Port Dolphin Energy LLC

GENERAL

Volume I

Deepwater Port License Application

Port Dolphin Project, Tampa Bay, Florida

PUBLIC

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General (Public)
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Acronyms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
ABS	American Bureau of Shipping
AISC	American Institute of Steel Construction
AIV	Assisting Installation Vessel
ANSI	American National Standards Institute
AP	Anchor Pile
API	American Petroleum Institute
Applicant, the	Port Dolphin Energy LLC
APRS	acoustic position reporting system
ARO	abrasive resistant overlay
ASD	automatic shutdown
ASME	American Society of Mechanical Engineers
CCR	cargo control room
C.F.R.	Code of Federal Regulations
CO_2	carbon dioxide
COLREGS	International Regulations for Prevention of Collisions at Sea
CP	central processor
CRT	cathode ray tube
DGPS	dynamic global positioning system
DP	dynamic positioning; dynamically positioned
DWPA	Deepwater Port Act of 1974, as amended
EBD	emergency buoy disconnect
EPA	(United States) Environmental Protection Agency
EPIRB	emergency position-indicating rescue beacon
ESD	emergency shutdown
ESDV	emergency shutdown valve
FBE	fusion bond(ed) epoxy
FCC	Federal Communications Commission
FEED	front-end engineering design
FERC	Federal Energy Regulatory Commission
GMDSS	Global Maritime Distress and Safety System
GOM	Gulf of Mexico
HDD	Horizontal Directional Drilling
HF/MF	High frequency/medium frequency
IAS	integrated automated system
ID	inside diameter
IMO	International Maritime Organization
INMARSAT	International Maritime Satellite Communication System
ISO	International Standards Organization
kg/m^3	kilograms per cubic meter

LAN	local area network
lb/ft^3	pounds per cubic foot
LNG	liquefied natural gas
LWS	lower wire segment
m^3	cubic meters
MARAD	Maritime Administration
MIV	Main Installation Vessel
mm	Millimeter
MMS	(United States Department of the Interior) Minerals Management Service
mmscfd	million standard cubic feet per day
Navtex	Navigation telex radio
NBDP	narrow band direct printing
NEPA	National Environmental Policy Act
NIS	Norwegian International Ship Register
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OCS	Outer Continental Shelf
PA	public address
PABX	private automatic branch exchange
PC	personal computer
PCHE	printed circuit heat exchanger
PLEM	pipeline end manifold
Ppm	parts per million
PR	pressure regulator
Psi	pounds per square inch
Psig	pounds per square inch gauge
RACON	radar beacon
RCS	Recognized Classification Society
ROV	remotely operated vehicle
ROW	right-of way
RP	Recommended Practice
SES	Ship Earth Station
SIGTTO	Society of International Gas Tanker and Terminal Operators
SOLAS	International Convention for the Safety of Life at Sea
STD	Standard
STL	submerged turret loading
TECO	Tampa Electric Company
U.S.C.	United States Code
UHF	ultra high frequency
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard

UWS	upper wire segment
VHF	Very high frequency

Figure 1-1
Shuttle and Re-gasification Vessel

1. Introduction

1.1 Project Description

Port Dolphin Energy LLC (Applicant) is filing for a license pursuant to the Deepwater Port Act of 1974, as amended (DWPA), and the United State Coast Guard's (USCG) regulations, 33 C.F.R. Part 148 (2006), to construct, own and operate a deepwater port. The unloading portion of the deepwater port, named *Port Dolphin*, would be located in federal waters approximately 28-miles (45-kilometers) offshore of the Tampa Bay area of Florida in approximately 100-feet (30-meters) of water (Figure 1-3). This area lies within the St. Petersburg block of the Outer Continental Shelf (Figure 1-4).

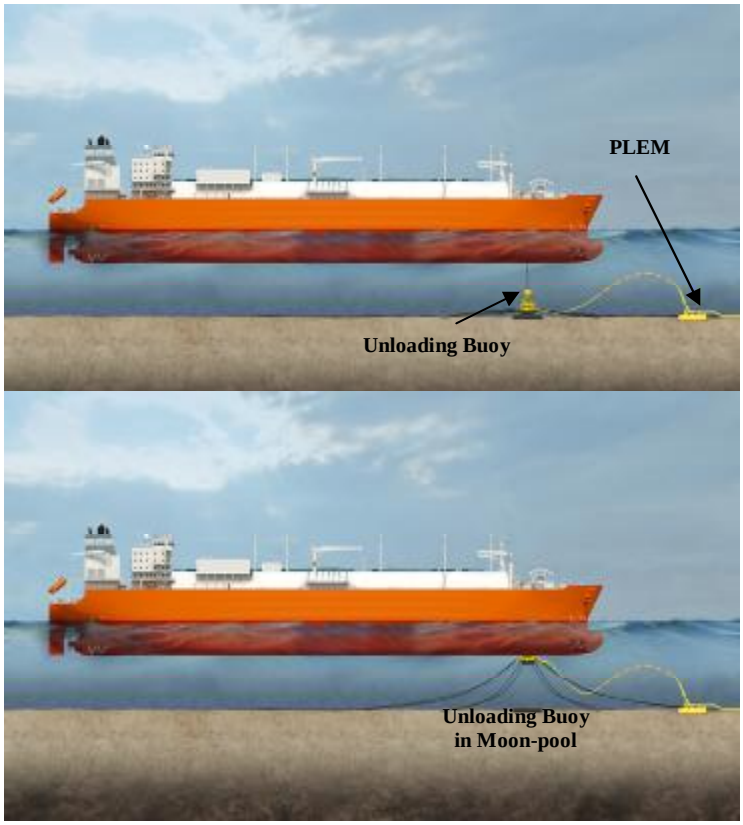
The *Port Dolphin* deepwater port would be capable of mooring Shuttle and Re-gasification Vessels (SRV) as depicted in Figure 1-1 and is intended to provide a diverse and resilient source of natural gas delivery. The SRVs are vessels designed to carry liquefied natural gas combined with a capability to re-gasify the natural gas prior to off-loading it for transport to shore. These vessels would have a capacity range of 145,000 cubic meters (m^3) to 217,000 m^3 of natural gas in a liquid state cooled to -261º F. The SRVs themselves are almost entirely propelled

by comparatively clean-burning natural gas which significantly reduces their environmental impact compared to conventional vessels.

Up to two SRVs would temporarily moor at the proposed deepwater port by means of a submerged unloading buoy system (Figures 1-2 and 1-5). Two unloading buoys would be separated by a distance of approximately 3.1-miles (5-kilometers). The unloading buoys would moor each SRV on location throughout the unloading cycle. Each unloading buoy would have eight mooring lines consisting of wire rope and chain. The mooring lines would connect each unloading buoy to eight anchor points most likely consisting of driven piles on the seabed. The unloading buoy designed by APL, and is also commonly known as Submerged Turret Loading (STL) Buoys.

An SRV would typically moor at the deepwater port for between four and eight days, depending on vessel size and send-out rate. The two separate buoys would allow natural gas to be delivered in a continuous flow, without interruption, by scheduling an overlap between arriving and departing SRVs. The unloading buoy technology and associated equipage proposed for *Port Dolphin* is similar to that used in the *Gulf Gateway* deepwater port and that is planned for the *Northeast Gateway*, *Neptune* and *Calypso* projects. The technology has also been successfully used at several locations overseas including the North Sea.

When not connected to an SRV, the unloading buoy would be submerged 60-70 feet (18-21 meters) below the sea surface. In this position, the buoy would be held in position by the mooring lines and would be resting on the STL Buoy landing pad. A marker buoy and retrieval line would be used to locate and recover the buoy as the SRV arrives at the deepwater port. The unloading buoy would be retrieved from its submerged position by means of a winch and recovery line. It would be hoisted up through a moon-pool in the forward part of the SRV where it would be located in a receiving cone within the hull trunk (see illustrations). After the buoy is locked in position, unloading of natural gas would begin. The gas would be unloaded through the flexible riser into the pipeline end manifold (PLEM) for transportation to shore via the subsea pipeline.



The SRVs would be equipped to transport, store, and vaporize liquefied natural gas and to meter natural gas. The SRV would have insulated storage tanks for the liquefied natural gas

located within its hull. Each tank would be equipped with an in-tank pump to circulate and transfer liquefied natural gas, at a temperature of approximately -261 degrees Fahrenheit (ºF), to the vaporization facilities located on the deck of the SRV. The vaporization system would have a closed-loop cycle utilizing glycol/water brine as the re-circulating heating medium. This re-circulating medium would heat the liquefied natural gas and the medium itself would be warmed using steam from the SRV's natural-gas boilers.

Initially, it is expected that the average daily throughput of the port will be approximately 400 mmscfd. *Port Dolphin* would eventually be capable of achieving an average throughput of 800 million standard cubic feet per day (mmscfd) and a peak capacity of approximately 1200 million mmscfd. Natural gas would be sent out, by means of a 16-inch flexible riser from each buoy down to two 36-inch subsea flowlines through a piggable-Y to a 36-inch gas transmission line. The gas transmission line would transport natural gas to onshore facilities that interconnect with the Gulfstream Natural Gas System, L.L.C. and Tampa Electric Company ("TECO") respectively, at locations approximately 3.6-miles (5.7-kilometers) and 5.8-miles (9.2-kilometers) inland in Manatee County, Florida. From there, the natural gas would be available to serve residential, commercial, industrial and electrical generation customers primarily in Florida and the Southeastern United States.

Construction of *Port Dolphin* would proceed in two phases lasting a total of approximately 22 months with the port expected to commence operations in the second quarter of 2011. The first phase would consist of the offsite fabrication of components including the unloading buoys (STL Buoys) and associated equipment and marine piping. The second phase would consist of siting the STL Buoys and associated equipment and laying the marine pipeline. Separate construction activities would involve the construction of the onshore interconnection facilities in Manatee County, Florida that are described in a companion application to be filed with the Federal Energy Regulatory Commission under Section 7 of the Natural Gas Act.

Figure 1-2
Port Dolphin Subsea Components

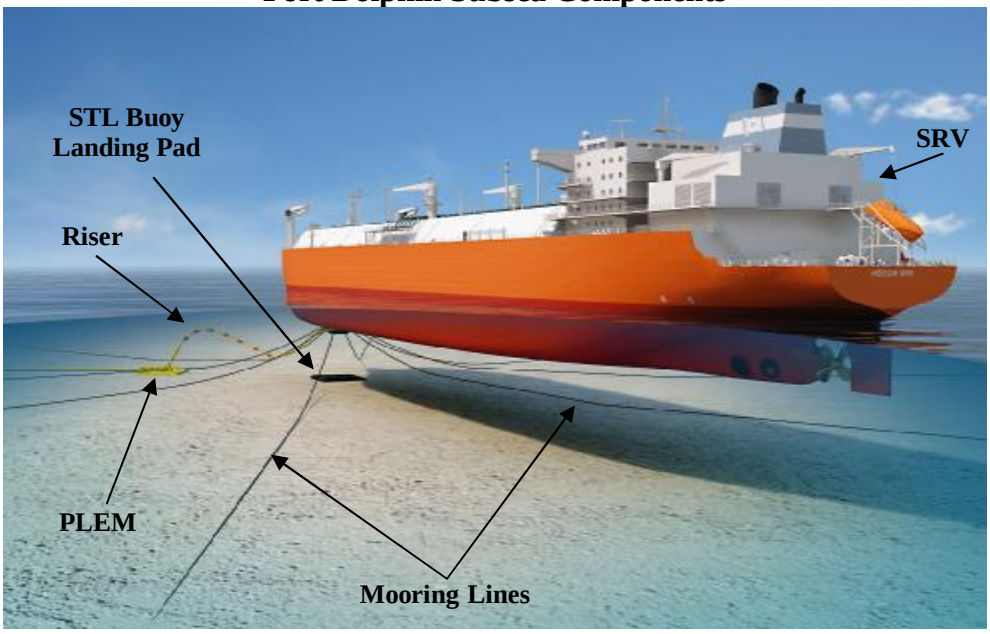
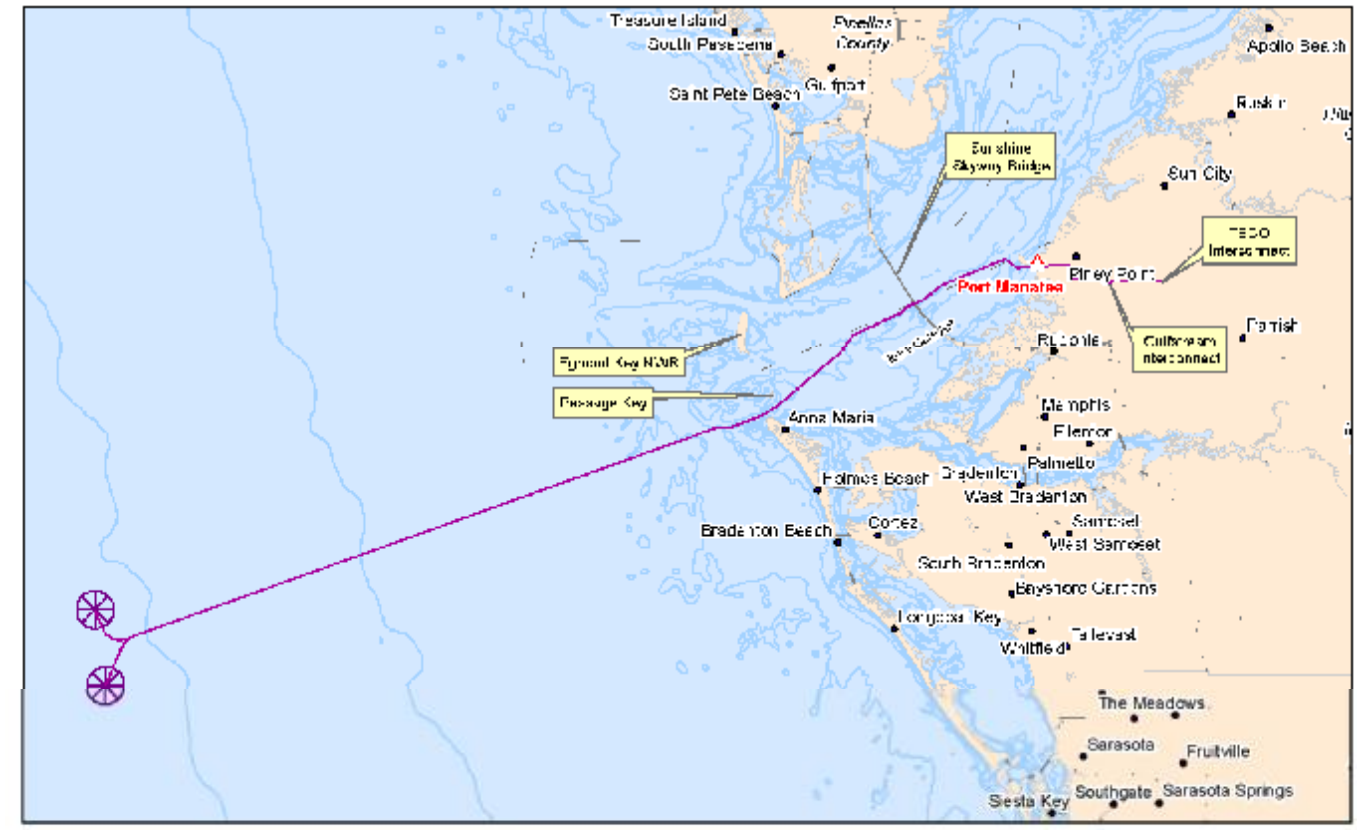


Figure 1-3



Port Dolphin location diagram.

Proposed Port Dolphin

Figure 1-4
St. Petersburg Blocks of the Outer Continental Shelf

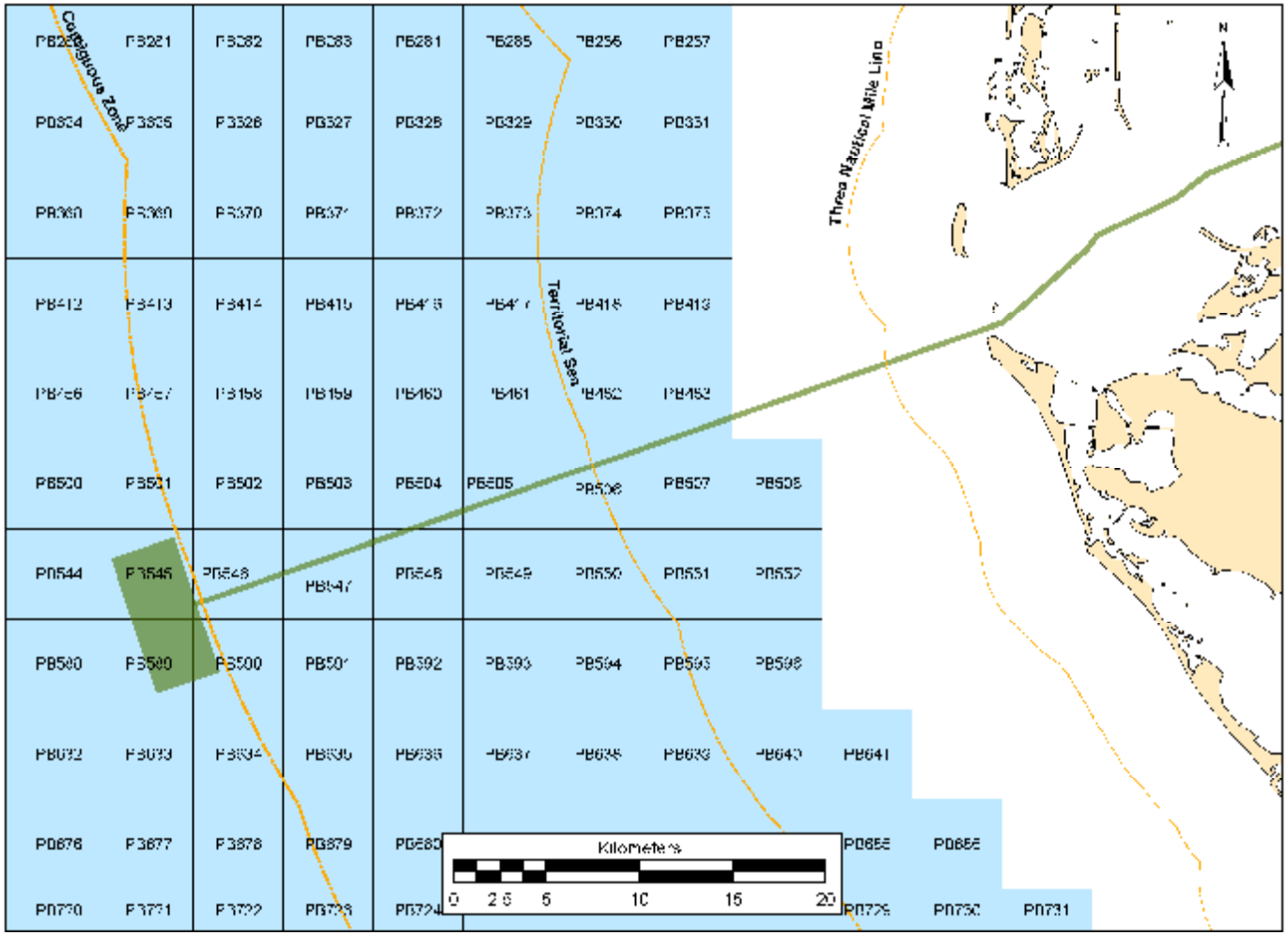
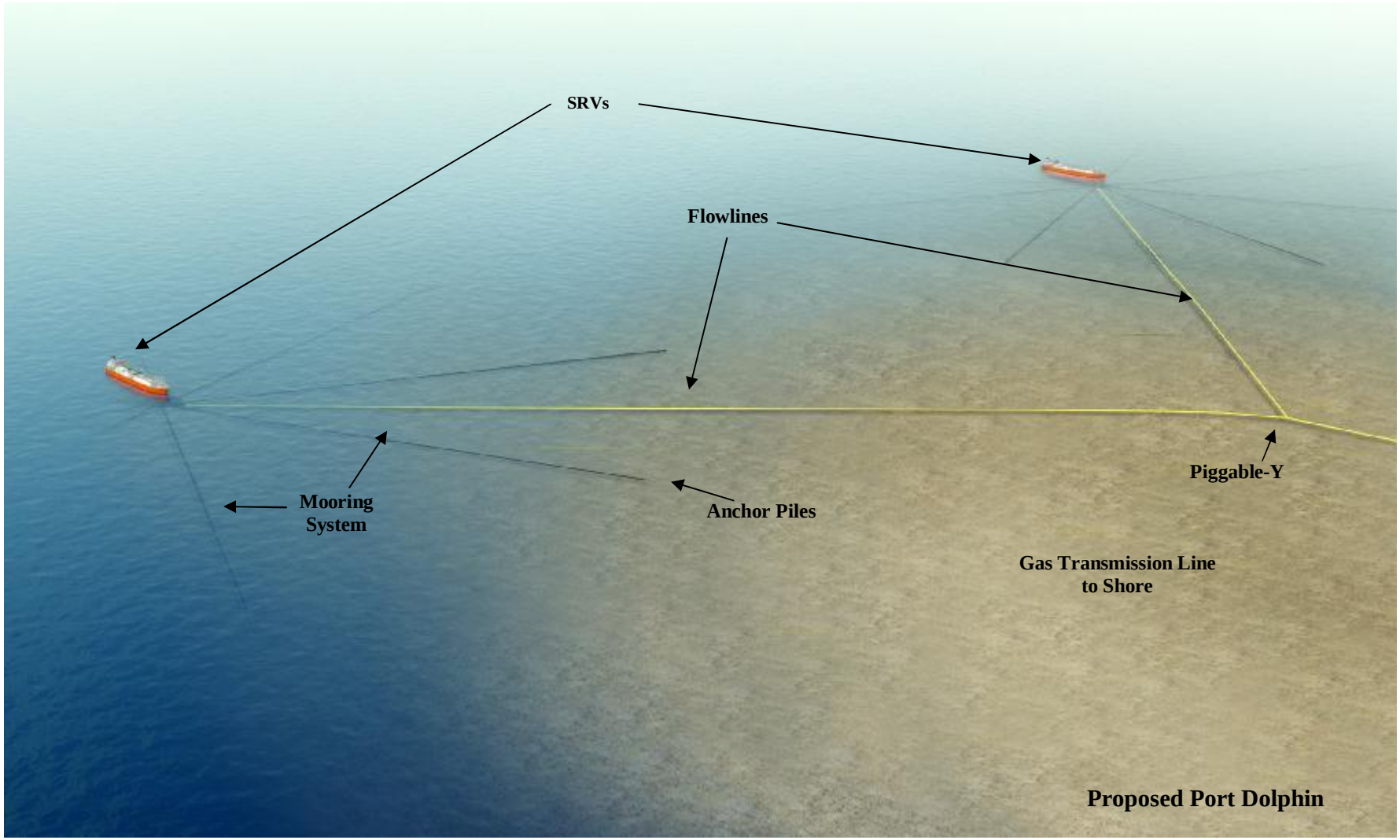


Figure 1-5
Aerial View (to scale)

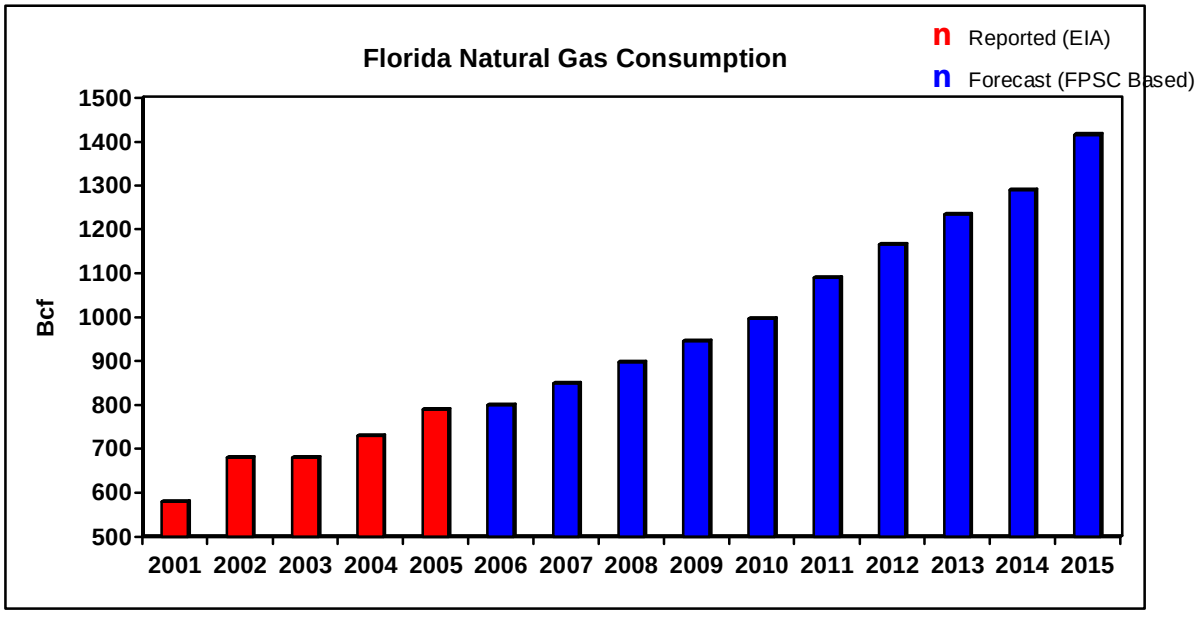


1.2 Project Need

The *Port Dolphin* Project will address the increasing demand for natural gas in the Southeastern United States and particularly the State of Florida. This demand is attributable primarily to the increase in natural gas-fired power generation in Florida. According to projections by the Florida Public Service Commission (FPSC) in its review of state electric utilities' ten-year site plans,[1] gas-fired power generation will grow to over 44% of all power generation in Florida by 2014. As further noted by the FPSC, the "vast majority" or 92% of all generating capacity constructed in Florida during the past ten years was natural gas-fired. This trend is expected to continue, with forecasts indicating that natural gas-fired units will comprise 96% of all planned generating capacity additions in the state over the next decade. The increase in natural gas-based generation will, in turn, lead to a 92% increase in Florida's natural gas requirements from 2006 to 2015.

Overall, current demand in Florida is approximately 775 Bcf per year according to the U.S. Energy Information Administration, of which, over 600 Bcf is for power generation while the remaining portion is devoted to residential, commercial, industrial and vehicular uses. According to FPSC projections, Florida electric utilities, whose needs constitute approximately 80% of demand, will increase their natural gas consumption by an average of 6.6% a year to 997.8 Bcf by 2014. Figure 1-6 shows the overall growth in Florida's natural gas demand over the last five years as well as the forecast growth through 2015.

Figure 1-6



[1] A Review of Florida Electric Utility 2005 Ten-Year Site Plants, prepared by the Florida Public Service Commission, Division of Economic Regulation (December 2005).

The FPSC has also noted the challenges in meeting the demand for natural gas with diverse sources of supply. Since there are no natural gas production facilities and only limited natural gas storage capacity within the state, Florida is heavily reliant on daily deliveries from outside sources. Currently, the state receives natural gas primarily from the Florida Gas Transmission and Gulfstream pipelines which cumulatively, can provide up to 3.3 Bcf per day. Interstate pipeline capacity into the state will increase by 0.5 Bcf per day when the Southern Natural Gas Company completes its Cypress pipeline project, which will deliver gas from Georgia. As noted by the FPSC in its ten-year review of utilities' site plans, the limited sources of natural gas supply remain a concern. In this regard, the FPSC has concluded that the primary threat to electrical generation reliability in Florida is the possibility of natural gas supply disruption such as that caused by hurricanes.

By supplying up to 144 Bcf of natural gas during its proposed, first year of operation in 2011, the proposed *Port Dolphin* can play a significant role in helping to address the forecasted growth in the state's needs, as well as expanding Florida's access to natural gas supplies. If approved, the port will utilize proven technology combined with a relatively small footprint to provide approximately 15% of the natural gas necessary to meet, during its initial four years of operation, Florida's gas-fired power generation needs.

Figure1-7 below, shows the forecasted annual growth in Florida's natural gas requirements during the port's initial years of operation, and indicates which requirements are driven by the state's electrical generation needs. As previously noted, electrical generation consumption will result in a 6.6% annual growth in Florida's natural gas requirements during this period. Figure 1-8 shows the role that the proposed *Port Dolphin* can play in helping to address this need by providing the natural gas needed to address the projected growth in Florida's electrical generation requirements, in addition to helping to meet the state's baseline power needs.

Figure 1-7

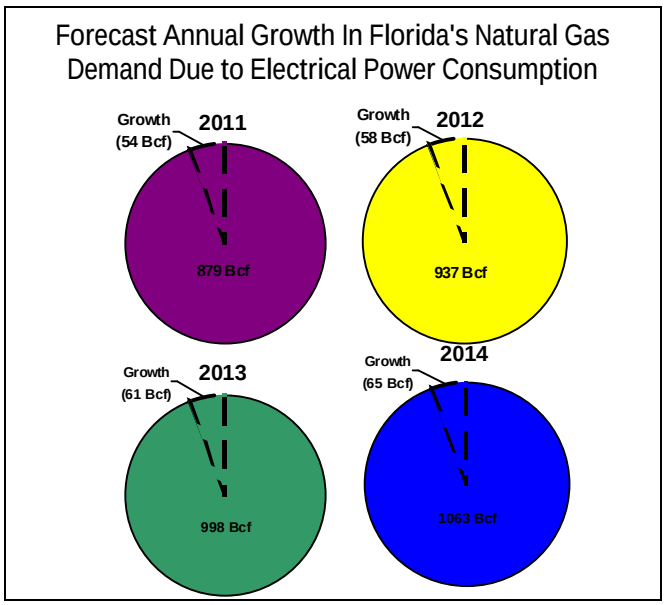
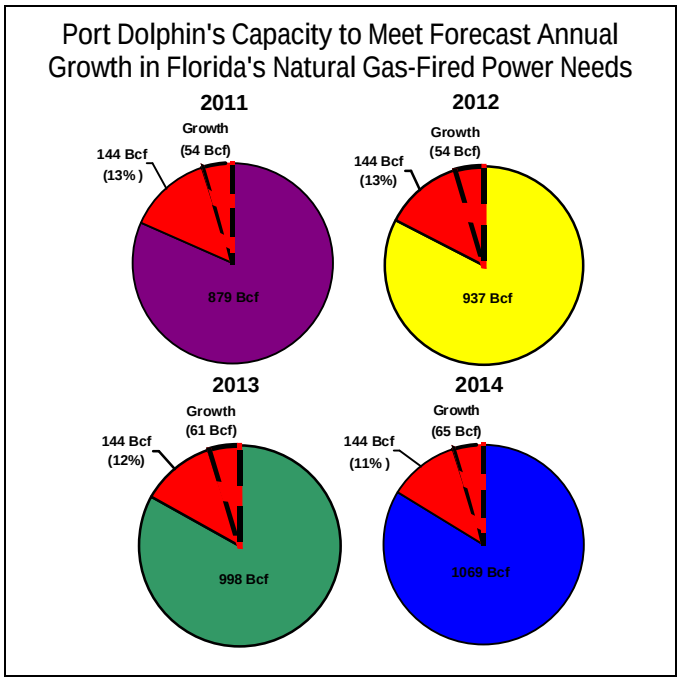


Figure 1-8



Thus, the proposed *Port Dolphin* can make a significant contribution to addressing the State of Florida's natural gas needs through its 25-plus years of expected operation. The proposed *Port Dolphin* provides these benefits through the use of proven, low impact technology and facilities without significant risk.

In addition to meeting gas needs and increasing supply diversity within Florida, though back-haul arrangements on the Gulfstream Natural Gas System, L.L.C., natural gas received through the *Port Dolphin* Project can reach numerous other markets that are connected to the Gulf Coast.

2. § 148.105(a) – Applicant and Affiliate Information

This section provides corporate information regarding the Applicant, Port Dolphin Energy LLC, and its indirect parent companies, Höegh LNG AS, Höegh LNG Limited and Leif Höegh & Co. Limited along with the affiliated Höegh Fleet Services. The applicant's direct parent company, Port Dolphin Holding Company, LLC, is a member-managed entity and does not have a separate board of directors. An organizational chart depicting the entire Höegh corporate structure is contained in Section 3.1 and further information regarding the Höegh family of companies are set out in Appendix A.

2.1 § 148.105(a)(1) – Identities of the Applicant and Affiliates

Name of Applicant	Port Dolphin Energy LLC
Address	12727 Featherwood, Suite 113 Houston, Texas 77034
Telephone Number	(281) 922-1822
Citizenship	United States
Principal Business Activity	Construct, own and operate a proposed LNG terminal offshore the Tampa Bay area of Florida

Affiliated Parent Company of Applicant	Höegh LNG AS
Address	Drammensveien 134 N-0212 Oslo Norway
Telephone Number	+47 21 03 90 00
Citizenship	Norway
Principal Business Activity	Provide midstream transportation solutions for LNG; maritime transportation of LNG

Affiliate Company of Applicant	Höegh Fleet Services AS
Address	Drammensveien 134 N-0212 Oslo Norway
Telephone Number	+47 21 03 90 00
Citizenship	Norway
Principal Business Activity	Ship management, ship engineering and ship consultancy

Affiliated Parent Company of Applicant	Höegh LNG Limited
Address	Canon's Court 22 Victoria Street P.O. Box 1179 Hamilton HM12, Bermuda
Telephone Number	+1441 295 2244
Citizenship	Bermuda
Principal Business Activity	Developing, constructing, owning, operating and maintaining offshore terminals and systems for receiving, re-gasifying, storing and delivering liquefied natural gas; ship owning.

Affiliated Parent Company of Applicant	Leif Höegh & Co. Limited
Address	Canon's Court 22 Victoria Street P.O. Box 1179 Hamilton HM12, Bermuda
Telephone Number	+1441 295 2244
Citizenship	Bermuda
Principal Business Activity	Shipping business

2.2 § 148.105(a)(2) – Identities of Applicant's and Affiliate's Subsidiaries and Divisions

Port Dolphin Energy LLC does not have subsidiaries or divisions. The participants in the decision to apply for a license to construct a deepwater port are listed above.

2.3 § 148.105(a)(3) – Affiliate Relationship(s) to Applicant

The Applicant, Port Dolphin Energy LLC, is a wholly-owned subsidiary of Höegh LNG AS. Through Höegh LNG Limited (which serves as a holding company), Höegh LNG AS is a wholly-owned subsidiary of Leif Höegh & Co. Limited and oversees LNG operations on behalf of the latter. Höegh Fleet Services assists Höegh LNG AS with technical, training and crewing support and is also a wholly-owned subsidiary of Leif Höegh & Co. Limited.

2.4 § 148.105(a)(4) – Corporate Directors and Officers of Each Participating Affiliate

Table 2-1a
Corporate Directors and Officers of Applicant

Title	Name
Applicant: Port Dolphin Energy LLC	
Directors	
Chairman of the Board	James Butcher
Director	Roy Winograd
Director	Ragnar Wisløff
Officers	
Chief Executive Officer	James Butcher
President	James Butcher
Secretary	Marc Sorensen

Table 2-1b
Corporate Directors and Officers of Affiliated Parent Company

Title	Name
Applicant Affiliate: Höegh LNG AS	
Directors	
Chairman	Morten W. Høegh
Director	Sveinung Støhle
Director	Olav Sollie
Officers	
Chief Executive Officer	Sveinung Støhle
Chief Financial Officer	Øystein Lauritzen
Chief Operating Officer	Stephan Tschudi-Madsen
Senior Vice President	Roald Nord
Senior Vice President	Øystein Bruno Larsen
Senior Vice President	Trond Evju

Table 2-1c
Corporate Directors and Officers of Affiliate

Title	Name
Applicant Affiliate: Höegh Fleet Services AS	
Directors	
Chairman	Thor Jørgen Guttormsen
Director	Erik Falkenberg
Director	Yngvil Signe Eriksson Åsheim
Director	Stephan Tschudi-Madsen
Officers	
President	Yngvil Signe Eriksson Åsheim
Executive Vice President	Sebjørn Dahl
Senior Vice President	Øistein Dahl
Senior Vice President	Svein Pedersen
Senior Vice President	Karl Helge Røyter
Senior Vice President	Jan van Tiggelen
Senior Vice President	Vegard Hellekleiv
Vice President	Kristin Haugen
Vice President	Tarald Nomeland
Vice President	Jan Høgmo

Table 2-1d
Corporate Directors and Officers of Affiliated Parent Company

Title Applicant Affiliate: Höegh LNG Limited	Name
Directors	
Chairman	Westye Høegh
Deputy Chairman	Leif Ove Høegh
Deputy Chairman	Morten W. Høegh
Director	Truls Holthe
Director	Jörgen Ekberg
Director	Gunnar Reitan
Director	Jon Erik Reinhardsen
Director	Ditlev Wedell Wedellsborg
Director	Cameron Adderley
Director	Michael L. Jones
Officer	
President	Sveinung Støhle

Table 2-1e
Corporate Directors of Affiliated Parent Company

Title Applicant Affiliate: Leif Höegh & Co. Limited	Name
Directors	
Chairman	Westye Høegh
Deputy Chairman	Leif Ove Høegh
Deputy Chairman	Morten W. Høegh
Director	Truls Holthe
Director	Jörgen Ekberg
Director	Gunnar Reitan
Director	Jon Erik Reinhardsen
Director	Ditlev Wedell Wedellsborg
Director	Cameron Adderley
Director	Michael L. Jones

2.5 §148.105(a)(5) – Applicant's and Affiliates' Five-Year Histories

Port Dolphin Energy LLC has not been involved in any civil or criminal legal proceeding during the preceding five years that relates to, or that could materially affect, information contained in this license application. An affiliate of the Applicant, Höegh Fleet Services AS, was

involved in an incident in 2003 regarding a Marpol violation aboard a non-LNG vessel. The matter was subsequently settled with the U.S. Government.

2.6 § 148.105(a)(6) – Lobbying Activities Prohibited by 31 U.S.C. § 1352 or Other Applicable Federal Anti-lobbying Statutes

Neither Port Dolphin Energy LLC nor its affiliates has engaged in lobbying activities prohibited by 31 U.S.C. § 1352 or other applicable Federal anti-lobbying statutes.

3. § 148.105(b) – Experience Related to Deepwater Ports

This section provides an overview of the Applicant's affiliates and contractor's experience related to deepwater ports. Further information regarding individual companies can be found in Appendix A.

Höegh Liquefied Natural Gas Vessel
S/S *Arctic Princess*

3.1 § 148.105(b)(1) – Offshore Operations Experience

Höegh LNG AS, the parent company of the Applicant, draws on over 30 years of operational LNG experience within the Höegh group. This includes LNG carrier operations in some of the most challenging maritime environments in the world, all performed with a flawless safety record. During this time, Höegh has pioneered:

- use of "Moss" cargo containment systems (spherical tanks)

- development of advanced offshore LNG transfer systems
- innovative offshore terminal solutions for natural gas
- integration of shipboard re-gasification technology

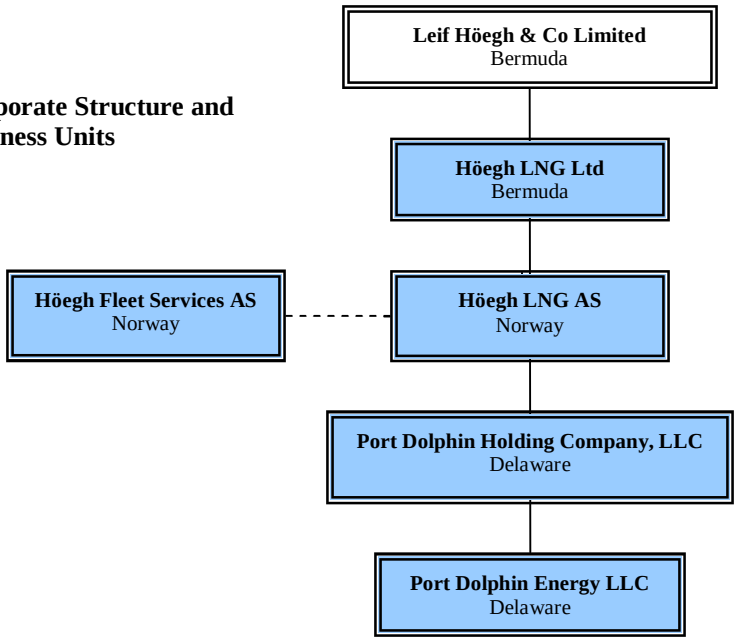
Höegh continues to build its offshore experience through its current participation in the Snøhvit project in the Barents Sea which includes the development of Europe's first LNG export terminal, and in the *Neptune* project, which consists of the construction of an STL Buoy deepwater port near Boston Harbor, Massachusetts. This is aligned with the company's goal of continuing to expand its role as a leader in developing midstream solutions for the importation of natural gas that utilize breakthrough technology while being environmentally sensitive.

In addition to its longstanding role in LNG operations and systems development, Höegh is at the forefront of liquefied natural gas carrier safety compliance with almost all of its vessels having Condition Assessment Program Certificates, Class 1 or equivalent, which certifies a standard of quality beyond the vessel class requirements. Through an affiliate, Höegh LNG AS maintains on-premises oversight of new construction vessels including the recently delivered *Arctic Princess* (photo above) and *Arctic Lady* in addition to three vessels under construction at Samsung Heavy Industries. Through this relationship with its affiliated companies (see diagram below), Hoegh LNG is able to maintain comprehensive, life-cycle expertise in all aspects of transporting natural gas in the offshore environment.

An important component of Höegh's offshore expertise and unblemished safety record is its cadet and seafarer training programs administered by the affiliated Höegh Fleet Services and under which personnel are schooled in maritime operations at three global locations. As part of the maritime operations curriculum, comprehensive instruction in environmental compliance is provided to Masters and engineering personnel. Its practice experience and commitment to environmental protection led to Höegh Fleet Services' receipt of ISO 14001 certification in 2001.

Höegh LNG is a member of a number of industry trade organizations including the Society of International Gas Tanker and Terminal Operators, the Baltic and International Maritime Council, the Norwegian Oil and Gas Partners, and the Norwegian Shipowners Association. Further details regarding Höegh LNG's expertise can be found in Volume III, Section 1.

Corporate Structure and Business Units



3.2 § 148.105(b)(2) – Contracted Affiliates' Marine and Offshore Construction Experience and Qualifications

Construction contracts have not yet been awarded for the proposed *Port Dolphin*, and the USCG will be notified when there is an award. Two of the firms associated with the preliminary engineering phase of the project, Pipeline Engineering & Technology Corporation (PETC) and Advanced Production and Loading (APL), have considerable construction expertise as described in the following summary.

Pipeline Engineering & Technology Corporation (PETC)

PETC has 11 years of experience encompassing over 70 pipeline and infrastructure projects. Several of these projects were in environmentally sensitive areas and involved detailed engineering and design as well as construction management services. A sampling of the related types of projects PETC has been involved in includes:

- Numerous horizontal direction drilled (HDD) crossings of rivers, bayous, creeks, canals, highways, railroads shore approaches and foreign pipelines
- Construction of 62 miles of 8-inch pipeline from a plant in McNary, Louisiana to Iowa, Louisiana

- Construction of dual parallel 10-inch pipelines from Hackbury to Sulphur, Louisiana over a distance of 15 miles, almost half of which was in marsh and wetlands

- Construction and burial of 4 miles of 14-inch pipeline in the Gulf of Mexico as well as the supporting anchoring structures

- Installation of PLEM tie-in and a sub-sea connection to a foreign pipeline in 75 feet of water

- Construction and installation of numerous meter and regulation and pump and compressor stations

A complete listing of PETC's relevant experience can be found in Appendix A to this volume.

Advanced Production and Loading (APL)

APL has over 13 years experience in the design, manufacture and installation of submerged turret loading (STL) systems in the United States and at 11 other worldwide locations. The company has been the leader in the development of STL technology designed specifically to withstand harsh climatic conditions such as those found in the North Sea (see Figure 3-1) and at depths significantly in excess of those found at the proposed *Port Dolphin* site. A representative list of APL's projects include:

- Gulf Gateway (USA), STL, Water Depth, 295-feet (90-meters)

- Heidrun (Norway) STL, Water Depth, 1149-feet (350-meters)

- Asgard C (Norway) STL, Water Depth, 952-feet (290-meters)

- Bayu Undan (Australia) STL, Water Depth, 262-feet (80-meters)

- Banff (United Kingdom) STL, Water Depth, 311-feet (95-meters)

A complete listing of APL's project accomplishments and references is found in Appendix A.2 .

Figure 3-1
STL Buoy Riding a 100-Year Storm in the North Sea

4. § 148.105(c) – Engineering Firms

Table 4-1 provides a listing of participating engineering firms to date. As the design for *Port Dolphin* progresses, more firms may be added and the USCG will be notified accordingly.

Table 4-1
Identity of Participating Engineering Firms and Contact Information

Name	Address	Citizenship	Telephone Number
Continental Shelf Associates, Inc. (CSA)	759 Parkway Street Jupiter, Florida 33477	USA	(561) 746-7946
Pipeline Engineering & Technology Corp. (PETC)	13831 Northwest Freeway, #312 Houston, Texas 77040	USA	(713) 690-9111
Höegh LNG AS	Drammensveien 134 N-0212 Oslo Norway	Norway	+47 21 03 90 00
Advanced Production and Loading, Inc.(APL)	2000 Dairy Ashford Suite 600 Houston, Texas 77077	USA	(281) 283-7711
Hamworthy Gas Systems AS	Solbraaveien 10 PO Box 144 N-1371 Asker Norway	Norway	+47 66 10 95 00
T. Baker Smith, Inc. (TBS)	412 South Van Avenue Houma, LA 70363	USA	(985) 223-9230
Forristall Ocean Engineering Inc.	101 Chesnut Street Camden, ME 04843	USA	(207) 236-7747

Qualifications

Continental Shelf Associates (CSA)

CSA's qualifications to provide engineering and environmental analysis services are based on their extensive national and international experience in connection with a variety of LNG and deepwater port-related projects. Specifically, CSA has considerable experience in performing comprehensive environmental analyses in differing maritime and shore environments under a variety of national, state and local regulatory regimes. Some of CSA's recent activities follows:

- Assisted in EIS preparation for a Deepwater Port Act application in the Gulf of Mexico including a description of, and impacts on, water resources and water quality.

- Assisted in preparing the environmental permitting documentation for an international 162-mile undersea pipeline construction project to deliver natural gas to the Florida mainland from the Bahamas.

- Prepared all environmental documentation necessary for permitting of three separate, offshore re-gasification facilities including one LNG terminal in the Gulf of Mexico. This work included compliance with the requirements of several government organizations including the USCG, Minerals Management Service (MMS), EPA and various agencies of the State of Louisiana.

- Performed a marine environmental survey in support of the Brass LNG Terminal in Nigeria. This work included the identification of potential significant impacts during the front-end engineering design phase.

- Provided environmental services in support of the Sakahlin Island, Russia, Phase 2 development project. This work supported the development of the offshore Lunskoye gas and condensate field and further development of the offshore Piltun-Astokhskoye oil and associated gas field.

- Prepared a technical plan, terms of reference, environmental impact assessment, mitigation plan and monitoring plan in support of an LNG development project in Irian Jaya, Indonesia. During this project, CSA managed an international team of subcontractors and consultants and conducted extensive public consultation with 52 affected villages on issues including regional growth management, revenue management, economic issues and purchasing of goods from the region.

T. Baker Smith, Inc. (TBS)

TBS's qualifications to provide engineering support services are based on their long-standing experience in performing geophysical, archeological and hazard surveys. These services have included considerable experience in supporting energy-related projects in the Gulf of Mexico region. A description of TBS's 2005-2006 activities follows:

- Provided geophysical survey services for the inspection of potential post-Hurricane Katrina impacts on the El Paso Pipelines in the Gulf of Mexico. This included all planning and coordination of survey operations of pipelines, platforms and diving operations. Additionally, TBS performed shallow depth hazard surveys and permitting for pipeline repairs and reroutes.

- Supported post-Hurricane Katrina inspections of the Williams Transcontinental Pipeline in accordance with MMS NTL No. 2005-G20. This work included the preparation of drawings, a final report, and digital basemaps in addition to an analysis of damage and recommendations for further actions.

- Provided shallow water hazard and archeological surveys in support of the across-water portions of a proposed 72-mile pipeline in the Keith Lake and Salt Bayou areas of Texas. This work included coordination with the Texas State Historic Preservation Office for archeological survey requirements as well as research in historic and pre-historic sensitive areas.

- Supported platform relocation in the Eugene Island, Louisiana area through site assessment. This included locating all existing wells, pipelines and platforms for construction requirements as well as seismic and sub-surface analyses and interpretation in compliance with MMS specifications.

Hamworthy Gas Systems AS

Hamworthy Gas Systems AS is a designer, developer and manufacturer of advanced marine fluid handling systems for ships and offshore oil and gas facilities. The company has over 60 years of experience in working with LNG and has been an industry leader in developing re-gasification technology.

Hamworthy has delivered or has on order 25 re-liquefaction, liquefaction and re-gasification systems for shipboard use to customers worldwide. Further, the company has shipped a number of LNG heat exchangers, and, combines this with its vast experience in the liquid propane gas (LPG) area where it has produced over 170 LPG liquefaction plants and over 280 LPG heaters and vaporizers respectively.

Additional information describing Hamworthy Gas Systems' experience and qualifications can be found in Volume III, Section 4.

Pipeline Engineering & Technology Corporation (PETC)

PETC has been responsible for the preliminary design of the fixed offshore components for *Port Dolphin* described in Section 19 and onshore components described in Section 22. PETC's engineering qualifications are evidenced by the series of projects listed in the previous section in addition to those listed in Appendix A.

Advanced Production and Loading (APL)

APL has been responsible for the design of the floating offshore components for *Port Dolphin* described in Section 18, and will also assist in the design of STL shipboard systems described in Section 19. APL's engineering qualifications are evidenced by the series of projects listed in the previous section in addition to those listed in Appendix A.

Forristall Ocean Engineering, Inc.

Forristall has been responsible for the development of the metocean data for the proposed *Port Dolphin*. Through its principal, Dr. George Forristall, the firm has developed an international reputation for its expertise in meteorological and oceanographic conditions and its application to the design of offshore structures.

5. § 148.105(d) – Applicant's Citizenship, Incorporation, and Operating Authority

The Applicant, Port Dolphin Energy LLC, is a limited liability company organized under the laws of the State of Delaware. Its principal place of business is 12727 Featherwood, Suite 113, Houston, Texas 77034. Corporate filings pertaining to the formation of Port Dolphin Energy LLC can be found in Section IVa.

6. § 148.105(e) – Address for Service of Documents

All correspondence should be sent to:

Egil Rokstad
Port Dolphin Energy LLC
12727 Featherwood, Suite 113
Houston, Texas 77034
(281) 922-1822

Ragnar Wisløff
Höegh LNG AS
P.O. Box 4 Skøyen
N-0212 Oslo
Norway
+47 21 03 90 00

7. § 148.105(f) – Proposed Location and Use of Deepwater Port

The Applicant is filing an application for a license pursuant to the DWPA and the USCG's regulations, 33 C.F.R. Part 148, to construct, own and operate a deepwater port. The unloading portion of the proposed deepwater port (*Port Dolphin*), would be located in federal waters approximately 28-miles (45-kilometers) offshore of the Tampa Bay area of Florida in St. Petersburg blocks PB 545 and PB 589. The water depth in this region is approximately 100-feet (30-meters). From the above site, a transmission pipeline approximately 47.2-miles (75-kilometers; total) in length will be run to onshore interconnection facilities in Manatee County, Florida.

Port Dolphin (Figure 1-3) will be capable of mooring up to two SRVs simultaneously for the off-loading and transmission of natural gas to onshore interconnection stations for delivery to customers in Florida and elsewhere in the Southeastern United States. It is anticipated that the LNG will arrive from global supply sources. The port will be capable of hosting SRVs with onboard vaporization and metering equipment that converts the LNG into a gaseous state suitable for transportation in conventional undersea pipelines.

Once in a gaseous state, the natural gas will be off-loaded to unloading buoys that will be connected to a moon-pool in the ship's forward part (see illustrations p. 8). From there, it will be transmitted via the PLEMs to the piggable-Y for further transportation to onshore interconnection facilities. The SRVs will moor between four and eight days to complete the unloading process depending on SRV size and send-out rate. During initial operations, *Port Dolphin* would have a throughput of 400 mmscfd. This would grow to throughput of 800 million standard cubic feet per day (mmscfd) and a peak capacity of approximately 1200 million mmscfd.

When not being utilized, the unloading buoys will be retracted to a submerged state in 60-70 feet (18-21 meters) of water. Because it is a purpose-built facility, *Port Dolphin* will have no uses other than the off-loading of natural gas.

8. § 148.105(g) – Financial Information

This section of the application provides financial information on the Applicant and its affiliates.

8.1 § 148.105(g)(1) – Applicant and Affiliates' Financial Information

Annual consolidated financial statements for Leif Höegh & Co. Limited for the years 2003, 2004, and 2005 (the last full three years for which statements are available) are provided in Volume IVb. An interim report through the fourth quarter of 2006 (the latest available interim quarterly report) is also included.

8.2 § 148.105(g)(2) – Construction Cost Estimates

An estimate of the construction cost for the deepwater port is provided in Volume IVa Also included is an estimate of the cost to remove the marine components of the deepwater port, other than pipelines that lie beneath the seabed.

8.3 § 148.105(g)(3) – Future Projections

The Applicant has provided annualized projections for the project during the first five years of operation. Projections for intervals throughout the life of the deepwater port have also been submitted. These projections can be found in Volume IVa together with balance sheets, income statements and operating expenses.

8.4 § 148.105(g)(4) – Proposals and Agreements

There are no agreements currently in place concerning the management and financing of the deepwater port. Agreements once entered into will be made available to the USCG.

8.5 § 148.105(g)(5) – Throughput Reports

As the deepwater port is a proposed new facility and is not yet in operation, there are no throughput reports for the year preceding the application for the deepwater port license. Additional information on throughput is provided in Volume IVa.

9. § 148.105(h) – Construction Contracts and Construction-Related Studies

Construction Contracts

The Applicant has not, at the time of submitting the application for the deepwater port license, entered into any contract for the construction of the deepwater port facility. At the time of execution of any such contract, the USCG will be provided with copies of the contracts.

Studies

The Applicant has completed two construction-related studies involving a hydraulic analysis of proper pipe sizing for the proposed port and a study of the proposed pipeline construction. Both studies are included in Volume III, Section 6. There are currently no ongoing studies and the USCG will be provided with copies of all contracts in regard to any future studies to be undertaken.

10. § 148.105(i) – Compliance with Federal Water Pollution Requirements

The proposed deepwater port would involve construction activities in the state waters of Florida. A request for state water quality certification is included in the United States Army Corps of Engineers (USACE) dredge and fill permit application and will be submitted pursuant to Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act (Appendix B). This as well as the dredge and fill permit application and the water quality certifications will be submitted shortly after the submission of this application.

The information required to evaluate the project is included with the USACE dredge and fill permit application (ENG FORM 4345) along with relevant technical and environmental information. The dredge and fill permit application will be submitted to the USACE at the following address:

U.S. Army Corps of Engineers
West Permits Section
Tampa Regulatory Office
CESAJ-RD-SW-T
10117 Princess Palm Avenue, Suite 120
Tampa, FL 33610
United States

The issuance of a joint coastal permit under Florida Statutes, Chapter 161 (Fla. Stat. § 161.055 (2006)) and Part IV of Chapter 373 (Fla. Stat. §§ 373.403-.468 (2006)) constitutes certification of compliance with state water quality standards pursuant to Section 401 of the Clean Water Act, 33 U.S.C. § 1341. Accordingly, a permit application, which includes the water certification application, will be submitted to the Florida Department of Environmental Protection at the following address with a copy will be provided to the USCG as Appendix C of this Volume:

Florida Department of Environmental Protection
Southwest District (TP)
13051 N. Telecom Parkway
Temple Terrace, FL 33637-0926

For federal waters, the Applicant will be applying for the water quality certification required by Section 401 of the Clean Water Act from the United States Environmental Protection Agency (EPA). This includes both construction and operational discharges to federal waters. The operational discharges would occur in OCS blocks PB 545-546 and PB 589-590. An application for a National Pollutant Discharge Elimination System (NPDES) permit (Appendix D) will be submitted to the EPA at the following address:

U.S. Environmental Protection Agency
Region IV
Sam Nunn Atlanta Federal Center
61 Forsyth St., S.W.
Atlanta, GA 30303
United States

11. § 148.105(j) – Coastal Zone Management

The unloading portion of the proposed deepwater port would be located in the federal waters of OCS blocks PB 545-546 and PB 589-590 approximately 28-miles offshore of the Tampa Bay area of Florida in 100 feet of water. The proposed gas transmission line leading from the deepwater port would connect to onshore facilities in Manatee County, Florida operated by the Gulfstream Natural Gas System, L.L.C., and the Tampa Electric Company (TECO). The subsea pipeline will enter state waters approximately 9-miles southwest of the entrance to Tampa Bay.

The State of Florida qualifies as the adjacent coastal state in accordance with the DWPA (33 U.S.C. § 1502). No other state meets the definition in 33 U.S.C. § 1502 of an adjacent coastal state or appears to be capable of designation by the Administrator of the Maritime Administration as an adjacent coastal state in accordance with 33 U.S.C. § 1508 (a)(2). In Florida, a coordinated group of state agencies and water management districts has federal consistency review authority to implement the process described in 16 U.S.C. §§ 1451-1465 and in Florida Statutes at Section 380.23(3) (Fla. Stat. § 380.23). Accordingly, a formal consistency filing will be made with the Florida State Clearinghouse which serves as the delivery point for documents requiring federal consistency review. A draft federal consistency certification is included as Appendix E of this volume.

12. § 148.105(k) – Lease Block Information

12.1 § 148.105(k)(1) – Lease Block(s) where Proposed Deepwater Port or its Approaches are Located

Port Dolphin will be located in the St. Petersburg lease blocks of the Gulf of Mexico OCS area as depicted in Figure 1-2. A narrative description of lease block locations including lease blocks traversed by the gas transmission pipeline is provided as follows. Additionally, charts signed by a professional surveyor are enclosed in Volume III, Section 2.

Description of Lease Block Location

An approximately 269-foot (82-meters) flexible riser and umbilical would be installed from the south unloading (STL) buoy (lease block PB 589) to the southern PLEM and from there, a flowline would connect the southern PLEM and the piggable-Y (lease block PB 546). A

second 269-foot (82-meters) flexible riser and umbilical would be installed from the north unloading (STL) buoy (lease block PB 545) to the northern PLEM and from there, a flowline would connect the northern PLEM and the piggable-Y (lease block PB 546). The flexible riser and flowline from the south buoy would have a total length of approximately 2.2-miles (3.5-kilometers) and would be within lease blocks PB 589, PB 545, and PB 546. The flexible riser and flowline from the north buoy would have a total length of approximately 2.1-miles (3.3-kilometers) and would be within lease blocks PB 545 and PB 546. From the piggable-Y (lease block PB 546) the proposed pipeline would travel through lease blocks PB 546, PB 547, PB 548, PB 504, PB 505, PB 506, PB 507, and PB 463. Approaches to the mooring areas will generally be made by the SRVs through the immediately adjacent lease blocks running in an arc, counter-clockwise, from the North to the Southwest. Variations due to weather and other local conditions will however occur. These lease blocks include PB 501, PB 500, PB 543; PB 544; PB 587; PB 588 and PB 631.

Table 12-1 below, provides a summary of lease block areas where proposed *Port Dolphin* components are located. Table 12-2 provides lease block crossing information.

Table 12-1
OCS Lease Block Summary

Description	OCS Area	OCS Lease Blocks
North Unloading Buoy	St. Petersburg	PB 545
South Unloading Buoy	St. Petersburg	PB 589
Gas Transmission Line	St. Petersburg	PB 546; PB 547; PB 548; PB 504; PB 505; PB 506; PB 507; PB 463
Piggable-Y	St. Petersburg	PB 546
Approaches	St. Petersburg	PB 500; PB 501; PB 543; PB 544; PB 587; PB 588; PB 631

Key:
OCS = Outer Continental Shelf
PB = St. Petersburg Block

Table 12-2
OCS Lease Block Crossing Data

OCS Lease Block Crossing	Easting	Northing	Latitude	Longitude	Distance in Lease Block (ft)
PB 589/PB 545	117119.61	1114876.12	27° 23´ 45.45´´	83° 10´ 47.79´´	8079.47
PB 545/PB 546 South Buoy Flowline	118446.98	1117028.92	27° 24´ 06.89´´	83° 10´ 33.29´´	2540.78

OCS Lease Block Crossing	Easting	Northing	Latitude	Longitude	Distance in Lease Block (ft)
PB 545/PB 546 North Buoy Flowline	118442.18	1117451.48	27° 24′ 11.07″	83° 10′ 33.39″	10347.138
PB 546/PB 547	134236.53	1123062.55	27° 25′ 08.08″	83° 07′ 38.74″	17569.01
PB 547/PB 548	150037.54	1128686.01	27° 26′ 05.14″	83° 04′ 43.97″	16763.62
PB 548/PB 504	156641.94	1131030.48	27° 26′ 28.92″	83° 03′ 30.90″	7095.66
PB 504/PB 505	165826.45	1134294.78	27° 27′ 02.01″	83° 01′ 49.28″	9668.11
PB 505/PB 506	181623.34	1139908.96	27° 27′ 58.86″	82° 58′ 54.45″	16763.95
PB 506/PB 507	197415.78	1145528.09	27° 28′ 55.71″	82° 55′ 59.62″	16764.15
PB 507/PB 463	202206.97	1147238.91	27° 29′ 13.00″	82° 55′ 06.57″	5174.83
PB 463/block eastern boundary	213205.88	1151148.09	27° 29′ 52.50″	82° 53′ 04.76″	11589.47

Easting and Northing coordinates are in Florida West Zone NAD 27.
Latitude and Longitude coordinates are in NAD 27.

12.2 § 148.105(k)(2) – Interest in Lease Block(s)

A check with MMS indicates that there are no lessees of the blocks identified in Table 12-1.

12.3 § 148.105(k)(3) – Present and Planned Use of Lease Block(s)

To the Applicant's knowledge, there is no present or planned oil and gas leasing activity in the area affecting the blocks identified in Table 12-1.

13. § 148.105(l) – Overall Site Plan

As depicted in Figures 1-3 and 13-1, the proposed *Port Dolphin* consists of north and south STL Buoy unloading systems connected by a piggable-Y to a gas transmission line. The system overview for this arrangement is shown in Figure 13-1 and is contained in Drawing Number 26017-B-4003 in Appendix F. As depicted in Figure 13-1, the onshore segment landward of the jurisdictional line consists principally of the gas transmission line and

interconnections with the Gulfstream and TECO systems along with associated facilities. Drawing Numbers 26017-B-4101 and 26017-B-4102 found in Appendix F show the layout of these facilities. A more detailed description of the onshore facilities can be found in Section 22 and in the companion application to be submitted to FERC under Section 7 of the Natural Gas Act. The offshore site layout and a listing of component line-drawings are contained below.

Table 13-1
Deepwater Port Arrangement Drawings

Drawing Number	Drawing Title
26017-A-4009	Subsea Mainline Block Valve
26017-B-2701	Mooring Area (Safety and No Anchor Zones)
26017-B-4003	System Overview
26017-B-4004	PFD (Gulfstream Interconnect)
26017-B-4005	PFD (TECO Interconnect)
26017-B-4006	PFD Hydrostatic Testing (Offshore)
26017-B-4008	PFD PLEM and Removable Pig Launcher
26017-B-4101	Plot Plan (Gulfstream Interconnect)
26017-B-4102	Plot Plan (TECO Interconnect)
26017-B-4202	Piggable-Y
26017-B-4207	Mooring Area
26017-B-4311	PLEM and Removable Pig Launcher
26017-D-2001	Pipeline Alignment Sheet (North Flowline)
26017-D-2002	Pipeline Alignment Sheet (South Flowline)
26017-D-2003	Pipeline Alignment Sheet (Offshore)
26017-D-2004	Pipeline Alignment Sheet (Offshore)
26017-D-2005	Pipeline Alignment Sheet (Offshore)
26017-D-2006	Pipeline Alignment Sheet (Offshore)
26017-D-2007	Pipeline Alignment Sheet (Offshore)
26017-D-2008	Pipeline Alignment Sheet (Offshore)
26017-D-2009	Pipeline Alignment Sheet (Offshore)
26017-D-2010	Pipeline Alignment Sheet (Offshore)
26017-D-2301	HDD Crossing - Shore Approach
1410-APL-N-XD-BG-0001	STL Buoy
1410-APL-N-XD-BG-0002	STL Landing Pad
1410-APL-N-XD-BP-0002	STL Pick-up System Illustration
1410-APL-U-XD-RG-0001	STL Riser System
1410-APL-W-XD-MG-0001	STL Mooring Arrangement
1410-APL-W-XD-MS-0001	STL Pile Anchor
1410-APL-Y-XD-SG-0005	STL Compartment Deck Level Elevation

13.1 § 148.105(l)(1) – Floating Structures

Floating structures at the proposed *Port Dolphin* Deepwater Port consist of the two STL Buoys and associated landing pads, two mooring systems with anchor piles, two 16-inch flexible risers and umbilicals, and two STL Buoy pick-up assemblies which incorporate floating message lines with marker buoys. Arrangement drawings of these structures are listed in Table 13-1. The center coordinates of each floating structure are located at:

- North Buoy 27º 25´ 12.14´´N/83º 11´ 50.11´´W
- South Buoy 27º 22´ 28.73´´N/83º 11´ 22.49´´W

13.2 § 148.105(l)(2) – Fixed Structures

The fixed structures encompassed by the proposed *Port Dolphin* consist of the PLEMs, flowlines, piggable-Y and natural gas transmission line. The PLEMs are located approximately 250-feet (76-meters) from the STL Buoy landing pad. The flowline connecting the PLEM to the piggable-Y from the south buoy is approximately 2.2-miles (3.5-kilometers) in length while the flowline from the north buoy to the PLEM is approximately 2.1-miles (3.3-kilometers) in length. From the piggable-Y, the natural gas transmission line runs approximately 41.4-miles (66-kilometers) in a northeasterly direction to the Port Manatee pier bulkhead (change between USCG and FERC jurisdiction. From there, the line proceeds 3.6-miles to the Gulfstream Interconnection Station located in the vicinity of Port Manatee and an additional 2.1-miles (3.2-kilometers) to the TECO Interconnection Station further to the east in Manatee County (in addition to .1 mile at the interconnection). A drawing of the PLEM can be found in Volume III, Section 5 while drawings of the remainder of the components can be found in Appendix F-2.

13.3 § 148.105(l)(3) – Aids to Navigation

The SRVs will be equipped with mandatory navigation lights as required by the classification society, flag-state rules and international conventions. The vessels will also be equipped with navigation components and equipment as described in the SRV specifications (Volume III, Sections 4a-b).

The recovery buoys that will be attached to the unloading system will be equipped with transponders positioned on the STL Buoy.

The *Port Dolphin* deepwater port will not have any fixed aids to navigation installed for ships arriving, departing or transiting in the vicinity of the deepwater port. The STL Buoys will be permanently installed and completely submerged at a depth of approximately 60-70 feet (18-21 meters).

Ships that arrive at the *Port Dolphin* deepwater port will utilize on-board navigation equipment such as GPS, radar, STL system transponders and an echo-sounder to locate the buoys.

The buoys will be connected to a messenger line that runs up to the surface, and the messenger line will be marked with two buoys. Both buoys will have marker-lights attached. The characteristics of the marker lights are proposed to be:

- Yellow color
- Cylindrical shape
- Flashing, yellow strobe
- No sound signal
- Position:
  - North buoy: 27º25´12.14´´N/83º11´50.11´´W
  - South buoy: 27º22´28.73´´N/83º11´22.49´´W

The Applicant will however, provide whatever characteristics and type the USCG will require for this particular application.

The buoys at the messenger line will be used primarily to assist during retrieval of the messenger line and buoy. Secondarily, the marker buoys with lights will be used to alert vessel traffic in the vicinity of the presence of a floating messenger line if no SRV is connected to the buoy.

When the SRVs are connected to the buoys, they will not represent a significant obstruction to navigation for any ships. The SRV will then be considered a "vessel at anchor." In order to comply with the international COLREGS, the vessel will then exhibit an all-round white light in the fore part and one all-round white light at or near the stern and at a lower level than the light in the forward part of the SRV.

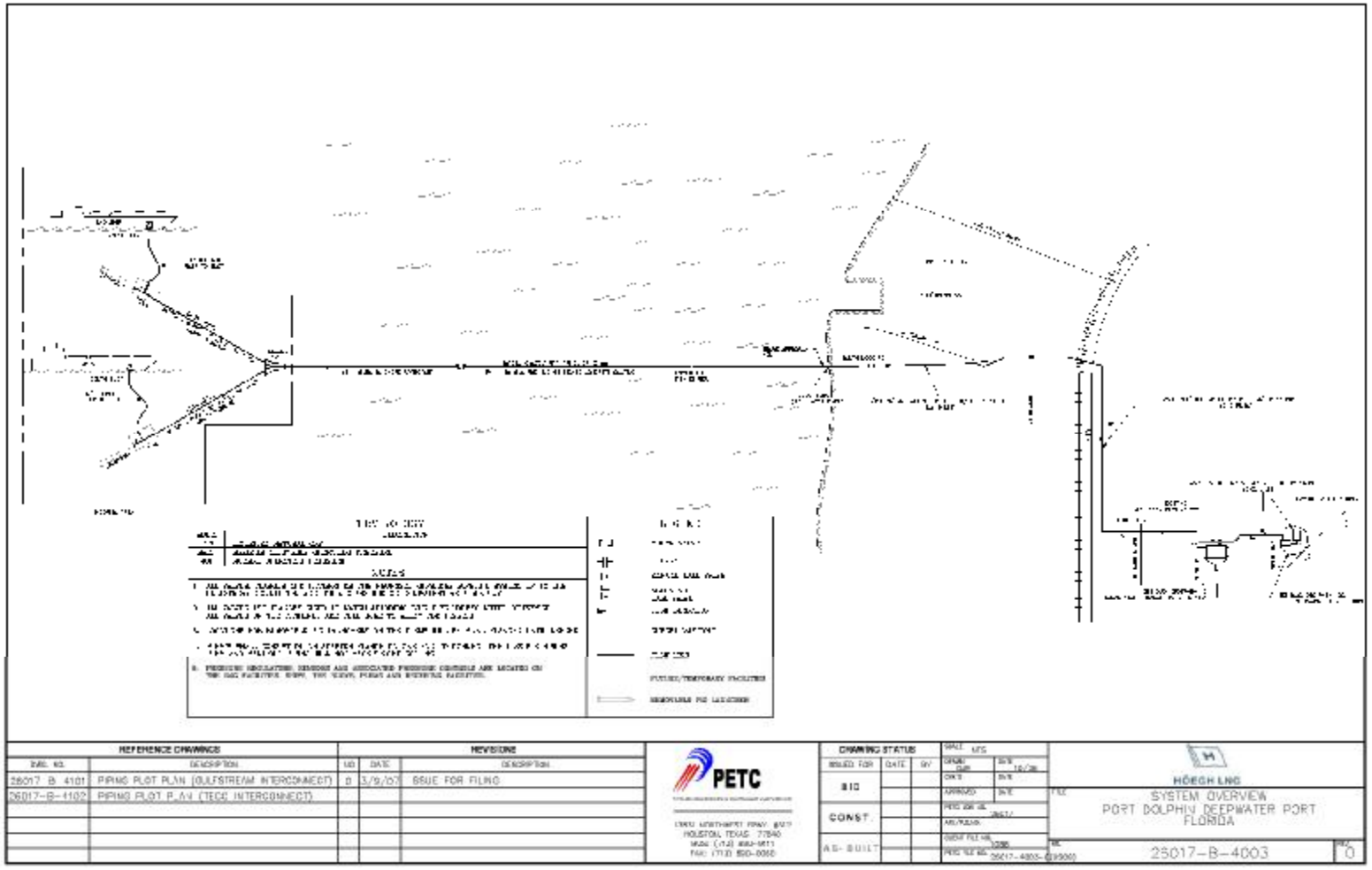
13.4 § 148.105(l)(4) – Manifold Systems

The proposed *Port Dolphin* will incorporate two PLEMs that form the termination point of the subsea pipeline. A technical drawing of the PLEMs can be found in Volume III, Section 5.

13.5 § 148.105(l)(5) – Onshore Storage Areas, Pipelines, and Refineries

There are no onshore storage areas or refineries associated with the proposed *Port Dolphin*. The onshore pipeline and associated interconnection facilities are described in Sections 21 and 22 of this volume as well as the companion application filed with FERC under Section 7 of the NGA.

Figure 13-1
System Overview



14. § 148.105(m) – Site Plan for Marine Components

The overall site plan for the marine components of the proposed *Port Dolphin* is depicted in Figure 14-1 and is comprised of fixed and floating structures described in Sections 18 and 19 of this volume in addition to the Safety Zone, No Anchoring Area and Area To Be Avoided. Specific locations of components and other areas which comprise the elements of the site plan are described below and are further discussed in Volume III, Section 9.

14.1 § 148.105(m)(1) – Overall Marine Components Site Plan

The locations of floating and fixed marine components are depicted in Tables 14-1 and 14-2. Tables depicting these locations referenced to NAD (83) are contained in Appendix F of this volume.

Table 14-1
Floating Marine Components

Component	Location	Drawing Number
North Unloading Buoy (Center)	27º 25´ 12.14´´N/83º 11´ 50.1´´W	26017-A-4206
South Unloading Buoy (Center)	27º 22´ 28.73´´N/83º 11´ 22.49´´W	26017-A-4206

Proposed Buoy Anchor Pile Locations

Pile	X=NAD(27)	Y=NAD(27)	LAT=NAD(27)	LONG=NAD(27)
1	107,494.65	1,123,683.55	27° 24´ 53.24´´	83° 41´ 28.01´´
2	108,691.04	1,126,575.25	27° 25´ 22.03´´	83° 41´ 15.18´´
3	111,583.51	1,127,776.49	27° 25´ 34.30´´	83° 40´ 43.28´´
4	114,478.19	1,126,579.75	27° 25´ 22.84´´	83° 40´ 10.99´´
5	115,678.82	1,123,684.42	27° 24´ 54.34´´	83° 39´ 57.23´´
6	114,477.11	1,120,789.69	27° 24´ 25.53´´	83° 40´10.13´´
7	111,585.92	1,119,586.39	27° 24´ 13.23´´	83° 40´ 42.02´´
8	108,688.47	1,120,789.50	27° 24´ 24.75´´	83° 41´ 14.34´´
9	109,823.79	1,107,157.95	27° 22´ 28.34´´	83° 12´ 07.89´´
10	111,022.76	1,110,052.54	27° 22´ 57.12´´	83° 11´ 54.91´´

Pile	X=NAD(27)	Y=NAD(27)	LAT=NAD(27)	LONG=NAD(27)
11	113,917.34	1,111,251.51	27° 23´ 09.26´´	83° 11´ 22.93´´
12	116,811.92	1,110,052.54	27° 22´ 57.66´´	83° 10´ 50.70´´
13	118,010.90	1,107,157.96	27° 22´ 29.12´´	83° 10´ 37.10´´
14	116,811.92	1,104,263.38	27° 22´ 00.34´´	83° 10´ 50.09´´
15	113,917.34	1,103,064.41	27° 21´ 48.20´´	83° 11´ 22.06´´
16	111,022.76	1,104,263.38	27° 21´ 59.80´´	83° 11´ 54.29´´

Table 14-2
Fixed Marine Components

Component	Location	Drawing Number
North PLEM	27º 25´ 9.88´´N/83º 11´ 50.11´´W	26017-D-2001
South PLEM	27º 22´ 30.9´´N/83º 11´ 50.11´´W	26017-D-2002
North Flowline	Start 27º 25´ 9.66´´N/83º 11´ 48.95´´W End 27º 24´ 12.85´´N/83º 10´ 27.74´´W	26017-D-2001
South Flowline	Start 27º 22´ 31.19´´N/83º 11´ 21.38´´W End 27° 24´ 12.85´´N/ 83° 10´ 27.74´´W	26017-D-2002
Piggable-Y	27° 24´ 12.87´´N/83° 10´ 23.73´´W	26017-B-4202
Gas transmission line	Start 27° 24´ 12.87´´N/83° 10´ 23.73´´W Port Manatee Bulkhead 27°37´ 48.73´´N/83°33´ 48.43´´W Gulfstream Interconnect 27°37´ 14.80´´N/83°30´53.57´´W	26017-D-2003

The proposed Safety Zone, No Anchoring Area and Area To Be Avoided are described below and depicted in Figure 14-2.

Safety Zone

The Safety Zone is proposed to extend 1641-feet (500-meters) in addition to the length of the SRVs around each STL Buoy. Based on this formula, the Safety Zone radius will be

approximately 2790-feet (850-meters) from the center location of each STL Buoy. (Slightly varying with the length of each SRV)

No Anchoring Area (Precautionary Area)

The No Anchoring Area is defined by avoidance of entanglement of any vessel's anchors with the STL Buoy mooring system. Accordingly, for *Port Dolphin*, the No Anchoring Area is proposed to be an area defined by the outer bounds of each STL Buoy anchor pile (plus 821-feet (250-meters)) and having a radius of 4925-feet (1500-meters). Additionally, an area between the STL Buoys defined by a 4925-feet (1500-meters) boundary extending on both sides of a straight line between the buoys shall be part of the No Anchoring Area.

Separately, the No Anchoring Area for the pipeline route is proposed to be defined by a line parallel on both sides of the pipeline centerline with a distance of 656-feet (200-meters).

Area To Be Avoided

The proposed Area To Be Avoided is identical to the No Anchoring Area described for the mooring site. The proposed Area To Be Avoided does not include the gas transmission pipeline route.

Aside from the areas described above, the proposed *Port Dolphin* does not require areas to be designated that would potentially impact other vessels' routing. Nor does the proposed port require special routing measures for SRVs arriving at the port.

Figure 14-1
Buoy Placement Area

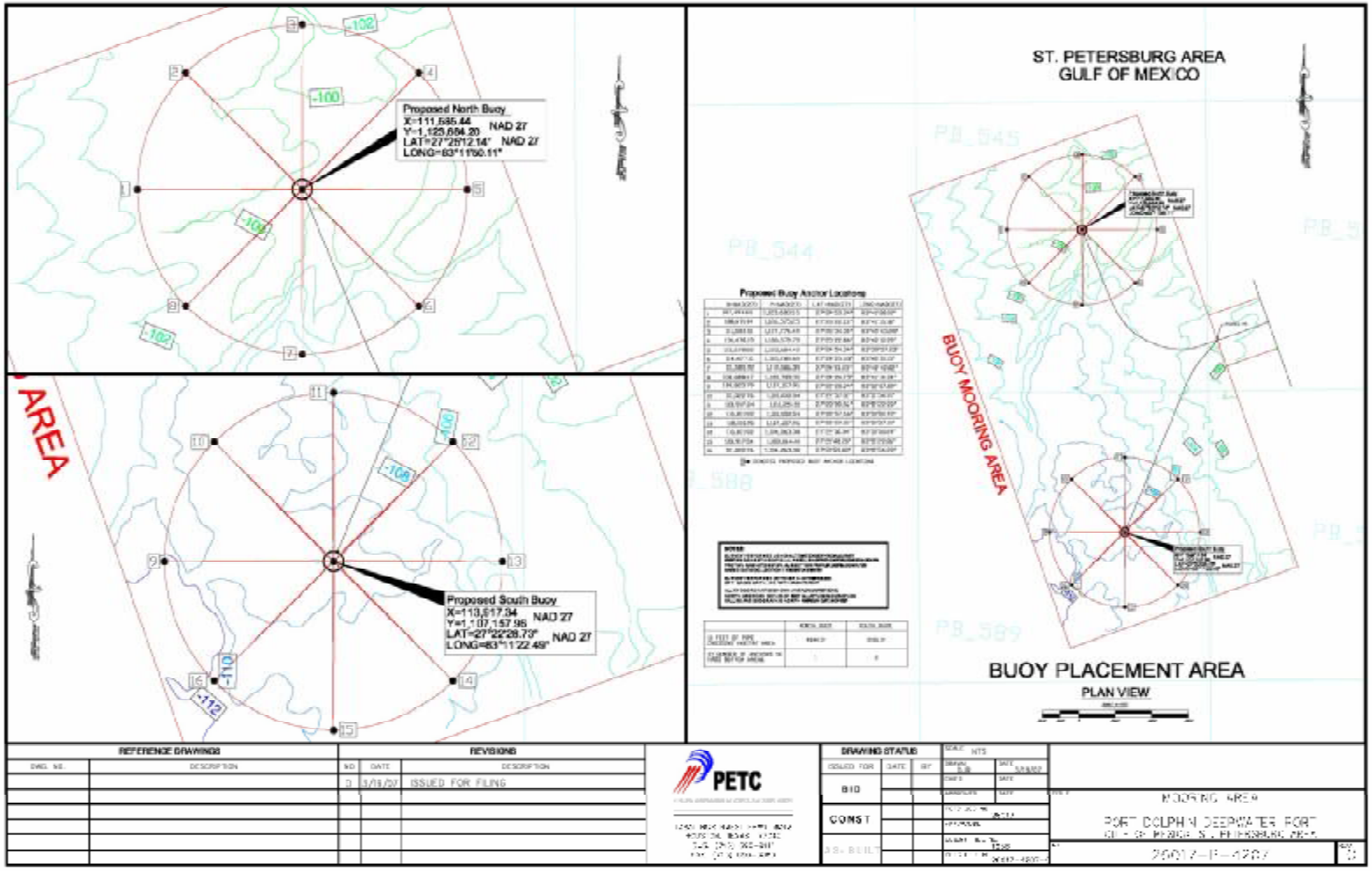


Figure 14-2
Mooring Area

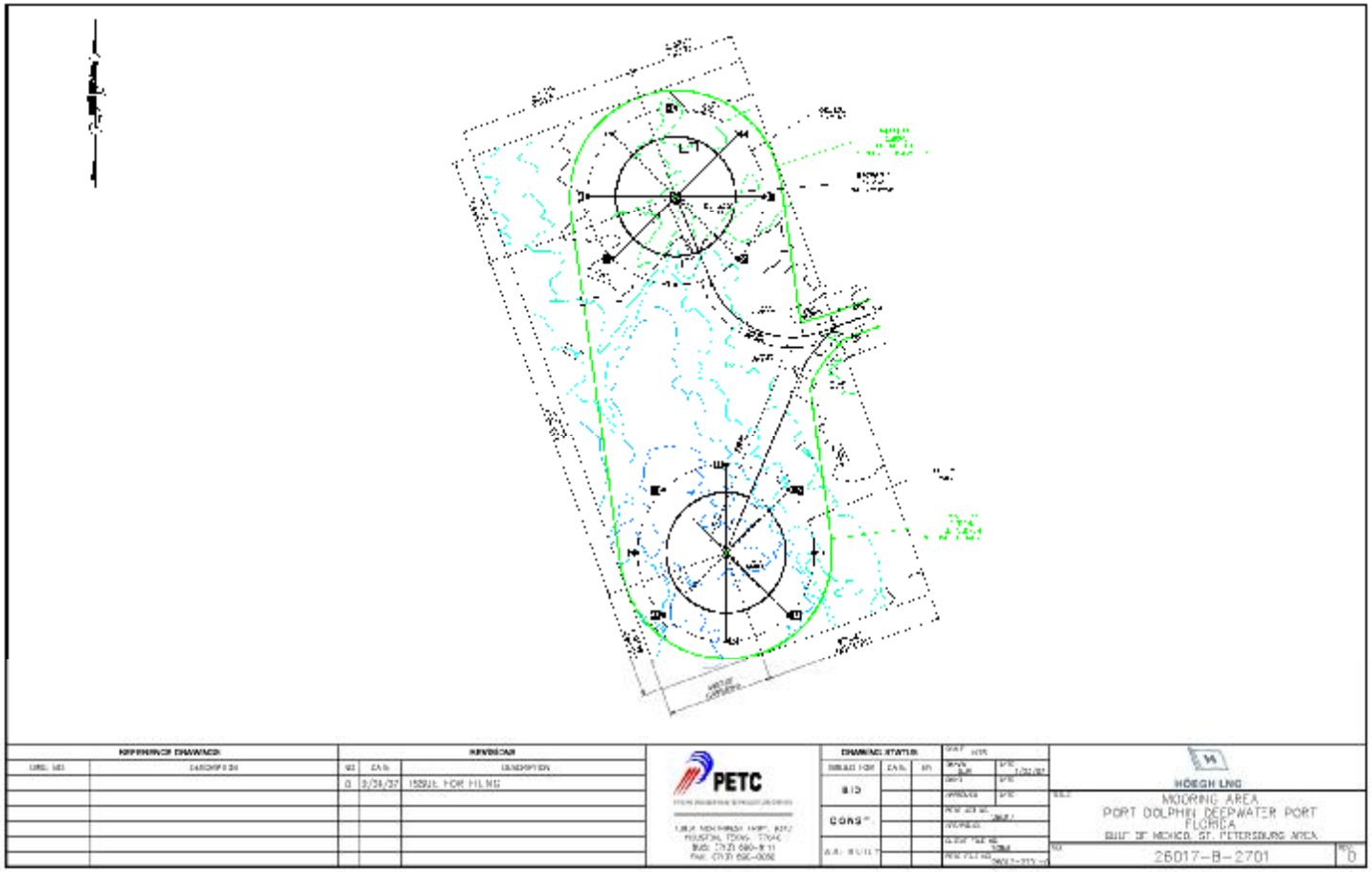


Figure 14-3
Port Dolphin Location Diagram with Special Use Areas

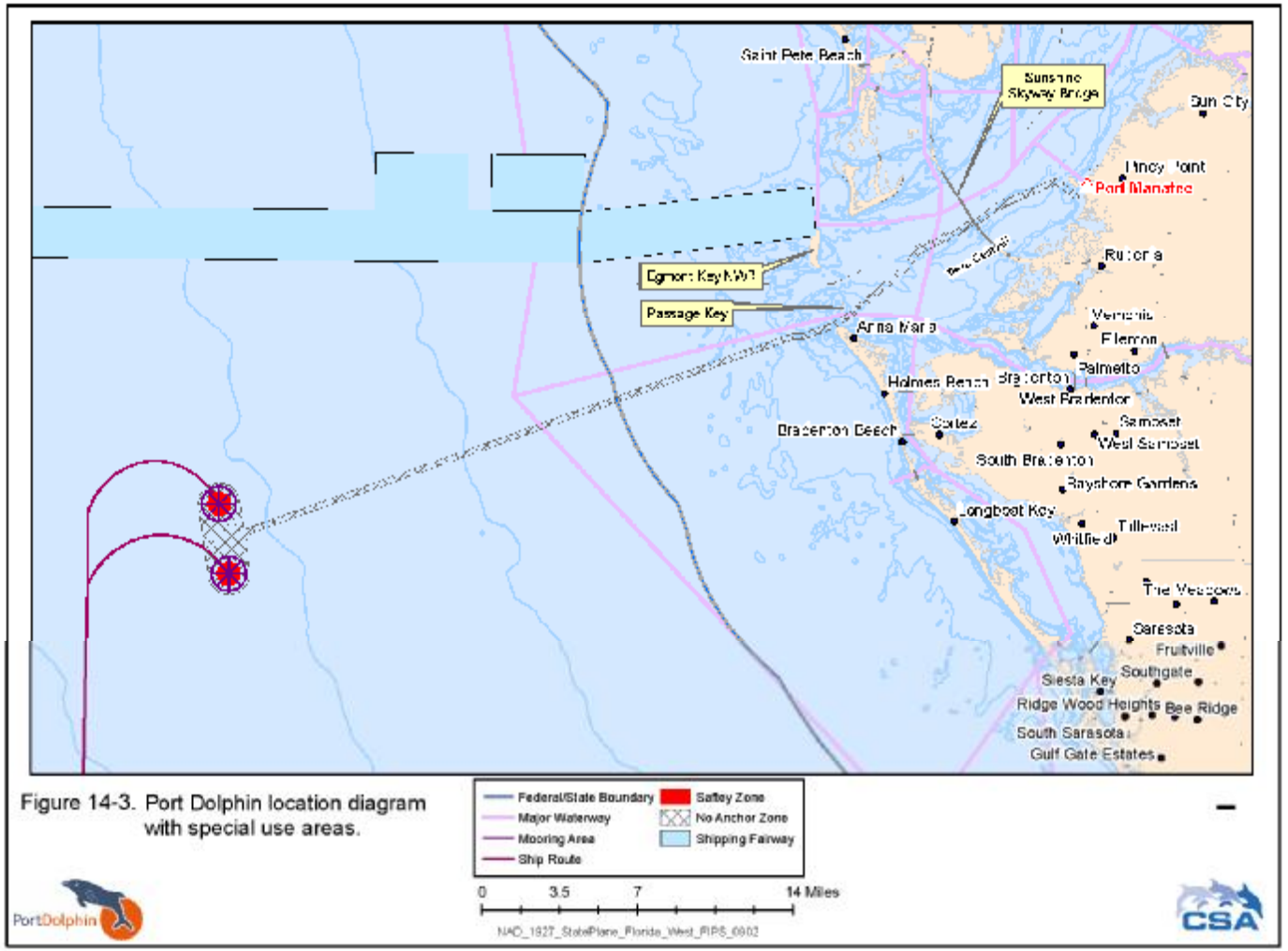


Figure 14-3. Port Dolphin location diagram with special use areas.

14.2 § 148.105(m)(2) – Hydrographic Survey of the Proposed Site

A survey was conducted by T. Baker Smith, Inc. to generally characterize the proposed STL Buoy and mooring system sites as well as the gas transmission pipeline route. The survey scope was designed as such to exceed requirements specified by MMS NTL No. 98-20 and NTL No. 2005-G07. The geophysical survey was conducted by utilizing two similarly equipped survey vessels. A small 26-foot (8-meter) coastal survey boat completed the inland portion of Tampa Bay, while a larger, 110-foot (33-meter) research survey vessel performed the offshore portion.

The methodology and results are summarized below and are contained in the survey report found in Volume III, Section 2.

Summary of Methodology

Survey coverage for the buoy mooring area was achieved by running a total of 82 track lines spaced at 328-feet (100-meters) intervals with six tie lines run 3,280-feet (1,000-meters) apart.

The pipeline corridor was surveyed by running 19 parallel track lines spaced at 164-feet (50-meter) intervals. This survey grid included a centerline and nine additional survey lines to either yielding a 3000-foot wide survey swath. The survey line spacing was tightened to 82-feet (25-meters) at the Three League Line (Federal/State boundary) and the proposed pipeline corridor was maintained at 3000-foot width at the 82-foot (25-meters) primary line spacing all the way to the end of the route. The 82-foot (25-meters) spacing consisted of 30 primary lines. Additionally, 13 lines were surveyed parallel to the fishing pier and Sunshine Skyway Bridge due to the proximity of these structures.

The equipment used for the geophysical survey included towed vehicles with side-scan sonar, subbottom profiler, magnetometer and an over-the-side mounted dual frequency echo sounder corrected by motion and heave sensors. All sensors were corrected for offsets and cable laybacks positioning by a differential global positioning system.

Summary of Results

Results of the geophysical survey for the proposed mooring area and pipeline construction are summarized below. Detailed information regarding potential hazards, seafloor and subbottom conditions and an assessment of prehistoric and historic cultural resources is included in Volume II.

Water depths at the proposed north buoy location measures 100-feet (30-meters) and 111-feet (33-meters) at the south buoy site. Along the specific pipeline route the water depths range between a maximum of 100-feet (30-meters) at the start of the proposed pipeline route,

decreasing predictably towards the east to depths less than 6-feet (2-meters). The seabed slopes smoothly to the west at an average rate between 2 and 6 feet (.6-2 meters) per mile (0.02° to 0.06°).

In the buoy mooring area and the offshore portion of the proposed pipeline, the seafloor displayed varied topographic features and bottom types. The predominant presence of sandy and hard bottom seafloor areas was noticeable. The hard bottom areas were displayed as rough, pebbly seafloor with varied relief and the hard bottom itself is believed to consist of bedded hash. The sandy seafloor areas occurred as widespread deposits of sand with no discernable seafloor irregularities other than sand ripples in some locations. Sand sheets were noted covering some areas of hard bottom. Scour channels were observed dissecting some of these sand sheets.

At the entrance to Tampa Bay, the seafloor displayed areas of sand broken now and then by hard bottom. Hard bottom was particularly evident where the tidal flow through the deepest part of the entrance channel has scoured the seafloor to depth. Once inside the Bay proper, the seafloor was observed to be primarily smooth sand with areas of sand waves.

Several sonar targets were identified throughout the survey area and some of these were associated with magnetic anomalies. Notable man-made features observed were the Gulfstream Natural Gas pipeline trench and artificial reefs built perpendicular to the Sunshine Skyway fishing pier. Sonar contacts and magnetic anomalies tables are listed in Volume II.

15. § 148.105(n) – Soil Data

The seafloor soil type(s) at the proposed mooring sites and along the pipeline route were characterized as part of the Hazards and Archeological Survey conducted by T. Baker Smith, Inc. in order to determine the suitability of the site for the proposed port. A general description of that survey and its findings are summarized in the above section (14.2). The geotechnical investigation involving the collection and analysis of vibracores will be conducted during the detailed design phase.

15.1 § 148.105(n)(1) – Soil Suitability

Based on the geophysical study and an engineering assessment, the ocean bottom and subsurface soils are expected to be adequate for the installation of each marine component of *Port Dolphin* that will be fixed to or supported on the ocean floor. Different construction methods will likely have to be used to accommodate the different soil character in some areas as discussed in Section 24. As noted, the required geotechnical investigation involving the collection of vibracores will be performed during the detailed design phase to refine the character of the soil and to decide on which construction methods will be employed for particular segments.

15.2 § 148.105(n)(2) – Seabed Stability

Based an analysis of the near-seafloor stratigraphy profile gathered from centerline seismic data, there are no faults or other geologic hazards delineated within the survey area of the proposed port.

16. § 148.105(o) – Archeological Information

There are no significant archeological or cultural features in the area encompassed by the proposed mooring areas or the transmission pipeline route. This conclusion is based on an interpretation and analysis of the geophysical survey data that has been assessed for evidence of historic shipwrecks and high probability areas for prehistoric archeological sites associated with formerly subaerially exposed landforms. The archeological assessment and cultural resources investigation along with the resulting study were completed by a qualified Marine Archeologist. This report complies with the latest guidelines published in Performance Standards for Submerged Remote Sensing Surveys (May 17, 2001) issued by the Florida Department of State, Division of Historical Resources, and the latest guidelines published by the MMS in NTL No. 2005-G07. The methodology and results of the archeological and cultural resource analysis are discussed in detail in Volume II.

17. § 148.105(p) – Vessel Information

This section summarizes the operating parameters and dimensions of the SRVs that are reasonably anticipated to call on *Port Dolphin* and that are further described in the draft operations manual (Volume III, Section 9a) and SRV specifications (Volume III, Sections 4a and 4b). Regardless of whether the SRV is of the Moss (spherical) or Membrane type (both types are depicted in the figures) or other accepted cargo containment system designs, the main operating parameters will remain the same. The dimensions and capacities of the SRVs described are: (1) those of the same type of design of the two vessels ordered by the Applicant's parent company (145,000 m^3); and (2) a projected 217,000 m^3 capacity design that may call on the port in the future. The dimensions and capacities of these vessels that are expected to call on *Port Dolphin* are expected to be in the range somewhere in between the two designs that have been described.

17.1 § 148.105(p)(1) – Vessel Nationality

17.1.1 Nation of Vessel Registry

The Applicant has no vessels under its ownership. The Applicant's parent company's vessels are all registered in the Norwegian International Ship Register (NIS). The vessels that will be calling on *Port Dolphin* will be of various registries. The Applicant will investigate with MARAD, future requirements regarding vessel registry.

17.1.2 Nationality of Crew

To secure prudent and safe operation of the SRVs, the international market will be explored with the purpose of employing qualified ratings and crews. The Applicant will investigate with MARAD, future requirements regarding the nationality of officers and crew.

17.2 § 148.105(p)(2) – Vessel Operations

17.2.1 SRV Positioning

The SRV would be equipped with a thruster control system with a software program specially developed for handling all unloading buoy mooring operations. The SRV would have a dynamic global positioning system (DGPS) and an acoustic position reporting system (APRS). The APRS would be used for monitoring the unloading buoy draft and its position before and during connection/disconnection.

The bottom of the unloading buoy would be fitted with transponders, equally spaced around the circumference of the lower part of the buoy with one additional transponder being potentially located on the PLEM. The APRS would automatically search for the strongest return signal from the buoy. If the APRS should lose the return signal from the transponder, the search procedure would start again.

17.2.2 SRV Trim Limitations

The SRV would always have less than 2 degrees trim during normal connection to the unloading buoy.

17.2.3 Sea-state Limitations During Connection

The maximum sea state for connection of the SRV to the unloading buoy is:

- Significant wave height (Hs) 11.5 feet (3.5 m)
- Wind speed (Uw; 1 hour mean) 30 knots (15 m/s)
- Current speed (Uc) 3 knots (1.5 m/s)

Weather forecast and prevailing conditions would be carefully evaluated before and during connection to the unloading buoy system.

17.2.4 Sea-state Limitations During Discharging via the Unloading (STL) Buoy

At all times the vessel is moored to the unloading buoy, the SRV Master and Person-in-Charge would monitor weather conditions and weather forecasts. Any weather disturbances within a 500-mile radius of the buoy would be monitored as well.

The maximum sea state while connected to the unloading buoy is the 100-year (non-hurricane) condition:

- Significant wave height 20.3 feet (6.2 m)
- Wind speed (1hour mean) 39 knots (20m/s)
- Current speed 3 knots (1.5 m/s)

17.2.5 Sea-state Limitations During Disconnection from the Unloading (STL) Buoy

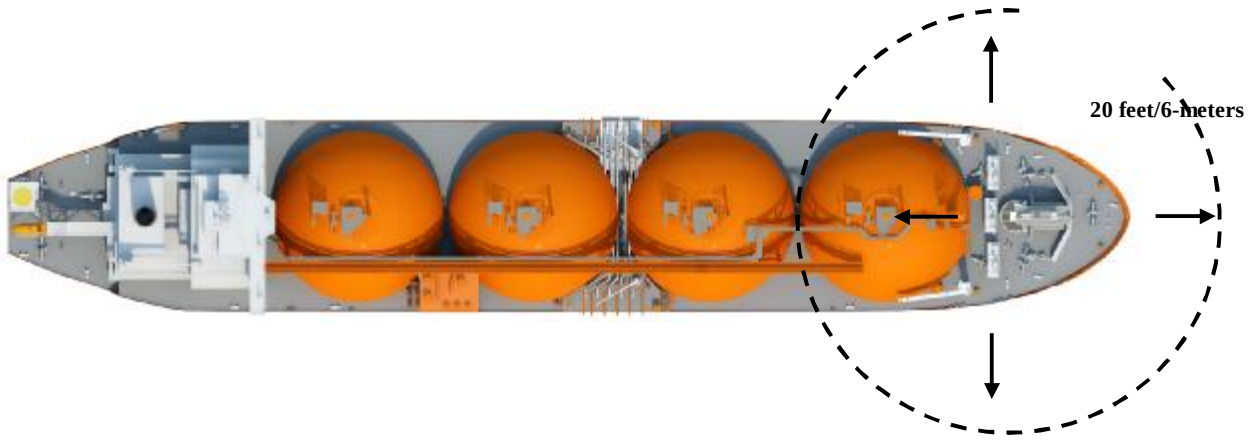
The maximum sea state for disconnection of the SRV from the unloading buoy is the 100-year (non-hurricane) condition:

- Significant wave height 20.3 feet (6.2 m)
- Wind speed (1 hour mean): 39 knots (20 m/s)
- Current speed 3 knots (1.5 m/s)

17.2.6 Offset Limits

The SRV would be equipped with a pre-defined DGPS alarm, which would be activated automatically if the design position limit is reached. The unloading buoy mooring system is designed to keep the SRV safely moored in all conditions up to the 100-year return period hurricane condition without any thruster or main propulsion assistance (passive mooring). The turret offset limit for the passive SRV attached to the unloading buoy during the 100-year hurricane condition would be approximately 20-feet (6-meters) as shown on Figure 17-1. This offset limit is based on the SRV in the ballast condition, implying that heavier load conditions would give slightly larger offsets. The offsets are based on the mean offset plus the low-frequency offset component, i.e., the offset component during the wave cycle (wave frequency component) is omitted.

Figure 17-1
Offset Tolerance



17.2.7 Sectors with Operational Restrictions

There are no sectors presently identified with operational restrictions.

17.3 § 148.105(p)(2) – Vessel Characteristics

The SRV would be a standard design for oceangoing LNG vessels, plus the following additional items:

- Trunk and mating cone to receive the unloading buoy
- Lifting and connection devices
- LNG vaporization system
- Gas and metering system
- Enhanced low-emission propulsion system

As previously noted, SRVs calling on the proposed *Port Dolphin* would be of the Moss (Figure 17-2b) and Membrane types (Figures 17-2b; 17-3). Cargo tank total capacity among these types would range from approximately 145,000 m^3 (base case) to 217,000 m^3 type. The ballast tank capacity would be sufficient to limit the draft variations when loading and discharging the cargo. The SRV and the cargo containment and handling systems would be suitable for cargoes of specific gravities up to 0.50 kg/m^3.

A description and the approximate dimensions and capacities of the representative 145,000 m^3 to 217,000 m^3 SRVs that are projected to call on *Port Dolphin* are contained in the following tables.

Table17-1
Typical 145 000 m^3 SRV ("Base case design")

Item	Description
Hull Type	Double-bottom/Double hull
Number of Cargo Tanks	4
Total LNG Capacity	145,000 m3 (5 120 780 ft3)
Type of Cargo Tank System	Membrane, Spherical or Prismatic
Vessel Design Life	30 to 40 years
Length Over All	918-feet (280-meters)
Molded Breadth	142-feet (43,4-meters)
Main Deck Nominal Height Above the Water Line	48-feet (membrane vessel) (14-meters)
Design Draft	37.4-feet (11.4-meters)
Scantling Draft (Summer load line)	40.7-feet (12.4-meters)
Range	12,000 nautical miles (19,200-kilometers)
Ballast Capacity	55,000 m^3 (1 942 365 ft3)

Item	Description
Maximum Daily Boil Off Rate (for LNG)	0.15 %
Vessel Speed (calm weather)	Approx. 19.5 kts
Number of vaporization units	3
Max vaporization capacity	750 mmscf/d
Average vaporization capacity	400 mmscf/d
Vaporization System Max re-gas pressure	120 bar (1740 Psi)
Vaporization medium	Water-glycol /steam
LNG Inlet Temperature	-160° C (-256 °F)
Minimum Gas Outlet Temperature	0 °C (32 °F)

Table 17-2
Typical 217 000 m^3 SRV ("X-Flex type")

Item	Description
Hull Type	Double-bottom/Double hull
Number of Cargo Tanks	5
Total LNG Capacity	217,000 m3 (7 663 512 ft3)
Type of Cargo Tank System	Membrane, Spherical or Prismatic
Vessel Design Life	30 to 40 years
Length Over All	1035-feet (315,5-meters)
Molded Breadth	164-feet (50-meters)
Depth	89-feet (27-meters)
Design Draft	39.5-feet (12-meters)
Normal Draft	38-feet (11,5-meters)
Range	20,000 nautical miles
Ballast Capacity	72,000 m^3 (2 542 732 ft3)
Maximum Daily Boil Off Rate (for LNG)	0.145 %
Vessel Speed (calm weather)	Approx. 19.5 kts
Number of vaporization units	Up to 5
Max technical vaporization capacity	Up to 1200 mmscf/d
Max technical vaporization capacity	Up to 800 mmscf/d
Vaporization System Max Re-gas Pressure	120 bar

The various tanks of the base case (145,000 m^3) SRV would have approximately the following capacities:

- Ballast water tanks 333,000 barrels (53,000 cubic meters)
- Marine Diesel oil tanks: 37,700 barrels (6,000 cubic meters)

- G.O. 1,500 barrels (240 cubic meters)
- Distilled water (feed water) tanks 1,760 barrels (280 cubic meters)
- Fresh water tanks 1,570 barrels (250 cubic meters)
- Potable water tanks 1,250 barrels (200 cubic meters)

The various tanks of the "X-Flex type" SRV (217,000 m^3) would have approximately the following capacities:

- Ballast water tanks 452,400 barrels (72,000 cubic meters)
- Marine Diesel oil tanks: 44,000 barrels (7,000 cubic meters)
- G.O. 1,500 barrels (240 cubic meters)
- Distilled water (feed water) tanks 1,760 barrels (280 cubic meters)
- Fresh water tanks 3,800 barrels (600 cubic meters)
- Potable water tanks 1,250 barrels (200 cubic meters)

Figure 17-2a
Representative Moss-type SRV (145,000 m^3)
(dimensions approximate)

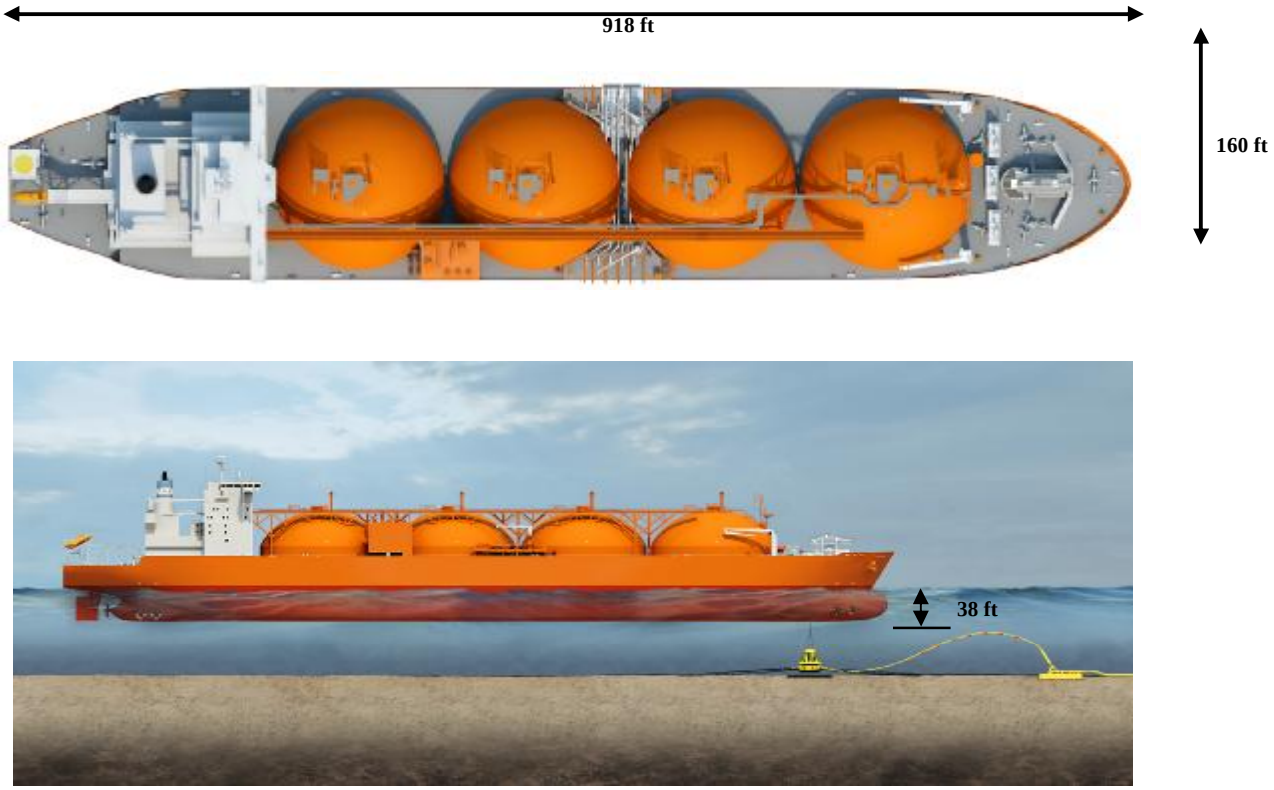


Figure 17-2b
Representative Membrane-type SRV (145,000 m^3)
(dimensions approximate)

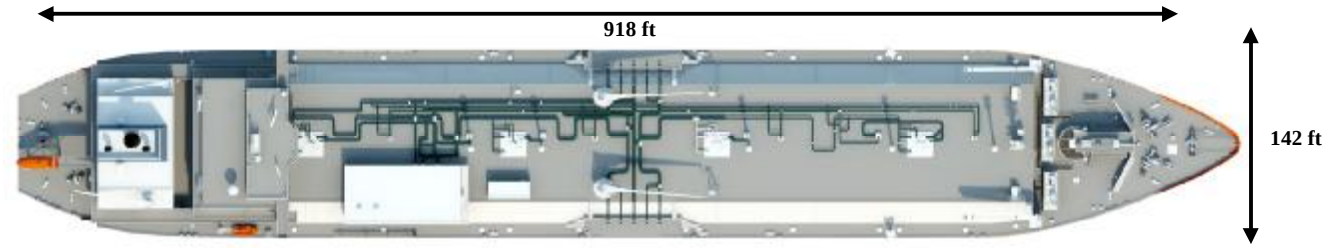
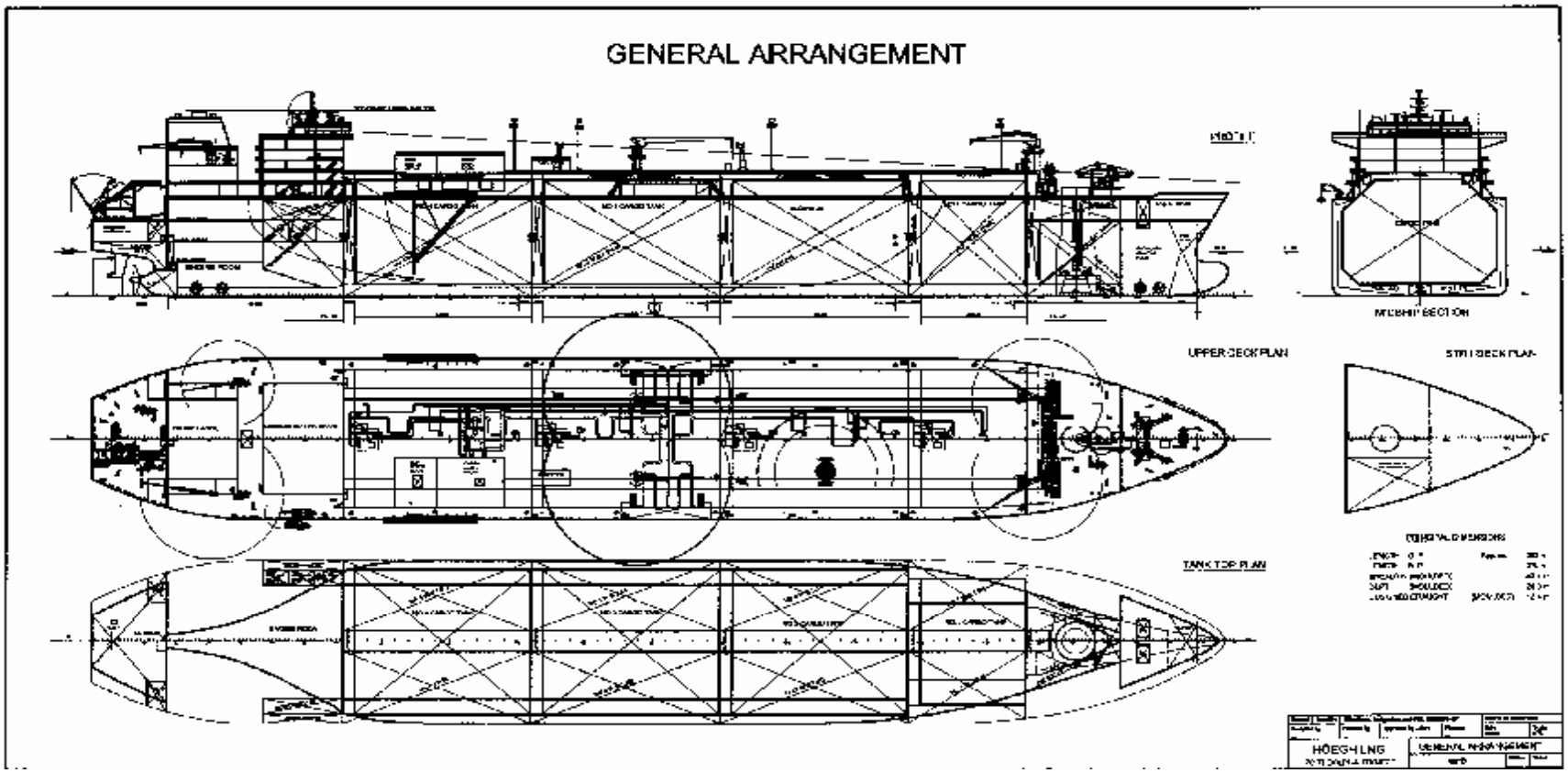


Figure 17-3
145 000 m^3 Membrane Type SRV (Base Case)



17.4 § 148.105(p)(2) – Weather Forecasting

The SRVs and support vessels will be equipped with equipment that will provide their respective Masters and the Person-in-Charge with access to up-to-date weather forecast data. Additionally, the SRVs will be equipped with the Global Maritime Distress and Safety System (GMDSS) enabling the vessels to automatically receive weather forecast information.

18. § 148.105(q) – Floating Components

The information regarding floating components requested by USCG regulations includes "A description and preliminary design drawing of each floating component, including the hoses, anchoring or securing structure, and navigation lights if the component is a mooring buoy." This section contains data on *Port Dolphin* components that fit within this category. Preliminary design drawings for the components described below are found in Appendix F along with a complete technical description in Volume III.

18.1 § 148.105(q)(1) Description and Preliminary Design Drawing

The principal floating components encompassed by the proposed *Port Dolphin* are encompassed by the STL Subsea System depicted in Figures 18-1 and 18-2 and consist of dual sets of the following:

- STL Buoy pick-up assembly
- STL Buoy
- STL Buoy landing pad
- Mooring lines with anchor piles
- Flexible riser and umbilical

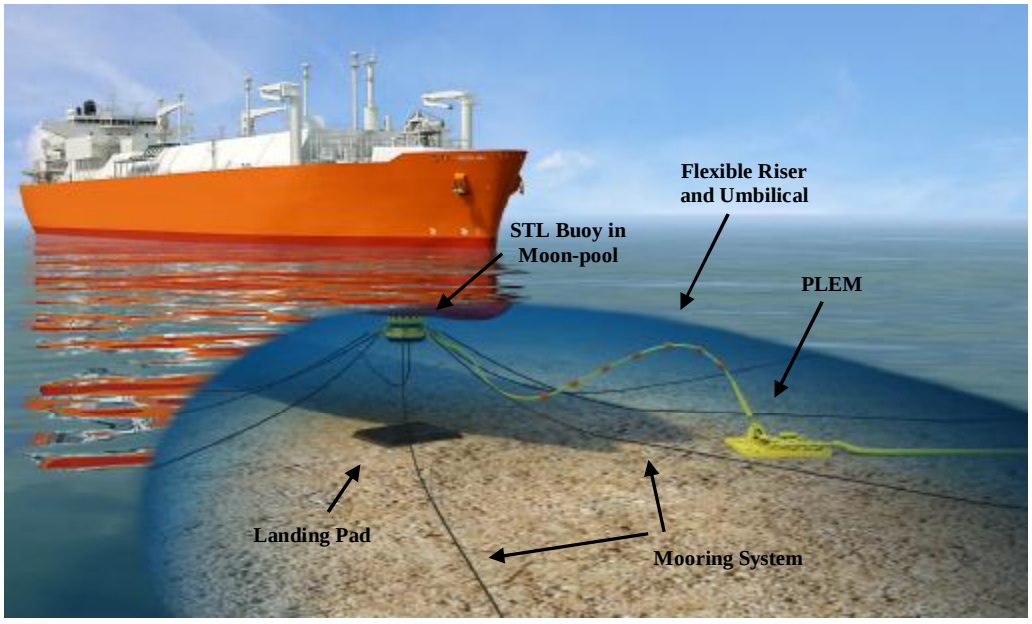
Each of these components is generally described below and additional data on their technical design features along with the host configuration aboard the unloading vessel is found in Volume III. Where necessary, those features and functions performed by the unloading vessel are described although the vessel itself, pursuant to regulation is not considered to be a part of the port. In this respect, operation of the STL Buoy system is controlled from the unloading vessel and is described in Section 19 and in Volume III, Section 4b.

In support of its principal function of off-loading re-gasified natural gas from the SRV, the STL Subsea System has three main tasks:

- Provide mooring for the SRV
- Provide weather vaning of the SRV

- Connect the flexible riser and umbilical to the shipboard swivel arrangement

Figure 18-1
Floating Offshore Components



STL Buoy

The STL Buoy is the core component of the STL Subsea System and is the primary interface for unloading the re-gasified natural gas from the SRV. An STL Buoy consists of the following major components:

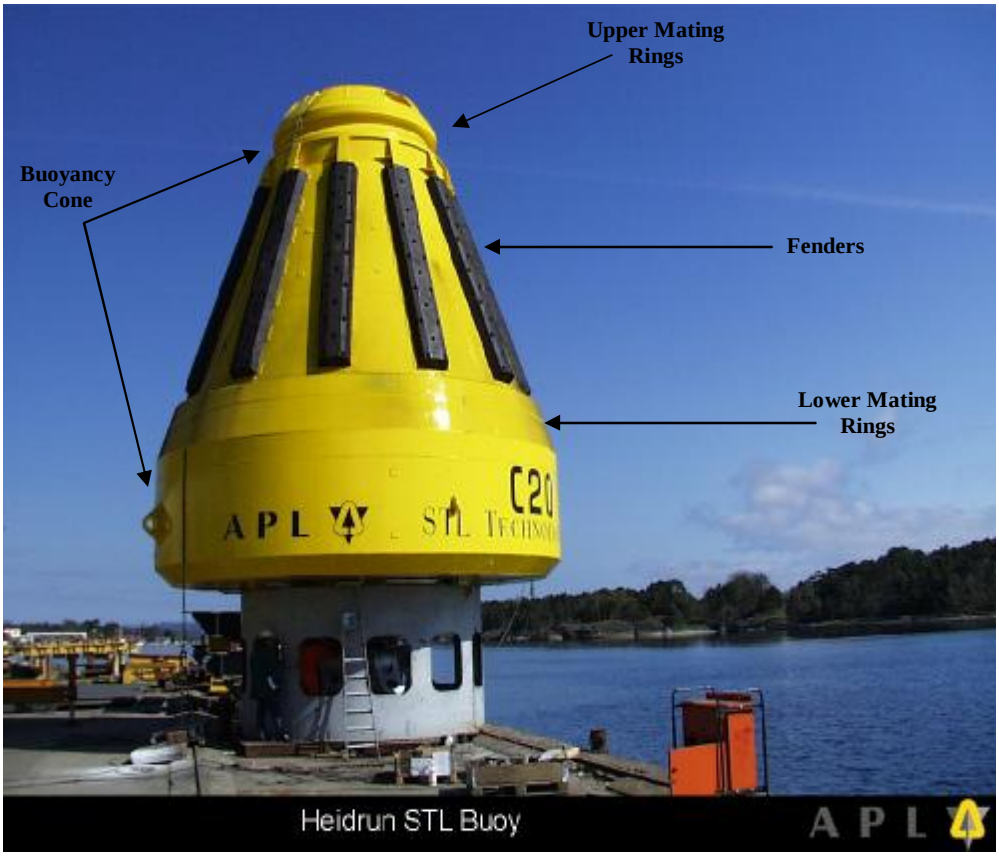
- Buoyancy cone with compartments
- Integrated turret with bearing
- Mooring, riser and umbilical connections
- Padeyes (three) for connection of pick-up assembly
- ESD valve and buoy part of gas line connector
- Acoustic transponders

As depicted in Figure 18-1 above and Figure 18-2 below, most of these components consist of structural and mechanical devices while the transponders, as more fully discussed in the operations sections, assist in locating the STL Buoy on the seabed.

All plating and profiles used in the fabrication of the STL Buoy hull and turret structure will be low alloy carbon steel. The coating for these and other STL Buoy surfaces is described in Volume III, Section 5.

Individual STL Buoy components are described below and further detail can be found in Volume III, Section 5.

Figure 18-2
Representative STL Buoy



Buoyancy Cone

The buoyancy cone consists of a welded steel structure that is divided into individual buoyancy compartments. The cone provides the required buoyancy and through the upper and lower mating rings, ensures the proper transfer of mooring, riser/umbilical and reaction forces in the vertical and horizontal axes to the vessel hull. The outer shell is designed to withstand impact loads during connection and disconnection in addition to hydrostatic pressure in the submerged position. Contact with the SRV is limited to the upper and lower mating rings and the buoyancy cone is equipped with heavy-duty fenders designed to absorb the impact of connection to the

SRV. The fenders will be designed to absorb the energy which corresponds to a sea-state with significant wave height of approximately 14-feet (3.5-meters) during connection.

The buoyancy cone is divided into several independent buoyancy compartments in order to reduce risk for critical loss of buoyancy in the event of damage. Size restrictions will be applied to external compartments facing seawater on the outside. Internal compartments surrounded by other compartments are well protected and are not subject to accidental flooding.

On top of the buoyancy cone is the locking recess ring. This ring is shaped with a recess for locking devices which support the buoy vertically. The top also serves as a protection structure for the buoy mounted ESD valve and a portion of the connector by using a configuration that prevents damage during connection and disconnection. The lifting and pull-in padeyes are also integrated in the top structure.

The buoyancy cone mates into a mating cone of the SRV and is locked in position by hydraulic locking devices. When weather-vaning, the buoyancy cone is stationary with the vessel and rotates around the turret structure which is geo-stationary. A detailed description of the mechanical interface between the STL Buoy and mating compartment of the SRV can be found in Volume III, Sections 4 and 5.

Turret

The integrated turret is the geo-stationary portion of the STL Buoy and consists of the shaft-part and lower section with mooring connections (padeyes). Mooring system tension is transferred into the turret through the turret padeyes. These forces are further transferred via the bearing and into the buoy and vessel structure. The turret is watertight and is divided into separate watertight compartments.

Mooring system lines are connected to the lower turret section at a double lug integrated with the turret internal structure (see representative Figure 18-4). A connection link element is fitted between the lugs and the mooring wire socket in order to allow pivoting about both axes. Self-lubricating bushes are fitted with both pins.

Turret bearings ensure load transfer from the turret structure to the buoyancy cone and allow unrestricted rotation. There are three main bearings:

- Upper axial bearing
- Upper radial bearing
- Lower radial bearing

All turret bearings are made in segments with self-lubricating sliding bearing materials. The upper and bearing segments (both axial and radial) are fitted into a housing in the locking recess ring of the Buoyancy Cone. The lower bearing segments are fitted into the housing in the lower ring of the Buoyancy Cone. The bearings are designed to operate without lubrication.

Further details regarding STL Buoy turret components can be found in Volume III, Section 5.

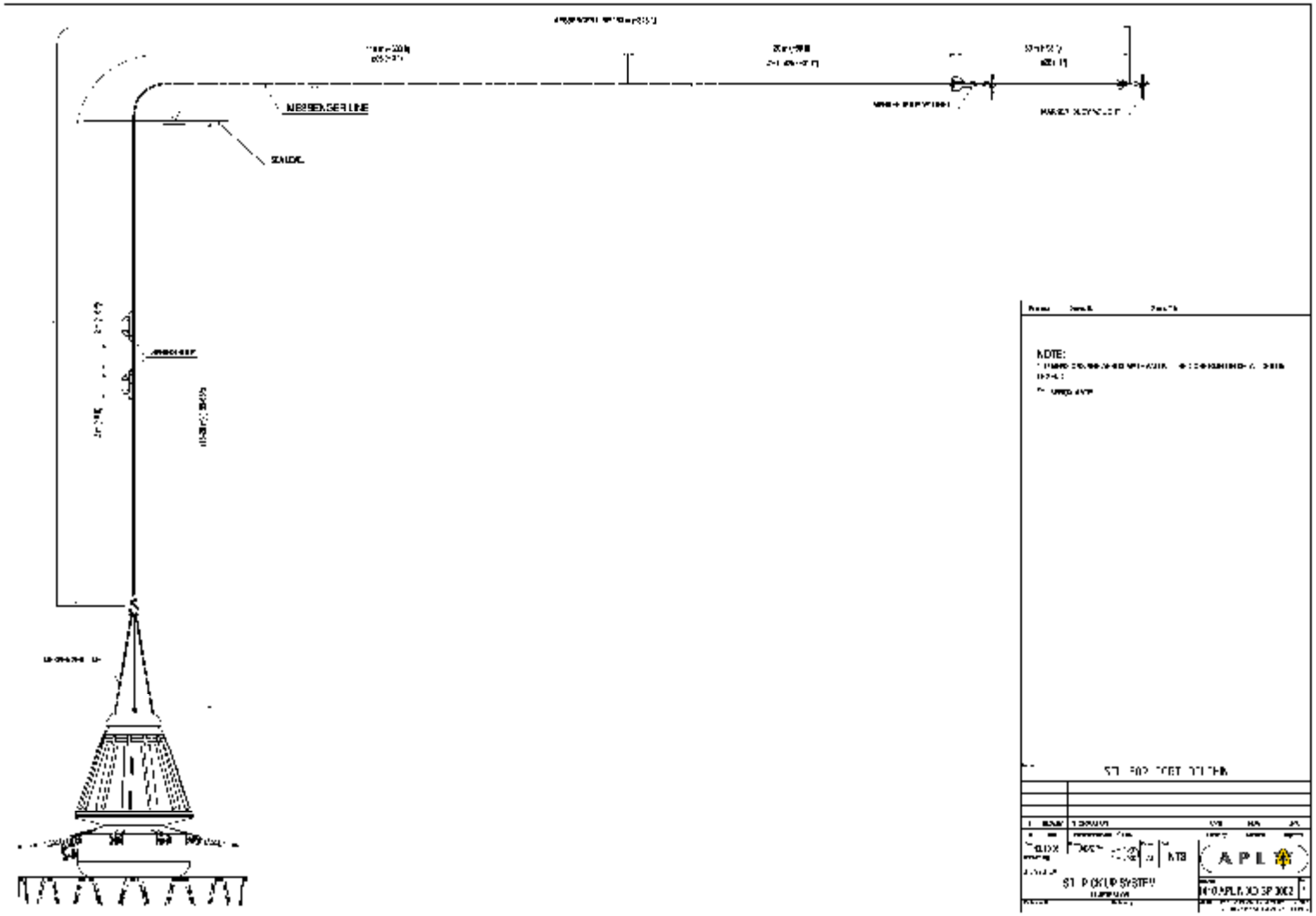
STL Buoy Pick-up Assembly

The pick-up assembly provides for buoy retrieval and is depicted in Figure 18-3. It is attached to the top of the STL Buoy and consists of the following main components:

- Three wide body shackles
- Three bridle legs
- One messenger line consisting of
  - Loadbearing section
  - Tapered section
  - Pick-up line
- Two spring buoys attached to the loadbearing section near the STL Buoy
- One marker buoy with flashing light attached to the pick-up section
- One finger buoy attached to the upper end of the pick-up line section

The messenger line is approximately 500-feet (152-meters) total length and will have a soft eye at both ends. The soft eyes will be covered with a soft wear resistant protective sleeve.

Figure 18-3
STL Buoy Pick-up Assembly



Mooring Lines and Anchor Piles

As depicted in Figure 18-5, there are eight mooring lines and anchor piles all connected at their upper ends to the bottom of each STL Buoy (Figure 18-4). The lines are arrayed at 45º intervals beginning at North (mooring line no. 1) and proceeding clockwise. This arrangement is as follows:

Mooring line no. 1 Directed 0º clockwise from North

Mooring line no. 2 Directed 45º clockwise from North

Mooring line no. 3 Directed 90º clockwise from North

Mooring line no. 4 Directed 135º clockwise from North

Mooring line no. 5 Directed 180º clockwise from North

Mooring line no. 6 Directed 225º clockwise from North

Mooring line no. 7 Directed 270º clockwise from North

Mooring line no. 8 Directed 315º clockwise from North

Each mooring line consists of the following components as depicted in Figure 18-5 and is set approximately 4100-feet (1250-meters) from the landing pad.

- Pile Anchor
- Chain Segment
- Lower Wire Segment
- Upper Wire Segment
- Connecting link (attachment to the STL Buoy)
- Shackles for the above components

As a base case, driven pile anchors will be used with a final determination being based on collected soil data. A typical driven pile is made of steel and will have a diameter of approximately 70-inches and length of 65-98 feet (20-30 meters). The anchors will weigh 40-50 tons each. As depicted in Figures 18-4 and 18-5b, the mooring chain will be terminated with an anchor shackle to a padeye at the anchor skirt. The location of the padeye will be optimized with respect to the moment capacity of the soil.

If the alternative suction pile type anchor is pursued, the diameter will be 14-16 feet (4-5 meters) with a corresponding weight of 50-70 tons.

The chain and wire segments will be designed with sufficient strength for 40 years of service life.

Table 18-2
Mooring System Lengths (Approximate)

Item	Element	Length
CS	Chain Segment	328-feet (100-meters)
LWS	Lower Wire Rope Segment	3611-feet (1100-meters)
UWS	Upper Wire Rope Segment	164-feet (50 meters)

Figure 18-4
Mooring System Attachments to the STL Buoy

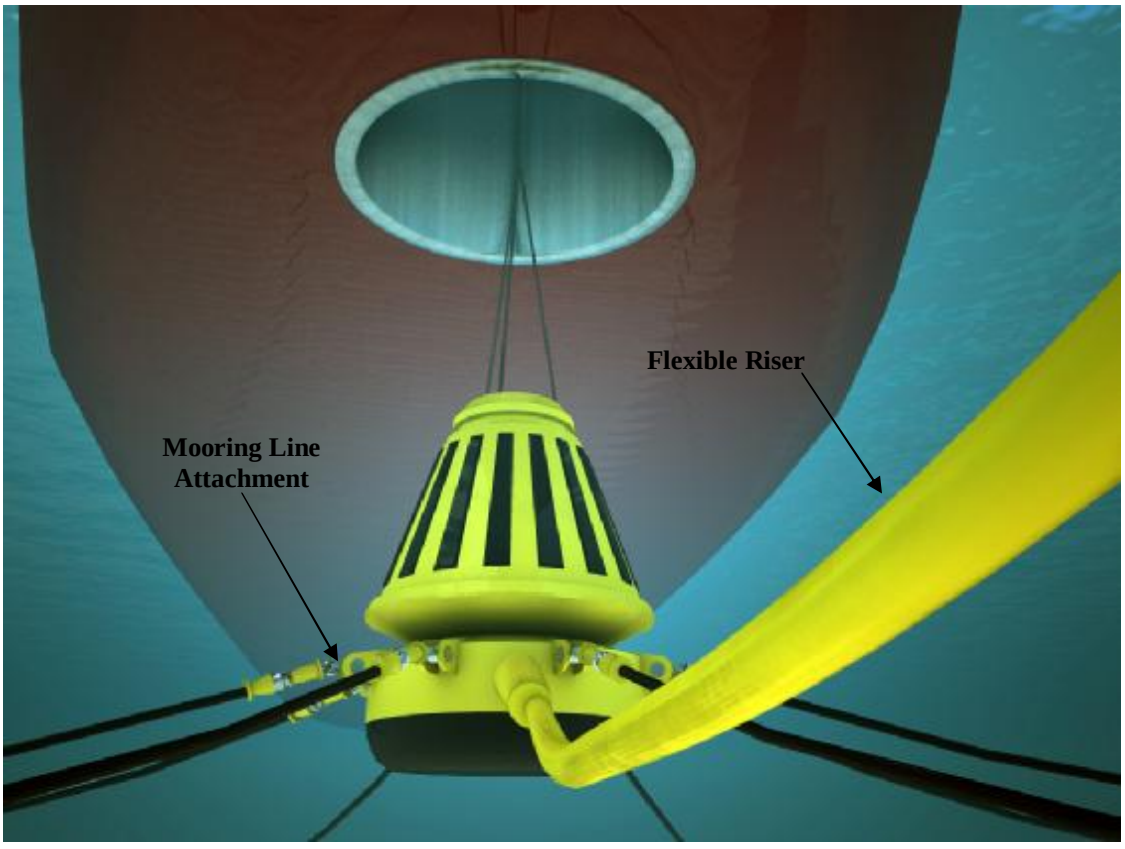


Figure 18-5a
Mooring System Drawing

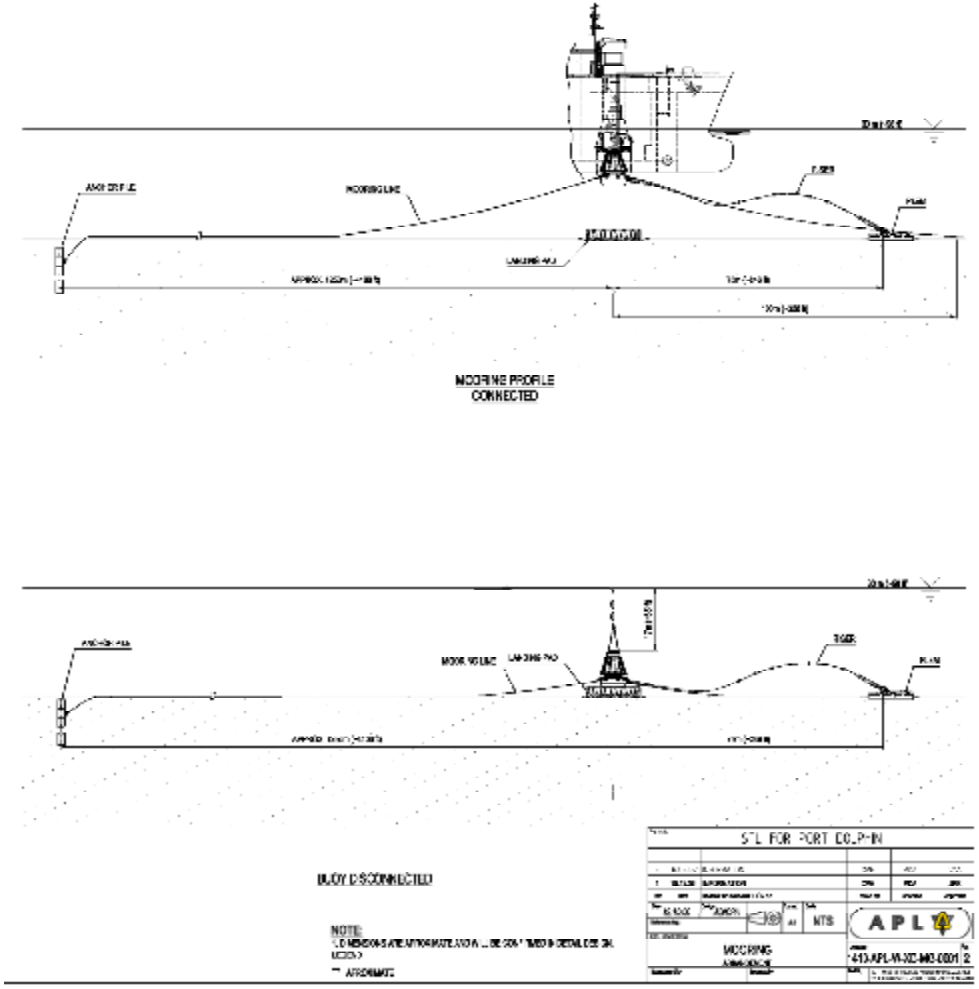
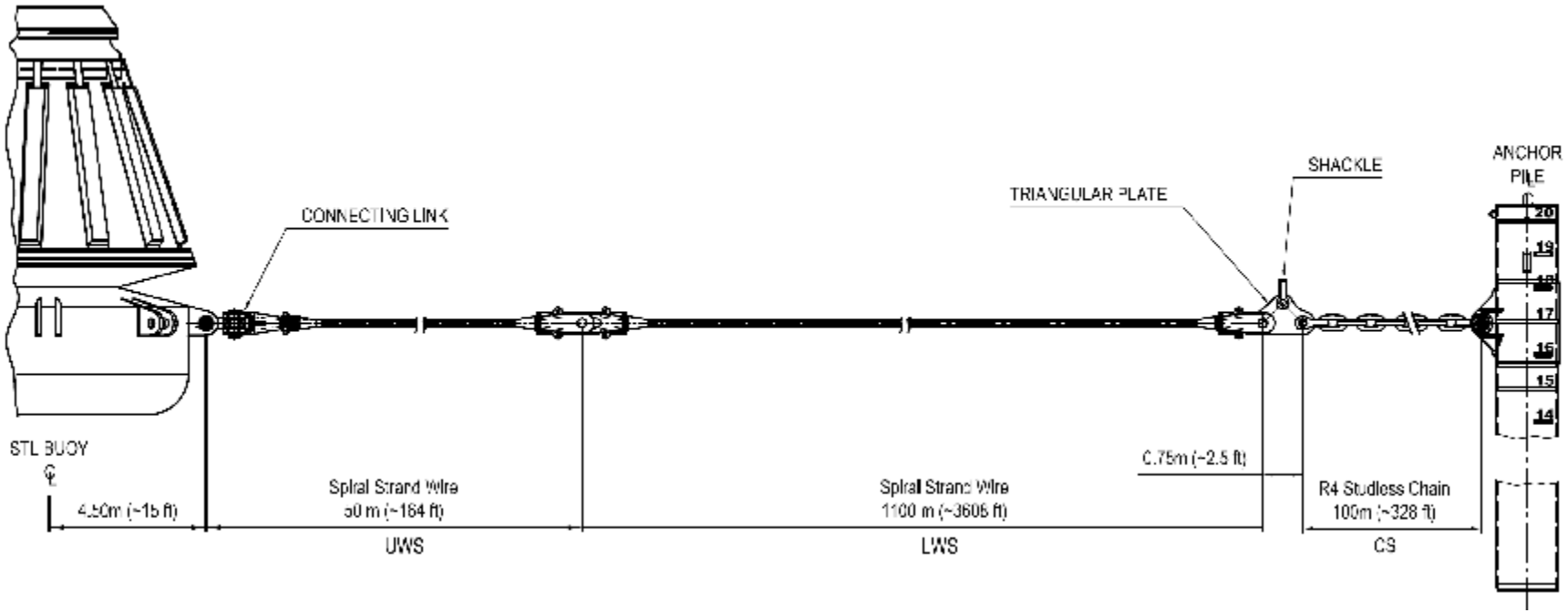


Figure 18-5b
Mooring System Drawing (Subassemblies)



STL Buoy Landing Pad

The STL Buoy landing pad, depicted in Figure 18-1, provides the resting point for the STL Buoy while the latter is in the idle position at a depth of 60-70 feet (18-21 meters). The STL Buoy landing pad will measure approximately 49-feet (15-meters) in diameter and will consist of a rubber fender set on a foundation. The fender will absorb the impact loads of the STL Buoy. Additionally, fenders may be fitted below the turret tank on the STL Buoy for cushioning. The landing pad will be fixed to the seafloor by a skirted mud mat (base case) or alternatively with a suction pile. This will be at a depth of approximately 100-feet (30-meters) of water for the north buoy and 111-feet (33-meters) of water for the south buoy.

Flexible Riser and Umbilical

The flexible riser consists of 16-inch flexible hose-like device that is approximately 269-feet (82-meters) in length and acts as the pipeline between the STL Buoy and PLEM as depicted in Figure 18-6. The umbilical provides hydraulic control connections and signals between the vessel and ESD valve and pressure transmitters in the PLEM. The flexible riser is routed in a steep wave configuration between the STL Buoy and PLEM via buoyancy elements at its lower end. The buoyancy equivalent section is approximately 138-feet (42-meters) long and the length between the buoyancy section and turret is approximately 131-feet (40-meters).

The flexible riser will consist of five protective layers, which, starting with the innermost consist of:

- Carcass – The carcass forms the body of the flexible pipe and is essentially corrugated metallic tube. The primary function of the carcass is to prevent the polymer inner liner from collapsing due to possible external pressure or rapid decompression.
- Pressure Sheath – Inner liner that is highly resistant to hydrolysis and virtually any chemicals used in the offshore industry.
- Pressure Armor – Pressure armoring layer consists of C or Z-shaped profiles.
- Tensile Armor – Two cross wound layers of rectangular carbon steel wires providing flexible strength in response to axial forces, induced by the internal working pressure, weight of the flexible pipe and external loads, e.g. tension loads during installation or dynamic loads.
- Outer Sheath – The outer sheath functions to protect the steel armor layers against mechanical damage and exposure to seawater, thus providing corrosion protection of the steel strands in both the pressure and tensile armor.

At each end of the flexible riser there will be an end termination which also provides a gas relief system as well as the termination flange. In addition, the upper end of the flexible riser

will be fitted with a bend stiffener which may be pulled into the lower part of the guide-tube in the STL Buoy. The guide tubes are routed through the STL Buoy turret shaft and allow the risers to be pulled in from below. At the PLEM end, the flexible riser will be fitted with termination that will be bolted to the PLEM.

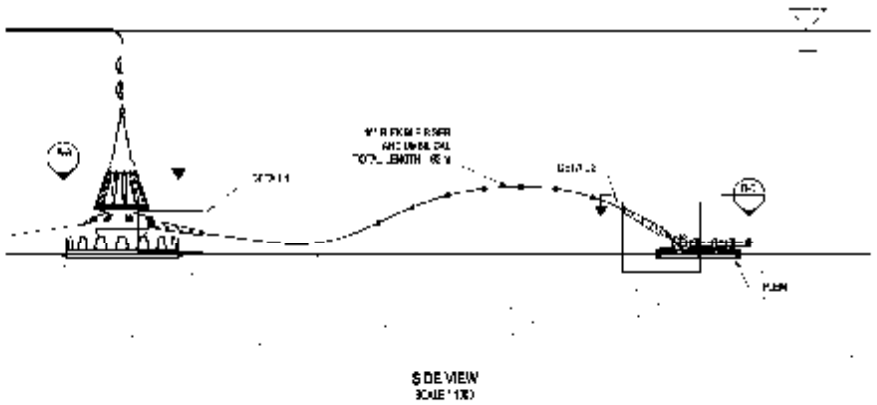
The umbilical will incorporate:

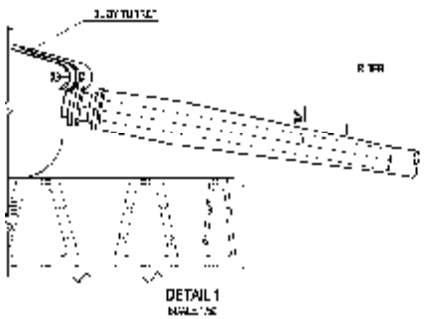
- Two hydraulic lines for the ESD valve (supply and return)
- Control lines for two pressure transmitters
- Signals for ESD valve status

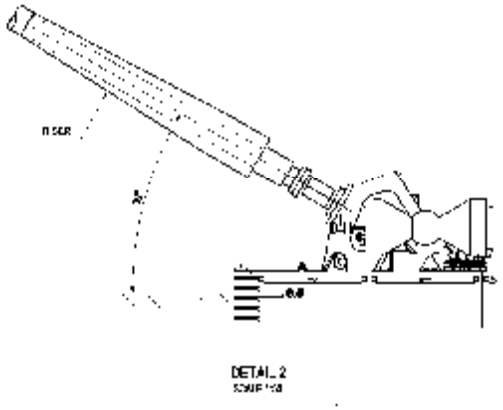
The umbilical will piggyback on the riser through the buoyancy modules. Instead of a vertical connection at the PLEM, however, the umbilical will be configured as a catenary from the lowest buoyancy module down to the horizontal connection at the deck of the PLEM. Guide tubes for connection to the STL Buoy will be provided for the riser and umbilical. At the PLEM end, the hydraulic and signal lines will be routed to the ESD valve and to the pressure transmitter by wet matable connectors.

Overall, the flexible riser and umbilical configuration is designed to counteract the dynamic forces caused by the environment and vessel-related motion that will be acting on it. A dynamic analysis of the proposed flexible riser and umbilical configuration in addition to a detailed technical description are found in Volume III, Section 5.

Figure 18-6
STL Riser System







18.2 § 148.105(q)(2) Design Criteria

Overall design requirements for the floating offshore components:

- The passive SRV is weather vaning
- Built for 40-year design life
- Survive the 100-year non-hurricane condition for the connected STL Buoy scenario
- Survive the 100-year hurricane condition for the disconnected STL Buoy scenario
- Connect Conditions
  - -- Significant wave height (Hs) 11.5 feet (3.5 m)
  - -- Wind speed (Uw; 1 hour mean) 30 knots (15 m/s)
  - -- Current speed (Uc) 3 knots (1.5 m/s)

More detailed design requirements are in Table 18-3 and are detailed by component in Volume III, Section 5.

Table 18-3
Floating Components General Design Criteria

Criteria	Value
Design Pressure	1958-psig (135 barg)
Maximum Operating Pressure	1643-psig (113 barg)
Min Gas Temperature	2ºC (35ºF)
Gas Flow Rate	750 mmscf/d@ 110 barg (145,000 m^3 SRV)
	1200 mmscf/d@ 110 barg (217,000 m^3 SRV)

18.3 § 148.105(q)(3) Floating Components Design Standards and Codes

The STL Subsea System shall be designed, certified and classed by a Recognized Classification Society (RCS), in this case ABS. General and component specific standards and codes are listed below and can also be found in Volume III, Section 5.

Table 18-4

Floating Components Design Standards and Codes
ABS Guide for Building and Classing Floating Production Installations
ABS Rules for Building and Classing Single Point Moorings
ABS Rules for Building and Classing Offshore Installations: Part 1 structures
ABS Guide for the Fatigue Assessment of Offshore Structures
DNV Buckling Strength Analysis, Classification Note No. 30.1
If the above standards and codes do not cover a specific item, the below may be used as a guideline:
DNV OS-C101 Design of Offshore Steel Structures
DNV Rules for Classification of Fixed Offshore Installation, Pt 3, Ch.1, Sect 9 Foundation Design, July 1995
DNV OS-F101 Submarine Pipeline Systems
The following industry codes and standards may apply:
API Spec 2F Specification for Mooring Chain
API Spec 9A Specification for Wire Rope
API Spec 17J Specification for Unbounded Flexible Pipe
API Std 1104 Standard for Welding Pipelines and Related Facilities
ANSI B31.3 Chemical Plant and Petroleum Refinery Pipeline
Flexible Riser with Umbilical
ABS Guide for Building and Classing Floating Production Installations
ABS Rules for Building and Classing Single Point Moorings
API Spec 17J Specification for Unbonded Flexible Pipe
API Spec 17E Specification for Subsea Production Control Umbilicals

18.4 § 148.105(q)(4) Engineering Practices

General engineering practices that will be followed in constructing the port can be found in the following table.

Table 18-5

Floating Components Engineering Practices	
API RP 2A	Recommended Practice for Planning, Designing and Constructing Offshore Platforms
API RP 2SK	Recommended Practice for Design and Analysis of Station Keeping System for Floating Structures
API RP 2FP1	Recommended Practice for Design, Analysis, and Maintenance of Mooring for Floating Production Systems

Floating Components Engineering Practices	
API RP 2FPS	Recommended Practice for Planning, Designing, and Constructing Floating Production Systems
API RP17B	Recommended Practice for Flexible Pipe

18.5 § 148.105(q)(5) Safety, firefighting and pollution prevention equipment

This section describes the equipment used to isolate unsafe conditions, perform lifesaving functions, fight fires and comply with overboard discharge and emissions requirements. Much of the equipment that performs these functions is found aboard the SRVs and it is described as applicable.

The safe transfer of natural gas from the SRV is ensured by a series of sensors that provide feedback to the operator panel and that can automatically shutdown gas transfer. Additionally, there are a series of emergency shutdown valves that will also interrupt gas transfer in the event of an unsafe condition along with emergency buoy disconnect procedures for interrupting gas flow as well.

These systems and associated procedures are summarized below and comprise the principal means for dealing with the unsafe discharge of natural gas. Further systems related-information can be found in Volume III, Sections 4 and 5. Additionally, information regarding shipboard firefighting and pollution prevention equipment and procedures can be found in the SRV specification in Volume III, Sections 4a and 4b.

Overview

There are three shutdown levels governing the transfer of natural gas from the SRV to the STL Buoy:

- Automatic Shutdown (ASD)
- Emergency Shutdown (ESD)
- Emergency Buoy Disconnect (EBD)

The safety related equipment and functions associated with these shutdown levels is described as follows.

Operator Control Panel

The duplicate Operator Control Panels aboard the SRV located in the STL control cabinet and on the navigation bridge monitor for a “Green Line” through sensors located within the STL system. Any interruption of the signals from the sensors along the transmission path will give an alarm which is triggered by one or more of the following errors:

- Loss of sensors in the locking mechanism over the center cylinder
- Loss of pressure transmitters on the connector claws
- Low N_2 pressure on the swivel seal and high flow in the swivel N_2 leak line
- Low pressure on accumulators

The sensors are complemented by a series of control system interlocks that when closed provide a signal to the operator panel to verify the integrity of the particular interlock. Each interlock signal appears with a green color on the operator panel.

Emergency Shutdown

ESD is controlled by automatic or manually activated systems:

- Automatic shutdown through the fire and gas detection or other systems on the SRV requiring a total shutdown of gas export
- Manual shutdown through ESD buttons positioned at strategic locations

Automatic or manual operation activates closed all of the three ESD valves (ESDV) which are located:

- ESDV1 – ESD valve mounted on main deck upstream of the STL Buoy system
- ESDV2 -- ESD valve mounted in the STL Buoy
- ESDV3 – ESD valve mounted subsea in the PLEM

The ESD valves are operated by spring return, hydraulically powered actuators with a fail-safe spring return to the closed position. The hydraulic power for operation of the valves is supplied from the STL valve control system. The signal for indicating the open or closed position of the valves will be sent to the vessel control system.

Emergency Buoy Disconnect

EBD can only be activated manually through the EBD button located on the STL operator panel on the SRV's navigation bridge. EBD involves a shutdown of the gas export operation followed by an automatic disconnection of the STL Buoy. The EBD is initiated through push-button activation in two steps. Step one disconnects the STL gas transfer system while step two releases the STL Buoy.

Overpressure Protection of Onshore Receiving Facilities

In addition to the safety features noted above, at each of the Gulfstream and TECO interconnection stations, there are appropriate overpressure protection devices to ensure the gas

transmission line running from *Port Dolphin* can not overpressure these facilities. The design of the interconnection stations includes pressure reduction (PR) equipment as well as materials and components with pressure ratings equal to or greater than the pipeline design pressure. The PR equipment includes valves which will be set at a pressure that will cause them to automatically close should the pipeline pressure exceed the design pressure of the facilities downstream of the PR station.

The Gulfstream and TECO interconnection stations also include emergency shutdown (ESD) valves that will automatically close and isolate the offshore facilities from the Gulfstream and TECO pipelines. These valves will be designed to ensure the offshore facilities do not exceed the design pressures of the Gulfstream and TECO pipelines. At this time, it is intended that the offshore floating and fixed components including the flowlines and gas transmission line will have higher design pressure ratings than the Gulfstream and TECO systems.

Lifesaving Equipment

The SRVs are equipped with a full range of lifesaving equipment in conformance with international maritime standards. A representative listing of the principal lifesaving equipment that will be contained aboard the 145,000m^3 and 217,000m^3 SRVs is as follows:

145,000 m^3 SRV

- One 42-person totally enclosed freefall type with water spray protection and air supply. The lifeboat shall be driven by closed circuit fresh water cooled diesel engine with dual electric starting.
- One rigid, GRP inboard diesel driven water jets designed engine rescue boat and hydraulic driven gravity davit shall be provided.
- Four 25-person liferafts; two throw-overboard type and two davit launched.
- One 6-person inflatable raft

217,000m^3 SRV

- Two 34-person fully enclosed lifeboats (one can be used as a rescue boat)
- Two hinged gravity type, electric motor drive lifeboat davits
- Five inflatable, throw-overboard life rafts (two 20-person; two 14-person; and one six-person)

Additionally, both types of SRV will be equipped with personal lifesaving equipment in conformance with international standards including life buoys, line throwing apparatus, life jackets, distress flares and exposure suits. A more detailed description of lifesaving equipment can be found in Volume III, Sections 4a and 4b.

Firefighting Equipment

Fire extinguishing systems that will be installed on the unloading SRVs are depicted in Table 18-6 below. This listing is representative of equipment aboard the 145,000 m^3 and 217,000m^3 SRVs that along with other types of SRV may call on *Port Dolphin*.

Table 18-6

Firefighting Equipment Aboard the Unloading SRV	
Exposed deck in the cargo area	Dry powder system and sea water fire extinguishing system
Cargo manifolds & cargo tank domes	Dry powder system, water spray system and sea water fire extinguishing system
Engine room	High expansion foam fire extinguishing system, portable fire extinguishers and sea water fire extinguishing system
Electric motor room, cargo switch board rooms, emergency generator room, and emergency switch board room	High pressure CO_2 fire extinguishing system, portable fire extinguishers
Accommodation	Sea water fire extinguishing system and portable fire extinguisher
Accommodation front wall, cargo machinery room wall	Water spray system
Cargo machinery room	CO_2 fire extinguishing system, inert gas system, portable fire extinguishers
Fire hazards portion of Aux. Engine for generator, boiler front, incinerator, F.O purifier and burner side of IGG	Water spray system, portable fire extinguishers and/or sea water fire extinguishing system (Water based local fire fighting system)
Paint stores, chemical stores, oil/grease store	Local CO_2 fire extinguishing system, portable fire extinguishers
Other spaces	Sea water fire extinguishing system and/or portable fire extinguishers

The interconnection stations at Gulfstream and TECO will also include appropriate fire protection equipment such as extinguishers to fight various types of fires and a station freshwater piping loop.

Pollution Prevention

The unloading SRV will be comprehensively equipped to comply with international conventions for the sanitary management of waste and control of emissions. This equipment will include an incinerator, sewage treatment system, garbage compactor and gas combustion unit (gas dumping incinerator). Further details regarding this equipment can be found in Volume III, Sections 4a and 4b.

The incinerator and gas combustion unit will not be operated while the SRVs are inside the Safety Zone. Nor will trash be disposed of into the water. Finally, there will be no discharge of grey or black water by the SRVs while moored.

18.6 § 148.105(q)(6) Description of lighting on floating components

Proposed lighting on the floating components will consist of yellow strobe lights attached to the marker buoys. There are no other lights envisioned on the port's floating components.

As previously noted, the SRVs while moored, will be considered a "vessel at anchor." In order to comply with the international COLREGS, the vessel will then exhibit an all-round white light in the fore part and one all-round white light at or near the stern and at a lower level than the light in the forward part of the SRV.

19. § 148.105(r) – Dedicated Fixed Offshore Components

19.1 § 148.105(r)(1) – Dedicated Fixed Offshore Components Descriptions and Drawings

The dedicated fixed offshore components encompassed by the proposed *Port Dolphin* include the following fixtures which are depicted in Figures 1-3 and 13-1:

- PLEM (two)
- Flowline (two)
- Piggable-Y
- Gas transmission line (with subsea valve)

A description of each dedicated fixed offshore component follows. Further technical data can be found in Volume III, Sections 5 and 6 and preliminary design drawings are contained in Appendix F-2.

PLEMs

The north and south PLEMs are the structures that provide the base for the flexible riser and umbilical and form the beginning point of the subsea pipeline. They are positioned approximately 246-feet (75-meters) from the landing pad. The PLEMs function as the interconnection between the flexible risers and flowlines. Additionally, the PLEMs have valve assemblies and pressure transmitters as well as the actuated valves and piping necessary to connect a removable pig launcher to facilitate launching inspection pigs. A foundation for a pig launcher skid is also provided.

Valves contained within the PLEM include an ESD valve of a fail-safe close type that is remotely controlled through the umbilical, a check valve to prevent back flow from the flowline, and an isolation valve located upstream of the connecting flange between the flexible riser and PLEM in order to isolate the PLEM for maintenance purposes. Two pressure transmitters isolated by double sets of valves are included in the main line and are connected to the SRV through the umbilical.

The flexible riser is terminated at the PLEM, as noted, by a flange that is properly supported to take the dynamic loads from the flexible riser. Likewise, the end termination of the umbilical will be designed to take dynamic loads. Also, as previously noted, the hydraulic and signal lines in the umbilical will be routed in the PLEM to the ESD valve and the pressure transmitters.

The PLEMs will be designed to accommodate removable pig launchers that will be connected to subsea valves for the safe launching of "pigs." The pigs are devices that that are propelled along the pipeline while being pushed by the natural gas and are used in their different configurations for operations, maintenance and integrity assessment.

The PLEMs will be fixed to the seafloor by skirted mud mats (base case) or alternatively, with a suction anchor. This form of fixture will counteract the forces of pipeline expansion and pressure on the landward end and the forces of riser and umbilical flex on the other end. If a suction anchor is used as a foundation, each PLEM structure will serve as the top lid for the suction skirt. In this circumstance, a suction pipe with flange for connection to a ROV mounted pump skid will be arranged on top of each PLEM.

The PLEMs will be specially fabricated for the *Port Dolphin* environment as further described in Section 24 of this volume. Appropriate corrosion protection and a corrosion allowance will be provided. A technical specification for the PLEMs can be found in Volume III, Section 5.

Flowlines

The two flowlines (north and south) transport the natural gas from the PLEMs to the piggable-Y and begin at a flanged 36-inch, ANSI 900, full opening thru conduit, piggable subsea

ball valve on each of the PLEMs. The flowlines are 36-inch (outer diameter) line pipe with .750-inch thickness and will be of API 5L, Grade X-60. The pipes will be double submerged arc welded with 16-mils of external fusion bonded epoxy corrosion coating and approximately 4 ½-inches of concrete coating. The flowlines will not be internally coated.

Piggable-Y

The piggable-Y functions as the interconnection between the two flowlines and the gas transmission line as depicted in Figure 13-1 in a manner that allows an instrumented "pig" device to be launched from either PLEM and to traverse the piggable-Y before being received at the onshore pig receiver. This in turn allows for an internal assessment of the integrity of the entire length of the flowlines and transmission line.

An asymmetric-type piggable-Y especially designed to meet the requirements of the proposed *Port Dolphin* will be gravity based on the seafloor where due to its weight, it will remain seated and stabilized. The piggable-Y will be made of forged steel and will be configured with a flanged connection at the north end and a flanged ANSI 900 check valve at the south end. The design of the piggable-Y will permit the offloading of one SRV at a time without the gas being diverted to the unused STL Buoy.

Gas Transmission Line

The 41.4-mile (66-kilometers) gas transmission line will transport the natural gas to the shore interconnection facilities. The intersection of the transmission line with the bulkhead on Port Manatee property serves as the boundary between USCG and FERC jurisdiction. The route was chosen to minimize impacts on the environment and was based on a review of hazard surveys, geophysical assessments, archeological surveys, bathymetry analysis, environmental impact surveys and alignment sheets.

The gas transmission line will be 36-inch (outer diameter) line pipe with .750-inch wall thickness and will be of API 5L Grade X-60. The pipe will be double submerged arc welded with 16-mils of external fusion epoxy coating and approximately 4 ½-inches of concrete coating. The gas transmission pipeline will not be internally coated.

The 36-inch pipeline parameters have been modeled using a computerized steady state pipeline hydraulic model that simulated the proposed range of flow-rates and system pressures and included the temperature changes that are expected offshore Florida. This was done to ensure that the design allows for the delivery of the natural gas to the Gulfstream and TECO systems at the correct temperature and range of pressures. The results of this modeling are contained in a study enclosed in Volume III, Section 6.

19.2 § 148.105(r)(2) – Dedicated Fixed Offshore Components Design Criteria

Table 19-1
Fixed Components General Design Criteria

Criteria	Value
Design Pressure	1800-psig (124 barg)
Maximum Allowable Operating Pressure	1750-psig (120 barg)
Min Gas Temperature	2ºC (35ºF)
Gas Flow Rate	750 mmscf/d@ 110 barg (145,000 m^3 SRV)
	1200 mmscf/d@ 110 barg (217,000 m^3 SRV)

19.3 § 148.105(r)(3) – Dedicated Fixed Offshore Components Design Standards and Codes

Table 19-2

Fixed Offshore Components Design Standards and Codes	
AISC-LRFD	Manual of Steel Construction – Load Resistance and Factor Design
ANSI B31.8	Gas Transmission and Distribution Piping Systems
API Spec 5L	Specification for Line Pipe
API Spec 6D	Specification for Pipeline Valves, (Steel Gate, Plug, Ball, and Check Valves
API Std 1104	Standard for Welding Pipelines and Related Facilities
API Publication 2201	Procedure for Welding or Hot Tapping on Equipment Containing Flammables – 3rd Edition – October 1985
ASME B31.3	[Chemical Plant and Petroleum Refinery Piping]
ASME B31.8	Gas Transmission and Distribution Piping Systems
ASME V	Non-Destructive Examinations
ASTM Specification A53-86	Standard Specification for Pipe Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless
ASTM Specification A106	Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service
ASTM Specification A134–85	Standard Specification for Pipe, Steel, Electric-Fusion (Arc)-Welded, (Sizes 16 in. and over)
ASTM Specification A135–86	Standard Specification for Electric-Resistance Welded Steel Pipe

Fixed Offshore Components Design Standards and Codes	
ASTM Specification A139–85	Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe, (NPS 4 inch and over)
ASTM Specification A211–75	(Reapproved 1980) Standard Specification for Spiral-Welded Steel or Iron Pipe
ASTM Specification A333/A333M-85b	Standard Specification for Seamless and Welded Steel Pipe for Low-Temperature Service
ASTM Specification A381–81	Standard Specification for Metal-Arc-Welded Steel Pipe for use with High Pressure Transmission Systems
ASTM Specification A671–85	Standard Specification for Electric-Fusion-Welded Steel Pipe for Atmospheric and Lower Temperatures
ASTM Specification A672–81	Standard Specification for Electric-Fusion-Welded Steel Pipe For High Pressure Service at Moderate Temperatures
ASTM Specification A691–85a	Standard Specification for Carbon and Alloy Steel Pipe Electric Fusion-Welded for High Pressure Service at High Temperature
AWS D1.1	Structural Welding Code
FH PM-6-6-3-1	Federal Highway Administration Federal Aid Highway Program Manual
FH PM-6-6-3-2	Federal Highway Administration Federal Aid Highway Program Manual
30 C.F.R. Part 250, Subpart J	Pipelines and Pipeline Rights-of-Way
33 C.F.R. Part 148	Navigation and Navigable Waters: Coast Guard, Department of Homeland Security
49 C.F.R. Part 190	Pipeline Safety Programs and Rulemaking Procedures
49 C.F.R. Part 191	Transportation of Natural Gas By Pipeline, Annual Reports, Incident Reports and Safety Related Condition Reports
49 C.F.R. Part 192	Transportation of Natural and Other Gas By Pipeline, Minimum Federal Safety Standards
49 C.F.R. Part 193	Liquefied Natural Gas (LNG) Facilities, Federal Safety Standards
49 C.F.R. Part 199	Drug and Alcohol Testing

Fixed Offshore Components Design Standards and Codes

Key:

AISC = American Institute of Steel Construction
API = American Petroleum Institute
ASME = American Society of Mechanical Engineers
AWS = American Welding Society
C.F.R. = Code of Federal Regulations
Spec = Specification
Std = Standard

19.4 § 148.105(r)(4) – Dedicated Fixed Offshore Components Engineering Practices

Table 19-3

Fixed Offshore Components Engineering Practices	
API RP 2A	Recommended Practice for Planning, Designing, and Constructing Offshore Platforms
API RP 2SK	Design and Analysis of Station Keeping System for Floating Structures
API RP 2FP1	Recommended Practice for Design, Analysis, and Maintenance of Mooring for Floating Production Systems
API RP 17B	Recommended Practice for Flexible Pipe
API RP 17J	Specification for Unbounded Flexible Pipe
API RP 1107	Recommended Pipeline Maintenance Welding Practices
API RP 1111	Design, Construction, Operation and Maintenance of Offshore Hydrocarbon Pipeline and Risers

Key:

API = American Petroleum Institute
RP = Recommended Practice

19.5 § 148.105(r)(5) – Lighting, Safety, Lifesaving, Firefighting, Pollution Prevention, and Waste Treatment Equipment

Various features, further discussed below, that are designed into the fixed offshore component of *Port Dolphin* that will ensure the safe operation and structural integrity of the pipeline.

19.5.1 § 148.105(r)(5)(i) – Navigational Lighting

There is no navigational lighting associated with the dedicated fixed offshore components in the proposed *Port Dolphin* design. Navigational-related lighting for floating components is addressed in Sections 13.3 and 18.6 above.

As previously noted, when the SRVs are connected to the STL Buoys, they will not represent a significant obstruction to navigation for any ships. The SRV will then be considered a "vessel at anchor." In order to comply with the international COLREGS, the vessel will then exhibit an all-round white light in the fore part and one all-round white light at or near the stern and at a lower level than the light in the forward part of the SRV.

19.5.2 § 148.105(r)(5)(ii) – Safety Equipment

The two flowlines and transmission pipeline will be fabricated with a corrosion protective layer fusion-bonded epoxy coating of 16-mils thickness. Additionally, a cathodic protection system for the offshore pipeline will be designed using industry accepted practices, techniques and materials. This will consist of zinc or other state of the art sacrificial anodes available at the time of design and construction that will be attached to the pipe at strategic locations along the entire offshore pipeline system while the pipeline is being installed. These anodes will be sized and located to ensure the pipeline is adequately cathodically protected for its service life of 25 years.

There is little risk of internal corrosion because the natural gas from the SRVs will be very dry and non-corrosive. Additionally, the piping will be wrapped in a 4 ½-inch concrete layer.

Externally, depending on the geologic environment, the flowlines and pipeline will be buried, covered with a concrete mat or covered by rocks. Whatever method chosen for a particular segment of pipe, will be in complete compliance with MMS regulations, 30 C.F.R. Part 250, Subpart J (2006).

The above features taken in total add a design-margin to ensuring the structural integrity of the flowlines and pipeline. These protective methods are further described in Section 24.

Redundant isolation systems will be located in the SRVs, PLEMs, transmission pipeline and shore interconnection stations to isolate any portion of the pipeline in case of an unsafe condition. Additionally, a subsea, remotely actuated block valve will be installed on a point near the approaches of Tampa Bay. This will be an ANSI 900 piggable subsea ball valve with a hydraulic over air type actuator. The valve will be connected by a umbilical covered with a mud mat to a small building located on the Sunshine Skyway Bridge fishing pier from which it could be remotely operated through a communications link. Finally, complementing these systems will be isolation valves located at the Gulfstream and TECO interconnection stations which will

provide an added means of isolating unsafe conditions. These facilities are discussed in Sections 22 and 23 respectively.

19.5.3 § 148.105(r)(5)(iii) – Lifesaving Equipment

There is no lifesaving equipment associated with the dedicated fixed offshore components in the proposed *Port Dolphin* design. Lifesaving equipment aboard the SRV is described in Section 18.5 and in Volume III, Sections 4a and 4b. The role of the *Port Dolphin* support vessels in lifesaving and their equipment is discussed in Section 23.4 and in the draft operations manual, Volume III, Section 9a.

19.5.4 § 148.105(r)(5)(iv) – Firefighting Equipment

There is no firefighting equipment associated with the dedicated fixed offshore components in the proposed *Port Dolphin* design. Firefighting equipment aboard the SRVs is described in Section 18.5 and in Volume III, Section 4. The role of the *Port Dolphin* support vessels in firefighting is discussed in Section 23.4 and in the draft operations manual, Volume III, Section 9a.

19.5.5 § 148.105(r)(5)(v) – Pollution Prevention Equipment

There is no specific pollution prevention equipment associated with the dedicated fixed offshore components in the proposed *Port Dolphin* design. As discussed in Section 19.5.2, the flowlines and gas transmission line do have structural features that protect against breach. Further, as noted in Section 18, there is a real-time monitoring and control system aboard the offloading SRV for automatically or manually shutting-down gas transmission in the case of a leak. Finally, it should be noted that natural gas poses very little pollution risk due to its properties.

The SRVs will be fitted with comprehensive pollution prevention and waste management facilities. These will include:

- Oily water separator (capacity 5 m^3 15 ppm)
- Incinerator (capacity 1 290 000kcal/h)
- Sewage treatment system
- Gas combustion unit (gas dumping incinerator)

While inside the Safety Zone, the above equipment will not be used. The pollution prevention features and capabilities of the offloading SRVs are further described in Section 18.5 and in Volume III, Sections 4a and 4b.

19.5.6 § 148.105(r)(5)(vi) – Waste Treatment Equipment

There is no waste treatment equipment associated with the dedicated fixed offshore components in the proposed *Port Dolphin* design. The waste treatment equipment aboard the SRVs is summarized above.

19.6 § 148.105(r)(6) – Cargo Handling Equipment Description and Preliminary Design Drawings

Under the proposed *Port Dolphin* concept of operations, the LNG cargo is re-gasified, pumped and piped to the STL Subsea System as described in Section 18 for further transfer to the gas transmission pipeline as described in this section. Accordingly, this subsection provides an overview of the means by which LNG is stored, re-gasified, pumped and piped to the STL Subsea System. A flow diagram depicting this process is contained in Figure 19-1. A more detailed technical description is included in Volume III, Section 4c.

Storage Overview

The LNG is stored in tanks of three fundamental types: membrane or spherical (depicted in Figure 19-1) in addition to the prismatic type cargo tank which may also be considered in the future. Each SRV will be constructed with four or five cryogenic cargo tanks of one of these three types. The tanks are contained in the double hull of the SRV and are designed to hold LNG cargoes with a specific gravity of up to 0.5 kg/m^3. The tanks can be filled to 98 percent capacity, depending on type, as specified in IMO regulations. Each tank shall be located in an individual hold that is separate from other holds as well as the engine room and forward part of the vessel. Further details can be found in Volume III, Section 4.

Re-gasification/Vaporization System Overview

Each SRV irrespective of size will be equipped with vaporization units. This will typically be of the Hamworthy Gas Systems design (Volume III, Section 4c) or similar. Each vaporization unit has a capacity to vaporize about 250 mmscfd. Under normal operation, two, three, four or five units per vessel may be in service. The combined maximum send-out capacity of 1200 mmscfd for the system as a whole shall not be exceeded, but this maximum may be achieved from one of the large SRVs alone or from two large or smaller SRVs in combination. The average annual send-out capacity is expected to be approximately 800 mmscfd. On each SRV, one vaporization unit is intended to be on standby to ensure redundancy, but all supporting systems for the vaporization system are designed for all the units to be operational simultaneously.

The vaporization system will typically be installed on the main deck in the forward part of the vessel. LNG is pumped from the cargo tanks to a common suction drum and re-condenser tank on deck. Each vaporization unit will be separately skid mounted and each skid will contain the required pumps, motors, heat exchangers, and control systems to provide the required

capacity. The units are independent and each can be disconnected for transportation to shore for maintenance and overhaul (if required). Heat is required to vaporize the LNG. There are two basic choices available for heating the LNG – a closed loop system and an open loop system. The vessels servicing *Port Dolphin* deepwater port will be utilizing the closed-loop system the process for which is depicted in Figure 19-1.

Each skid contains the following equipment:

- Two LNG booster pumps
- One LNG/brine shell and tube heat exchanger
- One Steam/brine heat exchanger of PCHE type
- Two brine circulation pumps
- A dedicated control system

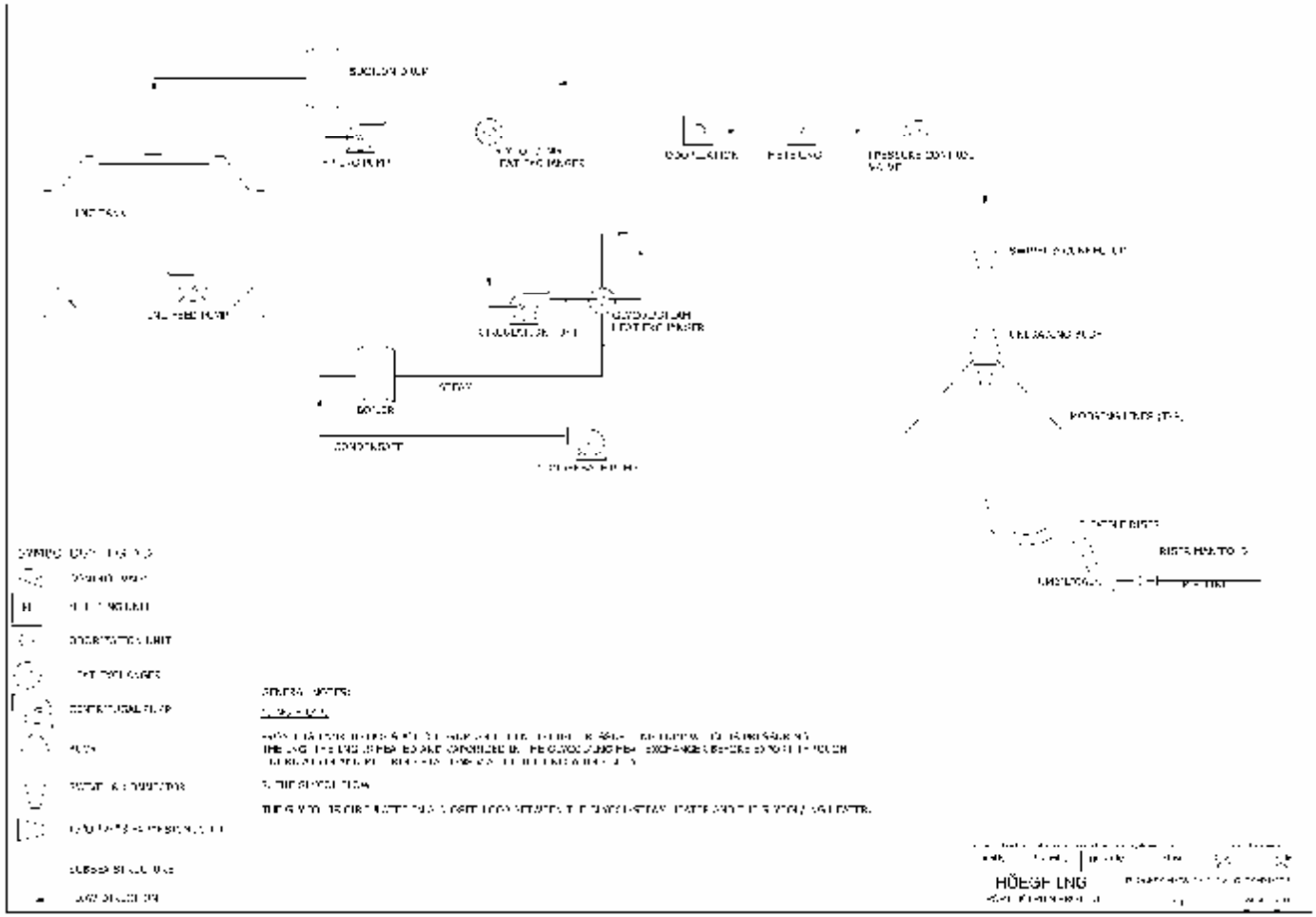
These components are discussed in more detail as follows.

19.6.1 § 148.105(r)(6)(i) – Cargo Pumping Equipment

Pumping equipment consists of the following and is depicted in Figure 19-1.

Within the LNG tanks there are LNG feed pumps for transporting the LNG to the re-gasification skids. On each skid, there are two sets of cryogenic LNG pumps for a total of six pumps. These are vertically-arranged, submerged, pot mounted type pumps that in addition to the pump include an electric motor, suction pot, junction boxes and terminal header. The pump runs at constant speed and volume, and, mass flow is controlled by a regulator valve at the outlet on the skid. Additionally, there are two brine circulation pumps per each skid with one operating and the second in standby for redundancy.

Figure 19-1
Natural Gas Handling Flow Diagram



19.6.2 § 148.105(r)(6)(ii) – Cargo Piping System

The LNG liquid main line is arranged on the trunk deck and is branched off to the LNG re-gasification plant. A dedicated vent mast fitted with appropriate valves and connection piping is provided for degassing and purging operations of the re-gasification plant. The LNG piping arrangement between the main liquid header and the vaporization plant is of the same standard and make as the other onboard LNG piping systems. The gas piping arrangement between the vaporization plant and STL Buoy is of cryogenic quality.

Within the STL Buoy compartment located in the forward part of the SRV (Figure 19-3), is contained the interconnection equipment between the shipboard piping arrangement and the STL Buoy for purposes of offloading. Specifically, this interconnection consists of a swivel stack assembly and internal piping.

The swivel stack assembly consists of several sub-assemblies arranged on top of each other. Each sub-assembly provides the following functionality referenced from the bottom of the swivel assembly and proceeding upward.

- Gas swivel. The gas swivel is integrated in a common swivel module and is designed with a toroidial swivel ring. For lubrication and monitoring, a swivel overhead tank is provided.
- Hydraulic utility swivel. The hydraulic utility swivel is configured with flow paths which are separated by individual ring volume in order to avoid a mixing of different fluids. Any leakage is collected in a local drain tank.
- Signal utility swivel. The signal utility swivel provides the electrical path for control signals between the STL Buoy turret and vessel and the STL Buoy and PLEM as the SRV weather vanes around the mooring system.

Two additional components that interact with the swivel are:

- Gas connector. The gas connector connects the STL Buoy and swivel piping. One part of the connector is mounted on the STL Buoy and the other is mounted on the swivel. The connector is based on double seals and hydraulic locking.
- Multi-quick connector. The multi-quick connector connects the utility lines between the STL Buoy and the swivel. One part of the connector is mounted on the STL Buoy and other is mounted on the swivel. The connector is operated by one hydraulic cylinder.

Additionally, there is a handling arm that is used to lift and position the swivel stack assembly and connector on to the STL Buoy. When positioned, the connector is activated and locked on to the STL Buoy. The handling arm is made as a welded-steel structure and operated by two hydraulic cylinders.

Supporting the above equipment is an STL hydraulic power unit which is a self-contained unit with tank, motors and an interface junction box mounted on a skid. The hydraulic power unit provides hydraulic pressure for the STL system. Interacting with this unit is the STL valve rack which ports hydraulic pressure to the STL-related equipment including ESDV 2 and ESDV 3. Finally, an N_2 barrier compressor provides a nitrogen barrier to the high pressure gas swivel and connector sealing system.

A detailed description of the above equipment in addition to the other mechanical components of the STL shipboard system is contained Volume III, Section 4. That section also includes a description of the traction winch, compensator, pick-up gear and storage unit for the messenger line.

19.6.3 § 148.105(r)(6)(iii) – Control and Instrumentation System

Re-gasification Control

There is one common control system for all the re-gasification skids. The system is integrated as part of the SRV's Integrated Automation System. Components of the re-gasification control system include the following:

One common operator/history station containing:

- Computer
- Screen
- Alpha numeric keyboard and trackball
- Dual process network connection
- Administrative network connection
- Historical database

Each skid has a field control station containing:

- Cabinet
- One real-timer processor
- Dual net interface
- Single input/output bus interface
- Serial interfaces
- Serial interface cards
- Hardwiring for analogue/digital/inputs/outputs

Control of the STL Buoy is accomplished through a separate system briefly described below and for which further information is found in Volume IIII, Section 4c.

STL Buoy Control System

There are three primary elements of the shipboard STL Buoy control system:

- Control cabinet
- Starter cabinet
- Remote bridge control panel

Control cabinet

A dedicated control cabinet is provided for control and monitoring of the STL-related shipboard equipment. The cabinet contains a common programmable logic controller. The user interface with the controller is through a touch screen panel where stored information can be accessed. The control panel is a stand-alone unit with a communication link for data transfer to the remote bridge control panel (master) as well as on the touch screen panel on the STL control cabinet (slave).

Starter cabinet

Each starter in the re-gasification system is an independent unit. Control circuits are powered by means of an independent transformer. The control voltage is 220V for main contactors and for heating in the cabinet and motor and 24V for pilot lamps and switches. The heater circuit is connected to a separate supply to keep heating on when the main switch is turned off.

Remote Bridge Control Panel

The remote bridge control panel serves as the master and can control all operations of the STL system. Manual operation of the winch rope guide and EBD functions can be performed here as well.

The role of the STL Buoy control system as a safety system is further discussed in Section 18.5.

19.6.4 § 148.105(r)(6)(iv) – Associated equipment for throughput measurement, leak detection, emergency shutdown and alarm system

Throughput measurement equipment is described in Section 21.5. The STL Buoy Operator Control Panel located on the bridge is the principal means of monitoring for a “Green Line” through a series of sensors located within the STL system. Any interruption of the signals

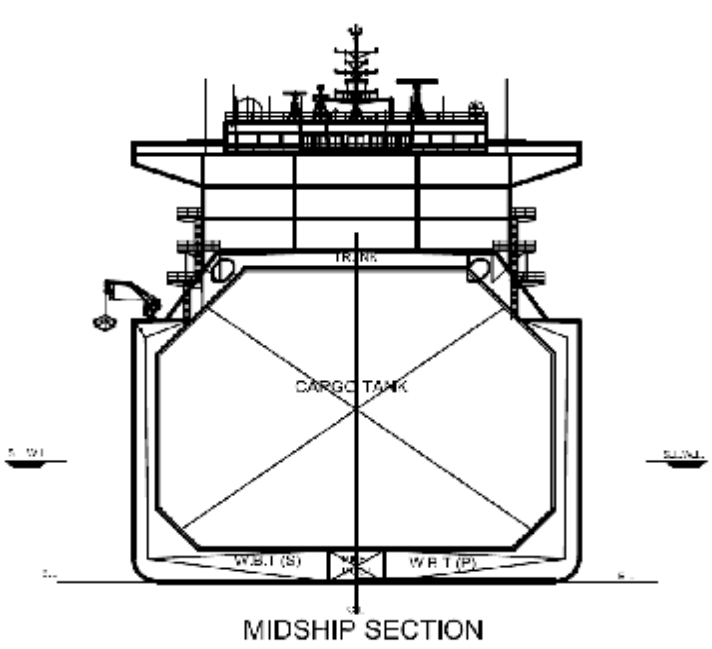
from the sensors in the Green Line will give an alarm which is triggered by one or more of the following errors:

- Loss of sensors on the locking mechanism over the center cylinder
- Loss of pressure transmitters on the connector claws
- Low N_2 pressure on the swivel seal and high flow in the swivel N_2 leak line
- Low pressure on accumulators

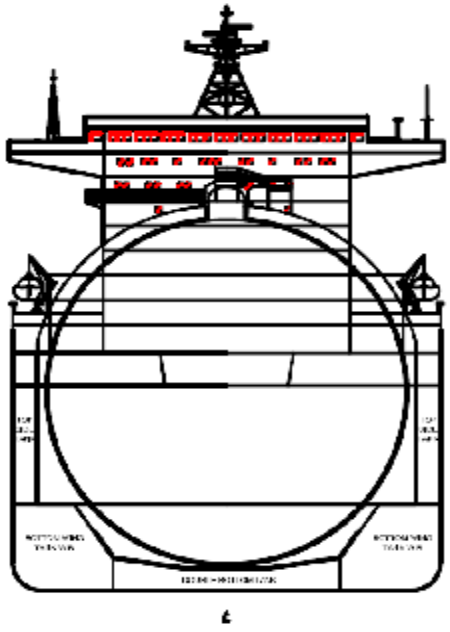
The sensors are complemented by a series of mechanical interlocks that when closed, provide a signal to the operator panel to verify the integrity of the particular interlock. Each interlock signal appears with a green color on the operator panel. The alarm will in turn trigger an automatic or manual shutdown of gas transfer operations which is accomplished by closing one or all of the three emergency shutdown valves.

Complementing these systems is the subsea mainline block valve discussed in Section 19.1 and which can be remotely operated from the SRV as well as shutdown valves at the Gulfstream and TECO interconnection stations which can be remotely operated as well. Associated equipment for leak detection, emergency shutdown and the alarm system is further described in Section 18.5 and in Volume III, Section 4.

Figure 19-2
Types of LNG Cargo Tanks



Membrane Type LNG Tank



Spherical Type LNG Tank

Figure 19-3
STL Buoy Shipboard Compartment

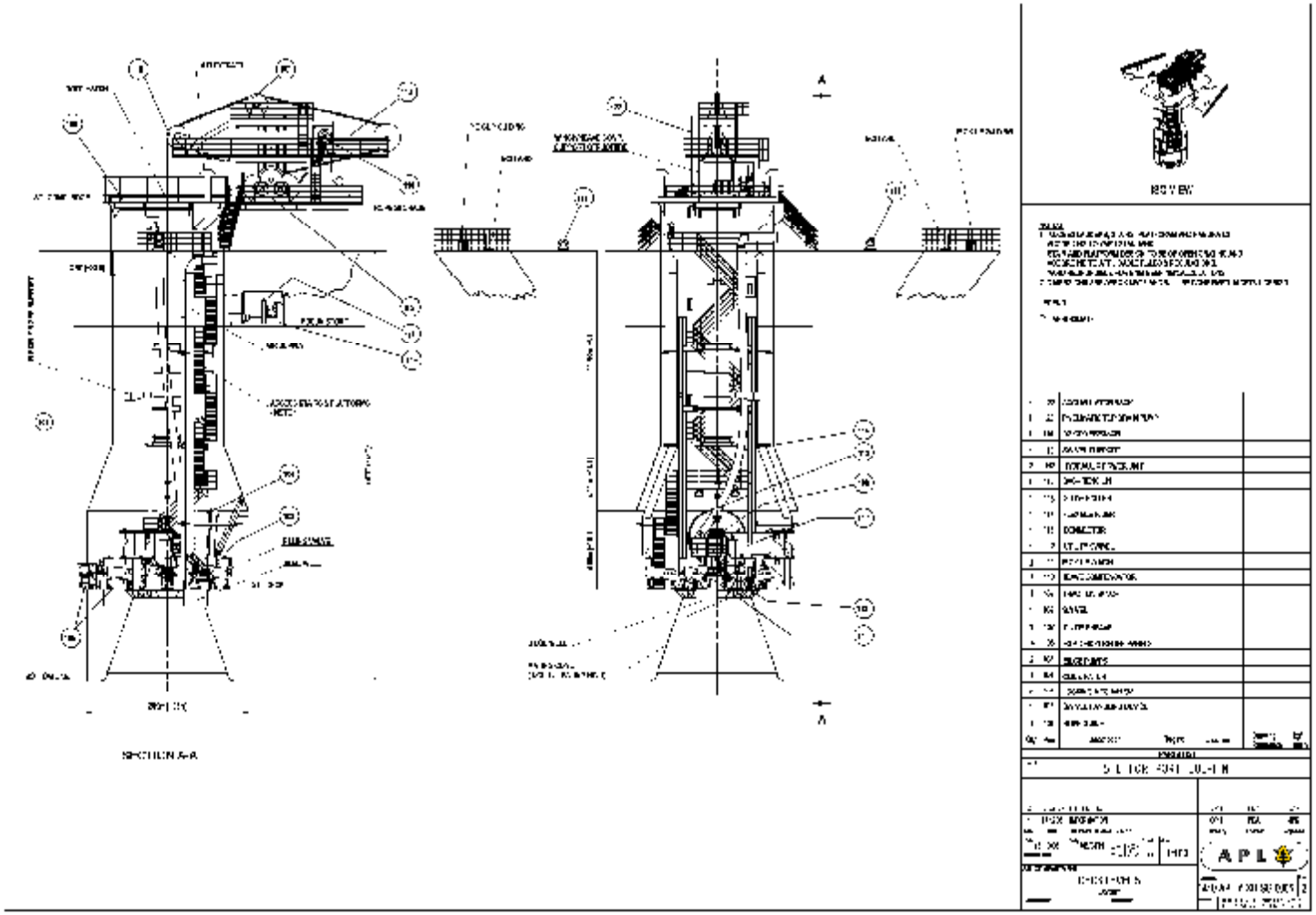
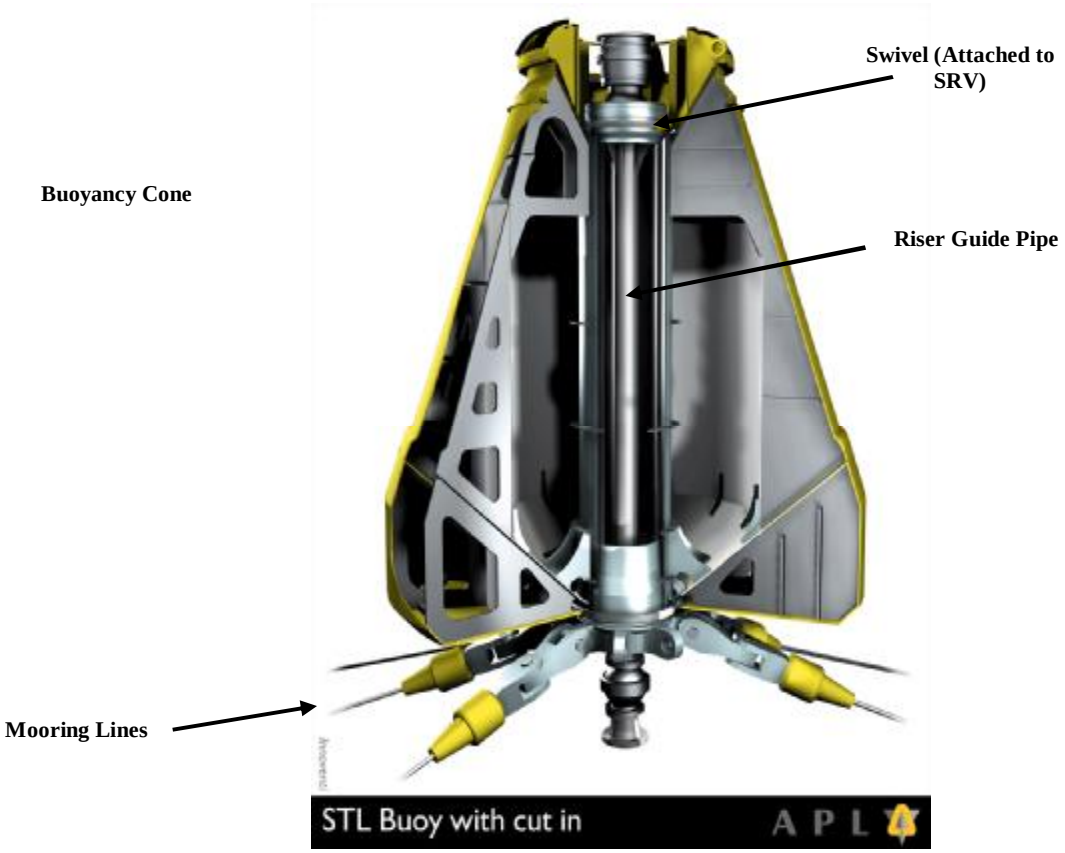


Figure 19-4
Representative STL Buoy Internal Piping



19.7 § 148.105(r)(7) – Personnel Capacity of Platform Complex

The *Port Dolphin* facilities themselves are unmanned. Crewing of the SRVs calling on *Port Dolphin* will be 27-34 personnel. The support vessel and dedicated crew boat described in Section 23.4 will be crewed by three personnel and the latter will have a carrying capacity of 12 personnel. Finally, the number of personnel assigned to the port operations support office described in Section 23.5 will be determined at a later stage of detailed design.

20. § 148.105(s) Refurbished OCS facilities and co-located fixed offshore components

The proposed *Port Dolphin* does not contemplate the use of refurbished OCS facilities and co-located fixed offshore components within the meaning of 33 C.F.R. § 148.105(s) or its subsections.

21. § 148.105(t) Offshore Pipelines

This section provides information on the marine flowlines, gas transmission pipeline and other facilities associated with *Port Dolphin*.

21.1 § 148.105(t)(1) – Marine Pipelines Descriptions and Drawings

The marine pipelines associated with *Port Dolphin* will consist of two 36-inch flowlines of approximately 2.1 (north) and 2.2 (south) miles (3.2 and 3.5-kilometers) in length respectively that are connected via a piggable-Y to a gas transmission line approximately 41.4-miles (66-kilometers) long (total) that will transport the natural gas to two onshore interconnection stations with the Gulfstream and TECO pipeline systems. These interconnections are described in Section 22 of this application and in the companion application to be submitted to FERC. The marine pipelines are depicted in Figure 13-1 and in detailed drawings in Appendix F.

The major components of the *Port Dolphin* marine pipelines consist of:

- Two 36-inch flowlines
- One 42-inch piggable-Y
- One 36-inch transmission line (with subsea block valve)

The preliminary pipeline design is provided in the Pipeline Design Basis Manual (Volume III, Section 6.1), and the overall site plan is provided in Appendix F.

21.1.1 § 148.105(t)(1)(i) – Size

Table 21-1
Size of Marine Pipelines

Parameter	Size (inches)
Nominal Outer Diameter	36
Nominal Wall Thickness	0.750
Fusion-Bonded Epoxy Coating Thickness	0.016
Concrete Weight Coating Thickness	4 1/2

21.1.2 § 148.105(t)(1)(ii) – Throughput Capacity

Table 21-2
Throughput Capacity of Marine Pipelines
(million standard cubic feet per day)

Average	Maximum
800	1200

21.1.3 § 148.105(t)(1)(iii) – Length

Table 21-3
Length of Marine Pipelines

Segment Name	Length
Port Dolphin Gas Transmission Line (piggable-Y to bulkhead)	41.4 miles (66 kilometers)
North Flowline	2.1 miles (3.3 kilometers)
South Flowline	2.2 miles (3.5 kilometers)

21.1.4 § 148.105(t)(1)(iv) – Depth of Cover

The trenching and burial requirements are governed by MMS Regulations, 30 C.F.R., Part 250, Subpart J, which require pipelines and all related appurtenances to be protected by 3-feet (.9 meters) of cover in all portions in water depths of less than 200-feet (60-meters). The offshore pipeline, including the flowlines and the transmission line will be buried along its entire length from the PLEMs to the tie-in to the shore approach HDD pipe.

The pipelines will be buried below the seafloor with the required 3-feet (.9-meters) of cover for all soft bottom areas that can be plowed, jetted or dredged. Any hard bottom areas encountered that preclude pipeline burial will necessitate the use of flexible concrete mattresses that will provide for an equivalent level of protection and stabilization.

21.1.5 § 148.105(t)(1)(v) – Protective Devices

The two flowlines and transmission pipeline are designed with a corrosion protective layer, fusion-bonded epoxy coating of 16-mil thickness. As previously noted, there is little risk of internal corrosion because the natural gas to be imported through *Port Dolphin* will be very dry and non-corrosive. Additionally, the pipe will be wrapped in a 4 $^{1}/_{2}$-inch concrete layer to ensure adequate negative buoyancy.

For external protection, depending on the geologic environment, the flowlines and pipeline will be buried (soft bottom) or alternatively covered with a concrete mat or by dumped rocks. Whatever method chosen for a particular segment of pipe, will be in complete compliance with 30 C.F.R., Part 250,Subpart J. These external protective methods are further discussed in Section 24.

21.2 § 148.105(t)(2) – Marine Pipelines Design Criteria

Table 21-4
Marine Pipelines General Design Criteria

Criteria	Value
Design Pressure	1800-psig (124 barg)
Maximum Allowable Operating Pressure	1750-psig (120 barg)
Min Gas Temperature	2ºC (35ºF)
Gas Flow Rate	750 mmscf/d@ 110 barg (145 000 m^3 SRV)
	1200 mmscf/d@ 110 barg (217 000 m^3 SRV)

21.3 § 148.105(t)(3) – Marine Pipelines Design Standards and Codes

Table 21-5
Design Standards and Codes for Marine Pipelines

Criteria	Value
American Institute of Steel Construction (AISC)	Manual of Steel Construction – Load and Resistance Factor Design
American Petroleum Institute (API) Spec 5L	Specification for Line Pipe
API Spec 6D	Specification for Pipeline Valves, (Steel Gate, Plug, Ball, and Check Valves)
API Std 1104	Standard for Welding Pipelines and Related Facilities
API Std 1107	Recommended Pipeline Maintenance Welding Practices

Criteria	Value
API Publication 2201	Procedure for Welding or Hot Tapping on Equipment Containing Flammables – 3rd Edition – October 1985
American Society of Mechanical Engineers (ASME) B31.8	Gas Transmission and Distribution Piping Systems
ASTM Specification A53-86	Standard Specification for Pipe Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless
ASTM Specification A106	Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service
ASTM Specification A134–85	Standard Specification for Pipe, Steel, Electric-Fusion (Arc)-Welded, (Sizes 16 in. and over)
ASTM Specification A135–86	Standard Specification for Electric-Resistance Welded Steel Pipe
ASTM Specification A139–85	Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe, (NPS 4 inch and over)
ASTM Specification A211–75	(Reapproved 1980) “Standard Specification for Spiral-Welded Steel or Iron Pipe”
ASTM Specification A333/A333M-85b	Standard Specification for Seamless and Welded Steel Pipe for Low-Temperature Service
ASTM Specification A381–81	Standard Specification for Metal-Arc-Welded Steel Pipe for use with High Pressure Transmission Systems
ASTM Specification A671–85	Standard Specification for Electric-Fusion-Welded Steel Pipe for Atmospheric and Lower Temperatures
ASTM Specification A672–81	Standard Specification for Electric-Fusion-Welded Steel Pipe For High Pressure Service at Moderate Temperatures
ASTM Specification A691–85a	Standard Specification for Carbon and Alloy Steel Pipe Electric Fusion-Welded for High Pressure Service at High Temperature
FH PM-6-6-3-1	Federal Highway Administration Federal Aid Highway Program Manual
FH PM-6-6-3-2	Federal Highway Administration Federal Aid Highway Program Manual
30 C.F.R. Part 250, Subpart J	Pipelines and Pipeline Rights-of-Way
49 C.F.R. Part 190	Pipeline Safety Programs and Rulemaking Procedures
49 C.F.R. Part 191	Transportation of Natural Gas By Pipeline, Annual Reports, Incident Reports and Safety Related Condition Reports
49 C.F.R. Part 192	Transportation of Natural and Other Gas By Pipeline, Minimum Federal Safety Standards
49 C.F.R. Part 193	Liquefied Natural Gas (LNG) Facilities, Federal Safety Standards
49 C.F.R. Part 199	Drug and Alcohol Testing

21.4 § 148.105(t)(4) – Marine Pipelines Engineering Practices

Table 21-6
Engineering Practices for Marine Pipelines

Criteria	Value
Det Norske Veritas (DNV) Recommended Practice (RP) B401	Rules For Submarine Pipelines: Cathodic Protection Design
API RP 2A	Recommended Practice for Planning, Designing, and Constructing Offshore Platforms
American Petroleum Institute (API) RP 1111	Design, Construction, Operation and Maintenance of Offshore Hydrocarbon Pipeline and Risers
American Welding Society (AWS) D1.1	American Welding Society – Structural Welding Code

21.5 § 148.105(t)(5) – Marine Pipelines Metering System

The natural gas would be metered onboard the SRV. The metering system would be mounted on the forward part of the main deck between the vaporization units and the unloading buoy trunk. Specific components of the onboard metering system would consist of the following:

- Ultrasonic gas metering system
  - – Two ultrasonic gas flow meters
  - – Two pressure transmitters
  - – Two temperature transmitters
- Gas analyzer system
  - – Sample probe
  - – Two gas chromatographs
  - – Pressure reduction cabinet
  - – Analyzer cabinet
- Metering control system
  - – Metering cabinet
  - – Two flow computers
  - – Terminal flow computers and gas chromatographs
  - – Supervisory computer and operator station
  - – LAN switch

Metering of the natural gas will also occur at the onshore Gulfstream and TECO interconnection stations. These facilities and their capabilities are described in Section 22.

21.6 § 148.105(t)(6) – Submerged or Buried Pipelines Crossed by Marine Pipeline

The hazards survey conducted by T. Baker Smith, Inc. did not identify submerged pipelines or cables crossed by the proposed transmission pipeline. The survey did identify four areas within state waters that exhibited magnetic anomalies with linear features that appear to be buried pipelines or cables and that are crossed by the proposed transmission pipeline. A review of publicly available sources could not corroborate the existence of buried pipelines or cables that correlated with these anomalies. Further, no evidence of buried pipelines or cables was detected by sonar or video imagery.

The Applicant will further investigate the existence of buried pipeline or cables at the locations of the anomalies and will take mitigating steps as necessary in conformance with MMS regulations.

Separately, the Applicant confirmed the existence of a control/communications cable between the Sunshine Skyway bridge fishing pier and mainline block valve on the Gulfstream pipeline that is crossed by the proposed transmission pipeline. The Applicant has had preliminary discussions with Gulfstream pipeline system personnel regarding steps that would be taken by the Applicant to traverse this communications link. During the detail design phase, the Gulfstream cable will be precisely located through field surveys and the Applicant will further coordinate with Gulfstream and other appropriate parties to ensure minimum impact on the cable.

21.7 § 148.105(t)(7) – Information on Pipeline Connecting to the Port

As described in the following section and shown in Figure 13-1, the natural gas transmission pipeline will transition to FERC jurisdiction at the Port Manatee pier bulkhead. From there, the transmission pipeline will interconnect with the Gulfstream pipeline at an interconnection station at approximately 3.6-miles along the onshore FERC jurisdictional segment and with the TECO lateral at the approximately 5.7-mile point. At the Gulfstream interconnection, there will be a reduction in pressure of the natural gas to 1480-psig as well as metering and scrubbing. At the TECO interconnection, there will be pressure reduction to 1200-psig and metering and scrubbing as well.

22. § 148.105(u) – Onshore Components

The onshore components of the proposed *Port Dolphin* deepwater port will principally consist of the gas transmission pipeline and two interconnection stations with the Gulfstream and TECO systems. A description of these facilities can be found below and in the application to be

filed with FERC under Section 7 of the NGA. Separately, a description of the port operations support office can be found in Section 23.5. The following describes proposed FERC-jurisdictional onshore facilities, commencing at the high water mark in Manatee County, to be constructed by Port Dolphin. These onshore facilities may be modified to the extent there are changes in the identity of the entity that will construct, own and operate such facilities.

22.1 § 148.105(u)(1) – Detailed Data on Onshore Components

As shown in Figure 13-1, the 36-inch gas transmission line (.875-inch W.T.) will make landfall on Port Manatee property with jurisdiction transitioning between the USCG and FERC at the pier bulkhead. From there, the transmission pipeline will proceed in a generally easterly direction to the first interconnection point with the Gulfstream system at 3.6-miles.

The Gulfstream Interconnection Station will occupy an approximately two-acre site (Plot Plan Figure 22-1) where up to 840 mmscfd of the natural gas will be reduced in pressure to 1480-psig. The natural gas will also be metered and scrubbed at the interconnection station and the site will contain a pig receiver and launch equipment as well. The measurements of the transmission piping for the onshore segment to the Gulfstream Interconnection Station are shown in Table 22-1, and, a listing of the major components at the station and their capability or size (as applicable) is depicted in Table 22-2.

The remaining portion of the natural gas not delivered to the Gulfstream system will be transported by 14-inch line running along the Gulfstream right-of-way in an easterly direction to the TECO interconnection station at 5.8-miles of pipeline travel (approximately 2.1-miles from the Gulfstream interconnect plus an additional .1-mile for connection to TECO). There, the remaining portion of the natural gas, or up to 360 mmscfd, will be delivered to the TECO system.

The TECO interconnection station will occupy an approximately one-acre site (Plot Plan Figure 22-3) where the remaining portion of the natural gas will be reduced to 1200-psig by pressure reduction equipment. The gas will also be metered and scrubbed and equipment will be provided for pig recovery at the site. The piping dimensions for the transmission line from the Gulfstream to TECO interconnects are shown in Table 22-3 and a listing of the major components at the TECO Interconnection Station and their and capability or size is depicted in Table 22-4. A detailed technical description of the onshore components is contained in Volume III, Section 6.1.

Table 22-1
Size of Onshore Pipeline (API 5L Grade X-60)

Parameter	Size (inches)
Nominal Outer Diameter	36
Nominal Wall Thickness	0.750; 0.875
Fusion-Bonded Epoxy Coating Thickness	0.014; 0.016

Table 22-2
Gulfstream Interconnection Station Major Components

Equipment	Capacity or Size	Quantity
Pressure Reduction Skid	1200 mmscfd	1
Gas Filters/Coalescers	840 mmscfd (total)	2
Gas Meters	840 mmscfd (total)	2
Natural Gas Liquid Tank	350 bbls	1
Pig Receiver Area	All equipment ANSI 900; will support "Smart Pig" analysis of 36" pipeline integrity	1
Pig Launcher	All equipment ANSI 600; will support "Smart Pig" analysis of the 14" pipeline to TECO	1
Back-up Generator	480 volts, 3-Phase, 4 wire, 60 hertz power	1
Buildings	20' by 60'	1

Table 22-3
Size of Onshore Pipeline (API 5L Grade X-60)

Parameter	Size (inches)
Nominal Outer Diameter	14
Nominal Wall Thickness	0.375
Fusion-Bonded Epoxy Coating Thickness	0.014; 0.016

Table 22-4
TECO Interconnection Station Major Components

Equipment	Capacity or Size	Quantity
Pressure Reduction Skid	360 mmscfd	1
Gas Filter/Coalescer	360 mmscfd	1
Gas Metering	360 mmscfd (total)	2
Natural Gas Liquid Tank	350 bbls	1
Pig Receiver Area	All equipment ANSI 900; will support "Smart Pig"	

	analysis of 14" pipeline	
Back-up Generator	480 volts, 3-Phase, 4 wire, 60 hertz power	1
Buildings	10'x10'	1

22.2 § 148.105(u)(2) – Chart of Planned and Existing Facilities to be Served by Port

Drawings showing the onshore interconnections between the gas transmission line and the Gulfstream and TECO systems are contained in Figures 22-1 and 22-2 and in Drawings 26017-B-4101 (Gulfstream) and 26017-B-4102 (TECO) in Appendix F-2.

22.3 § 148.105(u)(3) – Proposals and Agreements

At present, no agreements are in place pertaining to the natural gas send out from the proposed *Port Dolphin*. As agreements are concluded, copies will be forwarded to the USCG for review.

Figure 22-1
Piping Plot Plan

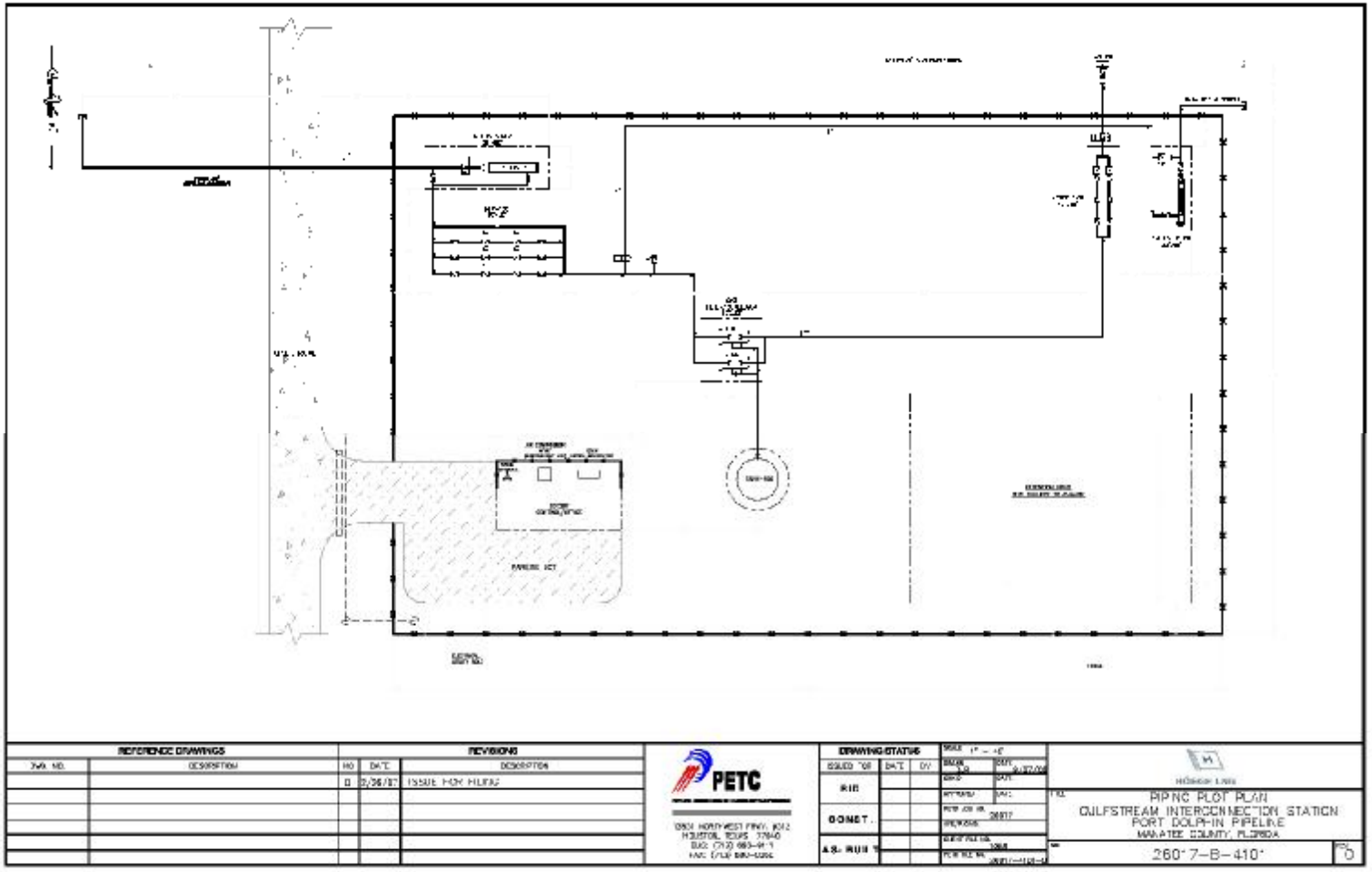
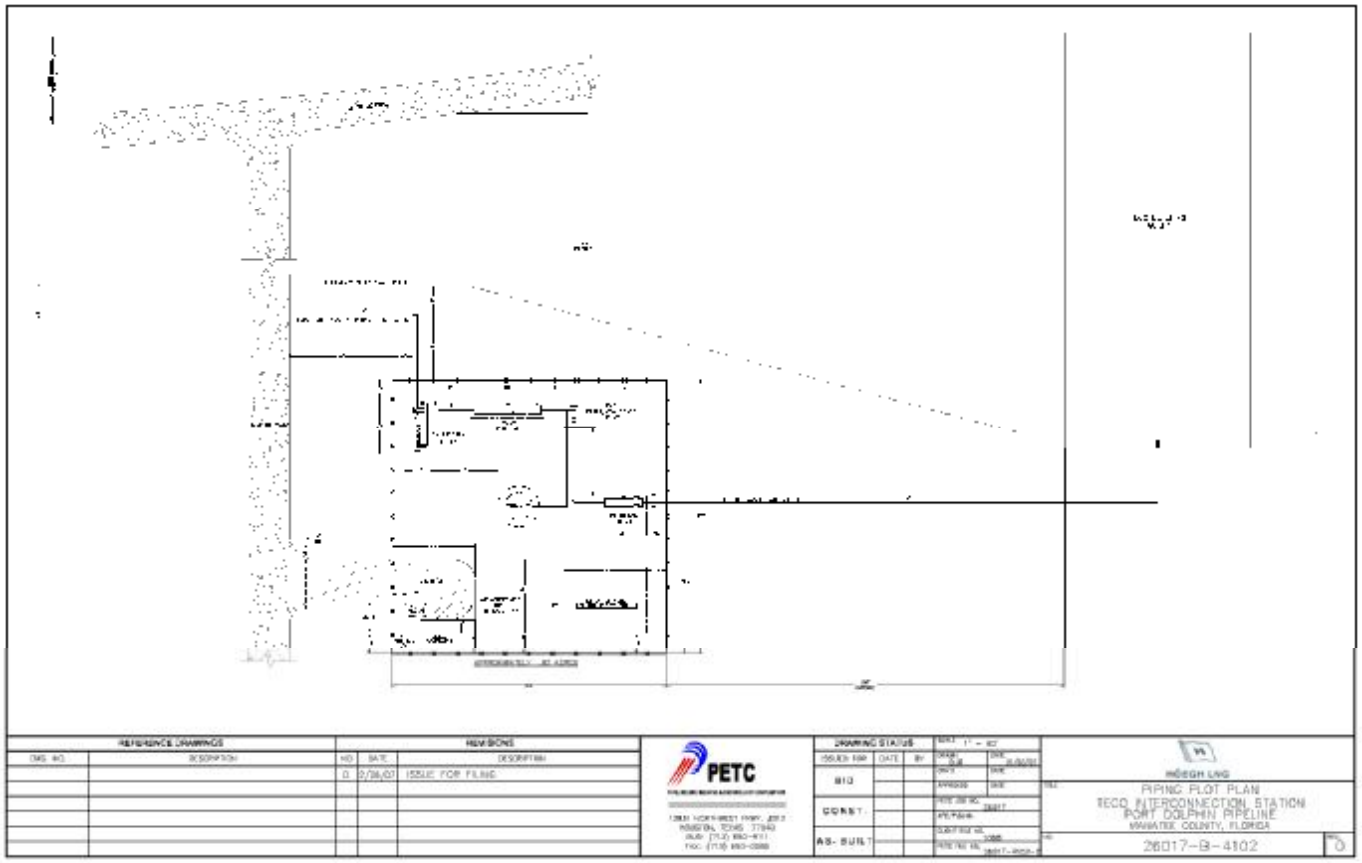


Figure 22-2
Piping Plot Plan



23. § 148.105(v) – Miscellaneous Components

23.1 § 148.105(v)(1) – Radio Station and Communications Systems

The radio equipment on board the SRV shall comply with the Global Maritime Distress and Safety System (GMDSS area 1, 2 and 3) requirements issued by the IMO. All radio equipment shall be functionally tested according to regulatory requirements in order to obtain a radio safety certificate. Power sources for the radio equipment shall be provided in accordance with the requirements of the appropriate regulations. The reliability of the radio system shall be ensured by duplication of equipment and shore-based maintenance.

The following paragraphs describe the typical radio and communications systems that are representative of that installed aboard SRVs that will be operating at the *Port Dolphin* deepwater port.

Radio Equipment

1) Radio station

One rack type radio station set shall be provided in the wheelhouse as follows:

1	--	MF/HF transceiver with DSC control unit
1	--	DSC watch receiver
1	--	Power supply equipment including battery and charger
1	--	Battery charger and battery
1	--	Remote distress button in wheelhouse safety console

The output of the transmitter shall be a minimum of 600W PEP.

2) VHF radio telephones

One international VHF radio telephone set (No.1) shall be provided as follows:

1	--	Transceiver (57 channels) with DSC control unit/ DSC watch receiver (channel 70) and a handset in the wheelhouse
1	--	Printer
1	--	Antenna on the radar mast
1	--	DSC antenna on the wheelhouse top
2	--	Handsets with possibility for channel changing in bridge wing consoles

One international VHF telephone set (No.2) shall be provided as follows:

1 -- Transceiver control unit (57 channels) with DSC control unit and a handset in the wheelhouse
1 -- Antenna on the wheelhouse top
1 -- DSC antenna on the wheelhouse top

(Power source from a 220VAC and 24V DC radio distribution board)

Both No.1/2 VHF/DSC systems shall be interfaced with the VDR.

One (1) international VHF radiotelephone set (No.3) without a DSC control unit for communication shall be provided as follows:

1 -- Transceiver control unit (57 channels) with a handset in CCR
1 -- Antenna on the wheelhouse top
(Power source from a 24V DC distribution board)

3) INMARSAT ship earth station (standard F77 type)

One Inmarsat Fleet F77 international maritime satellite communication system (INMARSAT) set shall be provided as follows:

1 -- Radome antenna on the wheelhouse top
1 -- Main unit with a telephone in the wheelhouse such as telephone/fax/data, HSD (high speed data, 64 kbps) and HSP (high speed packet, 64 kbps) data communication
4 -- Remote telephones, in the captain's office, wheelhouse, CCR and a designated location decided by the Buyer
2 -- Distress alarm unit, each one in bridge and CCR
1 -- Connection to PABX

The shipboard management system shall be interfaced to the Inmarsat-F system for data communication through the LAN. A standard Inmarsat Fleet F55 set shall be provided as a back-up means for the Inmarsat Fleet F77 system. The power source shall be from the navigation system UPS.

4) INMARSAT ship earth station (SES; standard 'C' type)

Two complete sets of INMARSAT SESs standard 'C' shall be provided as follows:

1 -- Master control unit with enhanced group calling (EGC) function
1 -- Antenna on the radar mast
1 -- Display with keyboard in the wheelhouse

1 -- Read-out printer
(Power source from a 220V AC and 24V DC radio distribution board)

5) Satellite E.P.I.R.B. (Emergency Position-Indicating Rescue Beacon)

One set of float-free type emergency position indicating radio beacon operating on 406 / 121.5 MHz shall be provided.

6) NAVTEX receiver (518 kHz)

One set of a NAVTEX receiver with a printer shall be provided in the wheelhouse.

7) Portable VHF transceiver

3 -- Portable VHF transceiver with primary lithium battery for the lifeboats
1 -- Battery charger (3 slots)
3 -- Rechargeable secondary battery

8) Radar transponder (9 GHz)

Two sets of a search and rescue radar transponder shall be provided for the lifeboats.

9) UHF onboard communication system

One complete UHF onboard communication system set shall be provided as follows:

1 -- Base station in the cargo control room
5 -- Passive antennas at machinery space, bosun store, side passages (2) and duct keel
3 -- Sets of portable transceivers

The equipment and installation for external communication and EPIRBs would fulfill Global Maritime Distress and Safety System rules for area A3.

Public Address System

A public address system with duplicate amplifiers and signal generators (400W amplifier each) shall be provided. The system will be integrated with the fire and general alarm system to release alarm signals through loud speakers in the accommodation section. A public address system with a loudspeaker installation in each cabin shall be provided in accordance with the requirements of an emergency general alarm for the Class.

Amplifiers and alarm tone generators shall also be duplicated. One amplifier and tone generator shall be selected as the working unit and the other shall be used as back-up. Automatic changeover on failure of the working unit shall be provided. The system shall provide an alarm to the bridge alarm system on failure or changeover to the back-up amplifier/tone generator. The

alarm signal tones for the fire alarm and general alarm shall be clearly distinguishable from each other.

Each control panel including a monitor speaker, speaker group selectors and a microphone shall be provided on the wheelhouse console and cargo control room console. The remote control panel on the wheelhouse console shall be provided with a broadcast AM/FM radio receiver and CD player. Public address shall be possible through the selected speakers from the control panels and from any of the automatic exchange telephones after dialing the dedicated number.

External loudspeakers in the hazardous area shall be, where necessary, of the certified explosion proof and waterproof type.

It shall be possible to make public address announcements from the control stations through selected groups as follows:

Selection	Selected loudspeaker
Deck	All external loudspeakers
Accommodation	All internal loudspeakers in accommodation
Machinery	All loudspeakers in engine room, switchboard rooms and other machinery spaces
All/Emergency	All loudspeakers

The system shall be operated with the following orders of priority:

Priority	Signal	Location
1st	Emergency speech	PA master station
2nd	General Alarm	CCR
3rd	Fire alarm	
4th	Normal speech	
5th	Auto-telephone paging	
6th	Radio Broadcast	

Talk Back System

One talk back system set shall be provided for communications between the wheelhouse and either navigation bridge wing, forward/aft mooring station, fire control station, steering gear room and lifeboat stations.

The amplifier and control panel of the public address system shall be commonly used for the talk back system.

Each bridge wing	1	--	Microphone with 2 m cord
	1	--	5 W speaker
	1	--	Receptacle for microphone

Mooring station (forward/aft, each)	1	--	Microphone with 15 m cord
	1	--	10 W speaker, portable type
	1	--	Receptacle for microphone and speaker
Steering Gear room	1	--	Microphone with 15 m cord
	2	--	5 W speakers
	1	--	Receptacle for microphone
Fire Control Station	1	--	Microphone with 2 m cord
	1	--	2 W speaker
	1	--	Receptacle for microphone
Life Boat Station (Port & Starboard)	1	--	Microphone with 15 m cord
	1	--	5 W speaker, portable type
	2	--	Receptacles for microphone and speaker
Engine Control Room	1	--	Microphone with 2 m cord
	1	--	2 W speaker
	1	--	Receptacle for microphone

External Sound Reception

The system for external sound reception shall consist of:

4	--	Microphones outside of wheelhouse
1	--	Central panel on central bridge console

Automatic Telephone System

One automatic exchange telephone system of 80 lines shall be provided. The telephone exchanger will be of the electronic type and shall be capable of interfacing with all telephones listed and a minimum of 12 simultaneously talking. The exchange trouble alarm shall be repeated to the bridge alarm system. Provision shall be made for connection between this system and the Inmarsat-F system and public address system.

The automatic telephone system shall be connected to the public address system and the telephones can be used for making announcements through the public address system.

The telephones in the engine room and the engine control room are connected in parallel. The telephones are also connected to the light signal column in the engine room in addition to the

normal acoustic signal. Telephones in the engine room, steering gear room and emergency generator room shall be provided with headsets or a telephone booth as appropriate.

Visible and audible devices shall be provided for telephones located in high noise areas. A 24V DC power supply shall be provided as backup power.

Sound Powered Telephone

The sound powered telephone system shall be provided as follows:

1 -- Wheelhouse (console mounting type)
1 -- ECR (console mounting type)
1 -- Propulsion motor local control station (frequency converter room, wall mounting type) with headset
1 -- Fire control station (wall mounting type)
1 -- Steering gear room (with headset)
1 -- Emergency generator room (with headset)
1 -- CCR (console mounting type)
1 -- Cargo switchboard room
1 -- GCU area

Visible and audible devices shall be provided for telephones located in high noise areas.

23.2 § 148.105(v)(2) – Radar Navigation System

Typically, three complete sets of radars will be provided on each SRV as follows:

	No.1 radar	No.2 radar	No.3 Radar
Type	S-band with ARPA	X-band with ARPA	X-band
Transceiver output	Manufacturer's standard		
Display unit	23.1" TFT LCD type		
Transceiver output, scanner length etc.	Manufacturer's standard		
Others	Performance monitor		

For No. 1 and No. 2 radar, one inter-switching device between the transceiver and display unit shall be provided.

The display system shall be provided as follows:

– No. 1 Display unit: Single display

– No. 2 Display unit: Dual displays

The transceiver unit shall be installed in the deckhouse area (down mast type). The system shall be interfaced to the gyrocompass, DGPS and speed log. The X-band Radar signal shall be transmitted to the integrated navigation system (INS) and the Voyage Data Recorder (VDR).

23.3 § 148.105(v)(3) – Vessel Bunkering Methods

There are currently no plans for the SRVs to conduct bunkering operations at the *Port Dolphin* deepwater port facility. The SRVs would periodically take on hydraulic and lube oil packaged in drums or other suitable small containers delivered by a support vessel. There would be no bulk oil transfers of any kind at the *Port Dolphin* deepwater port.

23.4 § 148.105(v)(4) – Vessels for Bunkering, Mooring, and Servicing Vessels Using the Deepwater Port

There will be two vessels supporting *Port Dolphin* that will be based at existing port or marina facilities in the Tampa Bay or Port Manatee areas:

- Supply vessel
- Dedicated crew boat

Supply Vessel

Description (Representative):

Class DNV +1A1 E0 FiFi I (or equivalent)

LOA	130-feet (39-meters)
Beam	45-feet (13-meters)
Design Draft	19-feet (6-meters)
Gross Tons	750 (approximate)
DWT	580 (approximate)
Horsepower	500 KW (approximate)
Maximum speed	8 knots (approximate)
Crew	2-3

Functions:

- Logistics/delivery of consumables, groceries, supplies, spare parts, mail
- Assist in security surveillance of areas around the SRVs and unloading buoys
- Provide Class I fire-fighting capability
- Assist in emergency evacuation of personnel injured or endangered by conditions at the port facility
- Assist in traffic control and monitoring of the Safety Zone

Dedicated Crew Boat

Description (Representative):

- Length overall 75.5-feet (23-meters)
- Breadth 18.8-feet (6-meters)

Weight (empty) 77,160-lbs.
Engine 500-1800 kW
Speed 22-33 knots

Functions:

- Transportation of USCG personnel and boarding teams upon USCG request
- Conduct other transportation functions for up to 12 personnel
- Assist in security surveillance of areas around the SRVs and unloading buoys
- Assist in emergency evacuation of personnel
- Respond to other emergencies upon the request of the USCG

Further details and employment of the support vessels can be found in Volume III, Section 9.

23.5 § 148.105(v)(5) – Shore-Based Support Facilities

A port operations support office will be established in leased or rented space in the Tampa Bay region at a location to be determined and will house the Port Director and other support personnel in addition to communications, operational support and maintenance equipment. The office will be located so as to ensure ready access to operational support vessels and will serve as the central point through which all operational and logistical support activities such as scheduling, crew transfer and support and maintenance shall be coordinated. Specific equipment anticipated to be housed at the office will include:

- Communications gear
  – UHF/VHF radio
  – Satellite Communications
- Meteorological monitoring
- Maintenance support
- Administrative

Separate from the port operations office, will be a small structure (8’X8’) located at the Sunshine Skyway bridge fishing pier that will house a communications link for control of the subsea isolation valve discussed in Section 19.

23.6 § 148.105(v)(6) – Radio Station License

Because the SRVs have not been specifically identified by hull, a radio station license cannot be made available. An application for a Federal Communications Commission (FCC) radio station license will be made once the vessel's specific information is available. A copy of the FCC radio station license application and a copy of the radio station license (when issued) will be forwarded to the USCG.

24. § 148.105(w) – Construction Procedures

This section provides an overview of the methods and procedures to be used in the construction and final testing of the components of the proposed deepwater port. Detailed installation information for the STL/floating offshore components is in Volume III, Section 5 and data regarding installation of the pipelines/fixed components is contained in Volume III, Section 6. Additionally, a detailed construction plan will be provided to the USCG at a later date prior to undertaking construction activities.

Construction will occur in two phases: (1) fabrication and assembly at the individual component level off-site; and (2) completion of the floating and fixed offshore components onsite. Separate construction activities will consist of the construction of the onshore transmission pipelines and interconnection stations that are the subject of the parallel application submitted to FERC under Section 7 of the NGA.

Construction Schedule Overview

Fabrication of the deepwater port individual components is expected to take approximately 14-months and is anticipated to commence in the second quarter of 2009 (calendar year). Onsite construction activities in the Gulf of Mexico and coastal and inland waters in the Tampa Bay area during the second phase is expected to take approximately six months if there are no weather delays. It is projected that the second phase of construction would commence in the fourth quarter of 2010 and would be completed by the second quarter of 2011 assuming no delays due to weather or other circumstances. Commencement of commercial operations for the proposed deepwater port is expected in the second quarter of 2011.

Off-site Fabrication of Components

The main components to be fabricated off-site are: (1) the STL Subsea Systems comprising the floating component of the port described in Section 18; and (2) the flowlines, gas transmission pipeline and associated components which comprise the fixed component of the port as detailed in Sections 19 and 21.

Specifically, these components consist of the following:

Floating Offshore Components (two each)

- STL Buoy
- STL Buoy pick-up assembly
- STL Buoy landing pad
- Mooring systems including anchor piles
- Flexible riser and umbilical

Fixed Offshore Components

- PLEM (two)
- Flowline (two)
- Piggable-Y
- Gas transmission line (with subsea block valve)

Fabrication of these components is discussed in more detail below.

STL Buoys/STL Buoy Landing Pad/STL Buoy Pick-up Assemblies

Contracts for the manufacture of landing pads and pick-up assemblies that are specifically designed for the proposed *Port Dolphin* site are expected to be concluded at a later date. The manufacture of the individual components of the STL Buoys, landing pads, and pick-up assemblies are anticipated to be subcontracted by the prime contractor. Final assembly of the STL Buoys is anticipated to occur at the subcontractor main assembly facility.

Mooring Systems With Anchor Piles

It is anticipated that APL will subcontract to an off-site facility the assembly of the mooring system components consisting of the chain, upper and lower wire segments and associated hardware along with the anchor piles.

Flexible Risers and Umbilicals

It is anticipated that APL will subcontract the manufacture of the flexible riser and umbilical based on its final design to an off-site facility.

PLEMs

The PLEMs are specifically designed by APL for the proposed *Port Dolphin* environment and are based on design work performed by APL. It is anticipated that APL will subcontract the manufacture of the PLEMs with final assembly occurring at a sub-contractor facility off-site.

Flowlines and Gas Transmission Line

Quotations for the line pipe will be tendered to both domestic and international manufacturers who are certified as API 5L pipe suppliers. Regardless of where the pipe is purchased, it will be transported to a pipe coating yard by rail or truck so that the appropriate corrosion coating and abrasive resistant overlay can be applied. When the line pipe has been properly coated with fusion bond epoxy (FBE corrosion coating), selected joints will also be coated with the appropriate abrasive resistant overlay (ARO) for the HDD shore approach section.

The finished FBE coated pipe will be transported by truck, barge or rail to the staging site most likely at Port Manatee, where it will be stacked and made ready for concrete coating. Concrete coating will occur at a temporary concrete coating and block fabrication yard that will be set-up at the staging area (the concrete blocks to used with the covering mattresses). The yard and staging area will be similar to that arranged to support the Gulfstream Pipeline construction and necessary permits will be applied for. After the coating process is completed, the concrete coated pipe will be stacked and the concrete will be left to cure for approximately 30 days. Once cured, the coated pipe will be transported to a dock where it will be loaded onto barges and shipped to the job site for installation.

Piggable-Y

The piggable-Y will be fabricated at an approved fabricator most likely on the Gulf Coast. This device will be machined by a computer controlled process that will machine the piggable-Y to particular specifications and tolerances. Once the fabrication process is completed, and the assembly is inspected and accepted, it will be coated with subsea paint and shipped via truck to the staging area at Port Manatee. It will be stored there until it is ready for installation at the mooring site.

Sub-Sea Block Valve

The sub-sea block valve and actuator will be fabricated at an approved national or international fabricator. A mud mat (steel frame structure) will likely be fabricated at a facility on the Gulf Coast and the valve and actuator will then be mounted on the mud mat. Once this process is completed, and the assembly is inspected and accepted, the entire assembly will be coated with subsea paint and shipped via truck to the staging point in the Tampa Bay area. It will be stored there until it is ready for installation at the mooring site.

Concrete Mattresses

Quotations for the concrete mattresses will be tendered to several domestic manufacturers who are qualified as acceptable suppliers. After a supplier is selected, all the fabrication materials will be shipped to the staging site at Port Manatee.

Concrete components (cement, aggregate and wire mesh) will likely be purchased from local Florida suppliers, and as noted, a temporary concrete block fabrication and coating yard will be set-up if an existing facility is not available. Once the concrete blocks are cured, they will be secured to the fabric and stacked and made ready for shipment. When they are needed, the mattresses will be transported to a dock where they will be loaded onto barges and shipped to the job site for installation.

Temporary Storage and Handling

The following manufactured components would be shipped to the region and may be stored temporarily at an existing onshore staging yard (most likely at or near the dock in Port Manatee), and transported to the proposed operating site for offshore installation:

- Anchor piles
- Mooring line components (chain and wire segments)
- Concrete coated line pipe for the flowlines and gas transmission pipeline
- PLEMs and spool pieces
- STL Buoys
- STL Buoy landing pad
- Flexible risers
- Umbilicals
- Concrete mattresses
- Miscellaneous consumables

Prior to shipping, the manufactured components will go through rigorous quality assurance and inspection to ensure they meet design specifications according to class requirements.

Onsite Construction

Onsite construction, the second phase of the construction process, will commence when all components and construction assets have been assembled at Port Manatee and will comprise the construction of the floating and fixed offshore components of the proposed port. Specific elements are described as follows.

Pre-Construction Activities

The following activities would be accomplished prior to start of the offshore construction operations:

- Submittal of a construction plan to the USCG
- Hazard survey (complete)
- Geotechnical survey
- Development and approval of detailed construction procedures

- Pre-lay survey of pipeline routes
- Placement of protective mattresses over any pipelines or cables to be crossed by the flowlines and the planned gas transmission line (if required)
- Placement of marker buoys and transponders on the seafloor (if required)
- Final assembly of the piping by adding a concrete and wire reinforcement mesh coating along with anti-corrosion, fusion bond epoxy that will be added to the steel pipe core
- Manufacture of concrete blocks onsite

Pipe Coating Process

The coating process used to coat the pipe with concrete is called the "wrapping" process and involves the pipe first being wrapped in a wire mesh. Due to the thickness of the concrete coating proposed for the 36-inch pipe, two layers of wire mesh will be used. The concrete is made by mixing pre-determined amounts of aggregate, sand, Portland cement, water and additives. Once the concrete is ready, the pipe joints containing the wire mesh are slowly sent through a conveyer belt that has the premixed concrete above it in a hopper. The pipe joints are rotated while traveling down the conveyer and the concrete is poured onto the pipe and the wire mesh holds the concrete in place. The coated joints are immediately transported to outside pipe racks where they are placed for curing.

Onsite Construction Sequence

It is anticipated that the offshore installation effort would be accomplished in the following sequence:

- Mobilize a dynamically positioned, or tug-assisted derrick and pipelaying vessels and workboats to the deepwater port site
- Install tie-in spools at the piggable-Y and the PLEMs
- Install the piggable-Y and the gas transmission line
- Install the two PLEMs and the flowlines between the PLEMs and the piggable-Y
- Fill, test, dewater, clean and dry the pipeline system
- Install the anchor piles and the lower portion of the mooring lines
- Connect the mooring lines to the unloading buoys and properly tension the mooring lines
- Connect the two risers and control umbilicals between the unloading buoys and the PLEMs
- Remove all construction debris
- Demobilize the offshore construction equipment

Offshore Construction Procedures

The following provides a summary of offshore construction procedures that would be used. The procedures are discussed in three segments: first, required construction vessels and

equipment; second, construction procedures for the mooring systems, STL Buoys, flexible risers and umbilicals and STL Buoy pick-up system; and third, construction procedures for the PLEMs, flowlines, gas transmission line and piggable-Y.

For additional information, refer to the System Design Report contained in Volume II, Appendix A, a technical report prepared by APL covering the STL-related systems (Volume III, Section 5) and a study detailing pipelaying, burial and covering techniques in the *Port Dolphin* environment (Volume III, Section 6.2).

Transportation of Materials to Operating Site

A deck cargo barge or anchor handling vessel would transport the STL Buoys, mooring line components, flexible risers, PLEMs and control umbilicals from the temporary shore base to the operating site. Additionally, cargo barges would transport the concrete-coated line pipe, the piggable-Y, the subsea valves and concrete mattresses to the operating site.

It is expected that *Port Dolphin* will require storage space at Port Manatee for approximately six to nine months. There is no special handling equipment required to offload, store and loadout the offshore components other than cherry pickers, cranes, spreader bars, lifting straps, etc., that are currently available at Port Manatee.

Equipment Mobilization

The equipment proposed for the offshore pipe installation will consist primarily of lay barge, tugs, supply vessels, bury barge with a plow, pile driving equipment, diving spreads and support vessels. These vessels will be United States owned/flagged vessels that have extensive experience working in the GOM. These vessels (USCG-approved) will be staged as needed out of a Gulf Coast port and will travel to the *Port Dolphin* job site. Once mobilized, it is anticipated they will work 24/7 until job completion.

Construction Vessels and Equipment

Mooring System and STL Buoy

It is anticipated that the installation will be carried out with a large crane vessel as the Main Installation Vessel (MIV) (representative photo Figure 24-1) and a cargo barge used to store and transport pile anchors, chain and wire segments, STL Buoys, PLEM assemblies, riser and umbilical systems, etc. Main installation equipment necessary onboard the MIV will be as follows:

- Offshore crane for handling of pile anchors and the STL Buoys. The installation vessel should preferably be equipped with a heave compensated crane for the installation of the pile anchors.

- Winch systems with sufficient wire length and load carrying capacity for the handling and deployment of mooring lines.

- Connection frame on the side of the vessel or subsea type with pull-in wire systems, lock-off systems and hydraulic position adjustment systems necessary to make-up the final mooring line connections.

- Chain and wire rope handling systems including wire installation reels, reel drive units, chain storage, chain wheels and chain lock-off devices for the actual chain dimensions.

- Roller or chute with radius larger than the MBR for the wire segment.

- ROV and diving system

- Pile lifting tool and pile hammer for installation of pile anchors. Further, a pile guide frame will be required to maintain the pile vertically when the pile has self penetrated.

- Positioning and survey equipment

Depending on the chosen installation method, one or several assisting installation vessels (AIV) may be required for the installation.

PLEMs, Flexible Risers and Umbilicals

The list below details the principal equipment that will be required onboard the MIV. Additionally, a DP vessel will likely be required due to the number of mooring lines and pipelines.

- Offshore crane for installation of PLEM assembly

- Drive unit for installation reels for the riser and umbilical. The drive units will have sufficient hold back capacity to operate the reels during installation at the anticipated water depths.

- ROV and diving system

- Positioning and survey equipment

Pile Anchors and Mooring System

Pile guide frame

Pile Anchors

A pile guide frame will be required to keep the pile stable after the self penetration. The frame is equipped with a conductor allowing the follower to drive the top of the pile into the seabed. When the pile is driven far enough to reach a stable depth, a latching mechanism on the conductor is engaged such that the conductor opens and is forced apart by gravity, allowing the padeye and the chain to pass the open frame.

No hydraulics is necessary. The only equipment on the frame will be transponders for position and orientation purposes. A guiding system between the pile and the guide frame conductor will automatically ensure that the pile has correct orientation within the frame.

When the pile is driven to the correct depth, the frame is lifted to the next pile location. The lifting force itself will close the conductor and the frame is ready to receive a new pile without having to be brought to the surface.

Method for installation of anchor piles and mooring lines

The anchor pile (AP) and hammer spread are located on the crane vessel (MIV) while the mooring chain and wire segments are located on the mooring line installation vessel (AIV). When positioned above the anchor pile location, the MIV installs the pile guide frame on the seabed. The lower end of the chain segment is transferred from the AIV to the MIV and is connected to the anchor pile. An internal lifting tool is inserted on top of the anchor pile and the anchor pile is upended and lowered to the seabed while simultaneously paying out the chain segment. The anchor pile is then entered into the pile guide frame conductor and lowered to self penetration depth, and the stab hammer and follower are subsequently overboarded and lowered onto the top of the pile.

When the pile has been driven to the correct depth, the frame is lifted to the next pile location. The lifting force itself will close the conductor and the frame is ready to receive a new pile without having to be brought to the surface.

With the anchor piles installed, the laying of the chain segments and mooring line will be commenced within the pre-defined corridor with sufficient tension to ensure no slack in the mooring line and minimum snaking on the seabed. A pick-up rigging for later retrieval is attached to the end of the chain segment.

Method For Installation of the STL Buoys

Installation of STL Buoy

It is anticipated that the STL Buoy will be mobilized at an inshore location with all upper wire segments (UWS) connected. A tug(s) will also be mobilized for the towing of the barge-mounted STL Buoys. The preinstalled UWS may be hanged-off on separate barges. An MIV will be used for installing the landing pad and the STL Buoy, and hook-up of the STL Buoy to the pre-installed mooring lines. The MIV will be equipped with a connection frame on the vessel side and a subsea connection frame for the final subsea connection of the last mooring lines. This frame comprises a wire routing arrangement and socket lock-off devices with hydraulic position adjustments.

Installation of PLEMs and Flexible Risers

PLEMs

Installation of the PLEMs will be performed as a part of the pipeline installation. A description of this installation can be found in the pipeline installation procedure.

Riser and Umbilical Installation

When all mooring lines are connected and the STL Buoy is standing on the landing pad on the seafloor, the riser and umbilical installation takes place. Both flexible risers and umbilicals will be installed from the MIV. The riser end is lowered to the seabed by a winch wire routed over the roller or chute. The riser end is located close to the STL Buoy and the final pull-in and connection to the connection pipe is done with diver assistance.

When the flexible riser has been connected to the turret, the laying operation of the riser starts. The buoyancy elements are attached at the deck of the MIV during the laying operation. The riser end is lowered to the seabed by a winch wire routed over the roller or chute. The riser end is located close to the PLEM and the final pull-in and connection to the PLEM subsea connector is done with WROV assistance.

The umbilical will be installed with the same procedure. The riser and umbilical are now connected permanently to the PLEM and to the STL Buoy. A permanent locking of the riser and umbilical at the buoy end will then take place with assistance from divers. It is anticipated that the riser will be locked-off with a watertight hang-off mechanism. The ESD valve shall be mounted on top of the STL Buoy after pull-in to the SRV.

As-installed Survey

The as-installed survey shall verify that the STL Subsea System has been installed according to requirements and within acceptable tolerances and shall include the following:

- Position, heading, tilt and penetration of pile anchors
- Position of STL Buoy in idle condition
- Position of tri-plates on seabed
- Position of riser, umbilical and PLEM on seabed
- Visual inspection of anchors and mooring lines with particular attention to identify possible twist and kinks in mooring lines, potential damage to sheathing and potential damage to sacrificial anodes in connection elements and on the buoy
- Visual inspection of riser and umbilical with particular attention on connection flanges, strapping and buoyancy system
- Electrical potential testing to verify that the CP system is active

STL Buoy Pick-up Assembly Installation

The STL Buoy shall be equipped with the following pick-up assembly:

- A three-leg bridle connected to the STL Buoy by wide body shackles
- Messenger line
- Spring buoys and marker buoys attached to the messenger line

The bridle and messenger line are made of high tensile fiber ropes requiring careful handling to avoid damage such as abrasion and cuts. The shackles for attaching the bridle to the STL Buoy shall not be used for other lifting purposes. The messenger line is buoyant and the major part of the line will be floating on the surface. Watch boat service may be required to safeguard pick-up assembly after installation.

The pick-up assembly is normally post-installed by air divers after installation of the buoy and riser. The alternative method is to lash the pick-up assembly to the STL Buoy prior to installation of the buoy. This method is not recommended since it has shown propensity for entanglement when subsequently uncoiling the messenger line. Pick-up assembly configuration shall be verified by an ROV prior to departing the area.

Figure 24-1
Typical Installation Vessel

Installation of the Gas Transmission Pipeline, Flowlines and PLEMs

Gas Transmission Pipeline

Line pipe (with concrete weight coating) would be transported from the temporary staging area to the operating site. A pipelaying barge would install the 36-inch diameter pipeline with concrete weight coating from the shallower water in the direction of the piggable-Y in deeper water. This pipeline would be approximately 41.4-miles (66-kilomters) long, and would be covered or buried as required for compliance with MMS regulations, 30 C.F.R., Part 250, Subpart J. The burial or covering method(s) used (as applicable) will depend on the geologic characteristics of a particular segment and the specific techniques for each are described later in this section.

The gas transmission line would be installed in the empty condition using the "S-Lay" method. It is referred to as the "S-Lay" method because of the shape the pipe takes as it moves from the welding and inspection stations across the stern of the pipelaying barge. There the pipe is supported by a truss-like structure with rollers that will minimize curvature and thus the bending stress on the pipe (see Figure 24-2). The S-Lay method is commonly used in shallower waters such as those found in the proposed *Port Dolphin* environment although a portion of the assembly may not be used in the most shallow waters.

Due to design criteria and construction route, the pipeline cannot be constructed in a single non-interrupted lay. Therefore, the pipeline will be constructed in five segments with six subsea tie-ins and two PLEM assemblies. For construction of the tie-ins and installation of the PLEM assemblies, the pipeline will be in a flooded condition.

Positioning of the pipelaying barge will be referenced to a Differential Geo-Stationary Positioning System (D-GPS) operated by professional surveyors. The barge positioning will be controlled through the "conventional mooring" technique of a series of anchors, associated anchor chains and/or cables. Appropriate measures to lighten the barge and use a fewer number of anchors to accommodate conditions in shallow water will be undertaken.

The transmission pipeline will be laid in the direction from the shallow water zone into the deeper water zone. Construction will be initiated by laying the pipeline away from a fixed anchor point attached to the pipeline end cap. The anchor point will consist of either a conventional gravity or drag anchor, or alternatively depending on the final design adopted, may be a pre-installed pile. Also depending on the final design and any access restrictions that arise, it is also possible that a sheave might be installed at the anchor point to allow the pipeline to be winched-in towards the initiation point using the pipe-lay barge A&R winch. Pipeline buoyancy may also be temporarily fixed to the pipeline to assist with such a process.

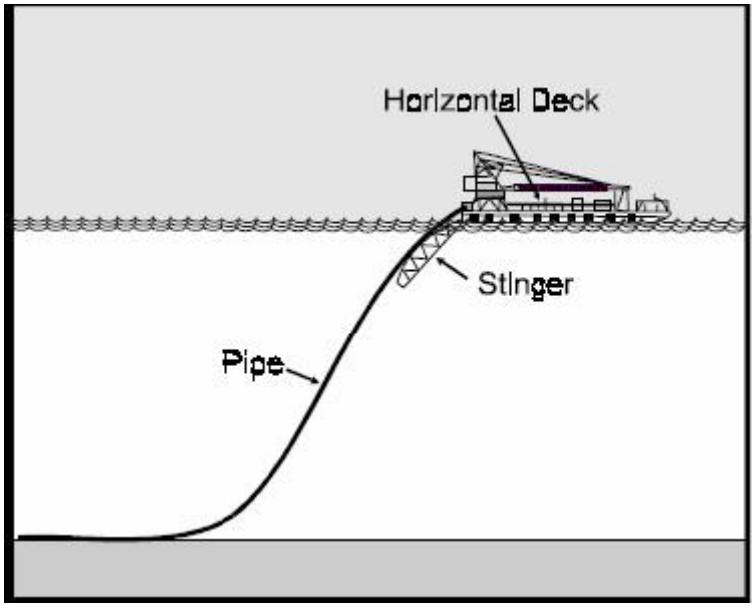
The first section of the two flowlines will also be laid continuously with the gas transmission pipeline. It is expected that the piggable-Y which connects the transmission pipeline to the flowlines will also be laid concurrently during this phase, although, it is possible

that the pipe-lay contractor may elect to install this independently. A separate initiation will be required to lay the second flowline.

At the end of each route, pipeline ends will be laid from the pipe-lay barge using the A&R winch. Prior to commissioning of the pipeline system, the pipeline ends will be carefully surveyed and then tied into the PLEMs (at the offshore offloading site) and at the HDD termination (at the shore approach site).

The tie-ins will be completed by installing flanged pipeline spool-piece sections specially fabricated for the purpose and it is anticipated that a separate diving support barge will be used to support this operation. The tie-in procedure will be to lower the spool-piece sections from the support barge using a deck mounted crane. On the seabed, divers will orientate the spool-piece sections into position and perform the flange bolting and connection sealing operations.

Figure 24-2
Pipeline "S"-laying Technique



Flowlines and PLEMs

A pipelaying barge (Figure 24-3) would install the two PLEMs and the piggable-Y at a location between the two PLEMs; install the flowlines from each PLEM to the piggable-Y; and complete the hydrostatic testing and dewatering of the flowlines. The flowlines would be 36-inch diameter line pipe with concrete weight coating, and have a combined length of approximately 4.3-miles (6.8-kilomters). The flowlines would be installed in the empty condition using the S-lay method discussed above. Additionally, the flowlines may be initiated from the north or south PLEM, and laid towards the piggable-Y.

After each flow line is laid, the lay vessel will deploy each of the PLEMs overboard to a predetermined target box for connection/tie-in by subsea diving operations after the flowline is hydro-tested. The PLEMs will be constructed with "mud mats" to ensure horizontal alignment with the flowlines and maximum stability on the sea floor.

The method(s) for burying or covering the flowlines and transmission pipeline are discussed below.

Burial

One of two techniques will be used, plowing or jetting, each of which involves burial of the pipe after it has been laid. Plowing involves the use of a plow towed along and underneath the pipe by a burial barge that creates a "V" shaped trench for the pipe to lie in.

Jetting involves the removal of seabed sediment underneath the pipe by high pressure water jets which creates a "U" shaped ditch. Sediment displaced by the ditch is simultaneously removed and dispersed by a short section of suction dredge pipe.

Cover

The pipe will be covered where the geologic character of the seabed is unsuited for burial. Cover techniques may involve the use of a concrete mattress that will be positioned by a crane and divers and/or submersible vehicles. Alternatively, rocks may be laid over the pipe to provide a protective cover.

Horizontal Directional Drilling

The shore approach will be designed and constructed using the Horizontal Directional Drilling (HDD) technique. The HDD rig and associated drilling support equipment will be positioned ashore at Port Manatee where the drilling entry point will be located. The pull-back carrier pipe will be strung out onshore in sections, filled, tested and dewatered prior to completion of the drilling and reaming operation. Once the reamed hole is ready for the carrier pipe to be installed, the HDD rig will winch the pre-tested carrier pipe into the hole using a dead-man pile and thrust block assembly. The tie-in of the transmission pipeline to the HDD pipe on the water side will be made with a full penetration butt weld in a dry environment using a coffer dam or similar technique. On the land side, the HDD pipe will be connected to a shop fabricated overbend and then to a flanged mainline block valve located at Port Manatee.

Testing and Inspections

The pipeline segments will be tested to 1.25 times the MAOP of 1750 psig (or 2188 psig) for eight hours. To the maximum extent practicable, piping assemblies will be pressure tested after installation as complete assemblies including extra pipe at each tie-in weld to ensure that all newly installed pipe is tested. If not practicable to test after installation, the pipe will be tested in as complete as segments as possible.

Additionally, once the tie-ins are complete, the entire pipeline will be hydrostatically tested to prove the integrity of the construction. A typical hydro-test for a 36" gas line involves pressurization of the line to 2200 psig, and holding for 24 hours. During the hydrostatic test, both check valves will be locked in the open position and the hydro-test will be conducted between blind flanges at the HDD entry station and blind flanges on the north and south flowlines.

After the offshore pipelines have been hydrostatically tested and accepted, the pipelines will be dewatered (discussed in the following paragraph), cleaned and dried to a dew point of -40º F prior to final tie-ins. Finally, all butt welds larger than 3 ½ -inches will be inspected by non-destructive inspection techniques.

Dewatering and Drying

Dewatering will occur in two phases summarized as follows. The first phase will involve the launch of a pig device from the south PLEM launcher with the check valve on the south flowline to be left open with the check valve (or ball valve) on the north flowline in a closed position. The pig train will be then push the water to the HDD entry point. The entry point will in turn be equipped with two devices: a pig train receiver and a water discharge manifold. The latter will discharge the water through six temporary irrigation pipes (6-inch diameter) what will discharge the water to four tanker barges temporarily moored at Port Manatee. The water discharged into the holds of the barges will be infused with industrial grade Hydrogen Peroxide. The water will be tested, and when tested negative for presence of Biocides and Oxygen Scavengers, will be discharged in to the bay through discharge nozzles. The water is completely inert at this point; discharging the water into the air enhances dilution and promotes re-oxygenation of the water.

Upon completion of the first phase of dewatering the south flowline check valve will be closed and the north flowline valve opened for completion of the second phase in a manner similar to that described above. Additional, alternate pig runs will be initiated from the south and north PLEMs to dry the pipeline of any residual water content. Any residual water received at the HDD station will be treated as above.

Figure 24-3
Representative Pipelaying Barge and Support Vessel

Demobilization

Upon completion of the offshore construction effort, side scan sonar would be used to check the area, construction debris would be removed from the ocean floor, and all construction equipment would be released.

Functional Testing

During the fabrication of the STL Buoy components, mating checks would be made to confirm that the SRV could be properly moored to the unloading buoy and that all piping has been pressure-tested in accordance with Manufacturers and Classification Society requirements. When the offshore construction is complete and an SRV is available, the SRV would perform a trial connection to each STL Buoy and would verify the functionality of all components, prior to initiating any discharge operations. The purpose of the functional testing is to verify that all components are compatible and will function as designed, prior to the vaporization of LNG and send-out of natural gas. Particular attention would be given to the following:

- Confirmation of the operation of the unloading buoy APRS
- Onsite verification of interoperability with the SRV's dynamic positioning system
- Verification of STL Buoy retrieval into the mating cone of the SRV, and the mechanical connection between the SRV and the STL Buoy
- Verification of mooring line tensions in comparison with the predicted values
- Functional test and verification of the gas tight connection between shipboard equipment and the STL Buoy turret
- Confirmation of the ESD and the EBD systems
- Verification of SRV disconnect from the STL Buoy

When those tests have been completed successfully, the send-out of natural gas could commence.

Onshore Facilities Construction

Details regarding onshore construction can be found in the companion application to be filed with FERC under Section 7 of the NGA.

There is no anticipated construction of operational support facilities for the proposed *Port Dolphin*.

25. § 148.105(x) – Operations Manual

A draft operations manual for the proposed *Port Dolphin* is provided in Volume III, Section 9a of this application.

26. § 148.105(y) – Risk and Consequence Assessment

Five sets of data to support an independent, site-specific analysis of the proposed *Port Dolphin* are being provided to the USCG in order that it can assess the risks and consequences of accidental and intentional events that could compromise cargo containment. This data consists of: (1) safety and security analysis (Volume II, Section 11); (2) site-specific metocean data (Volume II, Section 11); (3) SRV specifications (Volume III, Sections 4a and 4b); (4) population density diagram (Volume II, Section 11); and (5) Vessel traffic density diagram (Volume II, Section 11).

27. § 148.105(z) – Environmental Evaluation

An environmental evaluation of the impacts of the proposed *Port Dolphin* is provided as Volume II of this application.

28. § 148.105(aa) – Aids to Navigation

As discussed in Section 14.2, *Port Dolphin* will not have any fixed aids to navigation installed for ships arriving, departing or transiting in the vicinity. The two messenger lines which float on the surface and permit STL Buoy recovery will each be marked with two buoys with the characteristics outlined in Table 28-1. The Applicant will adjust these markings to whatever characteristics the USCG may require.

The buoys on the messenger line will be used primarily to assist in the retrieval of the messenger line and buoy. Secondarily, the marker buoys with lights will be used to alert vessel traffic in the vicinity of the presence of the floating messenger line if no SRV is present. Finally, as previously noted, the SRVs while unloading, will present a lighting scheme for vessels at anchor under international COLREGS. The anchored SRVs will not represent a significant obstruction to navigation while at anchor.

Table 28-1
Recovery Buoy Lights

Feature	Description
Shape	Cylindrical
Color	Yellow
Number or letter	North buoy: Letter N; South buoy: Letter S
Depth of water	Approximately 100 feet
General description	Flashing yellow, no sound signal
Location	North Buoy: 27º25´12.14´´N/83º11´50.11´´W South Buoy: 27º22´28.02´´N/83º11´22.82´´W

29. § 148.105(bb) – National Pollutant Discharge Elimination System

A draft of the NPDES permit application is contained in Appendix D of this volume.

30. § 148.105(cc) – USACE Dredge and Fill Permit

The draft USACE dredge and fill permit application is contained Appendix B of this volume.

31. § 148.105(dd) – Additional Federal Authorizations

Specific federal requirements other than those enumerated above are provided in the below subsections. Additionally, a listing of other federal environmental statues as described in 33 C.F.R. § 148.737 and how the Applicant proposes to meet their requirements is provided in Table 31-1 following the below subsections.

31.1 Air Permit 42 U.S.C. § 7401 *et seq*.

The draft air permit application to is contained in Appendix G of this volume.

31.2 MMS Pipeline Right-of-Way Grant 30 C.F.R. § 250.1000 *et seq*.

An application for a pipeline right-of-way grant will be submitted to the MMS Gulf of Mexico regional office and will be based on liaison already conducted with that office. A copy of this application will be provided to the U.S.C.G. as Appendix H.

Table 31-1

Summary of Potential Federal Requirements [Preliminary]

#	AGENCY / STATUTE	DESCRIPTION OF STATUTE OR PERMIT KEY AGENCY REQUIREMENTS AND ACTIONS	APPLICANT ACTIONS
1.	Abandoned Shipwreck Act (ASA), 43 U.S.C. §2102 *et seq*.	The Abandoned Shipwreck Act (43 U.S.C. §§2101–2106) reaffirms the assertion of U.S. title and management responsibility for abandoned shipwrecks located on public lands.	
2.	American Indian Religious Freedom Act (AIRFA), 42 U.S.C. §1996 *et seq.*	Protects and preserves religious freedoms of Native Americans, including access to religious sites and consultation with tribal leadership concerning human burial sites that federal projects might disturb.	
3.	Archaeological and Historic Preservation Act (AHPA), 16 U.S.C. §469; §470aa–ll *et seq*.	The purpose of the AHPA is to secure the protection of archaeological resources and sites on public or Indian lands, and to foster exchange of information between agencies, organizations and individuals having collections or data. The Act directs federal agencies to notify the Secretary of the Interior when they find that any federal construction project or federally licensed activity or program may cause irreparable loss or destruction of significant scientific, prehistoric, historical, or archaeological data. The AHPA also funds historical and archaeological protection in such projects and requires individuals to obtain a permit from the federal land manager for any excavation or removal of archaeological resources from public or Indian lands. Excavations must be undertaken for the purpose of furthering archaeological knowledge in the public interest, and resources removed remain the property of the United States. Finally the AHPA authorizes scientific investigation of antiquities on federal lands, subject to permits and other regulatory requirements, including paleontological resources.	If archeological resources are identified during project construction, applicable statutes will be followed.
4.	Architectural Barriers Act (ABA), 42 U.S.C. §4151 *et seq*.	The ABA requires access to facilities designed, built, altered, or leased with federal funds. Passed by Congress in 1968, it marks one of the first efforts to ensure access to the built environment. The Access Board develops and maintains accessibility guidelines under this law. These guidelines serve as the basis for the standards used to enforce the law, the Uniform Federal Accessibility Standards (UFAS).	The project site does not contain a facility designed, built, altered, or leased with federal funds.
5.	Clean Air Act (CAA), Pub. L. 95-95, 42 U.S.C. §7401 *et seq*.	The CAA is the comprehensive federal law that regulates air emissions from area, stationary, and mobile sources. This law authorizes the U.S. Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment.	The project has applied for a Title I Air Permit in compliance with the set minimum nationwide emission limitations as required by the New Source Performance Standards.
6.	Clean Water Act of 1977 (CWA), Pub. L. 95-217, 33 U.S.C. §1251 *et seq*.	The CWA consists of two major parts, one being the provisions that authorize federal financial assistance for municipal sewage treatment plant construction. The other is the regulatory requirement that applies to industrial and municipal dischargers. Section 401 of the CWA states that any applicant for a federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the state in which the discharge originates or will originate. Under Section 404, the Secretary of the Army acting through the Chief Engineer may issue permits, after notice and opportunity for public hearings, for the discharge of dredged or fill material into the navigable waters at specified disposal sites.	The application for a deepwater port license includes an NPDES permit submitted to EPA, a 404 permit to the Corps, and a 401 water quality certification to the State of Florida.

#	AGENCY / STATUTE	DESCRIPTION OF STATUTE OR PERMIT KEY AGENCY REQUIREMENTS AND ACTIONS	APPLICANT ACTIONS
7.	Coastal Barrier Resources Act (CBRA), Pub. L. 97-348, 16 U.S.C. §3510 *et seq*.	CBRA designates various undeveloped coastal barrier islands, depicted by specific maps, for inclusion in the Coastal Barrier Resources System (System). Areas so designated were made ineligible for direct or indirect federal financial assistance that might support development, including flood insurance, except for emergency life-saving activities. Exceptions for certain activities, such as fish and wildlife research, are provided. Additionally, National Wildlife Refuges and other, otherwise protected areas, are excluded from the System.	The project site is not located on a coastal barrier island.
8.	Coastal Zone Management Act (CZMA), Pub. L. 92-583, 16 U.S.C. §1451 *et seq*.	The CZMA provides for the development of state coastal management programs. Any project undertaken by a federal agency, requiring a federal permit, requiring a federal offshore oil and gas lease, or receiving federal funding that is in or may affect land or water resources or uses the Florida coastal zone must be found to be consistent with the State of Florida's coastal zone management (CZM) policies. The proposed activity cannot occur until there is concurrence that the project is consistent with state coastal policies.	The project intends to comply with the state and federal consistency review procedures and submit a final federal license or permit application, and a federal consistency certification for agency approval.
9.	Community Environmental Response Facilitation Act (CERFA), 42 U.S.C. §9620 *et seq*.	This statute applies to real property owned by the Department of Defense and on which the U.S. plans to terminate federal government operations, as well as to real property that has been used as a military installation and which is being closed or realigned pursuant to base closure. Federal entities with control over such properties must identify those upon which no hazardous substances or petroleum products/derivatives were stored for more than one year, released, or disposed of by examining relevant sources of data such as property deeds, aerial photographs, or other similar documents.	The project site was not owned by the Department of Defense, nor was it used as a military installation.
10.	Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), also commonly referred to as SUPERFUND, Pub. L. 96-510, 26 U.S.C. §4611 *et seq*.	CERCLA provides a federal "Superfund" to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment. Through the Act, EPA was given power to seek out those parties responsible for any release and assure their cooperation in the cleanup.	The project site is not an uncontrolled or abandoned hazardous-waste site. The proposed project will also comply with Department of Transportation regulations (33 C.F.R. Part 138) and set forth the procedures to establish and maintain evidence of oil spill financial responsibility to cover liability under CERCLA.
11.	Consultation and Coordination with Indian Tribal Governments, E.O. 13175, 65 FR 67249 (Nov. 9, 2000)	Executive Order 13175, entitled "Consultation and Coordination with Indian Tribal Governments," requires EPA to develop an accountable process to ensure "meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications."	The proposed project does not take part in the development of regulatory policies that have tribal implications.
12.	Coral Reef Protection, E.O. 13089, 63 FR 32701 (June 16, 1998)	The Executive Order established the Interagency U.S. Coral Reef Task Force, co-chaired by the Secretary of the Interior and the Secretary of Commerce, through the Administrator of the National Oceanographic and Atmospheric Administration (NOAA). The U.S. Coral Reef Task Force is charged with developing and implementing a comprehensive project of research and mapping to inventory, monitor, and "identify the major causes and consequences of degradation of coral reef ecosystems."	Coral reefs have not been identified within or around the proposed project site.
13.	Department of Transportation Act, Section 4(f), Pub. L. 89-670, 49 U.S.C. §303, Section 4(f), *et seq*.	This statute declares that the Secretary of Transportation shall not approve a transportation program or project requiring the use of any land of a public park, recreation area, wildlife and waterfowl refuge, or historic site unless there is no feasible and prudent alternative to the use of such land, and the project or project includes all possible planning to minimize harm to the park, recreation area, waterfowl refuge, or historic site.	The proposed project site does not require the use of any land of a public park, recreation area, wildlife and waterfowl refuge for the development of a transportation program.

#	AGENCY / STATUTE	DESCRIPTION OF STATUTE OR PERMIT KEY AGENCY REQUIREMENTS AND ACTIONS	APPLICANT ACTIONS
14.	Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986, 42 U.S.C. §§11001–11050 *et seq.*	Also known as Title III of the Superfund Amendments and Reauthorization Act (SARA), EPCRA was enacted by Congress as the national legislation on community safety. This law was designated to help local communities protect public health, safety, and the environment from chemical hazards. EPCRA establishes requirements for federal, state and local governments, Indian Tribes, and industry regarding emergency planning and "Community Right-to-Know" reporting on hazardous and toxic chemicals, in applicable circumstances.	An assessment of safety and security effects is included in the environmental report of the Deepwater Port Application. The project will work with federal and state authorities to prepare emergency response plans and notification procedures.
15.	Endangered Species Act of 1973 (ESA), Pub. L. 93-205, 16 U.S.C. §1531 *et seq.*	Requires protection of threatened or endangered species by prohibiting activities and facilities that would have an adverse effect on them.	Consultation will be initiated with the Department of Interior, U.S. Fish and Wildlife Service (USFWS) and NOAA to address the Threatened and Endangered Species Act.
16.	Efficiency and Water Conservation at Federal Facilities, E.O. 12902, 59 FR 11463 (Mar 10, 1994); Environmental Effects	This Executive Order requires federal agencies to develop and implement a program with the intent of reducing energy consumption by its buildings in use, to the extent that these measures are cost-effective. Each agency's implementation program shall be designed to speed the introduction of cost-effective, energy-efficient technologies into federal facilities, and to meet the goals and requirements of the Act and this Order.	The proposed facility will not be a facility used or owned by a federal agency.
17.	Abroad of Major Federal Agencies, E.O. 12114, 44 FR 1957 (Jan. 9, 1979)	This statute extends the National Environmental Policy Act (NEPA) statute to apply to major federal actions significantly affecting the environment of the global commons outside the jurisdiction of any nation or within the jurisdiction of a foreign nation.	The proposed project site is within U.S. federal boundaries.
18.	Environmental Quality Improvement Act, Pub. L. 98-581, 42 U.S.C. §4371 *et seq.*	The Act creates the Office of Environmental Quality to support the work of the Council on Environmental Quality (CEQ) and is further intended to assure that each federal department and agency involved with programs affecting the environment implements appropriate policies.	The U.S. Coast Guard (USCG) in compliance with NEPA will prepare an environmental impact statement for this project.
19.	Farmlands Protection Policy Act, Pub. L. 97-98, 7 U.S.C. §4201 *et seq.*	The purpose of this statute is to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses, and to assure that federal programs are administered in a manner that, to the extent practicable, will be compatible with state, unit of local government, and private programs and policies to protect farmland.	The proposed project site will not require the conversion of farmland.
20.	Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, E.O. 12898, 59 FR 7629 (Feb. 16, 1994)	This Executive Order was designed to focus attention on environmental and human health conditions in areas of high minority populations and low-income communities and to prevent discrimination in programs and projects substantially affecting human health and the environment. The order requires EPA and all other federal agencies (as well as state agencies receiving federal funds) to develop strategies to address this issue.	A review of the potential effects to minority and low-income neighborhoods has been conducted in the environmental evaluation of the project.
21.	Federal Aviation Administration (FAA), 14 C.F.R. §77.13(2)(i)	Requires completion of a FAA Form 7460-1, Notice of Proposed Construction or Alteration for obstructions located in the vicinity of an airport.	Complete FAA Form 7460-1 if necessary.
22.	Federal Communications Commission (FCC) regulations	FCC regulations require issuance of a license to operate a radio station associated with shore support facilities.	Application will be submitted once location and scope shore support facilities have been identified.

#	AGENCY / STATUTE	DESCRIPTION OF STATUTE OR PERMIT KEY AGENCY REQUIREMENTS AND ACTIONS	APPLICANT ACTIONS
23.	Federal Compliance with Pollution Control Standards, E.O. 12088, 43 FR 47707 (Oct. 17, 1978); Federal Insecticide, Fungicide, and Rodenticide Act, Pub. L. 86-139, 7 U.S.C. §135 *et seq.*	This statute requires the control of pesticide, insecticide, fungicide and rodenticide products and their application and the control of disease vectors.	The use of pesticide products is not anticipated for this project.
24.	Federal Records Act (FRA), 44 U.S.C. §§2101–3324 *et seq*.	The FRA requires federal agencies to preserve federal records of potential historic value following the procedures promulgated by National Archives and Records Administration.	Federal records of potential historic value are not expected to be discovered during construction of the deepwater port.
25.	Federalism, E.O. 13083, Fish and Wildlife Act of 1956, Pub. L. 85-888, 16 U.S.C. §742 *et seq*.	The Fish and Wildlife Act of August 8, 1956, as amended, establishes a comprehensive national fish, shellfish, and wildlife resources policy with emphasis on the commercial fishing industry but also with a direction to administer the Act with regard to the inherent right of every citizen and resident to fish for pleasure, enjoyment, and betterment and to maintain and increase public opportunities for recreational use of fish and wildlife resources.	A description of Essential Fish Habitats (EFH) is included as Appendix B of the environmental evaluation.
26.	Fish and Wildlife Coordination Act, Pub. L. 85-624, 16 U.S.C. §661 *et seq*.	The purpose of this statute is to coordinate the protection, rearing, and stocking of all species of wildlife, resources thereof, and their habitat, in controlling losses of the same from disease or other causes, in minimizing damages from overabundant species, in providing public shooting and fishing areas, including easements across public lands for access thereto, and in carrying out other measures necessary to effectuate the purposes of said sections. It also authorizes the Secretary of the Interior to make surveys and investigations of the wildlife of the public domain, including lands and waters or interests therein acquired or controlled by any agency of the United States; and to accept donations of land and contributions of funds in furtherance of the purposes of said sections.	Environmental assessments would be prepared to comply with the USFWS, Threatened and Endangered Species Act and Migratory Bird Treaty Act. The assessment will also comply with the Department of Commerce (NOAA) Threatened and Endangered Species Act and Marine Mammal Protection Act of 1972.
27.	Fisheries Conservation and Recovery Act of 1976, Pub. L. 94-265, 16 U.S.C. §1801 *et seq*.	This Act requires federal agencies to consult with the NMFS (NOAA Fisheries) when activities may adversely affect an EFH. An EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." EFH applies to marine species managed under a federal Fishery Management Plan (FMP) that manages fisheries in waters of the U.S. Exclusive Economic Zone (3 to 200 NM offshore). FMPs are prepared by Regional Fishery Management Councils for each fishery under their authority that requires conservation and management.	Potential effects to EFH are discussed in the environmental report of the application. An environmental impact statement will be prepared to evaluate potential effects on designated EFH.
28.	Flood Disaster Protection Act, 42 U.S.C. §4001 *et seq*.	The purpose of this Act is to establish a flood insurance program and a unified national program for flood plain management.	The proposed project site is located in open water and is not located within a flood plain.
29.	Floodplain Management and Protection, E.O. 11988, 42 FR 26951 (May 25, 1977)	Each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the effects of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for: (1) acquiring, managing, and disposing of federal lands and facilities; (2) providing federally undertaken, financed, or assisted construction and improvements; and (3) conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.	The proposed project site is located in open water and is not located within a flood plain.

#	AGENCY / STATUTE	DESCRIPTION OF STATUTE OR PERMIT KEY AGENCY REQUIREMENTS AND ACTIONS	APPLICANT ACTIONS
30.	Greening the Government Through Leadership in Environmental Management, E.O. 13148, 65 FR 24595 (Apr. 26, 2000)	The head of each federal agency is responsible for ensuring that all necessary actions are taken to integrate environmental accountability into agency day-to-day decision-making and long-term planning processes, across all agency missions, activities, and functions. Consequently, environmental management considerations must be a fundamental and integral component of federal government policies, operations, planning, and management.	The proposed project is not part of the day-to-day decision-making or long-term planning processes within an agency. Nonetheless, an environmental assessment will be conducted for the project in compliance with NEPA.
31.	Greening the Environment Through Waste Prevention, Recycling, and Federal Acquisition, E.O. 13101, 63 FR 49643 (Sept. 16, 1998)	Consistent with the demands of efficiency and cost effectiveness, the head of each executive agency shall incorporate waste prevention and recycling in the agency's daily operations and work to increase and expand markets for recovered materials through greater federal government preference and demand for such products. It is the national policy to prefer pollution prevention, whenever feasible. Pollution that cannot be prevented should be recycled; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner. Disposal should be employed only as a last resort.	The proposed project is not part of the daily operations within an agency.
32.	Historic Sites Act (HSA), 16 U.S.C. § 46 *et seq*.	The HSA establishes a national policy to preserve historic sites, buildings, and objects of national significance for the inspiration and benefit of the people of the U.S. The Act also authorizes and directs the Secretary of the Interior to make a survey of historic and archaeological sites, buildings, and object for the purpose of determining which possess exceptional value in commemorating or illustrating the history of the U.S. The program is known as the National Historic Landmark (NHL) Program.	The project site is not within a national historic landmark program. Nonetheless, if archaeological resources are identified during project construction, the applicable statutes will be followed.
33.	Indian Sacred Sites, E.O. 13007, 61 FR 26771 (May 29, 1996)	Executive Order 13007, "Indian Sacred Sites" (61 FR 26771–26772 (1996)), directs federal land managing agencies to accommodate access to, and ceremonial use of, Indian religious practitioners and to avoid adversely affecting the physical integrity of such sacred sites.	The proposed project site has not been identified as an "Indian Sacred Site."
34.	Intergovernmental Review of Federal Programs, E.O. 12372, 47 FR 30959 (July 18, 1982)	Federal agencies shall provide opportunities for consultation by elected officials of those state and local governments that would provide the non-federal funds for, or that would be directly affected by, proposed federal financial assistance or direct federal development.	Under the Deepwater Port Act, the proposed project may not be issued a license without the approval of the Governor of Florida. When submitting a federal permit application for a project that may affect the land or water resources within the Florida coastal zone, it must comply with Florida coastal policies.
35.	Invasive Species, E.O. 13112, 64 FR 6183 (Feb. 8, 1999)	The National Invasive Species Act of 1996 substantially amended the Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990, which is the primary federal law dealing with aquatic invasive species and ballast water management, and is the basis for USCG regulations and guidelines to prevent introductions of non-native species through the uptake and discharge of ships' ballast water.	The SRVs will be governed by the International Treaty for Maritime Pollution and will comply with the treaties specifies ballast water management practices.
36.	Locating Federal Facilities on Historic Properties in our Nation's Central Cities, E.O. 13006, 61 FR 26071 (May 24, 1996)	According to this Statute, the federal government shall utilize and maintain, wherever operationally appropriate and economically prudent, historic properties and districts, especially those located in our central business areas. When implementing these policies, the federal government shall institute practices and procedures that are sensible, understandable, and compatible with current authority and that impose the least burden on, and provide the maximum benefit to, society.	By nature of the deepwater port, the facility will not be located on a historic property.

#	AGENCY / STATUTE	DESCRIPTION OF STATUTE OR PERMIT KEY AGENCY REQUIREMENTS AND ACTIONS	APPLICANT ACTIONS
37.	Magnuson-Stevens Fishery Conservation and Management Act as amended through October 11, 1996, 16 U.S.C. 1801 *et seq.*	This Act requires federal agencies to consult with the National Marine Fisheries Service (now NOAA Fisheries) when activities may adversely affect an EFH. An EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." EFH applies to marine species managed under a federal Fishery Management Plan (FMP) that manages fisheries in waters of the U.S. Exclusive Economic Zone (3 to 200 NM offshore). FMPs are prepared by Regional Fishery Management Councils for each fishery under their authority that requires conservation and management.	The project's potential effects on designated EFHs will be evaluated.
38.	Marine Mammal Protection Act of 1972 (MMPA), Pub. L. 92-522, 16 U.S.C. §1361	The MMPA protects marine mammals and establishes a marine mammal commission. The MMPA also establishes a moratorium, with certain exceptions, on the taking of marine mammals in U.S. waters and by U.S. citizens on the high seas.	Evaluation of potential effects will be conducted in consultation with NOAA.
39.	Marine Protected Areas (MPAs), E.O. 13158, 65 FR 24909 (Apr. 28, 2000)	To this end, the purpose of this order is to, consistent with domestic and international law: (a) strengthen the management, protection, and conservation of existing marine protected areas and establish new or expanded MPAs; (b) develop a scientifically based, comprehensive national system of MPAs representing diverse U.S. marine ecosystems, and the Nation's natural and cultural resources; and (c) avoid causing harm to MPAs through federally conducted, approved, or funded activities.	A federal consistency certification will be submitted to comply with the Office of Coastal Zone Management, CZMA.
40.	Marine Protection, Research, and Sanctuaries Act of 1972, Pub. L. 92-532, 16 U.S.C. §1431 *et seq.* and 33 U.S.C. §1401 *et seq.*	Title I of the original Act authorized the EPA to regulate ocean dumping of industrial wastes, sewage sludge, and other wastes through a permit program. The basic objective of the permit program is to "prevent or strictly limit the dumping into ocean waters of any material that would adversely affect human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities." The Secretary of the Army is authorized to issue permits for dredged material disposal, and EPA is authorized to designate appropriate dumpsites.	The project effect any designated or proposed dredge disposal site. In addition, an application will be submitted to the U.S. Army Corps of Engineers to comply with the CWA 404 requirement for the discharge of dredged or fill material in waters in the U.S. In addition, an NPDES permit will be submitted to the EPA to discharge into waterways.
41.	Migratory Bird Treaty Act (MBTA), 16 U.S.C. §§703–712, *et seq.*	The MBTA implements international treaties protecting migratory birds. Prohibits taking or haring migratory (and certain other) birds, and their eggs, nests, and young, without permit.	Consultation will be initiated with the USFWS to assess potential effects on migratory birds.
42.	National Environmental Policy Act of 1969 (NEPA), Pub. L. 91-190, 42 U.S.C. §4321 *et seq.*	NEPA is the primary federal environmental planning law. It requires federal agencies to identify, consider, and document reasonably likely environmental effects of proposed actions, and prescribes the preparation of comprehensive, interdisciplinary environmental impact statement for projects significantly affecting the quality of the human and natural environment.	To comply with NEPA requirements, an environmental impact statement will be prepared by the USCG to document the reasonably likely environmental effects of the proposed project.
43.	National Historic Preservation Act of 1996 (NHPA), Pub. L. 89-665, 16 U.S.C. §470 *et seq.*	Establishes historic preservation as a national priority; protects, restores, and reconstructs districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, or engineering. Section 106 of the NHPA establishes a process to identify conflicts between historic preservation concerns (*e.g.*, properties included on or eligible for the National Register of Historic Places) and federal undertakings.	The project will comply with applicable statutes.
44.	Native American Graves Protection and Repatriation Act (NAGPRA), 25 U.S.C. §3001 *et seq.*	Prohibits the intentional removal of Native American cultural items from federal or tribal lands except under an Archaeological Resource Protection Act permit and in consultation with the appropriate Native American groups. Requires returning burial remains, associated funerary object, and objects of cultural patrimony to the appropriate Indian or Native Hawaiian organizations and tribes. Establishes Native American ownership of human remains and associated funerary objects discovered	The proposed project site has not been identified as religious or historic human burial site. If project activity disturbs underwater archaeological resources, applicable statutes will be followed.

#	AGENCY / STATUTE	DESCRIPTION OF STATUTE OR PERMIT KEY AGENCY REQUIREMENTS AND ACTIONS	APPLICANT ACTIONS
45.	Noise Control Act of 1972, Pub. L. 92-574, 42 U.S.C. §4901 *et seq.*	It is the purpose of this Act to establish a means for effective coordination of federal research and activities in noise control, to authorize the establishment of federal noise emission standards for products distributed in commerce, and to provide information to the public respecting the noise emission and noise reduction characteristics of such products.	To comply with NEPA requirements, an environmental evaluation will be conducted to document the reasonably likely environmental effects of the proposed project.
46.	Pollution Prevention Act of 1990 (PPA), 42 U.S.C. §§13101–13109, *et seq.*	The Congress hereby declares it to be the national policy of the United States that pollution shall be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.	The proposed project will minimize the use of hazardous material during construction and will seek to minimize the use of waste materials during construction while seeking to utilize reused or recycled waste materials..
47.	Protection and Enhancement of Cultural Environmental Quality, E.O. 11593, 36 FR 8921 (May 15, 1971)	This Executive Order states that the federal government shall provide leadership in preserving, restoring and maintaining the historic and cultural environment of the Nation. Agencies of the Executive Branch of the Government (hereinafter referred to as "federal agencies") shall: (1) administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations; (2) initiate measures necessary to direct their policies, plans and programs in such a way that federally owned sites, structures, and objects of historical, architectural or archaeological significance are preserved, restored and maintained for the inspiration and benefit of the people; and (3) in consultation with the Advisory Council on Historic Preservation (16 U.S.C. §470i), institute procedures to assure that federal plans and programs contribute to the preservation and enhancement of non-federally owned sites, structures and objects of historical, architectural or archaeological significance.	The project will comply with applicable statutes.
48.	Protection and Enhancement of Environmental Quality, E.O. 11514, 35 FR 4247 (Mar. 7, 1970)	According to this Executive Order, the federal government shall provide leadership in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life. Federal agencies shall initiate measures needed to direct their policies, plans and programs so as to meet national environmental goals. The CEQ, through the Chairman, shall advise and assist the President in leading this national effort.	To comply with NEPA requirements an environmental impact statement will be conducted by the USCG to document the reasonably likely environmental effects of the proposed project. In addition, a NPDES permit will be submitted to the EPA to comply with the CWA and a Title I for compliance with the CAA.
49.	Protection of Children from Environmental Health and Safety Risks, E.O. 13045, 62 FR 19885 (Apr. 23, 1997)	Executive Order 13045 makes it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children and ensures that federal agency policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.	An environmental evaluation will be conducted to document the reasonably likely environmental effects of the proposed project.
50.	Protection of Wetlands, E.O. 11990, 42 FR 26961 (May 25, 1997)	Each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for: (1) acquiring, managing, and disposing of federal lands and facilities; (2) providing federally undertaken, financed, or assisted construction and improvements; and (3) conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities. This Order does not apply to the issuance by federal agencies of permits, licenses, or allocations to private parties for activities involving wetlands on non-federal property.	The proposed project site is not located on protected wetlands.
51.	Recreational Fisheries, E.O.	Federal agencies shall, to the extent permitted by law and where practicable, and in	The project's potential effects on

#	AGENCY / STATUTE	DESCRIPTION OF STATUTE OR PERMIT KEY AGENCY REQUIREMENTS AND ACTIONS	APPLICANT ACTIONS
52.	Requiring Agencies to Purchase Energy Efficient Computer Equipment, E.O. 12845, 58 FR 21887 (Apr. 23, 1993)	The heads of federal agencies shall ensure that, within 180 days from the date of this order, all acquisitions of microcomputers, including personal computers, monitors, and printers, meet "EPA Energy Star" requirements for energy efficiency. The heads of federal agencies may grant, on a case-by-case basis, exemptions to this directive for acquisitions, based upon the commercial availability of qualifying equipment, significant cost differential of the equipment, the agency's performance requirements, and the agency's mission.	The project will not require the purchasing of federal computer equipment.
53.	Resource Conservation and Recovery Act of 1976 (RCRA), Pub. L. 94-580, 42 U.S.C. §6901, *et seq*.	RCRA gives the EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous wastes.	The SRVs will store waste on-board and will not dispose of waste in U.S. federal waters. The CWA and CAA will govern all other potential pollution by products.
54.	Responsibilities of Federal Agencies to Protect Migratory Birds, E.O. 13186, 66 FR 3853 (Jan. 17, 2001)	Executive Order 13186 directs federal agencies (to include an executive department or agency, but not independent establishments) taking actions that have, or are likely to have, a measurable negative effect of migratory bird populations to develop and implement, within two years, a Memorandum of Understanding (MOU) with the USFWS that shall promote the conservation of migratory bird populations.	In compliance with the MBTA, consultations would be held with the USFWS to determine potential effects on migratory birds.
55.	Safe Drinking Water Act (SDWA), Pub. L. 93-523, 42 U.S.C. §201, *et seq*.	The SDWA was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and ground water wells. SDWA authorizes EPA to set national health-based standards for drinking water to protect against both naturally-occurring and manmade contaminants that may be found in drinking water. EPA, states, and water systems then work together to make sure that these standards are met.	The deep-water port is assumed to be far from drinking water sources.
56.	Wild and Scenic Rivers Act, Pub. L. 90-542, 16 U.S.C. §1271, *et seq*.	Preserves and protects the free-flowing condition of selected rivers. Establishes a national Wild and Scenic Rivers System.	The proposed project site would not cause an effect to the Wild and Scenic Rivers System.

32. § 148.105(ee) – Statement Certifying Application

CERTIFICATION

STATE OF [FILL-IN]

COUNTY OF [FILL-IN]

Pursuant to the Deepwater Port Act of 1974, as amended and the United States Coast Guard's September 29, 2006 (71 Federal Register 57,644), 33 Code of Federal Regulations Section 148.105(ee), I [FULL NAME], the undersigned, having been duly sworn, depose and say that I am [TITLE] of Port Dolphin Energy LLC, that I am familiar with the content of this application, that to the best of my knowledge, information and belief, the information in said application is true, and that I possess full power and authority to sign this statement.

_____
[NAME]
[TITLE]
Port Dolphin Energy LLC

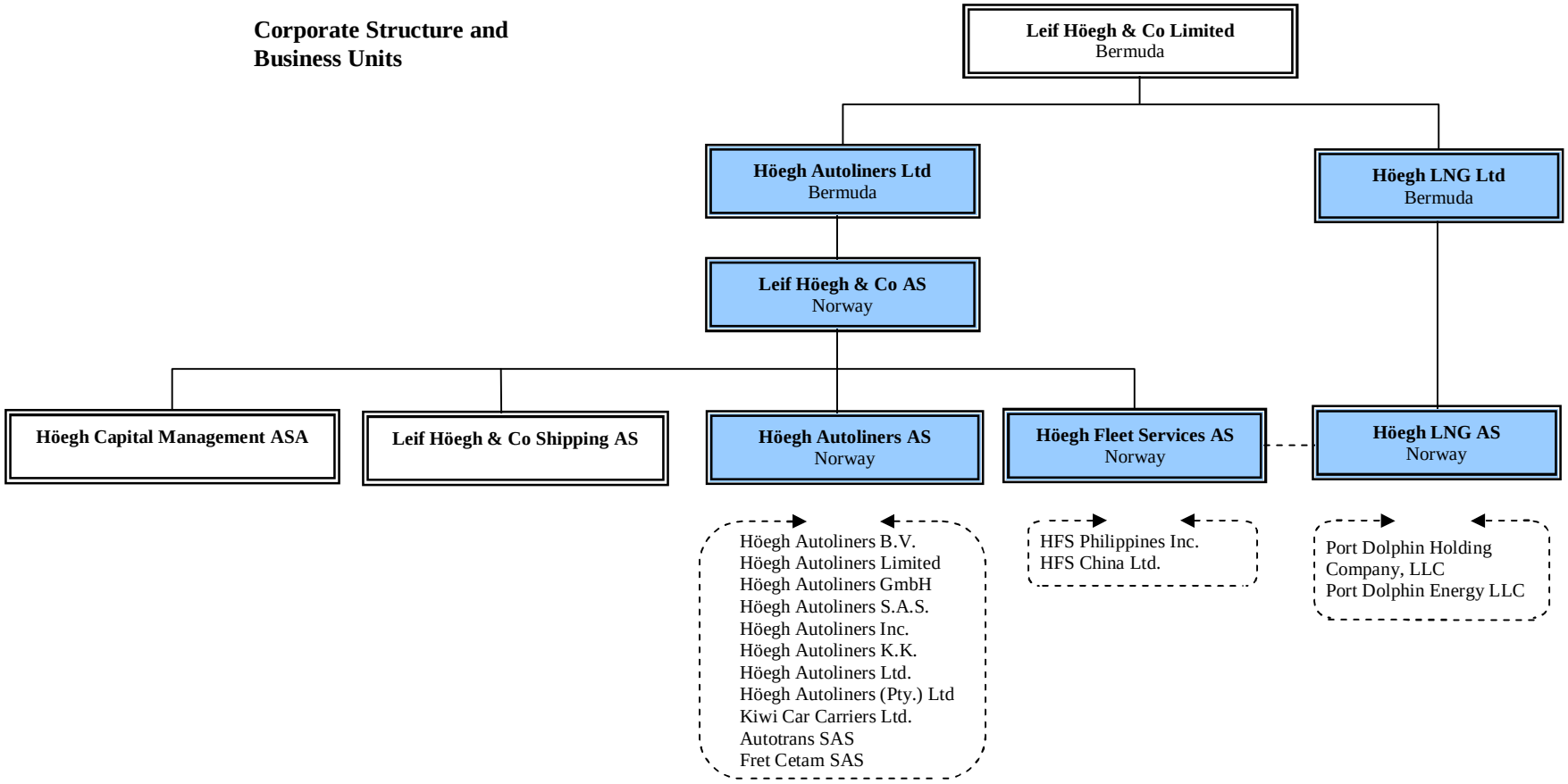
SWORN TO AND SUBSCRIBED BEFORE ME THIS ____ DAY OF MARCH 2007

_____
Notary Public, State of [FILL-IN]

Appendix A – Company Experience

Leif Höegh & Co.

Corporate Structure and Business Units



The Höegh Group of Companies

Overview

Höegh LNG In Brief

Operations

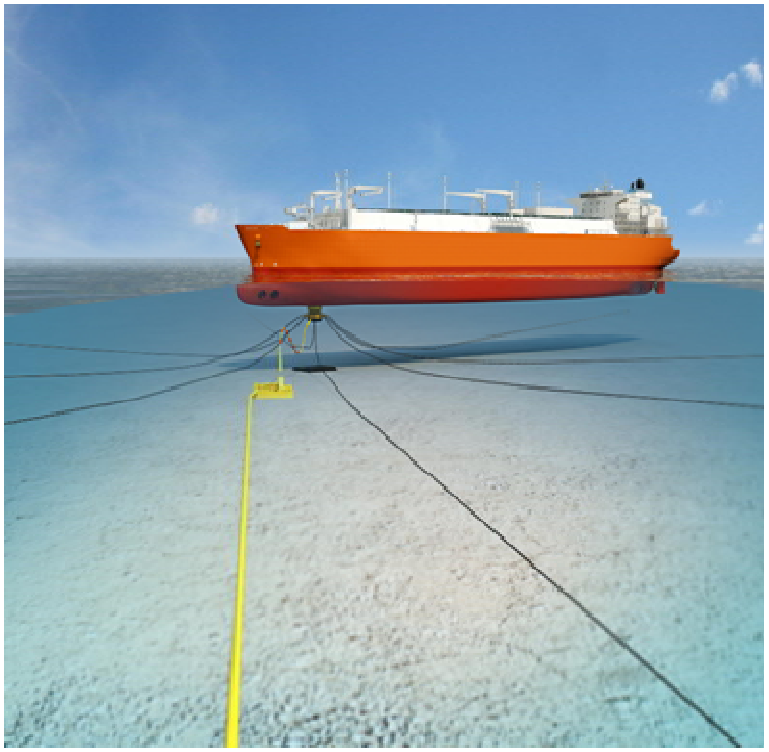
- More than 30 years of experience in the LNG business
- Builds on over three quarters of a century of experience in the shipping business
- Pioneered the use of “Moss” type vessels with spherical containment tanks
- Manages a fleet of 6 LNG ships (of which 5 are wholly or partly owned)
- Formed as independent entity within the Höegh group in 2006 as a result of its growing importance
- Offices in Oslo, Houston and London

Höegh LNG In Brief (cont.)

- Focused on becoming a significant, independent owner of LNG vessels and on developing innovative midstream terminal solutions
- Formed into four units: Fleet & Operations; Business Development; Floating Midstream Solutions/Projects; and Finance
- Innovative terminal solutions include the proposed *Port Dolphin*--proven, yet leading edge technology that eliminates the need for extensive onshore facilities
- Continued stewardship of the environment through investments in clean-burning natural gas technologies on its latest Shuttle and Re-gasification Vessels (SRVs) currently on order.

Human Resources

- Employs about 300 Mariners and 20 shore personnel
- Provided with technical, training and crewing support by Höegh Fleet Services



New construction SRV unloading
at a future submerged buoy Deepwater Port

Höegh Autoliners In Brief

Operations

- Höegh Autoliners AS is one of the leading global Ro/Ro operators with a fleet of about 50 vessels transporting a volume close to 1.4 million car equivalent units on deep sea routes worldwide.

Human resources

- Höegh Autoliners has about 400 land-based employees worldwide.
- Offices in 16 countries, Head Office in Oslo
- Höegh Fleet Services is responsible for crewing and technical management for most of the vessels

Höegh Fleet Services In Brief

- Manages Fleet Operations and Personnel in support of Höegh LNG and Höegh Autoliners
- Trains Mariners at three worldwide locations
- Oversees new construction vessels including two plus one option Shuttle and Re-gasification Vessels at Samsung Heavy Industries
- Integral to Höegh's uncompromising focus on safety and environmental compliance
- ISO 14001 certified

Höegh LNG

LNG Deepwater Port Terminal Projects
Florida and North Carolina

Profile data for Pipeline Engineering & Technology Corporation

Name: **Pipeline Engineering & Technology Corporation**

Address: **13831 Northwest Freeway, Suite 312**
Houston, TX 77040

Phone: **(713) 690-9111**
Fax: **(713) 690-0060**

President: **Ian S. Rostant**
Citizenship: **United States and Trinidad**

QUALIFICATIONS AND EXPERIENCE

PETC has successfully executed numerous projects and completed many feasibility studies and conceptual designs during the past eleven years. Most of these projects involved detailed engineering and design, as well as providing procurement, materials management, and construction management/inspection services.

Following is a partial list of studies and projects engineered, designed, and/or managed by **PETC**:

Pipeline Projects:

- Numerous horizontal directional drilled (HDD) crossings of rivers, bayous, creeks, canals, highways, railroads, shore approaches and foreign pipelines.
- A 24" natural gas pipeline to connect two existing gas pipelines in South Louisiana.

- Extensive liquid hydraulic analyses and cost estimates to optimize existing liquefied petroleum gas (LPG) gathering/transmission systems including line sizing, loop lines and pump stations.

- 62.0 miles of 8" pipeline from a plant in McNary, Louisiana to a pipeline connection at Iowa, Louisiana.

- Studied various options to clean and remove pipeline river crossings (required by the Corps of Engineers) which had been installed in the conventional cut-and-cover method.

- Modifications/enhancements to 23.0 miles of 6" pipeline, where 98% of the existing line was in the marsh/wetlands. A complete pre-test and a DOT hydrotest were included in the scope.

- Dual parallel 10" pipelines from Hackberry to Sulphur, Louisiana, a distance of 15.5 miles of which 40% was marsh/wetland.

- A lump-sum turnkey project for a 6" pipeline in a highly congested industrial area connected to a custody meter station on the delivery end.

- A brine disposal system consisting of a brine gathering piping lateral, an internally coated brine disposal pipeline and a new brine disposal well.

- Route selection, surveying, engineering, design, mapping, permitting, selection of materials and full quality assurance/quality control (QA/QC) inspection for the installation of a 10" ethane line from a Citgo plant to a tie-in point on a Trident NGL, Inc. pipeline.

- Conducted cross-country pipeline feasibility studies involving field routing, pipeline hydraulics, conceptual design and detailed cost estimates and reports for the following:

  - 25.0 miles of ethane/propane and natural gasoline dual pipelines from gas plants to petrochemical facilities;
  - 135.0 miles of 10" pipeline to handle raw product from a gas plant to a fractionator;
  - 23.0 miles of looped 8" pipeline to handle raw products from a Tenneco gas separation facility;
  - 103.0 miles of multi-product, bi-directional 12" pipeline from underground storage to a petrochemical plant;
  - 98.0 miles of product pipelines from underground storage to underground storage;
  - 22.0 miles of 8" and 10" pipelines from a Duke Energy gas plant to a tie-in point on an existing Warren Petroleum line; and

  - 55.0 miles of 12” pipeline from a natural gas processing plant to a pipeline connection.

- Seven pipelines into and out of a fractionation facility each handling a segregated product. One line was an ethane gas line involving multiple pipeline crossings and over 2,000 feet of process plant rack piping.

- 5.0 miles of 12” pipeline which included 1.5 miles of marsh and a 3,100 foot HDD river crossing.

- Detailed analyses and cost estimates of various options to submerge and backfill dual 4” and 6” pipelines crossing federal wetlands. Several site visits were conducted with the Corps of Engineers, state agencies, and contractors.

- A 4” acid gas pipeline system which included dehydration facilities and compression. Several trade-off options were analyzed including stainless steel pipe metallurgy versus a conventional carbon steel system.

- Development and implementation of a comprehensive five-year rehabilitation program for a 105.0 mile 12” by-directional pipeline. The scope of this project involved replacing numerous sensitive pipeline segments, installing aboveground mainline block valves, new scraper traps, and running of geometry and smart pigs.

- Rehabilitation and upgrade of an existing 4” pipeline from a DuPont facility in Orange, Texas to NGC in Cameron, Louisiana. This project included replacement of several sections of 4” pipeline, relocation of mainline block valves, and a complete DOT hydrostatic test.

- Complete lump sum turnkey project including surveying, permitting, engineering, design procurement and construction for the removal of an abandoned 8” pipeline and the relocation of a 20” crude oil pipeline in Sulphur, Louisiana.

- Project management, detail engineering, design and field inspection for a multiple LPG pipeline interconnection between two pipeline operating companies in Sulphur, Louisiana.

- Conceptual design, preliminary routing, preparation of preliminary alignment sheets and cost estimating for a sixty mile crude C4 (LPG) pipeline system in South Texas. This project included assessment of ROW acquisition issues, environmental permits, and field routing of the pipeline.

- Complete responsibility for preliminary surveying and mapping of a 116 mile natural gas pipeline in California ending at the Mexican border. This project involved use of GPS survey equipment and aerial mapping of the entire route for EMS (AEP).

- Detailed hydraulic analysis and pipeline studies for a 500 km crude oil pipeline in Ecuador.

- Lump sum turnkey project to connect a new natural gas well to an existing pipeline system. This project involved detail engineering, design, procurement and construction of measurement facilities and a gathering pipeline.

- DOT Location Class survey, detailed engineering and design, as-builts, job data books and consulting services for two 16" gas pipelines feeding a grass roots power plant in Seguin, Texas.

- Detail engineering and design, coordination of all permitting and ROW activities associated with the relocation of seven pipelines across the USACE Maryland Levee system. Work included continuous coordination of USACE's pile driving contractor work, construction inspection and as-built services.

- Detail assessment of nine LPG pipeline systems for geometry/smart pigging and pipeline integrity management purposes. Scope includes all detail engineering, design and as-built services.

- Complete engineering and design, mapping, inspection, as-built and consulting services for a 24" natural gas pipeline to FPLE's grass roots power plant. Scope includes manifold tie-ins, complete smart pigging facilities and several Horizontal Directional Drills.

- Development of Pipeline Integrity Assessment Plans for all PNG's pipelines to comply with TRRC Regulations. Work includes due diligence assessment of all pipeline records, field investigations, preparation of maps and risk indexing of all segments of each pipeline affecting "highly sensitive areas".

- Complete detailed engineering and design, and mapping of an HDD 8" pipeline crossing of the Calcasieu River in Louisiana. Scope included detail engineering, preparation of construction, bid packages, consulting services, and as-builts.

- Complete responsibility for alignment sheet surveying and mapping of a 116-mile natural gas pipeline in California to the Mexican border. This project involved use of GPS survey equipment and aerial mapping of the entire route.

- Detailed engineering and design and mapping for the relocation/rerouting of 18" and 12" natural gas pipelines in Clear Lake, Texas. Scope included, surveying, permitting, detailed engineering and design and included an HDD crossing and pigging facilities.

- Detailed engineering and design of mainline valve stations and pigging facilities on each end of a 17-mile 20" natural gas pipeline for the Hill Lake Gas Storage Project, Cisco, Texas. PETC's scope included complete as-built of the pipeline, job books and the DOT Location Class surveys.

- Detailed engineering and design for the replacement of a 16" brine collection and distribution pipeline system. The entire project was located in the shallow water and marsh and included tie-ins to nine LPG storage wells.

- Front-end Engineering Design (FEED) of an offshore 20" gas pipeline and condensate receiving facilities in South Texas. The scope of this project included pipe sizing, flow modeling, route selection, subsea connection and separation facilities on land.

- Detail design for the burial of 4.0 miles of 14" pipeline in the Gulf of Mexico. PETC was overall project manager and also designed the burial and anchoring structures for this pipeline.

- Performed conceptual design for a PLEM tie-in and a subsea connection to a foreign pipeline in 75 feet of water.

- Completed a study and conceptual design of a multi-pipeline offshore LNG system including 28 miles of new 24" pipe, subsea tie-in's, platform connections and compression facilities.

- Seven pipeline relocation projects in Tomball, Texas that involved the detail engineering, design, material specifications and construction inspection of four HDD crossings.

- Complete detailed engineering and design, and mapping of three HDD pipeline crossings and approximately three miles of cross-country pipelines and laterals in Nacogdoches County, Texas. The scope included detail engineering, preparation of construction, bid packages, consulting services, and as-builts.

- Complete responsibility for routing, surveying and mapping of a 35-mile LPG pipeline in Liberty County, Texas. This project involved use of GPS survey equipment, Trinity River profiling and aerial mapping of the entire route.

- Detail engineering, design and mapping for the installation of dual 24" natural gas pipelines in Louisiana. The scope included, detailed engineering and design and included two HDD crossings and pigging facilities.

Meter and Regulation Station Projects:

- Raw product (HVL) and isobutane meter station, including dual segregated pipeline laterals with tie-ins to existing Mobil pipelines. This project also included a complete SCADA/Comm. System for remote control.

- Measurement of ethane from an 8" pipeline to tie-in to an existing 10" pipeline. This project included a hot tap on the existing ethane pipeline.

- A multiple source crude/condensate measurement (LACT) and pipeline gathering network in Johnson Bayou, Louisiana. This project involved setting the LACT units in existing gas plant facilities and interfacing with existing SCADA systems.

- Complete detail engineering, design, and construction management of a custody transfer high pressure liquid ethane measurement facility including mechanical, civil, process, and I&E design.

- Lump sum turnkey project for ECLP (AEP) for a fuel gas control system and pipeline for a cogeneration facility in Longview, Texas. The scope of this project involved detailed engineering and design, procurement and construction of access roads, gas scrubber, condensate storage, control building, and several directional drill crossings.

- Detail engineering and design, and construction management of a raw product (LPG) custody measurement, control system, and pipeline from a process plant to the customer's mainline and ending at a fractionation plant.

- Lump sum turnkey project to connect existing gas processing and dehydration facilities to an existing natural gas pipeline. This project involved detailed engineering and design, procurement, and field construction of piping, measurement, instrumentation and other ancillary components for the entire project.

- Lump sum turnkey project to engineer, design, furnish and install a gas measurement facility. The scope of this project included a connecting pipeline and tie-in to a transmission pipeline in Northeast Louisiana.

- Detailed engineering and design, and construction inspection of a natural gas measurement and control facility in South Texas.

Pump and Compressor Station Projects:

- A multipurpose pump station with dual pumps including a manifold to pump any double combination of natural gasoline, liquid ethane and propane with each pump providing 100% redundancy for the other.

- A project involving the receipt of propane from a DuPont facility through a grass roots meter station at the receiving end and a booster pump station for injection into an existing LPG pipeline on the other end.

- Conducted numerous studies for the complete turnkey costs of adding booster pump stations to existing mainlines with the objective to increase throughput.

- A pipeline booster station to increase the pressure from an existing isobutane pipeline into a delivery pipeline for subsequent transmission to underground storage.

- Complete construction management and QA/QC inspection of a grass roots raw product pump station including access road, control building, and a single horizontal split-case electric driven pumping unit.

- A project involving the assessment of the optimum means of transporting raw product from a refinery through an existing 16" pipeline into a fractionator for processing. This project also involved the conceptual design and cost estimating of a pump station as well as converting the service of the existing 16" line from natural gas to liquids.

- Assignment of a team of designers to complete as-built existing LPG pump and measurement facilities including field data gathering, surveying and drafting.

- Complete detailed engineering and design, and construction management of a 1200 HP ethane compressor which was installed in a sixty thousand BPD fractionation plant in Sulphur, Louisiana.

- Conceptual design, sizing of all equipment, preparation of P&ID's, preliminary plot plan and detail cost estimates for a 1,000 HP gas compressor station in West Texas.

- Engineering and design of an ethane pump station to boost liquid ethane from one pipeline system to another in South Louisiana. The scope of this project included all I & E and SCADA and communication work.

- Complete detailed engineering and design, and construction management of a natural gas compressor station and measurement facility including mechanical, civil, process, and I & E design.

- Detail engineering and design of a raw product booster pump station. The scope of this project included all Civil, Mechanical, Piping, I & E and SCADA and communication work.

Various Facility Projects:

- Closure of an abandoned 50,000 barrel brine pond. Very rigid environmental closure parameters from the State of Louisiana had to be followed.

- Dredging of marine terminals at a slip on the Calcasieu River, Louisiana and on the banks of the Sabine River, Texas. Close coordination with the Corps of Engineers and the Natural Resource Conservation Departments in Texas and Louisiana was crucial to the success of these projects.

- Conversion/adaptation of a ship terminal to handle the loading of isobutane onto dual barges simultaneously. Major modifications to bresting dolphins and a loading arm was part of the scope.

- Receipt, storage, and truck loading of raw product (HVL) from a process plant and truck unloading into existing storage, then injection into an existing pipeline.

- Re-activation of an existing dock on the Mermentau River in Louisiana including modifications/enhancements to load LPG barges. This project included five 90,000 gallon bullets for storage of the LPG.

- A grass roots marine terminal in Texas for receiving, storing and loading dual crude/condensate barges at 5,000 BPH simultaneously. This project involved work to ensure the critical compliance with U.S. Coast Guard requirements for vapor handling technologies and the TNRCC for emissions.

- Routing, engineering, design and construction of marsh, multi-layer, board/gravel roads to grass roots facilities.

- Facilities to allow truck unloading of crude/condensate including storage tanks, measurement through LACT units, booster pump station and utilization of old and new pipelines to an island in South Louisiana for loading onto barges.

- Expansion of an existing 700,000 barrel brine pond to 2,100,000 barrels to support an existing underground LPG storage facility. A three-part containment system was used including a clay liner, a slurry wall, and an HDPE liner within the slurry wall.

- A multi-product LPG dual manifold system to receive and distribute ethane, propane, isobutane, and normal butane from Citgo Petroleum to Warren Petroleum.

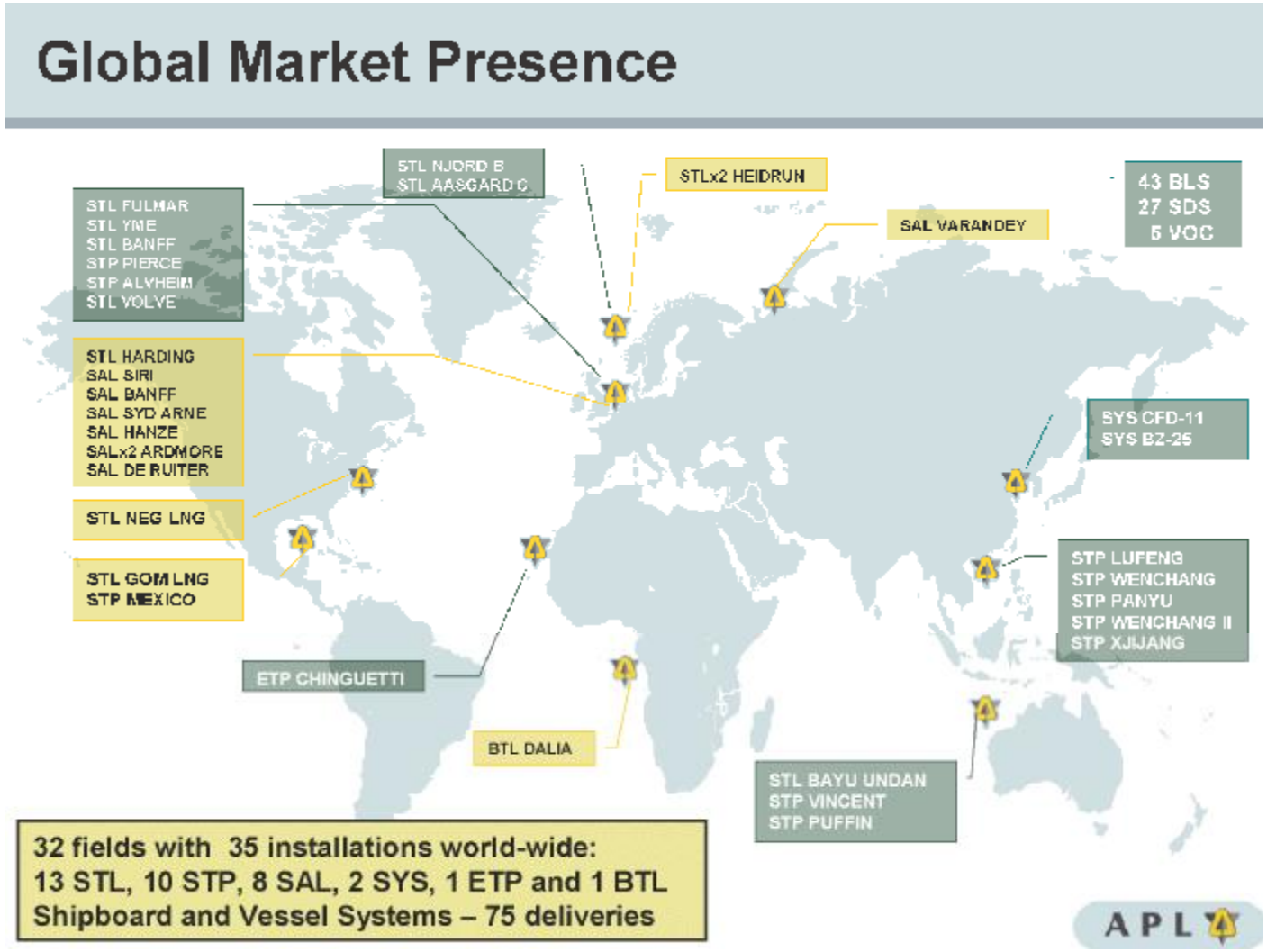
- A grass roots raw product storage and barge loading facility at Morgan City, Louisiana. This project included over fifty 90,000 gallon LPG bullets and a new dock facility.

- A comprehensive study for a sixteen well underground salt-dome storage facility including fresh water systems, brine systems, LPG pumps and associated facilities.

- Preliminary engineering, conceptual design, and estimating for the expansion of a gas and condensate facility in Texas City, Texas. This facility expansion included slug catchers, condensate stabilization, storage tanks, gas compression and pipeline facilities.

- Preliminary engineering, field as-builts, surveying, design and consulting to support EPFS with the detail assessment and estimating of sweet & sour gas compression, pipelines and 23 measurement facilities, near Kermit, Texas.

In addition to the above, Mr. Rostant (the project leader at PETC) has over 15 years in the offshore pipeline and platform industry and has been a project engineer in charge of many shallow water (less than 200 feet water depth) platforms and subsea pipeline projects. Mr. Rostant also directed all offshore pipeline and platform design and construction management projects at an international engineering and design company in Houston, Texas.


Global Market Presence
STL NJORD B
STL AASGARD C
STLx2 HEIDRUN
43 BLS
27 SDS
5 VOC
SAL VARANDEY
STL FULMAR
STL YME
STL BANFF
STP PIERCE
STP ALVHEIM
STL VOLVE
STL HARDING
SAL SIRI
SAL BANFF
SAL SYD ARNE
SAL HANZE
SALx2 ARDMORE
SAL DE RUITER
SYS CFD-11
SYS BZ-25
STL NEG LNG
STL GOM LNG
STP MEXICO
STP LUFENG
STP WENCHANG
STP PANYU
STP WENCHANG II
STP XJIJANG
ETP CHINGUETTI
BTL DALIA
STL BAYU UNDAN
STP VINCENT
STP PUFFIN
32 fields with 35 installations world-wide:
13 STL, 10 STP, 8 SAL, 2 SYS, 1 ETP and 1 BTL
Shipboard and Vessel Systems – 75 deliveries
APL

Advanced Production and Loading (APL) Detailed References

FIELD	FULMAR	HEIDRUN	HARDING	YME
Country	UK	NORWAY	UK	NORWAY
Type of System	**STL**	**STL**	**STL**	**STL**
No. of System Installed	1	2	1	1
Concept	FSO	DSL	OLT	FSO
Permanent / Disconnect	Permanent	Disconnect	Disconnect	Permanent
Design Life (years)	9	25	25	5
Year of Order	1993	1993	1994	1994
Installed Year	1993	1994	1995	1995
OPERATOR	**SHELL**	**STATOIL**	**BP**	**STATOIL**
Tanker	Vinga	Randgrid Navion Norvegia Navion Europa	Dicto Tove Knutsen Futura	Navion Saga
Size DWT	96 000	120 000	95-110 000	150 000
Passive / Dynamic Mooring	Passive	Passive	Passive	Passive
Water Depth (m)	83	350	110	95
Riser (No.x Dim..)	1x12”	1x16”	1x16”	1x7.5”
Design Hs [m]	9.8	15.5	10	12.5
Production rate (1000 bbl/day)	120	250	77	30
Anchor Type	Piles	Drag	Suction	Suction
Number of Mooring Lines	8	8	8	8
Mooring Line Buoy Element	NO	YES	NO	NO
Mooring Line Configuration	ACW	ACWW	ACW	AWCW

STL: Submerged Turret Loading / STP: Submerged Turret Production / SAL: Single Anchor Loading SYS: SAL Yoke System / BTL: Buoy Turret Loading / ETP: External Turret Production A:Anchor / C:Chain / W:Wire /R:Rope /Y:Yoke

FIELD	**NJORD**	**LUFENG**	**PIERCE**	**SIRI**
Country	NORWAY	CHINA	UK	DENMARK
Type of System	**STL**	**STP**	**STP**	**SAL**
No. of System Installed	1	1	1	1
Concept	FSO	FPSO	FPSO	OLT
Permanent / Disconnect	Permanent	Disconnect	Permanent	Disconnect
Design Life (years)	20	15	15	10
Year of Order	1995	1996	1997	1998
Installed Year	1997	1997	1998	1998
OPERATOR	**HYDRO**	**STATOIL**	**ENTERPRISE**	**STATOIL**
Tanker Size DWT	Njord FSU 100 000	Navion Munin 103 000	Berge Hugin 103 000	Shuttles (BLS) 100 -125 000
Passive / Dynamic Mooring	Passive	Passive	Passive	Passive+TA
Water Depth (m)	330	330	85	60
Riser (No.x Dim..)	1x10”/1xEC (10KV 11MW)	2x7”/2xUmb	3x10”/ 2x8” /1x6”/ 1xUmb	1x14”
Design Hs [m]	16.2	7	12.8	7
Production rate (1000 bbl/day)	70	60	45	40
Anchor Type	Suction	Suction	Piles	Suction
Number of Mooring Lines	8	6	8	1
Mooring Line Buoy Element	YES	YES	NO	YES
Mooring Line Configuration	ACWWW	ACWW	AWCW	AWWRRC

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FIELD	**ASGARD C**	**SOUTH ARNE**	**BANFF**	**BAYU UNDAN**
Country	NORWAY	DENMARK	UK	Australia
Type of System	**STL**	**SAL**	**SAL**	**STL**
No. of System Installed	1	1	1	1
Concept	FSO	OLT	OLT	FSO
Permanent / Disconnect	Permanent	Disconnect	Permanent	Permanent
Design Life (years)	30	20	10	25
Year of Order	1998	1998	1998	2000
Installed Year	1999	1999	1998	2002
OPERATOR	**STATOIL**	**AMERADA HESS**	**CONOCO**	**PHILLIPS**
Tanker Size DWT	Jorunn 125 000	Shuttle (BLS) 100-125 000	Wilma Yukon N. Svenita 100 000	TBA **LPG** 175 000
Passive / Dynamic Mooring	Passive	Passive	Passive	Passive
Water Depth (m)	290	60	95	80
Riser (No.x Dim..)	1 x 12” +2 x 14”	1 x 14”	1x12”	1x12”+2 x 6” +1 x 4”
Design Hs [m]	15.7	6	7	7.3
Production rate (1000 bbl/day)	60	50	95	**LPG**
Anchor Type	Suction	Piles	Suction	Piles
Number of Mooring Lines	9	1	1	12
Mooring Line Buoy Element	YES	YES	YES	NO
Mooring Line Configuration	ACWWW	AWWRRC	AWWRRC	ACW

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SYS: SAL Yoke System / BTL: Buoy Turret Loading / ETP: External Turret Production
A:Anchor / C:Chain / W:Wire /R:Rope /Y:Yoke

FIELD	**WENCHANG**	**HANZE**	**BANFF**	**PAN YU**
Country	CHINA	HOLLAND	UK	CHINA
Type of System	**STP**	**SAL**	**STL**	**STP**
No. of System Installed	1	1	1	1
Concept	FPSO	OLT	FSO	FPSO
Permanent / Disconnect	Permanent	Disconnect	Permanent	Permanent
Design Life (years)	20	20	15	10
Year of Order	1999	1999	2000	2001
Installed Year	2001	2001	2000	2003
OPERATOR	**CNOOC**	**VEBA**	**CONOCO**	**DEVON**
Tanker Size 1000 DWT	TBA 150 000	 30 – 95 000	TT Nordic Apollo 130 000	 150 000
Passive / Dynamic Mooring	Passive	Passive	Passive	Passive
Water Depth (m)	120	42	95	94
Riser (No.x Dim..)	2 x 10” + 2 Power Cables	1 x 12”	1 x 12”	2 x 12” + 2 Power Cables
Design Hs [m]	12.1	7	12.4	13.1
Production rate (1000 bbl/day)	60	30	90	70
Anchor Type	Suction	Suction	Driven piles	Suction
Number of Mooring Lines	9	1	8	9
Mooring Line Buoy Element	NO	Clump Weight	NO	NO
Mooring Line Configuration	CWCW	ARRC	ACWCW	CWCW

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FIELD	**VARENDEY**	**ARDMORE**	**CFD11**	**BZ25**
Country	RUSSIA	UK	CHINA	CHINA
Type of System	**SAL**	**SAL**	**SYS**	**SYS**
No. of System Installed	1	2	1	1
Concept	OLT	OLT	FPSO	FPSO
Permanent / Disconnect	Disconnect	Disconnect	Permanent	Permanent
Design Life (years)	20	7	25	25
Year of Order	2002	2002	2002	2003
Installed Year	2002	2003	2004	2004
OPERATOR	**MURMANSK SHIPPING COMPANY**	**TUSCAN ENERGY**	**KERR MCGEE**	**CNOOC**
Tanker Size DWT	Saratov Usinsk 20 000	Petrotrym Petrotroll 75 000	TBA 150 000	TBA 150 000
Passive / Dynamic Mooring	Passive	Passive	Passive	Passive
Water Depth (m)	12	80	25	18
Riser (No.x Dim..)	1x 16”	1x 8”	4 x 14”	4 x 14”
Design Hs [m]	2 for loading	7	5	5
Production rate (1000 bbl/day)	10		60	75
Anchor Type	Suction	Suction	Piles	Piles
Number of Mooring Lines	1	1	2	2
Mooring Line Buoy Element	Clump Weight	Clump Weight	Yoke	Yoke
Mooring Line Configuration	A-HOSE	ARRC	AC	AC

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FIELD	GULF GATEWAY	DALIA	CHINGUETTI	ALVHEIM
Country	USA	ANGOLA	MAURITANIA	NORWAY
Type of System	**STL**	**BTL**	**ETP**	**STP**
No. of System Installed	1	1	1	1
Concept	LNG Terminal	OLT	FPSO	FPSO
Permanent / Disconnect	Disconnect	Disconnect	Permanent	Permanent
Design Life (years)	40	20	15	25
Year of Order	2003	2003	2004	2004
Installed Year	2004	2006	2005	2006
OPERATOR	**EXCELERATE**	**TOTAL**	**WOODSIDE**	**MARATHON**
Tanker Size DWT	Excelsior Excellence 138 00 cbm	 350 000	 280 000	Odin 100 000
Passive / Dynamic Mooring	Passive	Passive	Passive	Passive
Water Depth (m)	90	1350	695	125
Riser (No.x Dim..)	14”	2 x 18.5”	5 x 10”+2 x 8” + 2 x 6” + 2 x Umb.	3 x 10.6” + 3 x 12.5” + 9.6” + 8” + 3 x Umb.
Design Hs [m]	5	4.6	6.1	14.6
Production rate (1000 bbl/day)	690 MMSCFD Natural Gas		100	
Anchor Type	Suction	Suction	Suction	Suction
Number of Mooring Lines	8	6	9	12
Mooring Line Buoy Element	N/A	N/A	N/A	N/A
Mooring Line Configuration	ACW	ACWCCWC	ACRC	AWCW

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FIELD	DE RUYTER	VOLVE	KMZ	WENCHANG II
Country	HOLLAND	NORWAY	Mexico	China
Type of System	**SAL**	**STL**	**STP**	**STP**
No. of System Installed	1	1	1	1
Concept	OLT	FSO	FPSO	FPSO
Permanent / Disconnect	Disconnect	Permanent	Permanent	Permanent
Design Life (years)	15	10	15	25
Year of Order	2004	2004	2005	2005
Installed Year	2006	2006	2006	2007
OPERATOR	**PETROCANADA**	**STATOIL**	**PEMEX**	**CNOOC**
Tanker Size DWT	 30 000 - 95 000	Navion Saga 159 000	Berge Enterprise 360 700	 100 000
Passive / Dynamic Mooring	Passive	Passive	Passive	Passive
Water Depth (m)	33	90	78	125
Riser (No.x Dim..)	16”	8”	5 off 15”	12”+2 off 10”+10” future
Design Hs [m]	7	14.3	8.6	12.1
Production rate (1000 bbl/day)	20	60	600	
Anchor Type	Suction	Pile	Pile	Pile
Number of Mooring Lines	1	9	12	9
Mooring Line Buoy Element	Clump Weight	N/A	N/A	N/A
Mooring Line Configuration	ARRC	ACWCW	ACWCW	ACWCW

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FIELD	**XIJIANG**	**KITTIWAKE**	**MAARI**
Country	China	UK	New Zealand
Type of System	**STP**	**SAL**	**STP**
No. of System Installed	1	1	1
Concept	FPSO	OLT	FPSO
Permanent / Disconnect	Permanent	Disconnect	Permanent
Design Life (years)	25	5	15
Year of Order	2005	2005	2006
Installed Year	2007	2005	2008
OPERATOR	**CNOOC**	**VENTURE**	**OMV**
Tanker Size DWT	 100 000	Petrotrym Petrotroll 75 000	Andaman Sea 108 000
Passive / Dynamic Mooring	Passive	Passive	Passive
Water Depth (m)	90		101
Riser (No.x Dim..)	12”	1x 8”	2x10”+8”+EC
Design Hs [m]	12.7	7	10.8
Production rate (1000 bbl/day)		SAL RE USE (ARDMORE)	40
Anchor Type	Pile	Suction	Pile
Number of Mooring Lines	9	1	8
Mooring Line Buoy Element	N/A	Clump Weight	N/A
Mooring Line Configuration	ACWCW	ARRC	ACWCW

STL: Submerged Turret Loading / STP: Submerged Turret Production / SAL: Single Anchor Loading
SYS: SAL Yoke System / BTL: Buoy Turret Loading / ETP: External Turret Production
A:Anchor / C:Chain / W:Wire /R:Rope /Y:Yoke

FIELD	**NORTH EAST GATEWAY**	**VINCENT**		
Country	USA	AUSTRALIA		
Type of System	**STL**	**STP**		
No. of System Installed	2	1		
Concept	LNG Terminal	FPSO		
Permanent / Disconnect	Disconnect	Disconnect		
Design Life (years)	40	25		
Year of Order	2006	2006		
Installed Year	2007	2008		
OPERATOR	**EXCELERATE**	**WOODSIDE**		
Tanker Size DWT	Excelsior Excellence 138 000 cbm	 300 000		
Passive / Dynamic Mooring	Passive	Passive		
Water Depth (m)	85	350		
Riser (No.x Dim..)	14”			
Design Hs [m]	9.1	7		
Production rate (1000 bbl/day)	400 – 690 MMSCFD Natural Gas			
Anchor Type	Suction	Drag		
Number of Mooring Lines	8	9		
Mooring Line Buoy Element	N/A	Yes		
Mooring Line Configuration	ACW	ACWWW		

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A:Anchor / C:Chain / W:Wire /R:Rope /Y:Yoke

Appendix B – USACE Permit

(Filed under separate cover)

Appendix C – Water Certification Application

(Filed under separate cover)

Appendix D – NPDES Permit Application

(Filed under separate cover)

Appendix E – CZM Consistency Certification Application

(Filed under separate cover)

Appendix F – Location Tables

F-1 Arrangement Drawings

(Filed under separate cover)

Appendix G – Air Permit Application

(Filed under separate cover)

Appendix H – MMS Right of Way Grant Application

(Filed under separate cover)