 2-2 Project Location and Layout

2.4 Onshore facilities

The Delfin onshore facilities consist of the onshore portion of the former U-T Offshore System (UTOS) pipeline (approximately 1.1 miles of existing 42-inch diameter pipeline located landward of the high water mark), a new compressor station, a new meter station, and a gas supply header connecting the meter station and compressor station (consisting of approximately 0.25 miles of new 42-inch pipeline to connect the former UTOS pipeline to the new metering facilities and 0.6 miles of new twin 30-inch pipelines), all located in southwest Cameron Parish, Louisiana near Johnson Bayou.

The onshore facilities provide interconnections to the pipeline grid and compression of natural gas that is delivered to the Port Delfin FLNGVs located offshore. The configuration of the Delfin Onshore Facilities located near Johnson Bayou on southwest Cameron Parish, Louisiana is shown in **Figure 2-3**.

Figure 2-3 Configuration of Delfin onshore facilities

3 Port Delfin general description

Port Delfin is an integrated LNG export project that consists of natural gas compression located onshore near Johnson Bayou, Louisiana (in southwest Cameron Parish), natural gas supply pipelines running offshore into the Gulf of Mexico, and four (4) FLNGVs located in the vicinity of West Cameron Block 327. The purpose of the FLNGVs is to receive natural gas, treat and liquefy it on board, and to store produced LNG within onboard storage tanks until it can be transferred to an LNGC for export. Each of the four (4) FLNGVs is a ship-shaped LNG liquefaction and storage vessel that is moored on location to a TYMS unit that allows each unit to freely weathervane in response to the prevailing winds, waves, and currents. While this Manual generally describes the operations at a single FLNGV, the procedures and requirements contained herein are applicable to all of the FLNGVs that comprise Port Delfin.

3.1 FLNGV specifications

The principal key dimensions of each of the four (4) Port Delfin FLNGVs are listed in **Table 3-1**.

Table 3-1 Principal dimensions of the Port Delfin FLNGVs

Length Overall	355.78 meters (1,167.26 feet)
Length Waterline	350.68 meters (1,150.52 feet)
Breadth	65.00 meters (213.25 feet)
Depth	32.00 meters (104.99 feet)
Design Draft	10.75 meters (35.27 feet)
Number of LNG Tanks	8 (2 rows x 4)
Containment Tank Type	GTT Mark III membrane
LNG Cargo Tanks Capacity	211,460 m3

3.2 FLNGV mooring system specifications

Delfin LNG will employ a single-point mooring in the form of a TYMS for each of the FLNGVs. The mooring system, composed of four TYMSs (one for each FLNGV), is a reliable solution for mooring vessels in shallow water (60 to 120 feet water depth). The TYMS allows the FLNGV (and any LNGC when moored alongside the FLNGV) to freely weathervane and provides increased berth availability at the DWP site. The TYMS and each of the FLNGVs will have a 0.95-nautical-mile-(1.09-statute-mile) diameter safety zone.

The TYMS is designed to safely withstand the loads imposed on the system over the full range of FLNGV operating drafts/loading conditions for the FLNGV with or without an export LNGC connected. In addition, all four (4) TYMSs, without a moored FLNGV and export LNGC, will be designed to safely withstand loads imposed on the system from Gulf of Mexico hurricanes up to a 1,000-year storm return period. The FLNGVs and TYMS are designed so that the FLNGVs can be disconnected from the TYMS, allowing each FLNGV to sail away under its own power in the event of a hurricane or other major storm event.

3.3 Mooring and departure assistance

Delfin LNG requires the use of tugs to assist with mooring each of the arriving LNGCs at individual FLNGVs. The tugs will at all times be under the direction and control of a Delfin LNG designated Mooring Master. The Mooring Master will board the inbound FLNGV approximately 10 nm from the designated FLNGV and assist with inbound navigation and the employment of tugs and other service vessels specified by Delfin LNG. Delfin LNG currently plans to provide (either directly or through a contracted service provider) four (4) tugs to assist arriving FLNGVs with mooring and departure operations. The tugs and other service vessels (crewboat) provided as part of Port Delfin services (either directly or through a contracted service provider) are required to be used by all FLNGVs calling on Port Delfin are as described below:

- Three (3) 6,000 hp offshore rated tugs
- One (1) 4,000 hp offshore rated tug
- One (1) crewboat for delivering and removing the Mooring Master from inbound and departing LNGCs.

NOTE: DELFIN LNG INTENDS TO CONDUCT MOORING AND DEPARTURE COMPUTER SIMULATION STUDIES TO CONFIRM THE REQUIRED SIZE AND HORSEPOWER REQUIREMENTS OF TUGS AND CREWBOATS NEEDED TO SUPPORT PORT DELFIN OPERATIONS. RESULTS OF FEED STUDIES ARE NECESSARY INPUTS FOR SUCH DETAILED SIMULATIONS.

3.3.1 Tug vessel specifications

The number of tugs required for any operation will be as specified in this Manual and at the discretion of the respective FLNGV/LNGC Masters in consultation with the Mooring Master according to the weather conditions and circumstances existing at the time.

It is assumed that up to four (4) tugs may be used, depending on weather conditions and circumstances:

- 3x Azimuth Stern Drive (ASD) Tug 6000 hp + FiFi monitor class (nominal 80-ton bollard pull); and
- 1x ASD Tug 4000 hp (nominal 50-ton bollard pull).

Tugs will be specified and either provided by an affiliate of Delfin LNG or chartered under a Master Services Agreement with an established towing vessel operator. The tugs will be based in the Cameron, Louisiana area when not engaged in service to Port Delfin. Simulation training will be provided for tug captains and Mooring Masters to ensure proficiency in integrated vessel operations.

The FLNGVs will be fitted with thrusters for heading control; however, for the purpose of this preliminary assessment, it is assumed that one tug will be connected to the FLNGV to assist with heading control during LNG loading.

The tugs servicing the Port Delfin FLNGVs will be capable of specifically addressing the missions developed for these boats to best serve the port complex. These missions include the following:

- Escorting LNGCs from the shipping fairway to the designated FLNGV (and return to the fairway upon LNGC departure).

- Controlling and towing the LNGC in an emergency.
- Assistance with mooring and departure of each LNGC (i.e. docking and un-docking).
- Security monitoring to protect the FLNGVs (reference Security Manual).
- Fire fighting
- Spill response

3.3.2 Service vessel specifications

The transport of personnel to and from the each FLNGV will primarily be done by crew/supply vessel, and helicopters may be used for emergency medical or other urgent transport requirements.
Crew change logistics will be based on regulatory and operational staffing requirements and applicable crew rotation schedules. The transport of stores, supplies, spares, and provisions will be optimized according to the number of FLNGVs in service and their specific logistical and operational requirements. It is anticipated that one crew/supply boat of 25 to 30 meters in length, 1,800 to 2,500 horsepower (hp) diesel (**Figure 3-1**), based in the Cameron, Louisiana, area will be employed for personnel, stores, spares, and provisions transfer.

Figure 3-1 Typical crew supply boat

3.3.3 Support vessels moorings

Service vessel anchoring points are provided to assist with operations of each FLNGV, as depicted on **Figure 2-2**, above. Four (4) anchor points are provided to support project operations. These anchor points are installed primarily to provide the service vessels supporting project operations an opportunity to safely anchor and shut down their main engines while awaiting their next assignment, instead of idling in open waters or returning to shore. Service vessel moorings are controlled by the Delfin LNG Terminal Manger to facilitate the efficient use of tugs and other port assets. The service vessel mooring locations are as shown in **Table 3-2**.

Table 3-2 Port Delfin service vessel anchoring locations

	Easting (UTM U.S. Survey feet)	Northing (UTM U.S. Survey feet)	Latitude (degrees minutes seconds)	Longitude (degrees minutes seconds)	Water Depth Feet
Service Vessel Anchor Point #1	1466696	10580350	29° 9' 5.5" N	93° 32' 39.9" W	61.0

Table 3-2 Port Delfin service vessel anchoring locations

	Easting (UTM U.S. Survey feet)	Northing (UTM U.S. Survey feet)	Latitude (degrees minutes seconds)	Longitude (degrees minutes seconds)	Water Depth Feet
Service Vessel Anchor Point #2	1462466	10558891	29° 5' 32.8" N	93° 33' 26.5" W	69.8
Service Vessel Anchor Point #3	1485237	10567891	29° 7' 2.9" N	93° 29' 10.2" W	65.4
Service Vessel Anchor Point #4	1482523	10552122	29° 4' 26.7" N	93° 29' 40.1" W	70.7

Note: Geodetic Information - Universal Transverse Mercator (UTM) Zone 15N, North American Datum (NAD) 1983 Geodetic Reference System 1980 (GRS80).

3.4 Mooring Master/Assistant Mooring Master

3.4.1 Mooring Master

The Mooring Master is a Port Delfin employee or contractor with a USCG license to serve as Master (unlimited tonnage) with authorization to operate upon oceans. The Port Delfin Mooring Master (and any assistant Mooring Masters) will possess specialized skill and abilities in large vessel maneuvering and docking. The Mooring Master is equivalent to a harbor pilot in inland waters. The role of the Mooring Master is to meet the incoming LNGC approximately 10 nms from the Port Delfin terminal, to board the incoming vessel and to assist the LNGCs master in bringing the vessel to the selected Port Delfin FLNGV and ensuring the vessel is safely moored. The Mooring Master will direct the use of the Port Delfin tugs to ensure safe mooring of the LNGC. The Mooring Master will also be on board the LNGC upon departure from the Port Delfin FLNGV and will direct the use of the tugs. An assistant Mooring Master may be required dependent upon the prevailing conditions and the nature of the operations expected. The Assistant Mooring Master, when provided, will be under the direction and control of the Delfin LNG designated Mooring Master for the specific operation.

3.4.2 Assistant Mooring Master

The Assistant Mooring Master is a Port Delfin employee or contractor with a USCG license to serve as Master (unlimited tonnage) with authorization to operate upon oceans. The Port Delfin Assistant Mooring Master will possess specialized skill and abilities in large vessel maneuvering and docking. The Assistant Mooring Master will be employed in mooring and unmooring LNGCs calling at Port Delfin and will be under the direction and control of the Mooring Master at all times. The Assistant Mooring Master may be placed on the bridge of the inbound/outbound LNGC in the company of the Mooring Master or may be deployed aboard the lead tug engaged in controlling the movement of the LNGC. Assistant Mooring Masters will be employed as required to effectively manage inbound and outbound LNGC traffic. The Assistant Mooring Master will form an integrated team in conjunction with the Mooring Master and the masters of the tugs. The Assistant Mooring Master and tug masters will be under the direction and control of the Mooring Master at all times.

3.4.3 Mooring Master/Assistant Mooring Master boarding areas

The Mooring Master/Assistant Mooring Master boarding area for LNGCs inbound to Port Delfin will be approximately 10 nms from the designated FLNGV within or adjacent to the Sabine Pass Shipping Fairway. This will allow the Mooring Master/Assistant Mooring Master to conduct his LNGC Master/ Port Delfin Mooring Master conference in an unhurried manner and familiarize the LNGC Master on the various unique aspects of the escort, security and berthing maneuvers at Port Delfin. For outbound LNGCs, the Mooring Master/Assistant Moring Master will depart the outbound LNGC once the vessel is within the limits of Sabine Pass Safety Fairway and on an appropriate heading for departure from the port complex.

3.4.4 Master, Mooring Master/Assistant Mooring Master conference

When the Mooring Master/Assistant Mooring Master joins the LNGC's Bridge Team on the LNGC's navigation bridge, he/she will introduce himself/herself and immediately check on the LNGC's position, heading, speed and local traffic. If necessary he/she will adjust the above to a safe speed and heading before conducting the Master and Mooring Master/Assistant Mooring Master conference.

During the Master and Mooring Master/Assistant Mooring Master conference the Mooring Master/ Assistant Mooring Master will undertake the following activities:

- Determine the presence of any problems or unusual maneuvering characteristics of the LNGC.
- Discuss the status of any equipment difficulties, especially with the steering or propulsion gear of the LNGC. The Mooring Master/Assistant Mooring Master should have been advised of any equipment difficulties prior to joining the LNGC through the regular communications between the LNGC and Port Delfin.
- Explain the Port Delfin tug escort and security system to the Master.
- Discuss with the LNGC Master the importance of early notification of any problems with the LNGC's steering system,
- Determine the strength of the LNGC's mooring systems that will be used for the tug escort.
- Explain to the Master the berthing maneuvers and mooring line arrangement at the FLNGV.
- Ensure that the LNGC's emergency steering station is manned and ready for immediate operation and that communication with this station and the wheelhouse is maintained at all times.

4 Limited and restricted areas

USCG regulations provide for establishing Safety Zones, Areas to be Avoided (ATBA) and No Anchoring Areas (NAAs) around certain offshore facilities including deepwater ports (see 33 CFR 150 Subpart J -150.900-150.940). Delfin LNG has requested that the USCG establish a Safety Zone, ATBA, and NAA around each of the Port Delfin FLNGVs as further described below.

4.1 Safety Zones

A fixed "Safety Zone" would surround each FLNGV and TYMS platform. The proposed Delfin LNG Safety Zones would extend in all directions an additional 500 meters beyond the limits established by the four (4) FLNGV units allowed to weathervane in a complete circle. With the length of each FLNGV and the TYMS mooring structure added to the proposed 500 meter Safety Zone area, each of the four Safety Zone zones would have a radius of approximately 916 meters (3005 ft). Only authorized vessels would be allowed to enter the Safety Zone (e.g. approved LNGCs and assist vessels). Fishing and anchoring within the Safety Zones would be prohibited at all times. These Safety Zones would surround each FLNGV and TYMS, as shown in **Figure 4-1**.

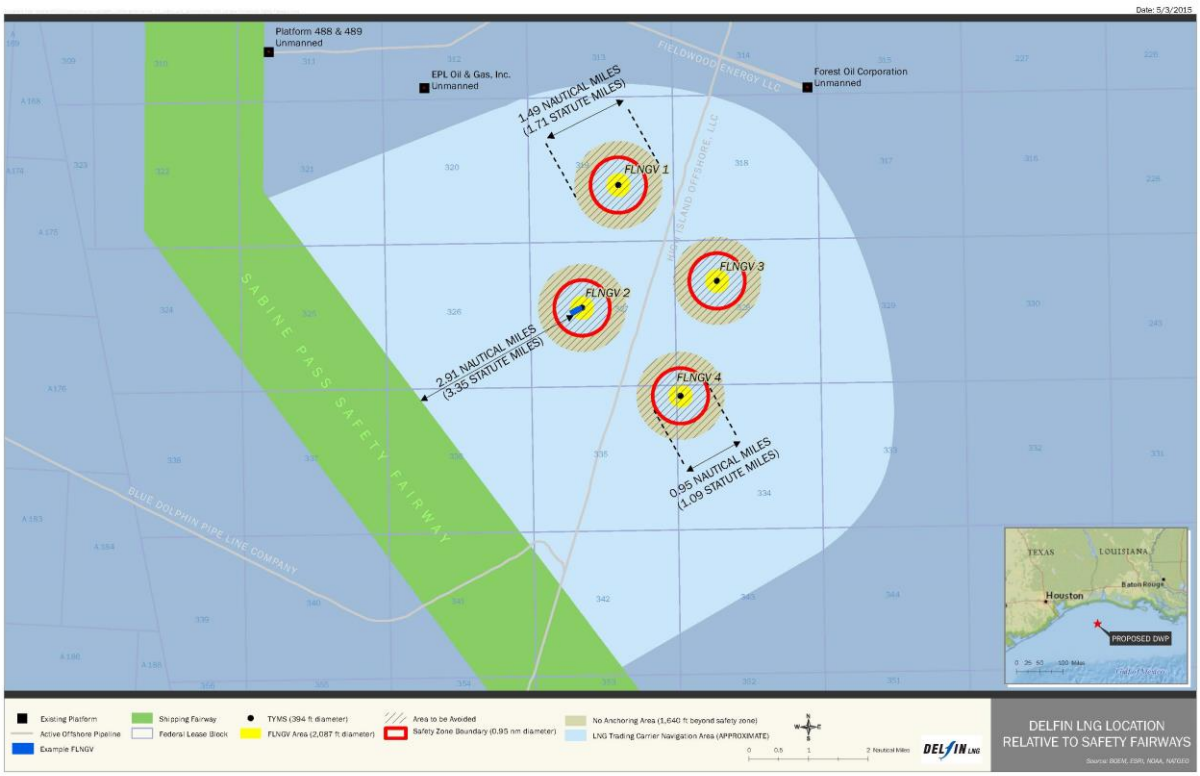

Figure 4-1 Delfin LNG Safety Zones and positon relative to safety fairway

Port Delfin proposes to monitor the Safety Zone and advise unauthorized vessels to avoid the restricted areas. Radar monitoring of the Safety Zone by Project personnel would be required when any vessel approached or entered this zone. Such vessels would be identified and warned off via radio or an assist vessel, if present at the port. The locations of the Port Delfin Safety Zones will be placed be placed on nautical charts printed by the National Oceanic and Atmospheric Administration (NOAA) Office of Navigation and Charting prior to commencement of Port Delfin operations.

4.2 NAA and ATBA

The Port Delfin Project has established a NAA that extends outward an additional 500 meter (radius) from the limits of the Project's Safety Zone. The NAA serves to protect project pipelines from damage by any vessel entering the area intending to anchor, bottom trawl, or conduct other activities that could result in entanglement with the pipelines, risers, and related Delfin LNG facilities below the water surface. The limits of the NAA is shown in **Figure 4-2**.

LNGCs calling at Port Delfin would be permitted to moor only at the FLNGVs and not anchor within the Safety Zone or adjacent No Anchoring Area. In the event that an LNGC cannot proceed directly to its assigned FLNGV for immediate mooring upon arrival, it will be directed to vary course and speed to arrive when the designated FLNGV is was prepared to receive the LNGC for mooring. All vessels with business at Port Delfin would be prohibited from anchoring in the NAA.

Delfin LNG has established Areas to Be Avoided (ATBAs) surrounding each of the four (4) proposed Safety Zones (**Figure 4-2**). Delfin LNG proposes that each ATBA extend 500 meters in all directions beyond the limits of the Safety Zone as a warning to mariners of the regular vessel maneuvering and other operations that would be occurring within close proximity of Port Delfin FLNGVs. As such, the ATBAs and the NAAs are coincident with each other. The Safety Zones, NAAs and ATBAs will be marked on navigation charts prior to commencement of Port Delfin operations.

[Figure 4-2 listed on following page]

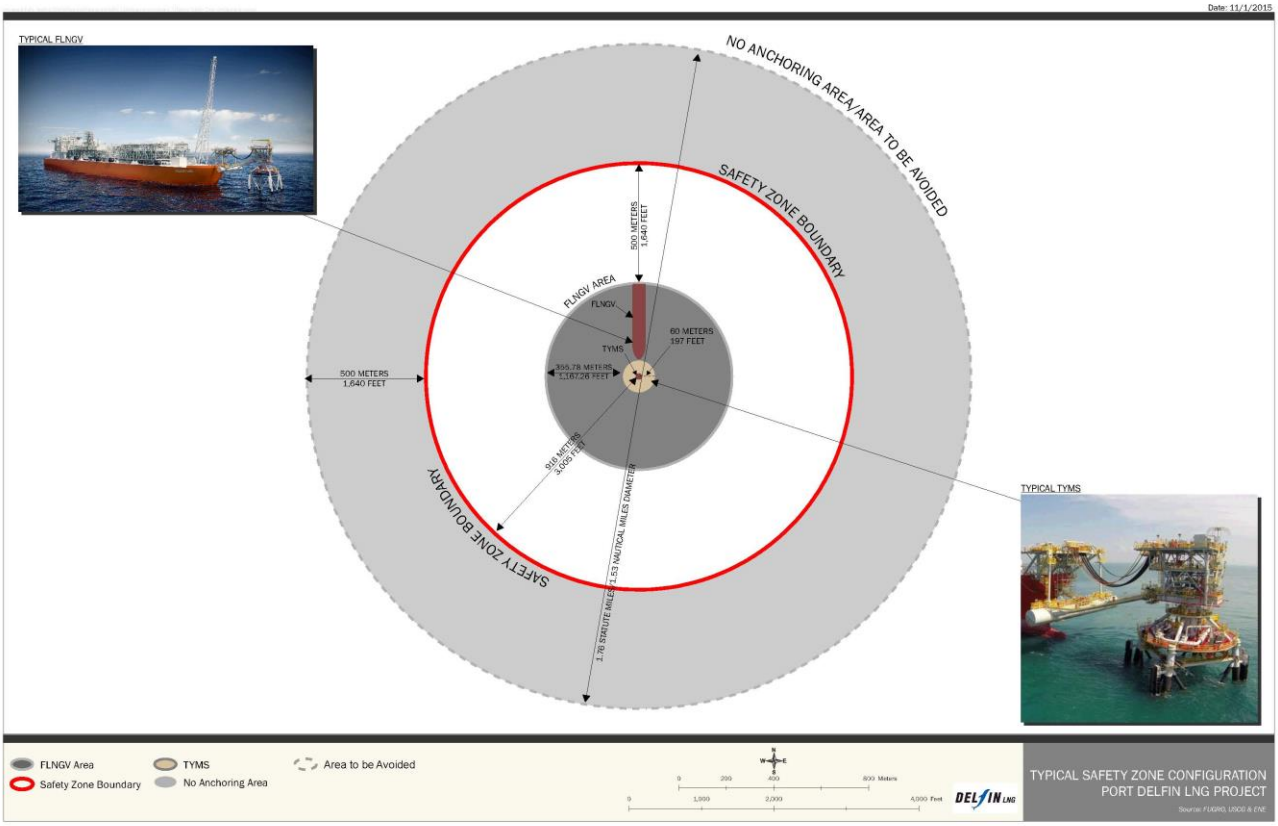

Figure 4-2 Configuration of Safety Zones, No Anchoring Areas, and Areas to be Avoided

5 Communications

It is essential that clear and effective communication be maintained between the LNGC and Port Delfin at all times prior to arrival of any vessel, during approach to the port, during operations, and during departure. Clear communications will help ensure the safety of port operations, personnel and equipment. The presence of the Mooring Master and/or the Assistant Mooring Master on board the LNGC during key operations is designed to ensure effective communications between the LNGC and the designated FLNGV and minimize the potential for incidents. Communications with arriving LNGCs begins seven (7) days or more in advance of arrival to facilitate scheduling of Port Delfin tugs, support vessels, and personnel. In addition to commercial and safety communication with Port Delfin, arriving LNGCs have independent responsibilities to provide required notices and information to the USCG and other government agencies designed to facilitate the safety and security of cargo operations. **Delfin LNG will not serve as the U.S. agent for any vessels calling at Port Delfin.**

5.1 Communications with Port Delfin

Corporate Mailing Address: Formal correspondence should be addressed to the address below.

Delfin LNG LLC
1100 Louisiana Street, Suite 3550
Houston, TX 77002

Requests for Port Information: Delfin LNG suggests that requests for port information be submitted via e-mail to the address listed below.

Delfin LNG LLC
Attn: Port Information Request
1100 Louisiana Street, Suite 3550
Houston, TX 77002
E-mail address: (**to be determined)**

Key Telephone Numbers:
Corporate Office (713) 714-2278
Operations Center **(to be determined)**
Delfin Onshore Facility **(to be determined)**
Port Delfin Vessel Traffic Control **(to be determined)**
Each individual FLNGV **(to be determined)**

TELEX Address: Port Delfin will be able to receive TELEX messages from vessels at sea and from the vessel's agent(s) advising the port of projected vessel arrival, special conditions, and vessel-specific needs. These TELEX messages should be sent to the following TELEX number attention "Port Delfin Operations Center":

Port Delfin Operations Center TELEX Number: **(to be determined)**

RADIO CONTACT CALL SIGNS:

1. Call Sign FLNGV No 1 **(to be determined)**

2. Call Sign FLNGV No 2 **(to be determined)**
3. Call Sign FLNGV No 3 **(to be determined)**
4. Call Sign FLNGV No 4 **(to be determined)**

RADIO FREQUENCIES:
VHF-FM

- US Channel 10 156.500 MHz - Commercial
- US Channel 16 156.800 MHz – International Distress, Safety and Calling
- US Channel 74 156.725 MHz – Port Operations

5.2 Agent Notification: Advance Notice of Arrival to USCG

Prior to arrival at one of the Port Delfin FLNGVs, each LNGC is required to designate an agent responsible for official communications between the LNGC, the U.S. government, and Port Delfin. Each vessel's agent is obligated to meet the U.S. Coast Guard Advance Notice of Arrival Requirements described in 33 CFR 160 including submitting the following information shown in 33 CFR 160.206 at least 96 hours in advance if vessel arrival. A copy of the information submitted to the USCG should also be provided to Port Delfin Operations at least 96 hours in advance of vessel arrival. The following information should be provided to the USCG Vessel Movement Center or as currently provided in the regulations at 33 CFR 160.206 (or as subsequently updated by regulation):

(1) Vessel Information:

(i) Name;
(ii) Name of the registered owner;
(iii) Country of registry;
(iv) Call sign;
(v) International Maritime Organization (IMO) international number or, if vessel does not have an assigned IMO international number, substitute with official number;
(vi) Name of the operator;
(vii) Name of the charterer; and
(viii) Name of classification society

(2) Voyage Information:

(i) Names of last five ports or places visited;
(ii) Dates of arrival and departure for last five ports or places visited;
(iii) For each port or place in the United States to be visited list the names of the receiving facility, the port or place, the city, and the state;
(iv) For each port or place in the United States to be visited, the estimated date and time of arrival;
(v) For each port or place in the United States to be visited, the estimated date and time of departure;
(vi) The location (port or place and country) or position (latitude and longitude or waterway and mile marker) of the vessel at the time of reporting; and
(vii) The name and telephone number of a 24-hour point of contact

(3) Cargo Information:

(i) A general description of cargo, other than CDC, onboard the vessel (e.g.: grain, container, oil, etc.);
(ii) Name of each certain dangerous cargo carried, including cargo UN number, if applicable; and
(iii) Amount of each certain dangerous cargo carried

(4) Information for each Crewmember Onboard:
(i) Full name;
(ii) Date of birth;
(iii) Nationality;
(iv) Passport or mariners document number (type of identification and number);
(v) Position or duties on the vessel; and
(vi) Where the crewmember embarked (list port or place and country)

(5) Information for each Person Onboard in Addition to Crew:
(i) Full name;
(ii) Date of birth;
(iii) Nationality;
(iv) Passport number; and
(v) Where the person embarked (list port or place and country)

(6) Operational condition of equipment required by 33 CFR § 164.35

(7) International Safety Management (ISM) Code Notice:
(i) The date of issuance for the company's Document of Compliance certificate that covers the vessel;
(ii) The date of issuance for the vessel's Safety Management Certificate; and
(iii) The name of the Flag Administration, or the recognized organization(s) representing the vessel flag administration, that issued those certificates

(8) Cargo Declaration (Customs Form 1302) as described in 19 CFR 4.7

(9) International Ship and Port Facility Code (ISPS) Notice:
(i) The date of issuance for the vessel's International Ship Security Certificate (ISSC), if any;
(ii) Whether the ISSC, if any, is an initial Interim ISSC, subsequent and consecutive Interim ISSC, or final ISSC;
(iii) Declaration that the approved ship security plan, if any, is being implemented;
(iv) If a subsequent and consecutive Interim ISSC, the reasons therefor;
(v) The name and 24-hour contact information for the Company Security Officer; and
(vi) The name of the Flag Administration, or the recognized security organization(s) representing the vessel flag Administration that issued the ISSC.

5.3 FLNGV Notices of Arrival and pre-arrival Instructions

Port Delfin requires periodic notifications of projected LNGC arrival to conduct proper planning and logistics coordination. Accordingly, LNGCs scheduled to call on Port Delfin are required to provide the periodic advance notice of arrival messages described in Sections 5.3.1 through 5.3.5 below so that

appropriate arrangements for vessel arrival can be made. These communications will also allow Port Delfin to provide pre-arrival instructions to LNGCs calling at port facilities. The Advance Notice of Arrival messages described below shall be sent by the vessel or the vessel's agent to the following TELEX addresses:

1. Port Delfin Operations Center: TELEX No (TBD)
2. Port Delfin Vessel Traffic Control: TELEX No. (TBD)

5.3.1 Seven Day Advance Notice of Arrival

The master of an LNGC bound for Port Delfin should send an initial arrival advice message to the Port Delfin Operations Center and Port Delfin Vessel Traffic Control as close as possible to seven (7) days before the vessel's expected date of arrival, even if the ship is in another port at the time. If the LNGC's trip to Port Delfin is less than seven (7) days, the LNGC Master should also send another arrival advice message as soon as possible after leaving the previous port. Any notable particulars related to the condition of the vessel, her equipment, or personnel should be included.

5.3.2 Four Day (96 hour) Advance Notice of Arrival:

As described in Section 5.2 above, a copy of the Advance Notice of Arrival required by the USCG at 33 CFR 160.206 should also be provided to the Port Delfin Operations Center. The information currently required to be submitted by 33 CFR 160.206 is included in Section 5.2, however, each arriving vessel is independently responsible for meeting the requirements of these regulations. Any notable changes to the vessel's material condition (including propulsion, steering gear and key navigation equipment) or estimated time of arrival should be included. Any special requests for port services or exchange of personnel should also be described.

NOTE: DELFIN LNG WILL NOT SERVE IN THE CAPACITY OF THE LNGC'S AGENT FOR PURPOSES OF REQUIRED NOTIFICATIONS TO THE USCG AND OTHER GOVERNMENT AGENCIES.

5.3.3 Two Day (48 hour) Advance Notice of Arrival

Each LNGC should provide a two-day (48 hour) advance notice of arrival to the Port Delfin Operations Center and Port Delfin Vessel Traffic Control. Any notable changes to the vessel's material condition (including propulsion, steering gear and key navigation equipment) or estimated time of arrival should be included. Any special requests for port services or exchange of personnel should also be described.

5.3.4 One Day (24 hour) Advance Notice of Arrival

Each LNGC should provide a one-day (24 hour) advance notice of arrival to the Port Delfin Operations Center and Port Delfin Vessel Traffic Control. The one (1) day advance notice of arrival should include the ship's estimate of the GMT and local time of the vessel's arrival at the Port Delfin Mooring Master pickup station. Any notable changes to the vessel's material condition (including propulsion, steering gear and key navigation equipment) or estimated time of arrival should be included. Any special requests for port services or exchange of personnel should also be described.

5.3.5 Local VHF-FM Notice of Arrival

Each LNGC should begin making VHF-FM radio calls to Port Delfin Vessel Traffic Control when within 30 nm of the Port Delfin port complex. The LNGC should call Port Delfin Vessel Traffic Control on the following frequencies:

- US Channel 16 156.800 MHz – International Distress, Safety and Calling
- US Channel 74 156.725 MHz – Port Operations (Primary working frequency)
- US Channel 10 156.500 MHz - Commercial (Secondary working frequency)

The initial VHF-FM radio call should be made on VHF-FM Channel 16. The LNGC should be prepared to switch to VHF-FM channel 74 as a primary working frequency. Calls should be initiated approximately 30 nms from the Port Delfin port complex and continue at intervals not more than five (5) minutes in duration until contact is made between the LNGC and Port Delfin Vessel Traffic Control. If communications are not effective on VHF-FM channel 74, the LNGC should be prepared to immediately switch to VHF-FM channel 10 as a secondary working frequency. VHF-FM Channel 16 will be used as the contact and hailing channel between the LNGC and Port Delfin Vessel Traffic Control in the event that communication is lost or becomes ineffective on other designated channels (VHF-FM channel 74 and 10). In that case, suitable secondary channels will be agreed to on Channel 16 and communications then switched to the channel agreed.

Once VHF-FM communication between the LNGC and Port Delfin Vessel Traffic Control is established, the LNGC should be prepared to provide the following information:

1. Ship's name;
2. Ship's current position;
3. Ships current course and speed;
4. Ship's estimated time of arrival (GMT and local time) at the designated Port Delfin Mooring Master pickup station; and
5. Any vessel condition problems or malfunctions, particularly those associated with the ship's propulsion or steering gear.

5.3.6 Port Delfin Pre-Arrival instructions

After receiving any of the Advance Notice of Arrival messages described above, Port Delfin may take the opportunity to provide a return TELEX to the ship with any special instructions or advice as to equipment and procedures to be used during LNG transfer. This information may include some or all of the following:

1. Location and procedures for taking the Mooring Master on board the LNGC for arrival.
2. Basic vessel arrival procedures.
3. Equipment/connection specifications for LNG transfer arms/hoses.
4. Special instructions related to Port Delfin services and/or LNG transfer.

5.4 Radio Communications at the Port

5.4.1 General radio communications at the Port

Port Delfin Vessel Traffic Control guards the international calling frequency 156.800 MHz. Channel 16. Port Delfin's working frequencies are VHF Channel 74 (Primary), and Channel 10 (Secondary).

5.4.2 Radio frequencies for berthing

Once local VHF-FM communications are established between the LNGC and Port Delfin Vessel Traffic Control, a primary frequency will be designated for use in the port area. The identified frequency will normally be VHF-FM channel 74 with channel 10 designated as a backup and/or secondary frequency. Channel 74 will normally be used for local LNGC communications with Port Delfin Vessel Traffic Control and the Mooring Master until he boards the LNGC.

5.4.3 Radio frequencies for Mooring Master

Port Delfin Mooring Masters and support vessels will work on the following frequencies unless otherwise instructed:

- US Channel 74 156.725 MHz – Port Operations (Primary working frequency)
- US Channel 10 156.500 MHz - Commercial (Secondary working frequency)

5.4.4 Live VHF-FM radio watch required

All LNGCs calling at Port Delfin or any of the Port Delfin FLNGVs must maintain a live radio watch at all times monitoring the communications Port Delfin Vessel Traffic Control and any associated tugs and support vessels attending the port complex. Periodic radio checks between each LNGC and Port Delfin Vessel Traffic Control will be accomplished with the following interval between radio checks:

- Mandatory Radio Check every **(to be determined)** hours

5.4.5 Radio Frequency in case of communication loss/failure

In the event of a VHF-FM communication loss/failure, Port Delfin Vessel Traffic Control and support vessels will switch to and monitor the following channel until communications can be reestablished:

- US Channel 16 156.800 MHz – International Distress, Safety and Calling

6 Environmental and weather operating criteria

Detailed monitoring of weather conditions by Port Delfin and visiting LNGCs is essential for the safe and efficient operation of the Port Delfin port complex. As such, weather monitoring and careful attention to forecast weather conditions is a vital component of Port Delfin operations. Port Delfin has established nominal environmental and weather operating conditions that will be used to guide vessel berthing, LNG transfer, LNGC departure, and FLNGV storm evasion planning and operations. Maximum environmental and weather operating criteria are provided below to promote safe operation of the port. It should be noted that the LNGC master always retains independent responsibility to provide for the safety of the ship, her cargo, and crew.

6.1 Weather monitoring on site

There will be a weather station on board each FLNGV with the ability to record wind speed, water temperature, atmospheric pressure, relative humidity and other pertinent weather details. **Weather monitoring is the responsibility of each FLNGV Master and the marine crew will be required to make and record periodic weather observations,** in line with the "Flag State" requirements, in the FLNGVs log book related to estimated wave height and direction, observed currents, current wind speed and direction, visibility, and other pertinent observations.

In the case of a named storm warning the Port Delfin Vessel Traffic Control and the Port Delfin Operations Center (onshore base) will be alerted and the storm will be continuously monitored and tracked on the "Atlantic Hurricane Tracking Chart" issued by the National Hurricane center.

6.2 Weather forecasting services

In addition to monitoring and receiving the NOAA and National Hurricane Center forecast and warnings, Delfin LNG will also subscribe to private marine weather and hurricane forecasting services specialized in serving the Gulf of Mexico offshore oil and gas industry. The customized weather forecast will be provided to Port Delfin Vessel Traffic Control, the onshore Operations Center, and aboard each of the FLNGVs.

During hurricane season, and, in particular, when tropical and named storms arise, the forecast service will increase the forecasting frequency and the advice activity. In the case of named storms, the deployment of an experienced meteorologist to the Delfin LNG onshore Operations Center will be considered on an as needed basis. **Weather forecast will be continuously monitored by the Port Delfin onshore Operations Center and each FLNGV (including Port Delfin Vessel Traffic Control). The Port Delfin onshore Operations Center will ensure that each FLNGV is alerted to any rapidly changing weather conditions and forecasts.**

6.3 Maximum environmental criteria for operations

The particular environmental conditions and the consequential impact on the LNGC while berthed at Port Delfin FLNGV will depend on a number of factors. These factors include: size of the LNGC, the amount of cargo onboard, the direction and strength of the wind, the height, period, timing, and direction of the

waves and the strength and direction of the current. Depending upon the particular circumstances, other factors may have to be considered.

The **Table 6-3** will be used by Port Delfin Vessel Traffic Control, each FLNGV Master, and the Mooring Master in determining the safe operating envelop for various vessel transit maneuverers (LNGC berthing and departure) as well as continued LNG transfer and the possible need for an LNGC to depart the STS berth with the FLNGV to await suitable conditions to return to the Mooring and complete allow safe LNG transfer. The visibility and wind conditions described below will be used as guidance in determining appropriate environmental conditions for various operations, however, the FLNGV master, the LNGC master, and the Mooring Master have independent responsibility to assess the on scene conditions, including the motions of the vessels with the prevailing conditions, and depart from these recommended conditions when needed to ensure safe and efficient operations. While the following table describes actions to be taken depending upon steady wind speed, all factors (including waves and currents) have to be considered in determining the forces on the LNGC and the berthing lines. Thus, it is required that the FLNGV master, Mooring Master and the LNGC's Master will monitor each situation taking into consideration all factors. The final decision rests with the FLNGV master or his/her designee. **In all situations the responsibility of the LNGC master for the safety of the vessel, crew and cargo is not affected.**

Table 6-1 Maximum environmental criteria for operations

LNGC ACTIVITY	CONDITION	LNGC ACTION*
Approaching Terminal	Visibility less than **(TBD)** miles	Approach prohibited
Berthing	Winds above **(TBD)** Kts.	Berthing Prohibited
Cargo Transfer	Winds above **(TBD)** Kts.	Stop Cargo Transfer
Cargo Transfer	Winds above **(TBD)** Kts.	Disconnect hoses/arms
Tugs Connect to LNGC	Winds above **(TBD)** Kts.	Secure tug lines to LNGC
At Berth	Winds above **(TBD)** Kts.	LNGC Leaves Berth

Note: All winds are "sustained" winds defined as a constant velocity for a period of at least 10 minutes.

NOTE: MAXIMUM ENVIRONMENTAL OPERATING CONDITIONS WILL BE DETERMINED DURING FEED PHASE FOLLOWING COMPLETION OF COMPUTER SIMULATIONS OF MOORING, DEPARTURE AND STS MOTIONS IN VARIOUS CONDITIONS.

In implementing these operating procedures the FLNGV master and Mooring Master must remain alert for possible changes in the environmental conditions at the FLNGV (e.g. wind speed and direction, wave height and direction and current speed and direction). This may require the LNGC's departure from the FLNGV prior to reaching any one of the documented limits. When evaluating if the LNGC can safely remain at the

berth, the FLNGV master, Mooring Master, and LNGC Master should also take into consideration the NOAA weather forecasts for the next 12 – 24 hours.

6.4 FLNGV departure and storm evasion

Port Delfin has established design criteria which include maximum wave, current and wind loads where the FLNGVs will be capable of remaining on station either in a production or production suspended mode. Any predicted environmental conditions that could exceed the individual or combined environmental loads approved for remaining on station will initiate LNG production shut down, with the possibility of instituting disconnection and storm evasion procedures. The Port Delfin FLNGVs are self-propelled and appropriately crewed vessels capable of independent navigation, including storm evasion.

Meteorological forecasting services are provided specifically to the Port Delfin FLNGV Project and is received both onboard the FLNGV and at the Delfin LNG Operations Center on a continuous year round basis. The hurricane season is from June 1 to November 30, with peak from mid-August to November. The potential for tropical storm and hurricane development is carefully monitored by NOAA and the National Hurricane Center who issue warnings for named storms.

In case of a named storm warning the possibility of disconnection of the FLNGV will always be considered. The Master onboard the FLNGV is responsible for the safety and wellbeing of his crew and vessel and will be responsible for the decision and time for disconnection. The corporate management of Delfin LNG and the Manager of the Port Delfin Operations Center will also have the right to order FLNGV disconnection at their discretion.

6.4.1 Normal operation

The FLNGV when connected to the TYMS is designed to operate in the following condition and requirement:

- FLNGV remain on station in a 100-year winter storm condition.

6.4.2 Disconnection

The TYMS connector release mechanism shall be operational and able to disconnect the FLNGV in the following conditions and requirements:

- Sea states up to and including significant wave height, Hs of 4.5m, to be confirmed during detailed FEED and simulation studies.
- Final mechanical release operation should be less than 1 hour, excluding any required preparatory work.

6.4.3 Reconnection

The TYMS connector mechanism shall be operational and able to reconnect the FLNGV in the following conditions and requirements:

- Sea states up to and including significant wave height, Hs of 2.5m, to be confirmed during detailed FEED and simulation studies.

Table 6-4 from the Delfin LNG Foul Weather Plan (attached hereto as Appendix 1) describes the environmental criteria that will be used to consider FLNGV disconnection and the initiation of possible storm evasion procedures.

Table 6-2 Metocean Condition – FLNGV disconnect guidelines

Beaufort number	Description	Wind speed	Wave Height	Sea conditions	Disconnection Guideline
0	Calm	< 1 mph	0 m	Flat.	Normal Operations
		< 1 knot	0 ft		
1	Light air	1–3 mph	0–0.2 m	Ripples without crests.	
		1–3 knots	0–1 ft		
2	Light breeze	4–7 mph	0.2–0.5 m	Small wavelets. Crests of glassy appearance, not breaking	
		4–6 knots	1–2 ft		
3	Gentle breeze	8–12 mph	0.5–1.0 m	Large wavelets. Crests begin to break; scattered whitecaps	
		7–10 knots	2–3.5 ft		
4	Moderate breeze	13–18 mph	1–2 m	Small waves with breaking crests. Fairly frequent whitecaps.	
		11–16 knots	3.5–6 ft		
5	Fresh breeze	19–24 mph	2–2.5 m	Moderate waves of some length. Many whitecaps. Small amounts of spray.	
		17–21 knots	6–9 ft		
6	Strong breeze	25–31 mph	2.5–3.5 m	Long waves begin to form. White foam crests are very frequent. Some airborne spray is present.	Prepare the FLNGV for Disconnect if named storm warnings forecast in area
		22–27 knots	9–12 ft		
7	High wind, moderate gale, near gale	32–38 mph	3.5–4.5 m	Sea heaps up. Moderate amounts of airborne spray.	
		28–33 knots	13–17 ft		
8	Gale/fresh gale	39–46 mph	4.5–6.5 m	Moderately high waves with breaking crests forming spindrift. Considerable airborne spray.	FLNGV will normally be disconnected if named storm forecast to enter area
		34–40 knots	18–25 ft		
9	Strong/severe gale	47-54 mph	7–9 m	High waves whose crests sometimes roll over. Large amounts of airborne spray	
		41–47 knots	23–32 ft		
10	Storm/whole gale	55–63 mph	9–11 m	Very high waves with overhanging crests. Large amounts of airborne spray reduce visibility.	
		48–55 knots	29–41 ft		
11	Violent storm	64–72 mph	11–13 m	Exceptionally high waves. Very large amounts of airborne spray severely reduce visibility.	
		56–63 knots	37–52 ft		
12	Hurricane force	≥ 118 km/h	≥ 14 m	Huge waves. Sea is completely white. Air is filled with driving spray, greatly reducing visibility.	
		≥ 64 knots			

THE PORT DELFIN FOUL WEATHER PLAN CONTAINS ADDITIONAL ENVIRONMENTAL CRITERIA AND PROCEDURES RELATED TO FLNGV DISCONNECTION AND STORM EVASION AND SHOULD BE CONSULTED FOR DETAILED GUIDANCE.

[End of Section]

7 Port Delfin vessel navigation procedures

This Section describes the vessel navigation procedures (including operating limits and vessel monitoring and control) that applies at Port Delfin. These procedures apply to vessels calling at Port Delfin and to vessels that may approach or enter controlled areas at the port complex (including Safety Zones, Areas to be Avoided, and No Anchoring Areas).

7.1 Port Delfin Vessel Traffic Control

One of the Port Delfin FLNGVs will be designated as **"Port Delfin Vessel Traffic Control"**. Port Delfin Vessel Traffic Control will have overall responsibility for LNGC arrival and departure and for the employment of the tugs and other vessels supporting Port Delfin. Port Delfin Vessel Traffic Control is located offshore aboard FLNGV No. **(to be determined**). Each individual FLNGV will coordinate vessel movements within their respective Safety Zones and Areas to be Avoided; however, only one (1) of the FLNGVs will be designated Port Delfin Vessel Traffic Control and have overall responsibility for coordinating vessel arrivals and departures at the port complex.

7.1.1 Responsibility

Port Delfin Vessel Traffic Control coordinates all inbound and outbound vessel traffic and directs the use of tugs, support vessels, and the scheduling of Mooring Masters to be placed aboard incoming and departing LNGCs. Port Delfin Vessel Traffic Control has on-scene responsibility for directing vessel navigation at Port Delfin. Port Delfin Vessel Traffic Control coordinates vessel arrival/departure with the Port Delfin Operations Center (located on shore) but maintains overall control offshore. The Port Delfin Vessel Traffic Control Center is continuously manned and actively monitored (24 hours per day, 7 days per week, 365 days per year).

7.1.2 Communication equipment: Port Delfin Vessel Traffic Control maintains the following communication equipment

1. VHF-FM Marine Radios (with backup radio available)
2. TELEX receive/transmit station number **(to be determined)**
3. Satellite Telephone (with backup telephone available)
    a. Primary Satellite Telephone Number: **(to be determined)**
    b. Secondary Satellite Telephone Number: **(to be determined)**
4. Other Communications Equipment **(to be determined).**

7.1.3 Other vessel monitoring & identification equipment

Port Delfin Vessel Traffic Control (and each FLNGV) will also be equipped with the following equipment to allow vessel traffic monitoring identification:

1. **RADAR**: Two fully independent radar units (9 GHz X Band) that comply with the International Convention for Safety of Life at Sea (SOLAS) and USCG Deepwater Port regulations and that have integrated Automatic Radar Plotting Aids (ARPA) and associated collision avoidance capabilities.
    a. Characteristics of the radar: **(to be determined)**

b. Radar Antenna Location: **(to be determined)**

2. **RACON:** One Radar Beacon (RACON) per FLNGV with an integrated AIS transponder that provides the name of the Port Delfin Vessel Traffic Control FLNGV and each of the other FLNGVs. A RACON is a transmitter-receiver associated with a fixed navigational mark which, when triggered by a radar, automatically returns a distinctive signal which can appear on the display of the triggering radar, providing range, bearing and identification information. The RACON will meet the requirements of 33 CFR 149.580.

7.2 Navigation procedures

Port Delfin Vessel Traffic Control will coordinate all inbound and outbound vessel arrivals and departures, including LNGCs calling at the port complex and the use and employment of Port Delfin tugs and other support vessels. Port Delfin Vessel Traffic Control will coordinate operations with the Port Delfin Operation Center onshore. Individual FLNGVs will monitor and coordinate vessel traffic movements within the boundaries of their individual Safety Zones and ATBAs; however, Port Delfin Vessel Traffic Control will have overall responsibility for coordinating vessel movement in and around the port complex.

7.2.1 Traffic monitoring and control

Port Delfin Vessel Traffic Control and individual FLNGVs will maintain a visual, RADAR and radio watch/lookout to monitor the status of vessels operating within or near the port complex. Port Delfin maintains a VHF Maritime radio system capable of communicating with vessels other than LNGCs or Port Delfin support vessels if such vessels are equipped with compatible equipment. When necessary to communicate with vessels of unknown communication capabilities, Port Delfin Vessel Traffic Control and/or individual FLNGVs will attempt to contact the approaching vessel on VHF Channel 16. If radio communication is unsuccessful, a Port Delfin tug or other support vessel may be dispatched to advise the vessel of any potential danger to the vessel as observed by the Port Delfin Vessel Traffic Control or the corresponding FLNGV. As such, Port Delfin Vessel Traffic Control and individual FLNGVs will perform the following vessel traffic monitoring activities:

1. Maintain an active radio watch on VHF-FM Channel 16.
2. Maintain an active visual lookout.
3. Maintain an active radar watch monitoring the approach of all vessels into the port complex.
4. Approve authorized LNGC and support vessel traffic into the port complex and at individual FLNGVs.
5. Provide VHF-FM radio advice and warning to unauthorized vessels with the potential to enter a Port Delfin Area to be Avoided (ATBA) or Safety Zone.
6. Coordinate the dispatch of Port Delfin tugs or other support vessels to advise unauthorized vessels of the presence of the Port Delfin ATBAs and/or Safety Zones and to stand clear of these areas.
7. Coordinate communication with the USCG in the event that any vessel fails or refuses to cooperate with Port Delfin's request for the vessel to stand clear of the designated ATBA or Safety Zone.
8. Maintain an active watch to ensure that unauthorized vessels do not anchor in any of the designated No Anchoring Areas (NAAs).

7.2.2 LNGC operating limits and maneuvering capabilities

The environmental operating limits (winds waves, currents) for various operations at the Port Delfin port complex are described in Section 6, above. In addition the following additional operating limits apply:

1. **Maximum LNGC size**
    a. Nominal 177,000 cubic meters (M3) of LNG capacity.
    b. 950 feet length (approx.).
    c. 170 feet width (approx.).
    d. Vessels in excess of these dimension must be separately evaluated and approved.

2. **Maneuvering capability**
    a. Vessels propulsion equipment in good operating order.
    b. Vessel's steering gear equipment in good operating order.
    c. All bridge navigation equipment in good operating order.

3. **Draft and Under Keel Clearance**
    a. Maximum draft: 45 feet (unless individually approved otherwise).
    b. Minimum under keel clearance - 10 feet

7.2.3 Speed limits at Port Delfin

Port Delfin Vessel Traffic Control has established recommended speed limits for different classes of vessels operating within the ATBA and Safety Zones. In general, the following speed limits will apply unless otherwise authorized by the Mooring Maters or FLNGV master:

1. **LNGCs Speed limits Arriving**
    a. LNGC's will approach the Port Delfin complex within the Sabine Pass Safety Fairway arriving from the south. The ship will proceed to the Mooring Master pick up point located adjacent to the Sabine Pass Safety Fairway approximately 10 nms south of the port complex. Speed approaching the Mooring Master pick up point may be normal open sea transit speed.
    b. Approximately 10 to 12 nm south of the Port Delfin complex, the LNGC will reduce speed and slow to safe speed (while maintaining maneuverability) to pick up the assigned Port Delfin Mooring Master in an area adjacent to the Sabine Pass Safety Fairway.
    c. Once the Port Delfin Mooring Master is on board, the LNGC will re-enter the Sabine Pass Safety Fairway and proceed north in the fairway at a safe speed recommended by the Mooring Master (typically 10 knots or less).
    d. At a point in the Sabine Pass Safety Fairway approximately 4 nm from the Port Delfin port complex, the Mooring Master will recommend that the LNGC's speed be reduced and the vessel depart the safety fairway on a route that will set the vessel up for its final approach to the designated FLNGV. By this time, the tugs identified by the Mooring Master will be made fast to the LNGC.
    e. The Mooring Master will direct when Port Delfin tugs will be made fast to the LNGC (typically 1 nm or more from the designated FLNGV).

f. Upon reaching the ATBA boundary (approximately 1 kilometer from the FLNGV) the LNGC should have reduced speed to bare steerageway and the attached tugs should have positive control of the ship.
g. Upon reaching the boundary of the Safety Zone (approximately 500 meters from the FLNGV), the LNGC should be at stop or bare steerageway and under the control of the mooring tugs. The LNGC will respond to propulsion request and steering orders relayed by the Mooring Master.
h. The LNGC will be gently moved into the berth with the FLNGV primarily under control of the attached tugs and under the orders of the Mooring Master.

2. **LNGCs Speed limits Departing**
   a. The Mooring Master will be on board the LNGC.
   b. The LNGC will be attached to tugs as designated by the Mooring Master in preparation for departure.
   c. The LNGC mooring lines will be taken in and the attached tugs will gently pull the LNGC from the berth.
   d. Once on a safe heading, the LNGC will begin making way at slow speed (as directed by the Mooring Master) to proceed towards the Sabine Pass Safety Fairway.
   e. Once the LNGC is approximately 1 nm from the FLNGV, the tugs will be released and the Mooring Master will be dropped off.
   f. The LNGC will proceed at a safe speed into the Sabine Pass Safety Fairway.
   g. Once in the Sabine Pass Safety Fairway, the LNGC will be independently navigating and will proceed at a safe speed and direction determined by the vessel's master.

3. **Port Delfin Support Vessels**
   a. Port Delfin support vessels will proceed at a safe speed approved by Port Delfin Vessel Traffic Control whenever operating within the ATBA and Safety Zones.
   b. Support vessels will normally run less than 10 knots in the ATBA.
   c. Support vessels will normally operate at slow speed or bare steerageway within the designated Safety Zones.

7.2.4 Required Equipment in Safety Zone and ATBA

Any vessels operating within the Safety Zone and/or ATBA at Port Delfin must be equipped with the following equipment:

1. VHF-FM radio with ability to communicate on standard U.S. frequencies including Channel 16.
2. At least one fully operational radar unit
3. Propulsion equipment in good operating order
4. Steering gear in good operating order.

7.2.5 Measures for routing vessels

The measures for routing vessels at the Port Delfin port complex are generally described in Section 7.2.1, above. These measures include monitoring the surrounding waters visually, by radar, and keeping watch in VHF-FM radio. Port Delfin Vessel Traffic Control is responsible for general vessel routing and control at the port complex and manages the logistics and employment of Mooring Masters, Assistant Mooring

Masters, and support vessels (tugs, crew boats, etc). Each FLNGV will monitor and control vessel movements within the FLNGV's designated Safety Zone and ATBA in coordination with Port Delfin Vessel Traffic Control. Vessels operating within the Safety Zone or ATBA must be cleared in advance by Port Delfin Vessel Traffic Control or the individual FLNGV, if such clearance authority is delegated to individual FLNGVs. Pursuant to 33 CFR 150.15(i)(4), the following specific measures for routing vessels at Port Delfin apply:

1. **Description of the Radar Navigation System:** The radar navigation system is described in Section 7.1.3, above.

2. **Procedures for Surveillance of Vessels Transiting Safety Zone and ATBA:** Port Delfin Vessel Traffic Control will monitor the surrounding waters visually, by radar, and by keeping watch in VHF-FM radio. Each vessel will be identified by name or call sign and the requested vessel routing approved in advance by Port Delfin Vessel Traffic Control via VHF-FM radio.

3. **Advisories to LNGCs in the Safety Zone:** Per 33 CFR 150.320, each LNGC underway in a Safety Zone or ATBA will be provided the following information by Port Delfin Vessel Traffic Control, the designated FLNGV, or the Mooring Master on board:
    a. At intervals not exceeding 10 minutes, the vessel's position by range and bearing from the pumping platform complex; and
    b. The position and the estimated course and speed, if moving, of all other vessels that may interfere with the movement of the tanker within the safety zone or area to be avoided.

4. **LNGC Notices of Arrival & Condition:** Each LNGC is independently responsible for providing the USCG the Advance Notice of Arrival information described at 33 CFR 160 Subpart C.

5. **LNGC Navigation within the Safety Zone and ATBA:** Any LNGC underway within a Port Delfin Safety Zone or ATBA will operate with a Port Delfin assigned Mooring Master on board to provide navigation advice and assistance. Mooring and departure from an LNGC will occur under the direction and advice of a Port Delfin Mooring Master.

6. **Anchoring within a Port Delfin Safety Zone or ATBA:** Port Delfin Safety Zones and ATBAs are also within the limits of a designated No Anchoring Area. The No Anchoring Area coincides with the limits of the ATBA. As such, anchoring within the Safety Zone or ATBAs of the Port Delfin FLNGVs is prohibited except in emergencies.

7. **Weather Limits for LNGCs:** The weather limits and environmental criterial for LNGC operations at Port Delfin are included in Section 6.

8. **Special Illumination Requirements:** The Pre-Arrival check list will include a request that the Master of the LNGC confirm that the lights and general illumination capabilities of the LNGC meet all of the U.S. regulations and conforms to the Oil Companies International Marine Forum

(OCIMF) recommendations. This is especially important in the manifold area. Further, adequate lighting is to be available to facilitate ease of monitoring the berthing system. (REF: 33 CFR 33.127.109). In addition to the lights usually displayed, tankers are required to furnish adequate additional lighting for night operations including:

a. Proper safety lighting of the accommodation ladder for personnel embarkation and debarkation. This is particularly essential for arriving and departing tankers when the Mooring Master and Assistant Mooring Master board or depart the tanker. A deck officer is required to supervise these procedures.
b. Lighting of the forecastle area.
c. Lighting of areas encompassing the derricks, deck, and water during equipment and hose handling operations.
d. Lighting to illuminate the cargo manifold.
e. Portable or hand-held safety lanterns for inspections and other deck activities that may require particular attention.

9. **Special Watchstanding Requirements: (to be developed)**

[End of Section]

8 Cargo transfer procedures

NOTE: DETAILED CARGO TRANSFER PROCEDURES WILL BE PREPARED DURING THE PORT DELFIN FLNGV FEED PROCESS AS ADDITIONAL INFORMATION AND SPECIFICATIONS FOR LNG TRANSFER EQUIPMENT ARE DEVELOPED. THE FOLLOWING GENERIC CARGO TRANSFER PROCEDUDES ARE PROVIDED AS A BASELINE FROM WHICH TO PREPARE MORE REFINED GUIDANCE.

This Section describes the general procedures and requirements associated with LNG transfer operations at Port Delfin FLNGVs. These procedures include the preparations, inspections, and mutual agreements that must be conducted between the LNGC and the FLNGV to initiate, continue, and complete a transfer of LNG between the vessels. The procedures for cargo transfer must comply with the applicable requirements of 33 CFR 127 subpart B (Operations) for natural gas.

8.1 Requirements for cargo transfer

Each transfer of LNG at a Port Delfin FLNGV must meet the requirements for natural gas transfer in accordance with 33 CFR 127, Subpart B, including:

8.1.1 Pre-transfer conference

An effective and complete pre-transfer conference must be held between the Person in Charge (PIC) of the cargo transfer on board the LNGC and the corresponding PIC of the LNG cargo transfer on board the FLNGV.

8.1.2 Inspection of transfer site and equipment

The PIC of the LNGC and the PIC of the FLNGV must conduct comprehensive inspections of the LNG transfer site and equipment including hoses, manifolds, connectors, closure devices, leak monitoring devices and spill containment.

8.1.3 Transfer equipment connections

The PICs on board the LNGC and the FLNGVs must ensure that the procedures for connecting and disconnecting cargo transfer hoses, loading arms, and related equipment are followed.

8.1.4 Purging of cargo transfer lines

The PICs on board the LNGC and the FLNGVs must ensure that the procedures for purging cargo transfer lines to test for leaks and to prepare for cool-down or heat-up phases are satisfactorily completed.

8.1.5 Declaration of Inspection

The PICs on board the LNGC and the FLNGVs must ensure that the Declaration of Inspection concerning the cargo transfer is prepared and signed by both sides prior to the introduction of any LNG into the cargo transfer lines.

8.1.6 Supervision by Person in Charge

Each LNG transfer must be supervised at all times by a qualified person in charge on the LNGC and a separate qualified Person in Charge aboard the FLNGV.

8.2 Additional LNG transfer requirements

In addition to the items listed above, the following additional requirements must be satisfactorily completed prior to LNG cargo transfer operations:

8.2.1 Shipping Name and Material Safety Data Sheet

The shipping name and Material Safety Data Sheet for Liquefied Natural Gas are shown below:

1. **Shipping Name:** Liquefied Natural Gas
2. **Material Safety Data Sheet:** Prior to or during the pre-loading conference, the FLNGV Person in Charge will provide to the Master of the LNGC the appropriate completed Material Safety Data Sheets form for the liquefied natural gas cargo being discharged.

8.2.2 Duties, Titles and Qualifications of the Person in Charge

Those individuals on board Port Delfin FLNGVs designated as "Person in Charge" of LNG transfer will have the duties, titles, and qualifications described below:

1. Person in Charge Duties:
    a. During the entire cargo transfer there shall always be PIC's in the transfer area of both the LNGC and the FLNGV.
    b. Additional Duties **(to be provided)**
2. Person in Charge Title: **(to be provided)**
3. Person In Charge Qualifications: **(to be provided)**

8.2.3 Minimum requirements for personnel on watch during LNG transfer

The following personnel will be on watch during LNG transfer on the FLNGV and the LNGC:

1. **On watch on the FLNGV:**
    a. A licensed deck officer standing a radio and radar watch on the bridge.
    b. A separate qualified Person in Charge of the LNG transfer.
    c. Two unlicensed merchant mariners (seamen) to assist with monitoring mooring gear and to assist the deck officers and PIC as needed.
    d. One license engineer to assist with cargo pumps and other engineering equipment.

2. **On watch on the LNGC:**
    a. A licensed deck officer standing a radio and radar watch on the bridge.
    b. A separate qualified Person in Charge of the LNG transfer.
    c. Two unlicensed merchant mariners (seamen) to assist with monitoring mooring gear and to assist the deck officer and PIC as needed.

d. One licensed engineering officer to maintain propulsion and steering gear on standby and assist with other engineering needs.

8.2.4 Procedures for Startup and Completion of Pumping

The following procedures will be followed for the startup and completion of pumping:

1. Startup of Pumping: see Table 12-1 (transfer hose connection) and Table 12-2 (cargo transfer procedures in Section 12).
2. Completion of Pumping (See Table 12-3 "Preparation and Disconnection" in Section 12.

8.2.5 Procedures for Emergency Shutdown

The following procedures will be followed for Emergency Shutdown:

1. Port Delfin will provide each FLNGV a remotely operated Emergency Shutdown Signaling Device to be kept in the LNGC's Cargo Control Room. Activation of this alarm requires an immediate, rapid stopping of the pumping operation aboard the FLNGV. The Mooring Master or other designated Port Delfin specialist will explain the use of the Emergency Shutdown Signaling Device.
2. Addition information on Emergency Shutdown: **(to be determined)**

8.2.6 Maximum relief valve settings and maximum allowable working pressure

The maximum relief valve settings and maximum allowable working pressures for the LNG transfer system on board the FLNGV is provided below:

1. The maximum relief valve settings: **(to be provided)**
2. Maximum allowable working pressure: **(to be provided)**

8.2.7 Special equipment required to conduct LNG transfer

Specialized equipment needed by the LNGC or FLNGV to conduct cargo transfer include the following:

1. Piping **(to be developed)**
2. Adapters **(to be developed)**
3. Bolted Flanges **(to be developed)**
4. Quick Disconnect Couplings: **(to be developed)** to the maximum relief valve.

9 General requirements for LNGCs calling at Port Delfin

LNGCs calling at Port Delfin are required to meet the mandatory design, safety, and pollution prevention standards described by applicable international conventions (e.g. SOLAS, International Gas Carrier Code, and the International Convention for the Prevention of Pollution from Ships – MARPOL). LNGCs calling at Port Delfin are also required to maintain compliance with the mandatory provisions of an International Association of Classification Societies (IACS) member classification society (i.e. maintain good standing in "class"). Further, these vessels must meet the provisions of U.S. law and regulation that apply to tank ships carrying liquefied natural gas in U.S. waters, including obtaining a USCG issued Certificate of Compliance (COC) and submitting to required periodic inspections to keep the COC in force. These and other requirements applicable to LNGCs calling at Port Delfin FLNGVs are described in further detail in the sections below.

9.1 Requirements for LNGCs calling at Port Delfin

9.1.1 International standards, classification and regulations

The LNGC Owner/Operator is at all times responsible for meeting applicable international standards, the requirements of the vessel's flag state, classification society and the USCG for a vessel calling in U.S. waters and receiving a cargo of LNG. This includes but is not limited to the following:

1. Compliance with all USCG Advance Notice of Arrival (NOA) regulations in 33 CFR 146 and 160.

2. Compliance with applicable U.S. regulations for a vessel carrying LNG as cargo in U.S. waters including obtaining and maintaining a current Certificate of Compliance pursuant to 46 CFR 154 Subpart A through F. Delfin will not be responsible for scheduling necessary inspections with the USCG to maintain the currency of the visiting LNGC's Certificate of Compliance.

3. Compliance with applicable flag state and classification society requirements related to construction, operation, and maintenance of the LNGC to authorize carriage, transportation, and transfer of LNG as cargo.

4. Compliance with all other applicable U.S. regulations related to vessel safety, security, operations, and pollution prevention and response including but not limited to the following:

    a. 33 CFR 101-107 – Maritime Security
    b. 33 CFR 127 – Waterfront Facilities Handling Liquefied Natural Gas And Liquefied Hazardous Gas (cargo transfer provisions)
    c. 33 CFR 151 and 153 – Pollution Prevention and Response Requirements
    d. 33 CFR 155 and 156 Oil and Hazardous Material Transfer Regulations
    e. 33 CFR 160 – Ports and Waterways Safety (including Notice of Arrival)
    f. 33 CFR 164 – Navigation Safety Regulations

9.1.2 General condition of LNGCs calling at Port Delfin

LNGCs calling at Port Delfin will be required to meet the following general conditions:

1. **Seaworthy and No Pollution:** The LNGC shall be seaworthy, have a fit crew, and not be leaking oil and not be in a condition which presents a risk or threat of a prohibited oil discharge.

2. **No Stern Tube Leakage:** Prior to arrival, the LNGC Master shall ensure that the vessel does not have stern seal leakage. Stern seal pressure shall be monitored throughout the cargo discharge to ensure that changes in draft or trim do not cause a stern seal leak.

3. **Clean Hull:** Hulls of tankers calling at Port Delfin shall be free of obstructions, (e.g., barnacles) which could cause damage to marine hoses, pollution, or injury to personnel.

4. **Accommodation Ladders Port and Starboard:** Size, draft, and maneuvering requirements of vessels calling at Port Delfin may not always allow the ship to create a lee side for Mooring Master boarding by alteration of heading alone. Therefore, Port Delfin REQUIRES THAT ALL LNGCs USING THE PORT BE EQUIPPED WITH ACCOMMODATION LADDERS ON THE PORT AND STARBOARD SIDES, LEADING AFT

5. **Condition and Illumination of Pilot & Accommodation Ladders:** All pilot and accommodations ladders must be clean, in good condition, and comply with all existing International Maritime Organization SOLAS requirements. The accommodation ladder must lead aft. Adequate light shall be provided so that the pilot and accommodation ladders and the position where personnel board the ship will be properly illuminated.

6. **LNGC Boarding Supervision by Deck Officer:** The boarding of the Mooring Master or other Port Delfin personnel should be directly supervised by a responsible deck officer on board the LNGC.

7. **General Lighting Requirements:** In addition to the lights usually displayed, LNGCs are required to furnish adequate additional lighting for night operations including:

    a. Proper safety lighting of the accommodation ladder for personnel embarkation and debarkation. This is particularly essential for arriving and departing tankers when the Mooring Master and Assistant Mooring Master board or depart the tanker. A deck officer is required to supervise these procedures.

    b. Lighting of the forecastle area.

    c. Lighting of areas encompassing the deck, and water during equipment and hose handling operations.

    d. Lighting to illuminate the cargo manifold

    e. Portable or hand-held safety lanterns for inspections and other deck activities that may require particular attention.

9.1.3 Other requirements for LNGCs calling at Port Delfin

The following additional requires will apply to LNGCs calling at Port Delfin:

1. **Safety Equipment Operating Properly:** All installed safety, emergency, lifesaving and firefighting equipment are operating properly.

2. **Navigation Equipment Operating Properly:** All navigation equipment is operating properly and meets applicable standards.

3. **Propulsion and Steering Gear Operating Properly:** All propulsion and steering gear systems on board are operating properly.

4. **Maintain Readiness to Get Underway:** Vessels berthed at the Port Delfin FLNGVs must maintain engines and propulsion machinery and emergency towing equipment in readiness to clear the Port Delfin FLNGV or port complex under full power on short notice. No repairs are permitted which would interfere with this requirement. Vessel trim and draft should also be considered in determining vessel maneuvering capability. Masters of tankers are advised to have sufficient personnel aboard and on watch to enable them to depart upon advice from Port Delfin Vessel Traffic Control. The master of a LNGC may, in an emergency for the protection of life or property, depart without clearance from the Port Delfin Vessel Traffic Control if the LNGC Master advises Vessel Traffic Control of the circumstances by radio at the earliest moment.

5. **LNGC Maintained in a Seaworthy Condition:** The LNGC Master is to maintain the vessel in a seaworthy condition and ready to sail and maneuver at all times. Port Delfin is in the open sea and IS NOT A HARBOR.

6. **Comply with IMO Emergency Towing Requirements:** Port Delfin employs tugs to assist with berthing, provide escort and, if required, assist with emergency towing response to disabled tankers. For emergency towing response to be effective, Port Delfin requires all LNGC tankships calling at the Port to be fitted in accordance with IMO Assembly Resolution A535(13) “Recommendations on Emergency Towing Requirements for Tankers”.

7. **Provide Accommodations for the Mooring Master or Assistant Mooring Master:** LNGCs calling at Port Delfin must provide meals and accommodations for the Mooring Master, Assistant Mooring Master, and the Deck Watch during their time on board and for an independent cargo inspector (when required) during their required time onboard.

8. **Pre-Planning of Berthing Arrangements:** The proposed berthing arrangements for each LNGC will be determined prior to or at least when the carrier is designated to discharge at the Port Delfin FLNGV. If there are any conditions on the LNGC, as outlined in the 96 hour Advance Notice of Arrival, that require reconsideration of the base plans, alterations to the berthing plan can be made. Berthing plans shall be coordinated in advance with Port Delfin Vessel Traffic Control and the Port Delfin Operations Center by the LNGC Master or via the ship’s agent.

10 Port Delfin services and port policy

The following general polices apply at the Port Delfin port complex.

1. **One LNGC per FLNGV:** Only one LNGC will be allowed at each of the FLNGVs at any one time. No LNGC will be allowed to commence an approach to an individual FLNGV until the previous LNGC has departed the port complex and re-entered the Sabine Pass Safety Fairway.

2. **LNGCs must designate and use a U.S. shipping agent:** Delfin LNG will not serve as the LNGC's U.S. agent.

3. **No LNGC anchoring at the port complex:** Port Delfin has no designated anchorages associated with the port complex. LNGCs that wish to anchor must use existing designated anchorages outside of the port complex such as the anchorage adjacent to the Sabine Pass Safety Fairway locatd approximately 12 NM northwest of Port Delfin.

4. **No LNGC bunkering at the port complex:** Port Delfin will not approve bunking operations aboard the LNGC while the ship is moored to the FLNGV or within the port complex. Bunkering should be arranged by the LNGC's U.S. agent and occur outside the port complex.

5. **Delivery of supplies to LNGCs:** Deliveries of supplies to the LNGC while conducting cargo transfer operations at a Port Delfin FLNGV is strongly discouraged. Requests to approve the delivery of supplies to the LNGC while moored to any Port Delfin FLNGV should be submitted to Port Delfin Vessel Traffic Control. No supplies may be delivered to a LNGC moored at a Port Delfin FLNGV without the express approval of Port Delfin Vessel Traffic Control, or the Port Delfin onshore Operations Center. Approval or denial of any request is at sole discretion of Port Delfin.

6. **Crew member medical evacuation:** While at Port Delfin, no crew members from the LNGC will be allowed to depart the vessel, except for medical evacuations with notification to Port Delfin in advance. All such medical evacuations when required, will be fully coordinated by the vessel or the vessel's agent in advance; including obtaining the necessary approvals from the appropriate agencies of the U.S. Department of Homeland Security.

7. **Other crew member transfers:** It is Port Delfin's policy to not allow routine crew member change-outs or transfers while at Port Delfin. When necessary, crew member transfers may occur outside the limits of Port Delfin, but only following coordination and approval of the appropriate agencies of the U.S. Department of Homeland Security.

LNGC equipment repairs: Repairs to LNGC equipment that would take vital propulsion, steering, navigation, or cargo control systems off line are prohibited while berthed at an FLNGV or within the port complex. Requests to approve repairs of other LNGC equipment while moored to any Port Delfin FLNGV should be submitted to Port Delfin Vessel Traffic Control. No equipment repairs or servicing will be permitted without the express approval of Port Delfin Vessel Traffic Control, or the Port Delfin onshore Operations Center.

[End of Section]

11 General LNGC operational sequence

This chapter describes the Port Delfin operational procedures using a tabular format. These procedures are subject to modification based on experience and optimizing port operations. A typical LNGC cargo loading operation will take about 36 hours from the time the LNGC enters the Safety Zone of the FLNGV until the loaded vessel departs. The typical LNGC loading operation will follow the sequence shown in **Table 11-1**, below.

Table 11-1 LNGC operational sequence at Port Delfin

No.	Vessel Type	Activity	Speed (knots)	Duration (hours)	Acc. Hours
1	Support/Crew Vessel	Mobilize Berthing Master + Deputy			
		Depart Cameron to meet and board LNGC	20	3.0	-6.0
		Maneuver and board LNGC ~10nm off		1.0	-2.0
4	Tug Vessels	Mobilize Tugs for Operation			
		Depart Cameron to meet LNGC	10	5.0	-6.0
		Meet LNGC ~1nm off			-1.0
		Hook up tugs to LNGC and assist approach		1.0	0.0
1	LNGC	LNGC operations			
		LNGC Arrival at Safety Zone	2-3		**0.0**
		Berthing LNGC		3.0	3.0
		LNGC fast alongside		0.0	3.0
		Pre-LNG transfer conference		1.0	4.0
		Safety inspection (in parallel)		0.5	4.0
		Connect and purge hoses		3.0	7.0
		Hose cool down and leak test		1.0	8.0
		LNG Transfer (170,000m^3)			
		Ramp up		1.0	9.0
		~Full rate 8-9,000m^3		21.0	30.0
		Top off		2.0	32.0
		LNGC disconnect			
		Purge and disconnect hoses		3.0	35.0
		Reconnect two tugs for departure assist		0.5	35.5
		Disconnect moorings and maneuver off		0.5	36.0
		LNGC sail away - outside Safety Zone		0.0	36.0
4	Tugs	Tugs Demobilize			
		Tugs disconnect from LNGC at ~1.0 nm		1.0	37.0
		Return to Cameron Base Port		5.0	42.0
1	Crew Vessel	Support Vessel Demobilize			
		Berthing Master + Deputy depart ~1.0 nm		1.0	37.0
		Return to Cameron Port		3.0	40.0

Acc hours = accumulated hours
LNG = liquefied natural gas
m^3 = cubic meters
nm = nautical mile

Note: The number of tugs required for any operation will be as specified in the Port Operations Manual (Conditions of Use) and at the discretion of the respective FLNGV/LNGC Masters in consultation with the Mooring Master according to the conditions existing at the time.

Times noted above are estimates only and may vary depending on weather conditions and other operational factors.

11.1 FLNGV pre-arrival procedures

The FLNGV pre-arrival procedures are shown in **Table 11-2**.

Table 11-2 FLNGV pre-arrival procedures

Task	Description
Deploy Fenders	Lower fender arrangement into position from safe storage position.
Quick Release Hooks/ Capstans	Checked and available for use.
FLNGV Heading Control	FLNGV heading control using FLNGV thruster and/or tug in combination as required.
Prepare Connection Equipment	Check and preparation of all equipment to be used.
Liquid Line Cool Down	Cool-down of FLNGV liquid transfer lines to -120°C.
Cargo Tank Vapor Pressure Control	Effective control of the cargo tank pressure on the FLNGV.

Key:
°C = degrees Celsius
FLNGV = floating liquefied natural gas vessel(s)

11.2 Entrance to Port Delfin FLNGV

All LNGCs arriving at Port Delfin will have onboard a Port Delfin Mooring Master/Assistant Mooring Master as a navigation advisor for approach and mooring at one of the FLNGVs. The Mooring Master/Assistant Mooring Master is a Port Delfin employee or contractor with specialized skills and abilities in large vessel maneuvering and docking. The Mooring Master is equivalent to a harbor pilot in inland waters. The role of the Mooring Master/Assistant Mooring Master is to meet the incoming LNGC approximately 10 nms from the Port Delfin terminal, to board the incoming vessel and to assist the LNGCs master in bringing the vessel to the selected Port Delfin FLNGV and ensuring the vessel is safely moored. The Mooring Master/Assistant Mooring Master will direct the use of the Port Delfin tugs to ensure safe mooring of the LNGC.

LNGCs approaching Port Delfin are advised to use the Sabine Pass Safety Fairway to approach the port from the south. An example of typical LNGC approaches to selected Port Delfin FLNGVs is shown in **Figure 11-1**, below. It should be noted that the arrival routes depicted in this figure are "typical" and are likely to vary depending upon the prevailing conditions of wind, waves, and current.

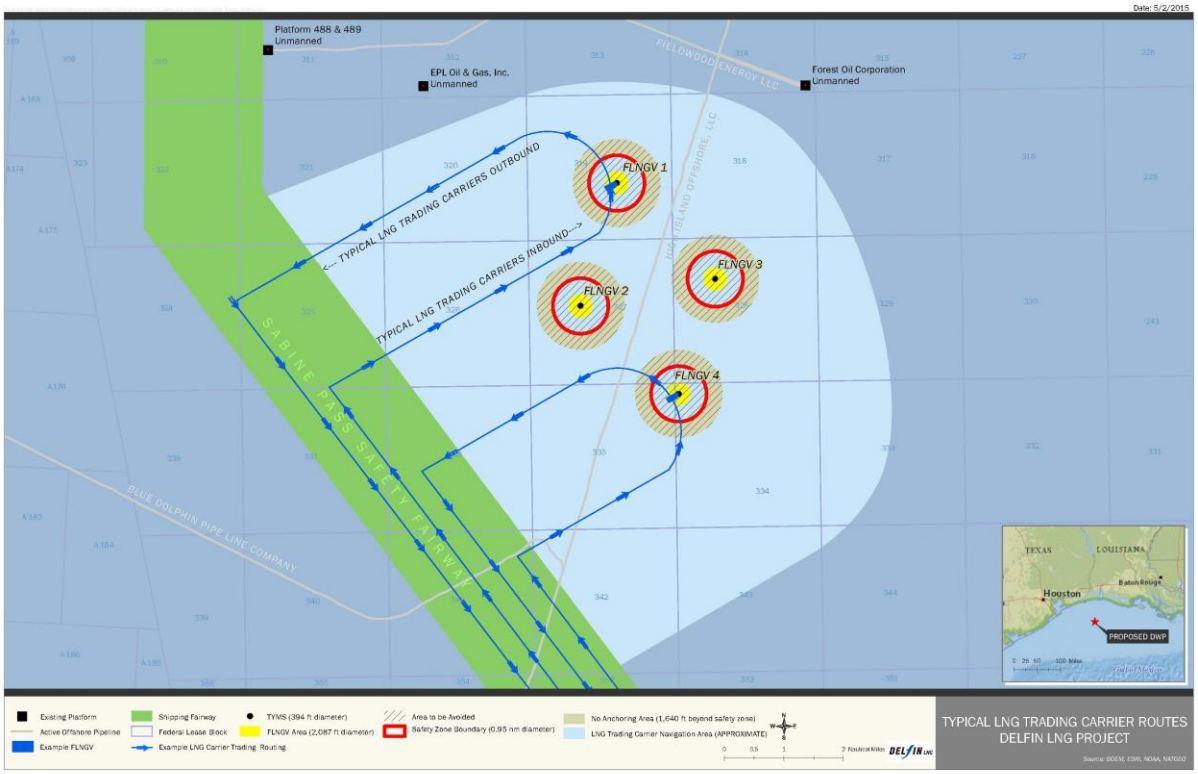

Figure 11-1 Vessels entering the Port Delfin FLNGV area

The operational procedures for an LNGC arriving at Port Delfin are shown in **Table 11-3**, below.

Table 11-3 LNGC arrival procedures

Task	Description
FLNGV Readiness	Starting in due time, pending weather forecast and operational status of the FLNGV, the LNGC to receive continuous information on whether go to standby or berthing starts immediately.
Mooring Master Boarding LNGC	FLNGV Mooring Master/Assistant Mooring Master boards LNG vessel, e.g., ~10nm off location.
Vessel Inspection	Inspection of LNGC mooring areas and manifold by Mooring Master or Assistant Mooring Master and LNGC officer.
Interface Meeting	Pre-berthing and cargo transfer meeting to be undertaken between all parties, including FLNGV Master, LNGC Master, and Mooring Master, and cargo surveyor (if any). Berthing procedures agreed upon (conducted by radio or mobile telephone).
STS Checklist	Completion of STS Safety Checklist. "Ship/shore" safety checklists and verification checks, with briefing of LNGC crews on berthing procedures will be undertaken prior to commencing the LNGC approach.
Liquid Line Cool Down	Cool-down of LNGC liquid lines to -120°C as agreed during pre-arrival communications and/or per the relevant charter party.
Cargo Tank Vapor pressure Control	Effective control of the cargo tank pressure on the LNGC.

Connect Tug Boats	Connect the tugs approximately 1nm off location.
LNGC Approach (tug assisted)	Tugboats assist LNGC into position for commencing mooring. LNGC typically approach from aft, stern tug constantly pulling astern so the LNGC can be controlled using engine and rudder. Assistance by use of the bow tug as required. The third tug (optional) may be required to assist in transverse berthing with a final berthing speed of 0.1 knots onto the fenders.

Key:
°C = degrees Celsius
FLNGV = floating liquefied natural gas vessel(s)
LNG = liquefied natural gas
nm = nautical mile
STS = ship to ship

11.3 LNGC berthing procedure

The vessel mooring procedures are shown in **Table 11-4**.

Table 11-4 Vessel Berthing Procedures

Task	Description
Agreed Berthing Plan	All parties agree on berthing plan and sequence of connection agreed to, communications tested. The LNGC is moored using its own mooring lines and winches, with each line secured to a quick release hook.
Port Safety Procedures	Notifications and reports of all vessel movements and operations within the port will be made in accordance with the procedures described in the Port Operations Manual and the requirements of USCG.
Commence Berthing	FLNGV to monitor own heading and movements. LNGC mooring lines passed to the FLNGV according to the direction of the Mooring Master/Assistant Mooring Master. The objective should be to have first lines secured on the FLNGV prior to fender contact – to control any tendency for "bounce" on the fenders, and to maintain manifold alignment.
Vessel Line Up	When LNGC has lines attached to the FLNGV, line up of manifolds required. Mooring lines used to bring the LNGC into position aligned with the cargo manifold. Once in position, moorings pre-tensioned
In Position/All Fast	Both vessels to monitor lines and ensure position maintained
Safety Boat in Position	A standby tug will remain on station during entire operation
Traffic Monitoring	FLNGV to monitor vessel movements in vicinity/Safety Zone visually and by radar, including use of VHF radio communications when required.

Key:
FLNGV = floating liquefied natural gas vessel(s)
LNG = liquefied natural gas
USCG = U.S. Coast Guard
VHF = very high frequency

12 LNG transfer procedures at berth

Once the LNGC has entered the port complex and is safely moored at one of the FLNGVs, the process of connecting and verifying the integrity of the LNG transfer system will occur. This process is critical to a safe and efficient transfer of LNG cargo from the FLNGV to the LNGC. The Sections below describe the LNG transfer hose/loading arm connection, the basic LNG transfer procedures and also include the LNG transfer disconnection and the LNGC departure from the port.

12.1 Schematic overview – FLNGV and LNGC moored side-by-side

A graphic of one of the FLNGVs with a LNGC moored along its starboard side is provided in **Figure 12-1** below:

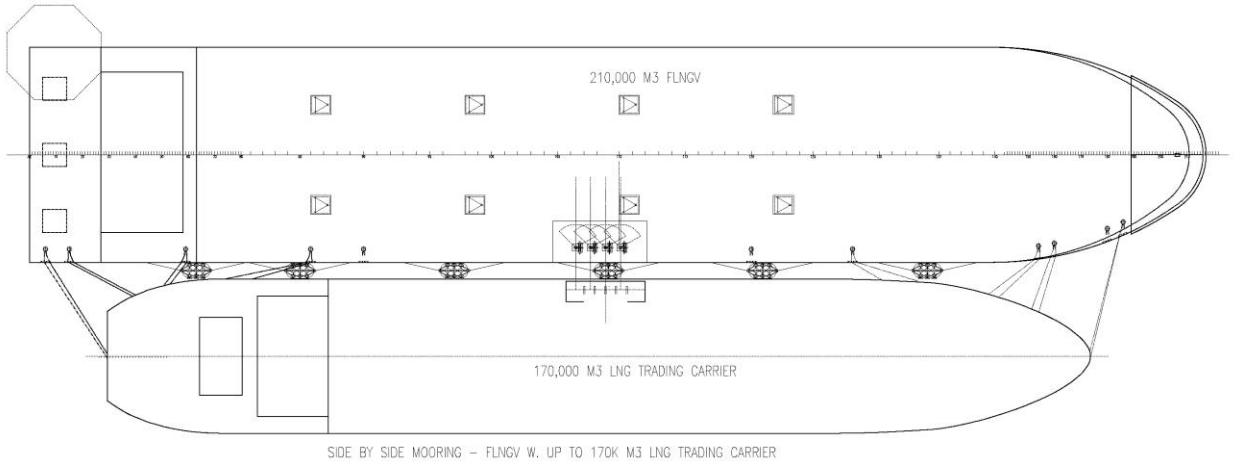

Figure 12-1 Overview of FLNGV with LNGC moored on starboard side

12.2 Transfer hose connection

The connection procedures for LNG ship-to-ship (STS) transfer is described in **Table 12-1**, below.

Table 12-1 LNG Transfer Hose Connection

Task	Description
Equipment Transfer	Transfer of STS equipment from the FLNGV to the LNGC, including personnel to direct/assist connection. Detailed list and sequence of equipment transfer to be developed.
Hose Connection	Vapor hoses first, then outwards from center of manifold.
Hose Purging & Leak Test	1 each vapor & 4 each liquid, 10- or 12-inch cryogenic cargo transfer hose.
Communications Test	All forms/types tested and verified.
Warm ESD Test 1	LNGC signal initiated.
Warm ESD Test 2	FLNGV signal initiated.
Open CTMS	Both vessels with already cooled down liquid header (CTMS conducted according to relevant charter party).
Commenced Hose Gas-Up and Cool-Down	Liquid lines and hoses filled and checked for adequate support throughout.
Cold ESD Test (as required)	LNGC signal initiated.
Vapor Lines Opened	Vapor management controlled by LNGC, maximum pressures agreed in advance.
Open Liquid Hoses	Systematic schedule of line/hose opening.
Traffic Monitoring	FLNGV to monitor vessel movements in vicinity/Safety Zone visually and by radar, including use of VHF radio communications when required.

Key:
CTMS = Custody Transfer Measurement Survey
ESD = Emergency Shutdown
FLNGV = floating liquefied natural gas vessel(s)
LNG = liquefied natural gas
LNGC = liquefied natural gas carrier
STS = ship to ship
VHF = very high frequency

12.3 Cargo transfer procedures

The cargo transfer procedures between FLNGVs and LNGC are provided in **Table 12-2**.

Table 12-2 Cargo transfer procedures

Task	Description
Start First Pump	Loading into one tank of LNGC initially.
Commence Ramp-up	Systematic approach to transfer/pump start/rate. Ramp up to full rate.
Ballasting Procedures	Both vessels carry out ballasting/de-ballasting as required.
Transfer Monitoring	Constant monitoring required according to SSSC, including remote CCTV.
Ramp Down	Systematic slowdown and topping off of LNGC tanks as agreed.
STOP	Cargo transfer stopped and liquid manifolds closed.
Close CTMS	Survey commenced.
Traffic Monitoring	FLNGV to monitor vessel movements in vicinity/Safety Zone visually and by radar, including use of VHF radio communications when required.

Key:
CCTV = closed circuit television
CTMS = Custody Transfer Measurement Survey
FLNGV = floating liquefied natural gas vessel(s)
LNG = liquefied natural gas
LNGC = liquefied natural gas carrier

SSSC = Ship Shore Safety Checklist
STOP = Transfer stopped and liquid manifolds closed
VHF = very high frequency

12.4 Cargo transfer completion preparation and disconnection

Table 12-3 below describes the cargo transfer completion and disconnection procedures for the FLNGVs:

Table 12-3 Cargo Transfer Completion and Disconnection

Task	Description
Line Draining and Warm Up	All liquid drained to FLNGV/LNGC as appropriate.
Line Purging and Gas Freeing	Hydrocarbon content less than 1% by volume.
Disconnection	All pressure in liquid line to be removed. Systematic disconnection procedure.
Transfer of Equipment to FLNGV	Return STS equipment to FLNGV. Checklist and transfer of equipment procedure.

Key:
FLNGV = floating liquefied natural gas vessel(s)
LNG = liquefied natural gas
LNGC = liquefied natural gas carrier
STS = ship to ship

12.5 LNGC Unmooring and departure

Table 12-4 below describes the LNGC unmooring and departure from the FLNGV:

Table 12-4 LNGC Unmooring and departure

Task	Description
Connect Tugs to LNGC	Number of tugs pending weather conditions; completion of final STS Checklist.
Release of LNG Lines via QRH Lever Release	Unmooring procedures followed. Tug(s) in control of LNGC movement.
LNGC Departure	Departure with tug(s) connected providing an off-berth tension as the last lines are released, with the objective of removing the LNGC from the FLNGV fenders as quickly as possible, maintaining a parallel direction to FLNGV.
Mooring Master/Assistant Mooring Master departure	Mooring Master/Assistant Mooring Master and other parties depart LNGC approximately 1nm off location.

Key:
FLNGV = floating liquefied natural gas vessel(s)
LNG = liquefied natural gas
LNGC = liquefied natural gas carrier
QRH = Quick Release Hook
STS = ship to ship

12.6 Post-Transfer Operations (FLNGV Only)

Table 12-5 describes the post-LNG transfer operations carried by out by the FLNGVs:

Table 12-5 Post-transfer operations (FLNGV only)

Task	Description
Operation Close Out	Post-cargo operations captured on specific checklist for safe handling and stowage of STS transfer equipment.

Key:
FLNGV = floating liquefied natural gas vessel(s)
STS = ship to ship

[End of Section]

13 FLNGV disconnect and reconnect procedures

13.1 General

Port Delfin has established design criteria which include maximum wave, current and wind loads where the FLNGVs will be capable of remaining on station either in a production or production suspended mode. Any predicted environmental conditions that could exceed the individual or combined environmental loads approved for remaining on station will initiate LNG production shut down, with the possibility of instituting disconnection and storm evasion procedures. The Port Delfin FLNGVs are self-propelled vessels capable of independent navigation, including storm evasion.

Meteorological forecasting services are provided specifically to the Port Delfin FLNGV and is received both onboard the FLNGV and at the Delfin LNG Operations Center on a continuous year round basis. The hurricane season is from June 1 to November 30, with peak from mid-August to November. The potential for tropical storm and hurricane development is carefully monitored by NOAA and the National Hurricane Center who issue warnings for named storms.

In case of a named storm warning the possibility of disconnection of the FLNGV will always be considered. The master onboard the FLNGV is responsible for the safety and wellbeing of his crew and vessel and will be responsible for the decision and time for disconnection. The Management of Delfin LNG and the Port Delfin Operations Center will also have the right to order FLNGV disconnection.

13.2 FLNGV Disconnection Procedure

Should FLNGV disconnection become necessary, the procedures described in **Table 13-1** will be followed.

Table 13-1 Disconnection sequence

Task	Description
Shut down production/ purge jumper hoses	Stop gas supply to liquefaction process, shut down all liquefaction trains, depressurize and gas free jumper hoses by purging from tower yoke to FLNGV. It is assumed that the topside process remains partly pressurized and process liquid is drained as reasonably practicable.
Connect tugs for positioning assistance	Connect tugs. Assumed up to three tugs for positioning assistance.
Disconnect TYMS jumper hoses and cables	Split hook up spools, connect blind flanges, and connect lifting bridles.
Pass jumper hoses and cables to FLNGV for stowage	By use of jib crane on FLNGV transfer hoses to storage hangers on FLNGV and sea fasten.
Drain yoke ballast tank	Discharge ballast water from yoke ballast tank.
Prepared yoke head for disconnection	Yoke head connected to tower/rotation table being prepared for disconnect.
Lift yoke for disconnection	Unlatch and lift yoke away from tower/rotation table by winch on FLNGV.
Stow yoke ballast tank/	Yoke and yoke ballast tank, secure for sea.
Sea fasten	To prevent wind-induced damage to the TYMS appurtenances.

Task	Description
Tug-assisted departure astern	Tugs assist in FLNGV departure astern before tugs disconnect and head for shore.
Sail away	FLNGV sails away under its own power.

Key:
FLNGV = floating liquefied natural gas vessel(s)
TYMS = tower yoke mooring system

13.3 Reconnection procedure

Table 13-2 below describes the FLNGV reconnection procedure:

Table 13-2 Reconnection Procedure

Task	Description
FLNGV arrive on location and connect tugs for positioning assistance	FLNGV arrives on location when weather and sea conditions allow reconnection. Connect tugs. Project-specific study to determine, but assume two tugs forward and potentially one aft for positioning assistance.
Move FLNGV into position	Connect tugs approximately 1nm off tower yoke when FLNGV has obtained correct heading, pending Project-specific study. Tugs assist as required during approach.
Prepare yoke for connection	Remove sea fastening.
Lower yoke into yoke head for connection	When FLNGV in position, yoke head lowered and by tug assistance correct position obtained and yoke head connected/latched.
Fill yoke ballast tank	Yoke ballast tank filled with sea water.
Pass jumper hoses and cables to tower	By use of jib crane on FLNGV, transfer hoses to tower.
Disconnect tugs	FLNGV is now connected to tower yoke and all lifting operations that may require positioning assistance are completed, so tugs disconnect and head for shore.
Connect jumper hoses and cables to tower	Blind flanges and lifting bridles taken off and hook up spools connected.
Testing/re-commissioning	All piping systems leak tested and all systems re-commissioned, including introducing hydrocarbons.
Start-up	Process system pressurized and production starting up.

Key:
FLNGV = floating liquefied natural gas vessel(s)
nm = nautical mile

14 Special operation procedures

14.1 Emergency Evacuation **(to be developed)**

14.2 Diving **(to be developed)**

14.3 Pigging of subsea pipeline **(to be developed)**

14.4 Helicopter operations **(to be developed)**

14.5 Port Security

Delfin LNG will submit a Port Security Plan (PSP) that is consistent with the requirements of 33 CFR Part 106 (Marine Security: Outer Continental Shelf Facilities) prior to operations. The purpose of the PSP is to provide Delfin LNG's personnel who have security responsibilities with a systematic approach to securing the deepwater port, and protecting personnel working at the Project site from human-caused threats such as theft, vandalism, or terrorism. The PSP will be included as an integrated component of the Port Operations Manual.

Under the International Ship and Port Security Code (ISPS Code) and implementing U.S. regulations, shipping companies, vessels, and port facilities are required to have a security officer, as well as a comprehensive security plan, to conduct their operations. Delfin LNG will prepare a PSP to comply with 33 CFR 106 and submit the document to the USCG for review and approval. Similarly, all vessels, including LNGCs, are required by the ISPS Code to have a vessel security officer onboard to oversee security measures. The ISPS Code requires a vessel security plan for all LNGCs that call at Port Delfin. Each vessel's security plan must be reviewed and approved by the USCG prior to entry into the deepwater port. Both Delfin and any LNGC that calls at Port Delfin must include detailed contingency procedures within their security plans. These procedures would be periodically exercised to enhance safety and security and to protect the terminal, visiting vessels, and the marine environment.

Federal regulations require that all vessels provide the USCG a 96-hour advance Notice of Arrival prior to entering any U.S. port. Information about the vessel and its voyage, including port of origin, cargo onboard, crew members, passengers, status of essential equipment, and special security information, must be provided with the Notice of Arrival. All vessel crew and non-crew would be screened by the National Vessel Movement Center prior to the vessel's entry.

The fundamental security program at Port Delfin will be described in the PSP. This plan will address security issues, including, but not limited to, access control for people, goods, and material; monitoring and alerting vessels that approach or enter the safety/security zone; identifying risks and measures to deter terrorist activity; internal and external notification requirements and response in the event of a perceived threat or attack on the Project's offshore facilities; designating a port security officer; providing identification means for Project personnel; security training requirements; actions and procedures that are scalable to the threat; emergency procedures such as evacuation; special operations procedures; and record keeping for periodic training, drills, and exercises. Additional requirements for the security plan include,

but not are limited to, radar monitoring of the security zone, maritime security levels, ship security plans, ship security alarm systems, and declarations of security between Port Delfin and visiting vessels.

The USCG has a number of measures available to enforce security requirements and otherwise enhance security for vessels and port facilities in the United States. These measures include: conducting random and targeted patrols and vessel boardings; reviewing information contained in vessel arrival notifications; conducting escorts and targeted boardings of vessels identified as high risk; conducting background intelligence checks; establishing safety and security zones when needed; reviewing, approving, and exercising vessel and facility security plans; and other appropriate actions designed to improve maritime security.

Delfin will prepare and submit the Port Delfin PSP to the USCG for review and approval as required by the applicable provisions of the Maritime Security Regulations at 33 CFR Parts 101-107.

[End of Section]

15 Appendices

15.1 Appendix 1: Foul Weather Plan

The Foul Weather Plan is attached to this Manual.

15.2 Appendix 2: Emergency Response Manual

The Emergency Response Manual is attached to this Manual.

15.3 Appendix 3: Emergency signals

(to be developed)

15.4 Appendix 4: Fire prevention

(to be developed)

15.5 Appendix 5: Port Security Plan (PSP)

(to be developed)

15.6 Appendix 6: Crew member training and qualifications

(to be developed)

15.7 Appendix 7: Maintenance procedures

(to be developed)

15.8 Appendix 8: Emergency evacuation plan

(to be developed)

DELFIN LNG LLC

PORT DELFIN FLNGV

DRAFT FOUL WEATHER PLAN

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Acronyms and Abbreviations

Delfin LNG	Delfin LNG LLC
DWP	deep water port
FEED	front end engineering design
FLNGV	floating liquefied natural gas vessel(s)
FTA	free trade agreement
LNG	liquefied natural gas
NOAA	National Oceanic and Atmospheric Administration
O&M	Operations and Maintenance
Port Delfin	the offshore component of the Port Delfin FLNGV Project consisting of the floating liquefied natural gas vessels, foundations, and underwater elements
Port Delfin FLNGV Project	Delfin LNG LLC's floating liquefied natural gas vessels project, including all onshore and offshore components
Project	Port Delfin FLNGV Project
TYMS	tower yoke mooring system
U.S.	United States
USCG	U.S. Coast Guard

1 Purpose

This document describes Delfin LNG LLC's (Delfin LNG's) plan for handling foul weather situations, and outlines how Delfin LNG will organize, plan, manage, and perform foul weather preparation, disconnection and the subsequent reconnection for the floating liquefied natural gas vessels (FLNGV) located at the Port Delfin deep water port (DWP) located off the coast of Louisiana.

Disconnecting the FLNGV from the mooring is provided as a means to protect personnel from risk, protect the environment and prevent potential damage to the Port Delfin FLNGV project equipment and facilities.

The Foul Weather Plan as described herein is:

- Provided for the Port Delfin FLNGV project only and describes precautions, limitations and decisions required when heavy weather and especially named storms are approaching the area.
- Based on best industry practice from both upstream floating production operations technology and downstream floating liquefied natural gas (LNG) regasification and the LNG production/export business.
- Intended to be regularly reviewed and will be periodically updated to reflect additional information developed during FEED and/or changes in operational or evolving operational approach.

The Foul Weather Plan shall satisfy all requirements from the US Coast Guard (USCG).

2 Introduction

Delfin LNG, a Louisiana limited liability company, is proposing to construct, own, and operate a DWP terminal (referred to herein as Port Delfin) in the Gulf of Mexico to serve the global LNG market. The purpose of the Project would be to provide a safe and reliable facility to liquefy natural gas for export to free trade agreement (FTA) and non-FTA nations.

The proposed DWP would be located in federal waters within the Outer Continental Shelf West Cameron Area, West Addition Protraction Area (Gulf of Mexico), approximately 40 nautical miles off the coast of Cameron Parish, Louisiana, in water depths approximately 64 to 72 feet (Figure 2-1 and Figure 2-2).

The DWP would consist of up to four new-build, custom designed FLNGV with yoke mooring systems. Existing 40-inch natural gas pipelines with new 30-inch pipeline laterals at the offshore location would supply feed gas from the U.S. pipeline grid directly to the FLNGV, each designed for approximately 575 million standard cubic feet per day of feed gas and approximately 3.3 million metric tonnes per annum of LNG production. Each FLNGV storage capacity would be approximately 210,000 cubic meters of LNG.

Standard LNG trading carriers would be used for the export of LNG. The LNG trading carriers would be maneuvered alongside the FLNGV, under the control of a Mooring Master and with tug assistance, and would moor next to the FLNGV in a side-by-side arrangement. The LNG would be transferred from FLNGV to LNG trading carriers via ship-to-ship transfer through loading arms or cryogenic hoses.

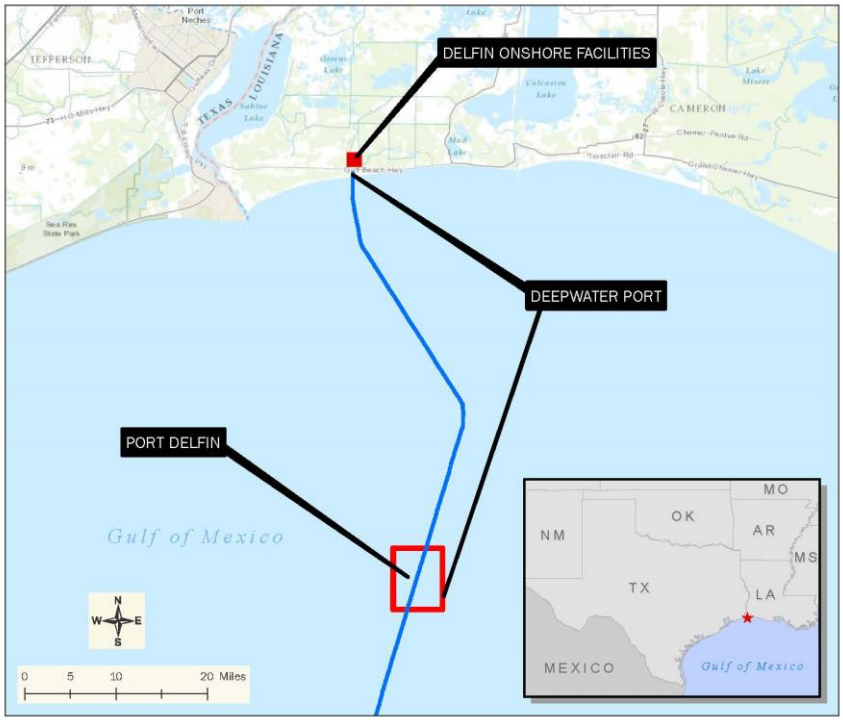

Figure 2-1 Project Vicinity

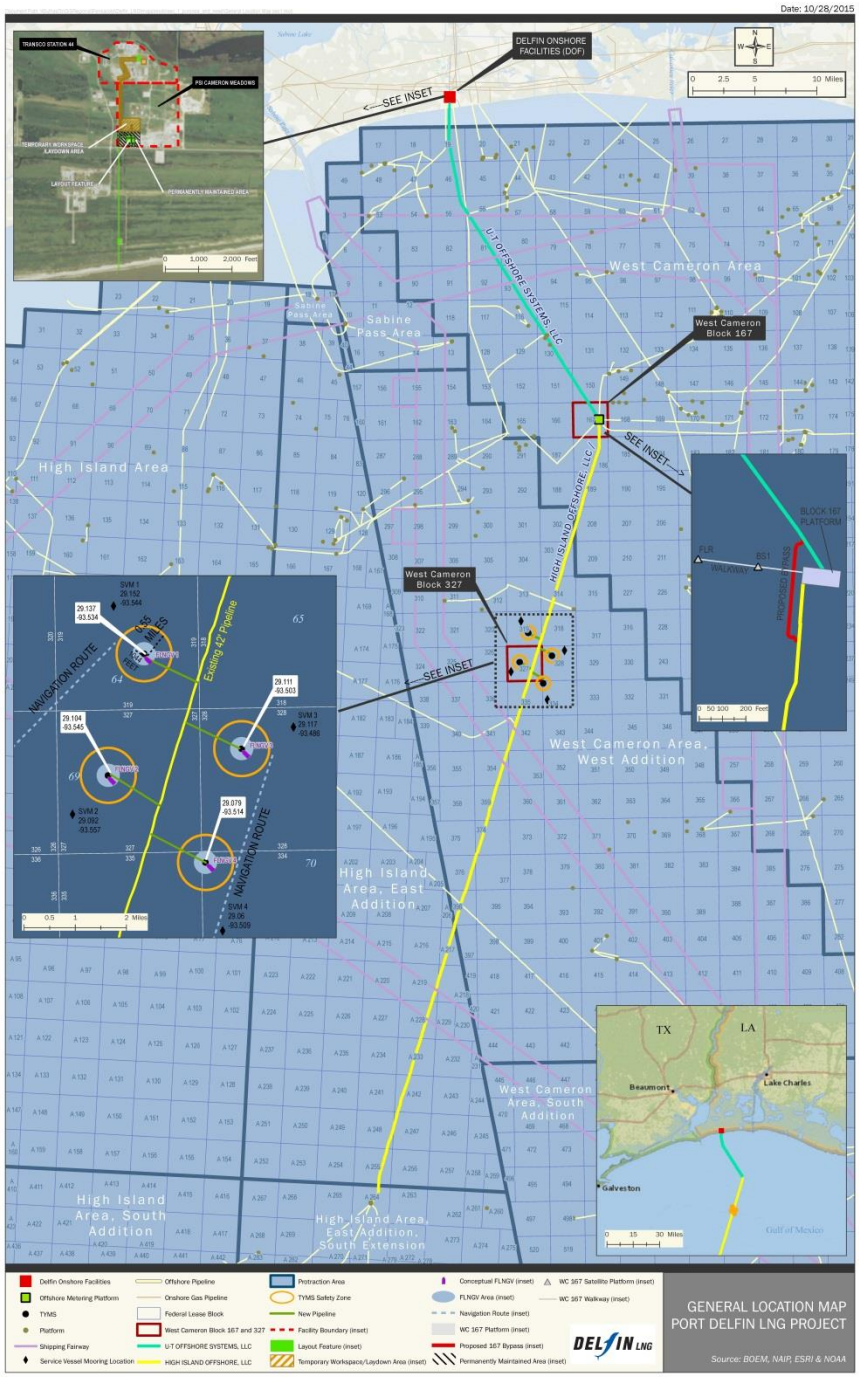

Figure 2-2 Project Location and Layout

3 Philosophy and principles

The Port Delfin FLNGV Project have established design criteria which include maximum wave, current and wind loads where the FLNGVs will be capable of remaining on station either in a production or production suspended mode. Any predicted environmental conditions that could exceed the individual or combined environmental loads approved for remaining on station will initiate LNG production shut down, with the possibility of instituting disconnection and storm evasion procedures.

Meteorological forecasting services are provided specifically to the Port Delfin FLNGV Project and is received both onboard the FLNGV and at the Delfin LNG Operations Center on a continuous year round basis. The hurricane season is from June 1 to November 30, with peak from mid-August to November. The potential for tropical storm and hurricane development is carefully monitored by the National Oceanic and Atmospheric Administration (NOAA) and the National Hurricane Center who issue warnings for named storms.

In case of named storm warning affecting the port complex, the possibility of disconnection of the FLNGV will always be considered. The Master of the FLNGV is responsible for the safety and wellbeing of his crew and vessel and will be responsible for the decision and time for disconnection. The decision to disconnect the FLNGV for storm evasion will be jointly evaluated by the FLNGV Master, the Port Delfin Terminal Manager and the Delfin LNG Operations Center. The Management of Delfin LNG and the Operations Center will also have the right to order disconnection.

3.1 Normal operation

The FLNGV, when connected to the Tower Yoke Mooring System (TYMS), is designed to operate in the following condition and requirement:

- FLNGV remain on station in a 100-year winter storm condition.

3.2 Disconnection

The TYMS connector release mechanism shall be operational able to disconnect the FLNGV in the following conditions and requirements:

- Sea states up to and including significant wave height, Hs of 4.5m.
- Final mechanical release operation should be less than 1 hour, excluding any required preparatory work.

3.1.3 Reconnection

The TYMS connector mechanism shall be operational and able to reconnect the FLNGV in the following condition and requirement:

- Sea states up to and including significant wave height, Hs of 2.5m.

4 FLNGV preparedness

4.1 Stores, bunkers and provisions

There should always be bunkers, provisions and critical spares onboard at all times to endure a disconnection and sail away:

- Bunkers – maintain a minimum bunkers amount onboard to be able to go full steam for 5 days and idle for 5 days with a 100% safety margin.
- Provisions – minimum requirement is to maintain provisions onboard for all the crew and possible extras for 2 weeks. (i.e. 14 days' supply for ~50 people).
- Spares – all critical spares to always be onboard. Sparing philosophy developed to ensure minimum 4 weeks without possibility of resupply.

4.2 Training

The crew will carry out regular disconnection and preparation exercises such that the FLNGV is prepared at all times.

5 Actual and forecasted weather monitoring

5.1 Observed weather on site

There will be a weather station on board each FLNGV with the ability to record wind speed, water temperature, atmospheric pressure, relative humidity and other pertinent weather details.

Weather monitoring is the responsibility of the FLNGV Master and the marine crew will be required to make and record periodic weather observations, in line with the Flag State requirements, in the FLNGV's log book related to estimated wave height and direction, observed currents, current wind speed and direction, visibility, and other pertinent observations.

In the case of a named storm warning, the FLNGV Master will be alerted, and the storm will be continuously monitored and tracked on the "Atlantic Hurricane Tracking Chart" issued by the NOAA National Hurricane Center.

5.2 Weather forecasting services

In addition to monitoring and receiving the NOAA and National Hurricane Center forecast and warnings, Delfin LNG will also subscribe to private marine weather and hurricane forecasting services specializing in serving the Gulf of Mexico offshore oil and gas industry. The customized weather forecast will be transmitted to the Delfin onshore Operations Center and aboard each of the FLNGVs.

During the hurricane season and in particular when tropical and named storms development arise, the forecast service will increase the forecasting frequency and the advice activity. In the case of named storms, the deployment of an experienced meteorologist to the Delfin LNG onshore Operations Center will be considered on an as-needed basis.

6 Planned disconnect criteria

6.1 Planned disconnection

The presence of potential named storm development will be continuously assessed by the Port Delfin Terminal Manager, the Master onboard the FLNGV and the onshore Operations Center management.

Decision to start preparations for disconnect should be taken based on the following conditions:

- The weather forecast indicates foul weather conditions will be in excess of the Design Criteria for the FLNGV to remain connected; and
- The disconnection must be completed prior to environmental conditions at site is reaching the limiting design wave height for the disconnection system (Hs = 4.5m).

Table 6.1 shows Disconnection Guideline related to the Beaufort Wind Scale.

The FLNGV shall be prepared for and disconnected from the mooring system after FLNGV Master's decision. The decision to disconnect will be made following full coordination with the Terminal Manager, the onshore Operations Center and the meteorologist and will consider the following main points:

- Wind speed, wave height and direction of storm
- Probability of being in the storm's path
- Speed of the storm
- Forecasted time of arrival of the named storm or heavy weather
- Time required to travel to safe area
- Time to prepare and be ready for disconnection

The shutdown of the production process and establish safe standby mode including contingency is considered to be 24 hours. Average speed of a named storm is generally 12.5 miles/hour. On this basis, a general named storm alert chart is established and presented in Table 6.2.

Beaufort number	Description	Wind speed	Wave Height	Sea conditions	Disconnection Guideline
0	Calm	< 1 mph	0 m	Flat.	Normal Operations
		< 1 knot	0 ft		
1	Light air	1–3 mph	0–0.2 m	Ripples without crests.	
		1–3 knots	0–1 ft		
2	Light breeze	4–7 mph	0.2–0.5 m	Small wavelets. Crests of glassy appearance, not breaking	
		4–6 knots	1–2 ft		
3	Gentle breeze	8–12 mph	0.5–1.0 m	Large wavelets. Crests begin to break; scattered whitecaps	
		7–10 knots	2–3.5 ft		
4	Moderate breeze	13–18 mph	1–2 m	Small waves with breaking crests. Fairly frequent whitecaps.	
		11–16 knots	3.5–6 ft		
5	Fresh breeze	19–24 mph	2–2.5 m	Moderate waves of some length. Many whitecaps. Small amounts of spray.	
		17–21 knots	6–9 ft		
6	Strong breeze	25–31 mph	2.5–3.5 m	Long waves begin to form. White foam crests are very frequent. Some airborne spray is present.	Prepare the FLNGV for Disconnect if named storm warnings forecast in area
		22–27 knots	9–12 ft		
7	High wind, moderate gale, near gale	32–38 mph	3.5–4.5 m	Sea heaps up. Moderate amounts of airborne spray.	
		28–33 knots	13–17 ft		
8	Gale/fresh gale	39–46 mph	4.5–6.5 m	Moderately high waves with breaking crests forming spindrift. Considerable airborne spray.	FLNGV will be disconnected if named storm will enter area
		34–40 knots	18–25 ft		
9	Strong/severe gale	47-54 mph	7–9 m	High waves whose crests sometimes roll over. Large amounts of airborne spray	
		41–47 knots	23–32 ft		
10	Storm/whole gale	55–63 mph	9–11 m	Very high waves with overhanging crests. Large amounts of airborne spray reduce visibility.	
		48–55 knots	29–41 ft		
11	Violent storm	64–72 mph	11–13 m	Exceptionally high waves. Very large amounts of airborne spray severely reduce visibility.	
		56–63 knots	37–52 ft		
12	Hurricane force	≥ 118 km/h	≥ 14 m	Huge waves. Sea is completely white. Air is filled with driving spray, greatly reducing visibility.	
		≥ 64 knots			

Table 6.1 Metocean Condition - Disconnect Guidelines

Warning Circle and Alert Category Chart for Named storms							
Named Storm							
Time away *Hours*	> 72	72 – 60	60 - 48	48 - 36	36 – 24	24 – 18	< 18
Distance away *Nautical miles*	> 900	900 – 750	750 - 600	600 - 450	450 - 300	300 – 225	< 225
Alert Code							
Alert Level	**Blue** Minimum Alert	**Green** Low Alert	**Yellow** Moderate Alert		**Orange** Elevated Alert		**Red** Maximum Alert
Actions	Follow storm development and projected trajectory	Plan for Production stop. Prepare for heavy weather	Prepare for Production Stop and disconnection operation		Stop Production. Start disconnection procedure		Complete disconnect. Proceed to Safe area

Table 6.2 Warning Circle and Alert Level Chart

6.2 Unplanned disconnection

Unforeseen weather conditions may force the FLNGV Master in consultation with the Terminal Manager to order an unplanned disconnection. In the Gulf of Mexico, on rare occasions, tropical storms have been known to develop rapidly and quickly develop to hurricane strength and push towards land.

Depending on the situation, the FLNGV Master and Port Delfin Terminal Manager will decide which preparations to carry out before the need for disconnection. It will always be a goal to get the production process to a safe standby mode. The safety of personnel is the number one priority in all such situations.

In extreme circumstances the disconnection can be achieved in sea states above the stated disconnect criteria of Hs = 4.5m

7 Operational procedure – disconnection

7.1 Disconnection sequence

The following procedure is described in the O&M Philosophy Document No. PDFLNGV-BD-0002.

Task	Description
Shut down production/ purge jumper hoses	Stop gas supply to liquefaction process, shut down all liquefaction trains, depressurize and gas free jumper hoses by purging from tower yoke to FLNGV. It is assumed that the topside process remains partly pressurized and process liquid is drained as reasonably practicable.
Connect tugs for positioning assistance	Connect tugs. Assumed up to three tugs for positioning assistance.
Disconnect TYMS jumper hoses and cables	Split hook up spools, connect blind flanges, and connect lifting bridles.
Pass jumper hoses and cables to FLNGV for stowage	By use of jib crane on FLNGV transfer hoses to storage hangers on FLNGV and sea fasten.
Drain yoke ballast tank	Discharge ballast water from yoke ballast tank.
Prepared yoke head for disconnection	Yoke head connected to tower/rotation table being prepared for disconnect.
Lift yoke for disconnection	Unlatch and lift yoke away from tower/rotation table by winch on FLNGV.
Stow yoke ballast tank/	Yoke and yoke ballast tank, secure for sea.
Sea fasten	To prevent wind-induced damage to the TYMS appurtenances.
Tug-assisted departure Astern	Tugs assist in FLNGV departure astern before tugs disconnect and head for shore.
Sail away	FLNGV sails away under its own power.

Key:
FLNGV = floating liquefied natural gas vessel(s)
TYMS = tower yoke mooring system

8 FLNGV sail away philosophy

8.1 Navigation – planned departure

After disconnection, the Master onboard the FLNGV will want to establish a safe distance from the storm as fast as possible. The FLNGV will therefore sail at best possible speed consistent with conditions on a course as close to 90 degrees abeam of the storm trajectory path as practical (dependent on other vessel traffic and installations). The preferred route would be to head out on the left side of the path of the hurricane, which in the Gulf of Mexico normally is the west side of the storm path that traditionally goes north and frequently recurves towards the northeast in the northern Gulf. The left side of the hurricane path is preferred due to the nature of a hurricane and its rotation and is often referred to as the navigational side.

The right side of the tropical storm or hurricane will have higher winds and higher waves due the counterclockwise rotation of the hurricane coupled with the forward motion of the storm. The right side is also referred to as the wet side and the left side the dry side.

The FLNGV Master and the Terminal Manager will continuously monitor the storm and be in contact with the onshore Operations Center and their meteorologist. The best sailing route away from the storm will be established based on good seamanship and monitoring of the storm track and development, taking into account:

- Relative moment of the storm and forecasted track.
- Maintaining maximum distance to closet point of approach.
- Seek to avoid areas where maximum sustained winds of 34 knots or higher are forecast to occur.
- Never cross the path of the hurricane.
- Leave restricted maneuvering areas as quickly as possible.
- Get to open sea quickly such that the FLNGV has sea room to maneuver.

The National Hurricane Center has provided guidance to mariners regarding hurricane avoidance at sea. This guidance is reproduced below for ease of reference:

GUIDELINES FOR AVOIDING HURRICANES AT SEA
In order to help account for the inherent errors in hurricane forecasting, a few guidelines should be used by the mariner in order to limit the potential of a close encounter between ship & storm.

1. ***34 KT Rule***
For vessels at sea, avoiding the 34 KT wind field of a hurricane is paramount. 34 KT is chosen as the critical value because as wind speed increases to this speed, sea state development approaches critical levels resulting in rapidly decreasing limits to ship maneuverability. It also deserves mention that the state of the sea outside of the radius of 34 KT winds can also be

significant enough as to limit course & speed options available to the mariner and must also be considered when avoiding hurricanes.

2. ***1-2-3 Rule***

This is the single most important aid in accounting for hurricane forecast track errors (FTE). Understanding & use of this technique should be mandatory for any vessel operating near a hurricane. The rule is derived from the latest 10-year average FTE associated with hurricanes in the North Atlantic. Application of the rule requires information from the National Hurricane Center's Tropical Cyclone Model (TCM) forecast and is extremely important to remaining clear of a hurricane at sea.

1-2-3 RULE OF THUMB

1 - 100 mile error radius for 24hr forecast
2 - 200 mile error radius for 48hr forecast
3 - 300 mile error radius for 72hr forecast

The 1-2-3 rule establishes a minimum recommended distance to maintain from a hurricane in the Atlantic. Larger buffer zones should be established in situations with higher forecast uncertainty, limited crew experience, decreased vessel handling, or other factors set by the vessel master. The rule does not account for sudden & rapid intensification of hurricanes that could result in an outward expansion of the 34 KT wind field. Also, the rule does not account for the typical expansion of the wind field as a system transitions from hurricane to extratropical gale/storm.

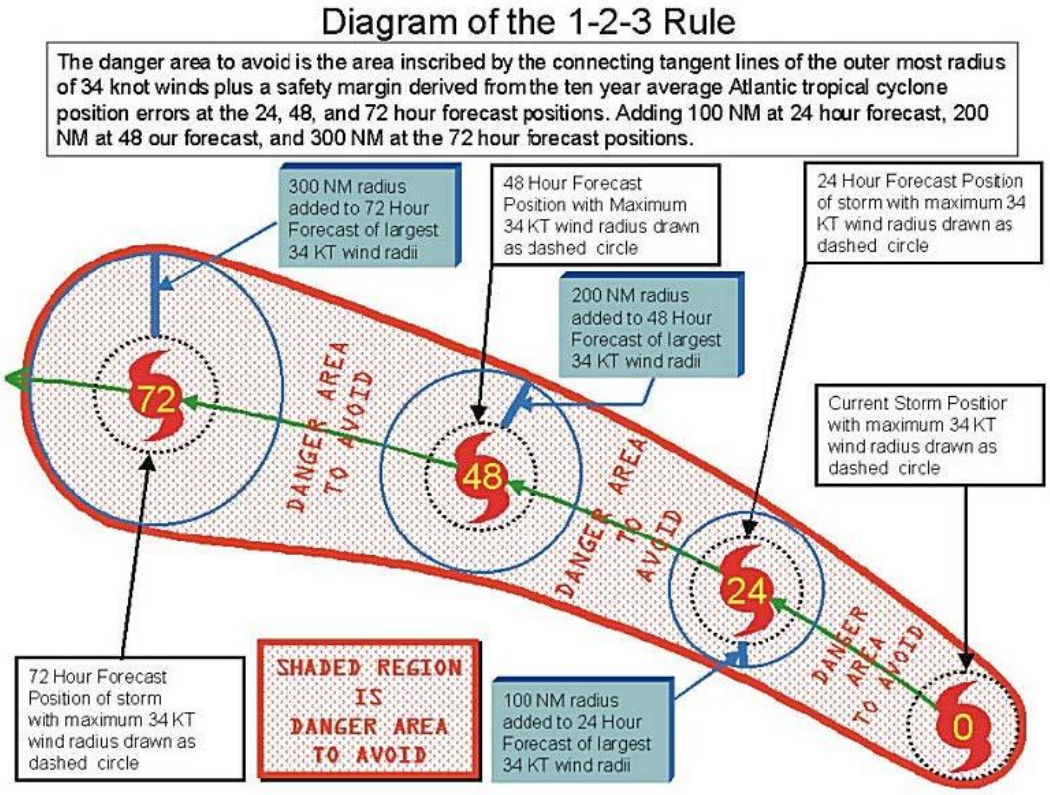

Figure 8-1 Diagram of the 1-2-3 Rule

3. ***Ship Versus Hurricane Track Analysis***

In the dynamic state of moving ships & hurricanes, recurring comparison of hurricane forecast track versus planned ship movement is mandatory. The continual monitoring of the latest official NHC forecasts compared to current or planned evasion options can greatly increase a mariner's confidence regarding vessel safety.

4. ***Never Cross The "T"***

Never plan to cross the track (cross the "T") of a hurricane. Done out of respect for the negative effects that heavy weather places on vessel speed/handling, sudden accelerations in hurricane motion can ultimately place a vessel in conditions not originally expected thereby resulting in disaster. Adjustments to course & speed in order to remain clear of the danger area in a hurricane are the most prudent navigation decisions a mariner can make in these instances.

5. ***Forecast Track Tendencies***

Comparison of the most recent NHC forecast track with forecast tracks from the past 24 hours can sometimes prove useful for determining a trend in the forecast motion of a hurricane. For instance, a comparison of forecast tracks issued every 6 hours over the last 24 hours, may show a noticeable shift right or left (with respect to storm motion) in the forecast track of a hurricane. This information may provide some indication as to how the forecast & actual hurricane track are tending and provide more guidance in navigation planning for avoidance, particularly in the 2-3 day forecast range & beyond.

6. ***Calculating Closest Point of Approach (CPA)***

The last item to complete in the at-sea risk analysis is comparison of CPA between current & possible evasion options. Over time, increases in CPA between vessel & hurricane based on current navigation decisions should increase the mariner's confidence in current avoidance plans. However, decreases in CPA should be dealt with using the utmost urgency. An immediate review of all evasion options combined with a detailed look into the latest official forecasts/discussions needs to be accomplished with a goal of establishing a new evasion course/speed option to once again increase CPA from the hurricane.

7. ***Assessing Options***

Mariners must be cautioned never to leave themselves with only a single navigation option when attempting to avoid a hurricane. Sea room to maneuver is not a significant factor when operating in the open waters of the North Atlantic, but becomes extremely important in the confined waters of the Western Caribbean Sea/Gulf of Mexico. More often than not, early decisions to leave restricted maneuver areas are the most sensible choice.

(Reference: National Hurricane Center: http://www.nhc.noaa.gov/prepare/marine.php)

8.2 Unplanned departure

If the time to completely avoid the heavy weather should be too short, the FLNGV will disconnect in a manner consistent with the procedures set forth in section 7.1 and sail as far out of the oil field and platform areas and into the open sea as fast and safely as possible. The FLNGV will then head up into the weather with bow directly into the seas and adjust the speed so the vessel stays in position without going backwards and as little forward as possible. This is normally the best way to ride out the storm while it passes through.

9 Prepare for reconnection

9.1 FLNGV preparation

After sail away, the weather will continue to be closely monitored. Once storm or hurricane conditions subside to safe levels and the center of the storm has a distance of some 80-100 Nm to the port and heading away, the FLNGVs will begin to transit back to the TYMS location at Port Delfin.

The systems for the reconnection onboard will be prepared and made ready. The upper wave condition limit for reconnection is set as a significant wave height of Hs=2.5m or less.

The decision for reconnection will be made by the FLNGV Master in consultation with the Port Delfin Terminal Manager.

9.2 Inspection of TYMS

As FLNGVs are transiting back to the location of the TYMS, Delfin will arrange for visual and possible diver inspection of the TYMS units to ensure they are undamaged and suitable for use in reconnecting the TYMS. Visual and diver (as needed) inspection of the TYMS proves the units are in satisfactory condition (or necessary repairs are required).

10 Reconnection procedures for the FLNGV

The following reconnect procedure is described in the O&M Philosophy Document No. PDFLNGV-BD-0002.

10.1 Reconnection sequence

Task	Description
FLNGV arrive on location and connect tugs for positioning assistance	FLNGV arrives on location when weather and sea conditions allow reconnection. Connect tugs. Project-specific study to determine, but assume two tugs forward and potentially one aft for positioning assistance.
Move FLNGV into position	Connect tugs approximately 1nm off tower yoke when FLNGV has obtained correct heading, pending Project-specific study. Tugs assist as required during approach.
Prepare yoke for Connection	Remove sea fastening.
Lower yoke into yoke head for connection	When FLNGV in position, yoke head lowered and by tug assistance correct position obtained and yoke head connected/latched.
Fill yoke ballast tank	Yoke ballast tank filled with sea water.
Pass jumper hoses and cables to tower	By use of jib crane on FLNGV, transfer hoses to tower.
Disconnect tugs	FLNGV is now connected to tower yoke and all lifting operations that may require positioning assistance are completed, so tugs disconnect and head for shore.
Connect jumper hoses and cables to tower	Blind flanges and lifting bridles taken off and hook up spools connected.
Testing/re-commissioning	All piping systems leak tested and all systems re-commissioned, including introducing hydrocarbons.
Start-up	Process system pressurized and production starting up.

Key:
FLNGV = floating liquefied natural gas vessel(s)
nm = nautical mile

EMERGENCY RESPONSE MANUAL

PORT DELFIN LNG PROJECT

Gulf of Mexico Deepwater Port

Delfin LNG LLC

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Houston, TX 77002

April 2016

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LIQUEFIED NATURAL GAS (LNG) QUICK SHEET

CAS Number: 74-82-8

Shipping Name: Natural Gas, Refrigerated Liquid

Other Names: LNG, Natural Gas

WARNING!

- EXTREMELY FLAMMABLE!
- CONTAINS REFRIGERATED (CRYOGENIC) GAS; MAY CAUSE CRYOGENIC
- BURNS OR INJURY

HAZARDS:

- Liquid leaks generate large volumes of flammable vapor which is heavier than air when first released and may collect in low lying areas.
- As the vapor warms it becomes less dense than air and will dissipate upwards.
- Gas may travel long distances to ignition sources and flashback
- Odor is not a reliable indicator of the presence of toxic amounts of gas
- Gas may collect in confined areas (e.g., tanks, sewers, buildings) and may explode when exposed to fire
- Contact with liquid may cause frostbite

DESCRIPTION:

- Colorless gas
- No odor or with weak skunk-like odor
- Shipped and stored as a cryogenic liquid
- Liquid floats and boils on the surface of water; is insoluble in water
- Extremely flammable
- Gas is lighter than air but will collect and stay in low areas when first released

RELEASE, NO FIRE:

- Evacuate the area and isolate from pedestrian and vehicle traffic
- Notify Parish 911 / NRC
- Alert personnel downwind of hazard to evacuate
- Eliminate all ignition sources
- Stop the release if it can be done safely
- Approach from upwind direction
- Wear cold insulating gloves and eye protection
- Monitor visible vapor cloud – use water spray to disperse vapors
- Ventilate confined area if it can be done without placing personnel at risk
- Allow gas to dissipate naturally

FIRE:

- Evacuate the area and isolate from pedestrian and vehicle traffic
- Notify Parish 911 / NRC
- Isolation is the preferred method of extinguishment. Do not attempt to extinguish the fire but stop the gas flow at the source if safe to do so and allow to burn out
- High expansion foam is recommended for firefighting suppression
- Water may be used to assist with cooling of cylinders and to disperse vapors
- ***Do not*** direct water spray or foam on pools of LNG liquid – water will heat the cryogenic liquid and result in a larger vapor cloud
- Cool exposed ***noncryogenic*** containers with large quantities of water from unattended equipment or remove intact containers if it can be done safely

FIRST AID:

- Provide Basic Life Support/CPR as needed
- Decontaminate the victim as follows:
- Inhalation - remove the victim to fresh air and give oxygen if available
- Skin Contact – Cold Burns – gently warm injured area in lukewarm water and apply clean, dry dressing
- Eye contact – Immediately flush with lukewarm water or saline solution for 15 minutes

Seek medical attention

1.0 INTRODUCTION

This Emergency Response Manual (ERM) was prepared for Delfin LNG LLC (Delfin), Gulf of Mexico Deepwater Port (DWP), herein referred to as Port Delfin, and provides guidelines to assist in managing initial response activities and objectives during an onsite emergency. The primary goal of the ERM is to ensure preparedness for efficient, coordinated and adequate incident response in order to protect people, the environment and property. The ERM is designed to direct and guide the emergency response personnel to respond effectively to site-level emergencies and return the site to normal operations.

This plan contains provisions that comply with US Coast Guard (USCG) and Department of Transportation (DOT) requirements under Title 33 of the Code of Federal Regulations Part 127.307 (33 CFR 127.307) – Waterfront Facilities Handling Liquefied Natural Gas (LNG). The ERM identifies the following:

- LNG release response procedures;
- Emergency shutdown procedures;
- The telephone numbers of local Coast Guard units, hospitals, fire departments, police departments, and other emergency response organizations;
- The location and provisions of any personnel shelters;
- First aid procedures; and
- Emergency procedures for mooring and unmooring a vessel.

Comprehensive technical and procedural information necessary for the effective management of a response and further support for spill response planning and operations will be further outlined in the Facility Response Plan (FRP) upon completed construction of the DWP. The FRP is intended to satisfy the USCG requirements of the Oil Pollution Act of 1990 (OPA 90) under 33 CFR 154.1035 and will be submitted to the appropriate agencies not less than 60 days prior to the start of operations.

The ERM is not meant to replace common sense or actions not specifically described herein. Responders should continually evaluate the effectiveness of actions called for in this plan and make the appropriate adjustments based on past experience and training. This ERM contains tactical response plans that identify potential site-specific response strategies. Such strategies, equipment and manpower requirements, and site conditions are based on circumstances proposed as part of the Port Delfin LNG Project design. Actual conditions at the time of a response may vary significantly and may necessitate the need for a different strategy and/or equipment requirements. The strategies and equipment lists contained in this manual should be used as guidelines only.

2.0 FACILITY INFORMATION

Delfin is proposing to construct and operate the Port Delfin DWP terminal in the Gulf of Mexico to provide a safe and reliable facility to liquefy natural gas for export to free trade agreement (FTA) and non-FTA nations. The proposed DWP will be located in federal waters within the Outer Continental Shelf (OCS) West Cameron (WC) Area, approximately 37.4 to 40.8 nautical miles (or 43 to 47 statute miles) off the coast of Cameron Parish,

Louisiana in water depths ranging from approximately 64 to 72 feet (19.5 to 21.9 meters). Delfin is also planning to construct and operate onshore facilities, the purpose of which is to receive, compress, measure, and deliver gas into the offshore pipeline for the DWP. The Delfin Onshore Facilities (DOF), which includes onshore pipelines and associated metering and compression facilities, comprises the facilities on the landward side of the mean high water mark. DOF operations are not included as part of this ERM. A general location map is provided as Figure 1.

The proposed DWP will provide a new use for existing gas pipelines that were historically used to transport offshore natural gas production to markets onshore. Port Delfin will consist of four moored floating liquefied natural gas vessels (FLNGVs), two existing 42-inch outside diameter (OD) offshore natural gas pipelines of the former U-T Offshore System (UTOS) and the High Island Offshore System (HIOS), and four new 30-inch OD pipeline laterals connecting the HIOS pipeline to each of the FLNGVs. Feed gas will be supplied through these new pipeline laterals to each of the FLNGVs, where it is cooled sufficiently to totally condense the gas and produce LNG, and then stored in Gaztransport & Technigaz Mark-III membrane-type LNG storage tanks aboard each of the FLNGVs. The existing UTOS pipeline extends from the DOF in Cameron Parish, Louisiana, and terminates at an existing offshore manifold platform located at WC 167. The existing HIOS pipeline segment planned for use transects Lease Blocks WC 314, 318, 319, 327, and 335. Moorings #1, #2, #3, and #4 will be located in WC 319, 327, 328, and 334 blocks, respectively.

The proposed DWP terminal facility would be designed to accommodate four, new-build, custom-designed FLNGVs. Each FLNGV will be moored by use of a pivoting tower yoke mooring system (TYMS). A riser will be provided at the mooring structure location. The riser taking the feed gas from the sea bed to the TYMS manifold deck would typically be a rigid steel pipe (able to absorb and dissipate flexural and axial bending resulting from different sea states) clamped to one of the jacket legs. An offloading mooring system will be installed on the starboard side of each FLNGV to moor a standard LNG trading carrier for offloading of LNG via ship-to-ship transfer through loading arms or cryogenic hoses. The FLNGVs are self-propelled, having the ability to disconnect from the TYMS and sail away from the DWP in the event of a forecasted hurricane or other unique circumstance (i.e., required inspections or unplanned repairs).

While operating attached to a TYMS, each of the FLNGVs is considered to be a fixed facility, as part of the DWP. It is the responsibility of the Operations Superintendent and the Vessel Master to ensure that appropriate information is exchanged such that the vessel and site emergency plans are linked for the duration of those operations. While operating as a self-propelled vessel engaged in navigation, the FLNGVs will be in full compliance with USCG requirements and regulations, MARPOL (International Convention for the Prevention of Pollution from Ships) and will meet other pollution prevention design and equipment requirements under applicable regulations.

The DWP will be in operation 24 hours per day, seven days per week and 52 weeks per year. The FLNGVs will each have a LNG storage capacity of approximately 210,000 cubic

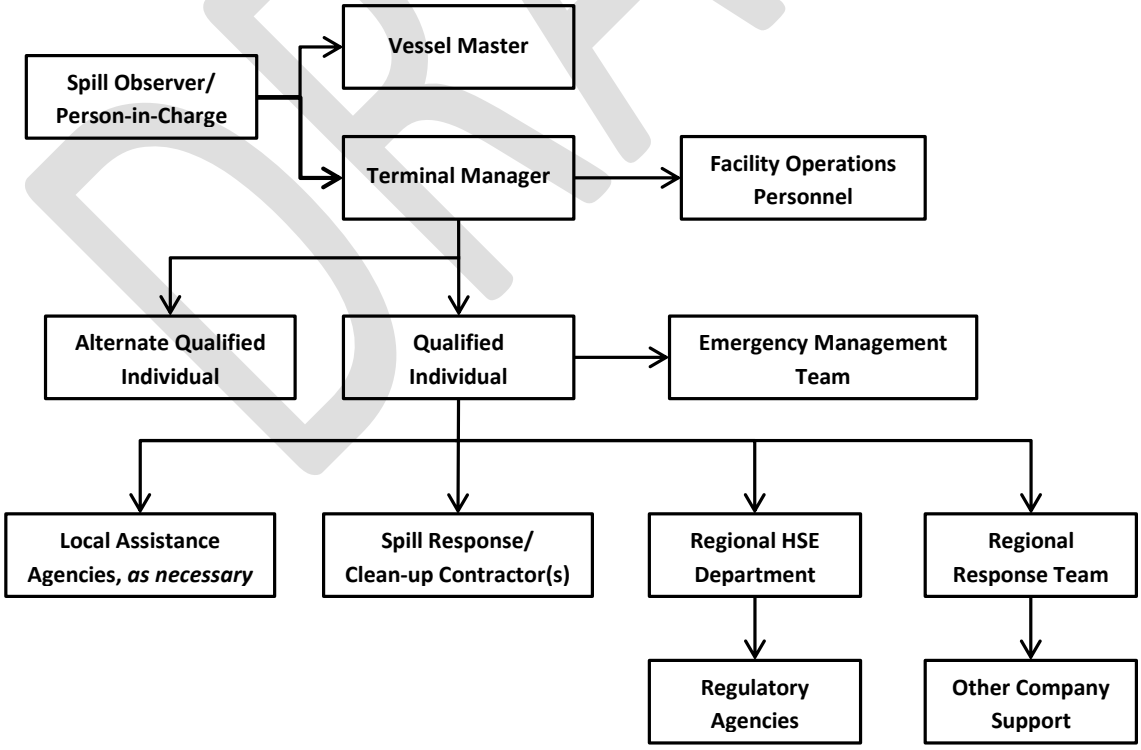
meters (m^3). In the nominal design case, each of the four FLNGVs can process approximately 500 million standard cubic feet per day (MMscf/d), which would total 2.0 billion standard cubic feet per day (Bscf/d) of input feed gas for all four of the FLNGVs. Together, the four FLNGVs are designed to have the capability to produce approximately 12.0 million metric tons per annum (MMtpa) of LNG for export.

LNG processing equipment and air-cooling facilities will be located on the topside of each FLNGV, covering nearly the entire deck. To support these operations, the vessels will require different types of lubricants such as mineral oil, synthetic oil, and hydraulic oil. Storage requirements will be finalized during the front-end engineering design (FEED) phase when actual information on topside equipment will be available. A preliminary list of chemicals and lubricants onboard each FLNGV is provided as Table 1. The key chemical and physical characteristics of each of these oils and/or other small quantity chemicals at the DWP are identified in Safety Data Sheets (SDS). SDS will be made available to all employees via the company intranet.

The TYMSs will normally be unmanned except when access is required for periodic maintenance. Any oil or lubricant required to service equipment on board the TYMSs will be stored onboard the Delfin FLNGVs and would be covered under that unit's FRP (or Vessel Response Plan when operating in a self-propelled mode).

3.0 EMERGENCY INFORMATION AND NOTIFICATION PROCEDURES

The notification sequence for a spill or other emergency situation is as follows:



3.1 Internal Notifications and Telephone Numbers

EMERGENCY RESPONSE PERSONNEL AND BUSINESS UNIT NOTIFICATIONS						
NAME/TITLE	**PHONE NUMBER**	**RESPONSE TIME (hours)**	**ICS POSITION**	**RESPONSE TRAINING TYPE**		
				1	**2**	**3**
TBD Terminal Manager **Qualified Individual**	TBD	1	QI/Incident Commander	x		x
TBD Lead HSE Specialist	TBD	0.25	Safety Officer	x	x	x
TBD General Manager	TBD	0.75	Alternate QI/Incident Commander	x	x	x
TBD Superintendent Operations	TBD	0.5	Facility Operations	x		
TBD President & CEO	TBD	6	Company Support			
TBD Corporate Communications	TBD	6	Information Officer, Alternate Public Information Officer			
TBD Risk Management	TBD	6	Risk Management	x	x	x

EMERGENCY RESPONSE TRAINING TYPE	
TYPE	**DESCRIPTION**
1	29 CFR 1910.120 HAZWOPER
2	OPA (Training Reference for Oil Spill Response) All Facility Personnel, SMT, QI Components
3	Qualified Individual/Incident Command Training

QI: Qualified Individual
ICS: Incident Command System
SMT: Spill Management Team
HSE: Health, Safety & Environmental

3.2 External Notifications and Telephone Numbers

AFFILIATION	PHONE NUMBER
Initial	

AFFILIATION	PHONE NUMBER
National Response Center	(800) 424-8802* (202) 267-2675* (202) 267-1322 Fax
La. State Police Troop D (Lake Charles)	(337) 491-2511
Cameron Parish Emergency Response	911
Recommended	
Federal Agencies	
DOT Office of Pipeline Safety	(713) 750-1746
US Environmental Protection Agency - Region VI (6SF-RO)	(866) 372-7745*, (214) 665-6444* Emergencies (800) 887-6063 Toll Free (214) 665-2200 Main line (214) 665-8365 Region 6 FOSC
US Coast Guard - Marine Safety Office, Lake Charles, LA	(337) 491-7803 Primary Emergency Number (504) 365-2390 MSU New Orleans (281) 464-4898 MSU Houston/Galveston
State Agencies	
Louisiana Wildlife and Fisheries	(337) 491-2575
Louisiana Department of Environmental Quality	(888) 763-5424 (225) 342-1234*
Louisiana State Police	(877) 925-6595 HazMat Hotline
Local Agencies	
Cameron Parish LEPC	(337) 775-7048
Law Enforcement	
Sheriff Department (Cameron)	(337) 775-5111 911
Sheriff Department (Hackberry)	(337) 762-3962 911
Fire Departments	
Johnson Bayou Fire Department	(337) 569-2119 911
Holly Beach Fire Department	(337) 569-2440 911
Cameron Parish Fire Department	(337) 775-7511 911
Hospitals	
South Cameron Memorial Hospital	(337) 542-4111 911
Lake Charles Memorial Hospital	(337) 494-3000

AFFILIATION	PHONE NUMBER
USCG Classified OSROs	
TBD	TBD
Neighboring Facilities	
Fieldwood Energy Offshore (Right of Use and Easement)	(337) 354-8000*
Energy XXI (WC333)	(713) 351-3000
Forest Oil Corporation (WC111)	(337) 265-2600
Century Exploration New Orleans, LLC (WC368)	(504) 832-3750

* 24-hour number

3.3 Notification Forms

The forms utilized for documentation and notification of an incident are provided as Appendix A. The First Report of Incident Form (Appendix A-1) is utilized for initial notification. Pipeline releases are summarized and documented on the Leak Accident Report Form (Appendix A-2). The Release Notification Data Sheet (Appendix A-3) contains information to be provided in the initial and follow-up notifications to federal, state and local agencies. All information on this form must be known at the time of notification, or be in the process of being collected; however, ***initial notification to the National Response Center (NRC) must not be delayed pending collection of all information***.

4.0 SPILL DETECTION AND MITIGATION

The purpose of this section is to identify the sources and sizes of small and medium discharges (average most probable and maximum most probable discharges). Potential spill scenarios may include tank overflow, valve failure, tank failure, pipe failure, hose failure, or pump seal failure; these spills would likely be in contained areas and unlikely to travel offsite. The DWP terminal would respond to these types of incidents in the same manner as a worst case discharge, but at a level appropriate to the incident size. The company's response in such an event would in no way obviate the liability of any other responsible parties.

Larger LNG spill scenarios, resulting from a breach of either a single or up to three LNG cargo tanks(s) spilling at a time, will be further addressed in the FRP; however, LNG spills resulting from any of these events may form a pool of LNG on the water surface, which can cause a pool fire or form a dense flammable vapor cloud, which will disperse downwind until it is diluted by air. It is unlikely that a pool hazard would reach another FLNGV, neighboring platform or shipping fairway; therefore suggesting that there would be minimal impact to public safety from even a large spill of LNG from the FLNGVs.

A leak detection system (i.e., pressure and flow monitoring) will be located on the FLNGV. The system will control a shutdown valve on the deck of the TYMS and communicate with the control system at the onshore compression facility. The priority of actions and

response procedures will depend upon the actual circumstances and will be determined by the Incident Commander.

4.1 Prioritized Mitigation Procedures

In the event of a spill, the Terminal Manager or Vessel Master will identify and control the source of a spill, if safe to do so, then will notify the Qualified Individual. The Terminal Manager or Vessel Master will assume the role of Incident Commander until relieved by upper management, if applicable. The Qualified Individual will conduct notifications as illustrated in Section 3.0. A Spill Response Action Checklist has been provided as Appendix B.

4.2 Firefighting Equipment

The FLNGVs would be required to meet the firefighting requirements of both the DWP regulations (33 CFR 149 Subpart D) and the Safety of Life at Sea (SOLAS) requirement for a LNG trading carrier while underway. In any instances in which the requirements of the Deepwater Port Act of 1974 (DWPA) and SOLAS differ, the more stringent requirement would be followed. The fire water system for both the hull and the topsides would be sized to comply with applicable codes and standards (SOLAS, flag state, USCG). Water from the seawater filtration system would be utilized, and the diesel-driven fire water pumps would move the water into the fire water ring header, where it would be distributed to its users. In addition to the hydraulic pumps, electrical jockey pumps will be included to maintain the required positive pressure in the fire water ring header.

The fire protection and safety system also includes:

- Diesel-driven Fire Water Pumps;
- Fire/Gas Detection System – to respond to release of combustible, hazardous and/or low temperature gases and fires;
- Fire proofing – to be carried out on the blast wall, as well as all major structural steel up to such height that it does not get exposed to flames;
- Deck fire water ring main system;
- Jockey pump – electrically driven;
- Foam generation system;
- Water spray system – for LNG tank domes;
- Deluge system – for pressurized vessels, bridge and accommodations block, and entire deck area; and
- Water curtain – for the LNG offloading area.

As required by 33 CFR 149.407(b), the TYMSs would be equipped with portable and semiportable fire extinguishers. The TYMS would not normally be manned so the firefighting equipment described in the regulations for manned facilities do not apply. As detailed engineering design for the project moves forward, Delfin will assess what firefighting equipment in addition to that required by the DWP regulations might be appropriate to reduce risk.

4.3 Emergency Lighting and Power Systems

The FLNGVs will use deck lights to illuminate the working spaces, process areas, LNG loading arms and transfer manifolds, passageways and similar spaces. Minimum lighting levels are needed to provide a safe working environment for employees at night and to meet regulatory standards (e.g., illumination of transfer areas). In the event of an emergency, three dual fuel and dual power (diesel/electric–powered) generators will be provided for the FLNGV hull propulsion system and for supplying power to utility systems in the hull.

4.4 Safety and Lifesaving Equipment

The FLNGVs will carry all of the required lifesaving equipment including survival craft, life jackets, ring life buoys, work vests, survival suits, litters, emergency communications and first aid kits. Sufficient safety and lifesaving equipment will be provided for the total persons on board (POB) the units and will fully comply with the latest SOLAS requirements. The lifesaving arrangements will be as required by the DWP regulations at 33 149 Subpart C for a manned facility with more than 31 POB. In addition, while operating as a self-propelled vessel, each FLNGV would meet the lifesaving requirements of an LNG trading vessel specified by SOLAS. The location of lifesaving equipment, including first aid stations, will be will be identified during the detailed engineering design of the DWP.

4.5 Response Equipment and Supplies

Appendix C has been reserved for a summarized facility equipment list, including quantity and storage location of response resources. Delfin also plans to ensure by contract the availability of private personnel and equipment necessary to respond, to the maximum extent practicable, to a worst case discharge or the substantial threat of such discharge. Evidence of emergency response contracts and equipment lists will be contained in the FRP upon completed construction of the DWP and will be submitted to the appropriate agencies not less than 60 days prior to the start of operations. All resources shall be capable of arriving at the facility within the applicable response tier requirements (Tier 1 = 12 hours; Tier 2 = 36 hours; Tier 3 = 60 hours).

5.0 MOORING AND UNMOORING VESSELS

The FLNGVs will be equipped with fenders and quick-release hooks to facilitate all mooring and unmooring operations. Each FLNGV will be moored to a disconnecting TYMS that allows the vessel to weathervane, as needed. The loading and offloading arms would be able to accommodate the linear and rotational relative motions between the unit and the FLNGV that are caused by the environmental loads and cargo transfer. The FLNGVs will be self-propelled and would be able to quickly disconnect from the TYMS and navigate using their own propulsion in the event of an emergency or other unique circumstance.

The LNG trading carriers will be directly moored to the FLNGVs during transfer operations. Approaching and departing LNG trading carriers will be under the direction of an approved Delfin LNG Mooring Master. Adequate tug boats would also be provided to

assist LNG trading carriers with arrival and departure. Specific requirements for Mooring Masters and tugs will be described in the Delfin LNG Port Operations Manual. The embarked Delfin LNG Mooring Master along with the LNG trading carrier's navigation crew would maintain a visual lookout and would also use visual cues to assist in approaching and departing the FLNGVs. Minimum visibility standards for arrival and departure will be specified in the Operations Manual. The Operations Manual also will include specific environmental criteria for arrival and departure including maximum winds speed, wave height, currents, or combinations of these conditions.

TABLES

TABLE 1
LIST OF CHEMICALS AND LUBRICANTS ONBOARD EACH FLNGV

LIST OF CHEMICALS AND LUBRICANTS ONBOARD EACH FLNGV

ONBOARD STORAGE DETAILS					
UNIT NO/NAME	**ITEM**	**PURPOSE**	**UNITS**	**STORAGE AMOUNT**	**STORAGE CONTAINER**
Process Hydrocarbon	Nitrogen	Consumable during process	kg	11,250	20 ft ISO Container (L)
	Ethylene	Consumable during process	kg	22,950	20 ft ISO Container (L)
	Propane	Consumable during process	kg	4,800	ISO Container (L)
	n-C_4	Consumable during process	kg	9,000	ISO Container (L)
	i-C_5	Consumable during process	kg	1,200	ISO Container (L)
Acid Gas Removal Unit	Amine Solvent	CO_2 & H_2S removal from feed gas	m^3	200	ISO Container
	Bailout Chem., K_2CO_2	AGRU startup flushing	kg	30,000	Drum
	Antifoam Agent	Foam control in AGRU	kg	100	Drum
Heating Medium	Synthetic Oil	Heating medium for process users	m^3	200	ISO Container
Nitrogen System	Liquid Nitrogen	Backup for initial purge during startup and commissioning	kg	TBD during FEED	
GTC	Synthetic Oil – Turbines	MR compressor	Liter	4,500 for three trains	Drum
Compressor	Lube Oil ISO VG 32	MR compressor	Liter	52,500 for three trains	Drum
GTG	Lube Oil – Turbine	For power	Liter		
Others	Hydraulic Oil	Hydraulic Equipment	Liter		Drum
	Marine Diesel Oil	Fixed and portable devices	m^3	NONE	By boat
DM Water Plant	98% Sulfuric Acid	Scaling	kg	350	Per Drum
	RO Scale Inhibitor (as supplied)	Scaling	kg	600	100 kg/drum
	Sodium bisulfite	Remove residual chlorine	kg	2,500	1,000 kg/tote
	Citric Acid Powder	General purpose cleaning for inorganic scales	kg	100	100 kg/bags

FIGURES

FIGURE 1
GENERAL SITE LOCATION

APPENDICES

APPENDIX A
INCIDENT REPORTING AND NOTIFICATION FORMS

APPENDIX A-1
FIRST REPORT OF INCIDENT

FIRST REPORT OF INCIDENT

Original to File; Copies To: Terminal Mgr or Vessel Master & HSE Group

I. Location: _____ Time: _____ Date: _____

II. INCIDENT TYPE:

A. Safety

- ☐ Non-injury
- ☐ Property/Equipment Damage
- ☐ Fire
- ☐ Other ____
- ☐ Injury
- ☐ First Aid
- ☐ Off-site Treatment
- ☐ Near Miss
- ☐ Employee
- ☐ Contractor

B. Environmental

- ☐ Spill
- ☐ Air Upset
- ☐ Discharge Event
- ☐ Other

For Safety and Environmental Departments Use Only

- ☐ Recordable Injury
- ☐ Chemical Exposure
- ☐ Recordable Illness
- ☐ Reportable to Agency
- ☐ PSM/RMP
- ☐ Other

Signature _____ **Date** _____

III. INJURED EMPLOYEE / CONTRACTOR

Name: _____ Social Security: _____

Occupation: _____ Department / Company: _____

Nature of work related injury: _____

_____

Supervisor's Name: _____

IV. DESCRIPTION OF INCIDENT: (Use additional sheet(s) if necessary)

Date: _____ Time: _____ Location: _____

Tank Capacity: _____

_____

_____

_____

_____

V. IMMEDIATE ACTION(s) TAKEN : (Use additional sheet(s) if necessary)

_____

_____

_____

VI. Incident Investigation Required ☐ Yes ☐ No

VII. Name of person preparing this report: _____

(Please print)

Signature: _____ Date: _____ Time: _____

Supervisor: _____ Date: _____

APPENDIX A-2
LEAK ACCIDENT REPORT FORM

LEAK ACCIDENT REPORT FORM

PL SYSTEM:_____
PL SEGMENT:_____
PRODUCTS ☐ CRUDE ☐

DISTRIBUTION:

Original - PIPELINE SAFETY ☐	
NOTE - Copy to the following as needed:	
MGR - ☐	SUP - ☐
ENG - ☐	ROW - ☐
ENV - ☐	☐

REPORT INFORMATION:

RECORDS RETENTION - Permanent
REPORT FREQUENCY - As Required
DUE DATES - Within 5 Days 1 day

PART A - TIME & LOCATION OF LEAK OR ACCIDENT

1. DATE (Month, Day, Year)	2. HOUR ☐ AM ☐ PM	3. LOCATION (State, County, City)

4. PHYSICAL LOCATION (Direction to site, reference highways & towns) _____
SECTION _____ BLOCK or TOWNSHIP _____ SURVEY or RANGE _____

PART B - ORIGIN OF LIQUID OR VAPOR RELEASE

1. PART OF CARRIER'S SYSTEM INVOLVED:
LINE PIPE ☐ PUMPING STATION ☐ TANK FARM ☐ OTHER (Specify) ☐

2. ITEM INVOLVED:
LINE PIPE ☐ GIRTH WELD ☐ LONGITUDINAL WELD ☐ PUMP ☐ OTHER (Specify) ☐
TANK ☐ WELDED FITTING ☐ BOLTED FITTING ☐ VALVE ☐ OTHER (Specify) ☐

PART C - CAUSE OF LEAK ACCIDENT

CORROSION ☐ FAILED WELD ☐ FAILED PIPE ☐ INCORRECT OPERATION BY OPERATING PERSONNEL ☐
OUTSIDE FORCE DAMAGE ☐ MALFUNCTION OF CONTROL OR RELIEF EQUIP. ☐ OTHER (Specify) ☐

PART D - INJURY OR DEATH

NUMBER OF PERSONS INJURED		NUMBER OF PERSONS KILLED	
CARRIER EMPLOYEES	NON-EMPLOYEES	CARRIER EMPLOYEES	NON-EMPLOYEES

PART E - ESTIMATED DAMAGES & COSTS

1. DAMAGE TO OPERATOR	2. LAND DAMAGE	3. CLEAN-UP COST	4. PRODUCT COST

5. ITEMS DAMAGED (Specify):

PART F - COMMODITY SPILLED OR RELEASED

1. NAME OF COMMODITY SPILLED OR RELEASED:	2. CLASSIFICATION:	3. TOTAL LOSS BBLS RECOVERED BBLS NET LOSS BBLS	4. WAS THERE A FIRE?	5. WAS THERE AN EXPLOSION?
	☐ Crude Oil ☐ Gas Oil ☐ LNG ☐ Non-LNG		YES ☐ NO ☐	YES ☐ NO ☐

LEAK ACCIDENT REPORT FORM

PART G - OCCURRED IN LINE PIPE (Answer sections G, H, or I ONLY if it specifically applies to the leak or accident)

1. NOMINAL DIAMETER in.	2. WALL THICKNESS in.	3. SPECIFICATION & GRADE:	4. YEAR OF INSTALLATION Before 1970 (Specify Yr.): ☐ After 1970 (Specify Yr.) ☐	5. TYPE OF JOINT: Weld ☐ Flanged ☐ Threaded ☐ Coupled ☐ Other ☐ _____

6. CONFIGURATION AT POINT OF ACCIDENT: Straight ☐ Sag ☐ Overbend ☐ Sidebend ☐	7. PIPE WAS: Coated ☐ Not Coated ☐	8. PIPE WAS: Above Ground ☐ Below Ground ☐

9. COVER (if below ground) in.	10. MAXIMUM OPERATING PRESSURE: psig	11. PRESSURE AT TIME & LOCATION OF ACCIDENT psig	12. SYSTEM PRESSURE TEST YES ☐ NO ☐

13. TEST MEDIUM USED; (If item 12, is Yes) Water ☐ Petroleum ☐ Air ☐	14. DURATION OF TEST hrs.	15. MAXIMUM TEST PRESSURE psig	16. DATE OF LATEST TEST

PART H - CAUSED BY CORROSION

1. LOCATION OF CORROSION EXTERNAL ☐ INTERNAL ☐	2. FACILITY COATED: YES ☐ NO ☐	3. FACILITY UNDER CATHODIC PROTECTION? YES ☐ NO ☐	4. TYPE OF CORROSION: GALVANIC ☐ OTHER ☐

PART I - CAUSED BY OUTSIDE FORCES

1. ☐ DAMAGE BY OPERATOR ☐ DAMAGE BY OPERATOR'S CONTRACTOR ☐ DAMAGE BY OTHERS (Name) _____
☐ DAMAGE BY NATURAL FORCES ☐ Washout ☐ Flood ☐ Subsidence ☐ Landslide ☐ Frostheave
☐ EARTHQUAKE ☐ OTHER (Specify)_____

2. DID EXCAVATOR CALL? YES ☐ NO ☐	3. WAS PIPELINE TEMPORARILY MARKED FOR EXCAVATOR? YES ☐ NO ☐	4. DISTANCE TO NEAREST LINE MARKER: feet

1. DETAILS OF INCIDENT: (Complete description of Cause, Response, Repairs, Affected Area & Land Damages.)

Use back for any additional information

PERSON COMPLETING THIS REPORT (Name):	DATE:

NRC # = 800-424-8802
INITIAL NOTIFICATION OF NRC MUST NOT BE DELAYED PENDING COLLECTION OF ALL INFORMATION.

APPENDIX A-3
RELEASE NOTIFICATION DATA SHEET

RELEASE NOTIFICATION DATA SHEET

Incident Date:		Incident Time:	
Reporters Name:		Reporter's Company:	
		Reporter's Position:	
Reporters Address:		City / State:	
Reporters Phone:		Zip:	

Name of Person who notified the reporter of the incident:	

It is not necessary to wait for all information before calling NRC. National Response Center 1-800-424-8802

Were Materials Discharged (please circle one)	Yes No
Calling for Responsible Party (please circle one)	Yes No

Incident Description

Facility Name:		Facility Address or driving directions:		
Organization Type:		Facility Latitude/Longitude:		
Responsible Party: (Name of company)		Owner's Address:		
Facility Contact Name & Title:		Facility Contact Phone No's	Office	
			Cell	
			Other	

Were Materials Discharged? Y____ N ____	Confidential? Y____ N ____
Meeting Federal Obligations to Report? Y ___ N __	Date Called: _____

Incident Description

Location of Spill:	Source or cause of discharge:		
Material Released:	CHRIS Code:		
Total Quantity Released:	Was surface water impacted by the spill? (yes or no)		
Total Quantity Recovered:	Total quantity into the water:		
Net Loss:	Tank Number (above/below) involved or pipe diameter:		
Container Type (AST/UST):	Tank Capacity (gallons):		
Facility Oil Storage Capacity	Units of Measure:		
Nearest City:	Parish:	State:	ZIP
Distance from City (in miles):	Direction from City:	Section:	
Township:	Range:	Borough:	
Weather conditions at time of incident (wind, rain, snow, temperature, etc.):			
Was there a fire or explosion involved?	Number of Injuries:	Extent of Injuries if known:	
Number of Deaths:	Numbers Evacuated (if any):		
Was there any damage:	Yes / No / Unknown (please circle one)		
	Estimate Dollars of Damage:	Description:	
More Information about Medium:			
Additional Information not recorded elsewhere in the report:			

Response Actions

Actions taken to correct, control, or mitigate the incident:	

RELEASE NOTIFICATION DATA SHEET

Notifications				
Group or Agency	**Persons Notified**	**Date & Time Notified**	**Notify By:**	**Incident No.**
NRC				
State Agency				
LEPC - Parish				
HSE Group:				
Other:				

APPENDIX B
SPILL RESPONSE ACTION CHECKLIST

SPILL RESPONSE ACTION CHECKLIST

RESPONSE ACTION CHECKLIST	
First Person to Discover Spill	
Immediately notify Terminal Management. Take appropriate action to protect life and ensure safety of personnel. Contact the appropriate local emergency responders or request the office to do so.	☐
Immediately shut down terminal operations (if applicable). Remotely controlled motor operated valves should be closed as soon as a leak is detected. Manual operated valves should be closed if safe to do so.	☐
Secure the scene. Isolate the area and assure the safety of people and the environment. Keep people away from the scene and outside the safety perimeter.	☐
Terminal Management	
Assume role of Incident Commander until relieved by upper Management (if applicable).	☐
Conduct preliminary assessment of health and safety hazards.	☐
Evacuate nonessential personnel, notify emergency response agencies to provide security, and evacuate surrounding area (if necessary).	☐
Call out Emergency Management Team and primary spill response contractors, as needed	☐
Notify the Facility Operations Personnel and provide an incident briefing.	☐
If safe to do so, direct facility responders to shut down potential ignition sources in the vicinity of the spill, including motors, electrical pumps, electrical power, flairs, etc.	☐
If safe to do so, direct facility responders to shut down and control the source of the spill. Be aware of potential hazards associated with product and ensure that lower explosive limits (LELs) are within safe levels before sending personnel into the spill area.	☐
If safe to do so, direct facility responders to stabilize and contain the situation.	☐
For low flash oil or gases, consider using water spray to reduce vapors, grounding all equipment, and using non-sparking tools. Do not direct the water spray on pools of LNG liquid as the water may heat the cryogenic liquid resulting in a larger vapor cloud.	☐
If there is a potential to impact shorelines, consider lining shoreline with sorbent or diversion boom to reduce impact.	☐
Notify Local Emergency Responders.	☐
Make local notifications: • LEPC • Police • Fire • Sheriff	☐
HSE Regional Manager	
Make appropriate notifications: • National Response Center (800) 424-8802 • External regulatory notifications	☐
Emergency Management Team	
Activate all or a portion of Emergency Management Team (EMT) (as necessary). HSE Department will maintain contact with notified regulatory agencies.	☐
Mobilize spill response contractors (if necessary). It is much better to demobilize equipment and personnel if not needed than to delay contacting them if they are needed.	☐

SPILL RESPONSE ACTION CHECKLIST

Document all response actions taken, including notifications, agency/media meetings, equipment and personnel mobilization and deployment, and area impacted.	☐
Water-based Spills: Initiate spill tracking and surveillance operations. Determine extent of pollution via surveillance aircraft, vessel or vehicle. Estimate volume of spill. Send photographer / videographer, if safe. Use of dispersants requires Federal or State approval.	☐

DOCUMENT ALL ACTIONS TAKEN	
First Priority	
Account for all personnel and visitors.	☐
Identify and assess fire/safety hazards.	☐
Second Priority	
Secure spill source, if possible.	☐
Assure all required notifications are conducted.	☐
Secure all drainage leading from facility.	☐
Facility drainage and secondary containment will be adequate to contain a spill of small or medium size, preventing it from reaching the Gulf of Mexico. Once the spill has been contained, resources are present at the facility to recover spilled product, safety conditions permitting.	☐
If unable to contain spill, refer FRP for location of booming strategy.	☐
Once deployment of response equipment has been completed, initiate recovery of product.	☐
Upon arrival of EMT, assure all information is accurate and complete prior to being released.	☐
Assure proper documentation has been completed from initial discovery of spill to finish.	☐

APPENDIX C
EQUIPMENT LIST AND RESPONSE RESOURCES

(RESERVED)