PETROBRAS TRANSPORTE S.A.
TRANSPETRO

PORT INFORMATION

Terminal **PECÉM**

2nd edition / 2010

SUMMARY

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Introduction

This Port Information was prepared by Petrobras Transporte S.A. (TRANSPETRO), which operates the Pecém LNG Flexible Terminal, state of Ceará. It provides essential information for ships operating at the terminal. This document is also distributed internally in the organization, to interested parties at the port and to local and federal authorities.

Operations by ships at the Pecém LNG Flexible Terminal should be in accordance with recommendations by ISGOTT – International Safety Guide for Oil Tankers and Terminals, by OCIMF Marine Terminal Baseline Criteria and Assessment Questionnaire and International Conventions by the International Maritime Organization (IMO).

This Port Information has Portuguese and English versions.

The information contained in this publication is intended to complement and never to replace or change any kind of legislation, instructions, guidance, or official publications, domestic and international. Hence, whatever is opposed to any item in the above-mentioned documents should not be considered.

The Terminal reserves itself the right to change any of its operating features described herein without previous advice.

Should any erroneous information be found in need of updating, please get in touch with:

Coordenação dos Terminais Aquaviários de Mucuripe e Pecém
Avenida Leite Barbosa, s/n
60180-420 – Fortaleza – CE
Phone: (55 85) 3266-4301
Cell Phone: (55 85) 9637-9916

Petrobras Transporte S.A. – Transpetro
Avenida Presidente Vargas, 328, 9th floor Centro
20091-060 – Rio de Janeiro – RJ
Phone: (55 21) 3211-9085
Fax.: (55 21) 3211-9067

This Port Information's most recent version and those of other Transpetro terminals may be obtained through the following address: **http://www.transpetro.com.br**

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Definitions

BP (Bollard-Pull) – A Vessel's Static Longitudinal Traction.

CARRIER – Supply Ship.

DAM – Pier Mooring Bollards (without fenders).

DAT – Pier Mooring Bollards (with fenders).

SQUAT EFFECT – Increase in a ship's draft due to the increase in speed when sailing in restricted waters.

FSRU – Floating Storage and Regasification Unit.

GIAONT – Operational Inspection and Monitoring Group for Ships and Terminals.

LNG – Liquefied Natural Gas.

CNG – Compressed Natural Gas.

IMO – International Maritime Organization.

ISGOTT – International Safety Guide for Oil Tankers and Terminals

ISPS Code – International Ship and Port Facility Security Code.

KOD – Knock Out Drum

SPRING TIDES – Condition whereby a tide reaches its maximum amplitude at certain times of the year.

OCIMF – Oil Company International Marine Forum

LCP – Local Contingency Plan.

ERP – Emergency Response Plan.

POB – Pilot on Board.

STCW – Seafarers Training Certificate and Watchkeeping.

SWL – Safe Working Load (Working Load Capacity).

DWT – Deadweight Tons.

UN-BUNKER – Petrobras Department that markets bunker stocked at Transpetro Terminals.

UTC – Universal Time Center (Standard Universal Time).

VTS – Vessel Traffic Service (Vessel Traffic Control Service).

VT2 – Vessel Type (Ship for stocking and regasifying LNG).

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Reference Letters and Documents

Information on the LNG transfer Pier between ships may be obtained in nautical chart DHN-705, which may be acquired by the Shipping Agency and made available to the interested party. Comments and information disclosed in Notices to seafarers at **www.dhn.mar.mil.br**.


WELD

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Documents and Exchange of Information

The items listed below should be prepared by the Terminal or by the Ship, or both as shown in the table.

Information	Prepared by			Delivered by			Comments
	Terminal	Ship	Both	Terminal	Ship	Both	
Before Arriving							
Estimated Time Arrival (ETA) and Information on vessel		X		X			
Before Transfer of Transshipment							
Detail on cargo / slop / ballast on board		X		X			
Information essential to the operation (complete on the spot)	X				X		
Ship / Shore Safety Check List			X			X	According to MOP

continue

Information	Prepared by			Delivered by			Comments
	Terminal	Ship	Both	Terminal	Ship	Both	
During Transshipment							
Repeat Ship / Shore Safety Check List			X			X	As established by ISGOTT
After transfer of cargo or bunker, before sailing							
Information necessary to unmooring ship			X			X	Amount of fuels and water on board
After unmooring, on way out of port							
Information on port exit data		X		X			Time pilot left ship and of departure from port

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Description of Port and Anchorage Area

5.1 Overall Description

The Pecém LNG Flexible Terminal is a Petrobras Transporte S.A. (Transpetro) administrative and operating body, the facilities of which are close to the city of Fortaleza, in the State of Ceará.

In addition to Transpetro, there are other port operators in activity at the Pecém Port Terminal.

The Pecém Port Terminal is an artificial outer port for mixed use owned by the Government of the State of Ceará, and the port authority is:

Companhia de Integração Portuária do Ceará – CEARÁPORTOS

Esplanada do Pecém, s/n – Distrito do Pecém
São Gonçalo do Amarante – Ceará
Postal Code: 62674-000
Corporate Taxpayers' Enrollment: 01.256.678/0001-00

CGC: 06.983.506-3
Municipal Enrollment: 450058-0

Telephone: (85) 3315-1977 (24-hour assistance)
Fax: (85) 3315-1974
Email: **cearaportos@cearaportos.ce.gov.br**

Pecém Port Terminal

The Pecém Port Terminal is composed basically of an L-shaped protection breakwater parallel to the pier, of 868 meters, and another parallel to the beach of 900 meters, starting from the original coastline and accommodating two docking facilities, both in the form of a pier and each with two mooring berths, pier 1 being reserved for commercial operations and pier 2 LNG transshipments between vessels.

The port works 24 hours per day during the entire year.

The Pecém LNG Flexible Terminal is responsible for transshipments of LNG between LNG tankers and for sending CNG to the GASFOR Pipeline.

Access by land to the Terminal can be made by means of the federal highways BR-101 and BR-222, and by state highway CE-422.

Local time in the region is three hours behind Greenwich Mean Time.

The state of Ceará does not adopt summer time.

5.2 Location

5.2.1 Coordinates

Its geographical position is Latitude 03°30'00" S and longitude 39°50'00" W.

5.2.2 General Geographic Location

The inter-ships LNG transfer pier is located in a mixed-use port located at Esplanada do Pecém, s/n – District of Pecém, municipality of São Gonçalo do Amarante, on the west coast of Ceará, 56 km by road from the city of Fortaleza.

5.3 Approaches to the Terminal

5.3.1 Overall Description

The approach to the Pecém Port Terminal has well-defined approach points.

The access channel to the Port is not signaled. The docking facilities are connected directly to the open sea.

Pier 2 where the LNG transfer operations are performed can receive ships of not more than 175,000 DWT.

With depth that may vary from 14 to 18 meters, its use should respect a maximum draft of 15.5 meters.

5.3.2 Anchorages

Recommended or Designated Anchorages

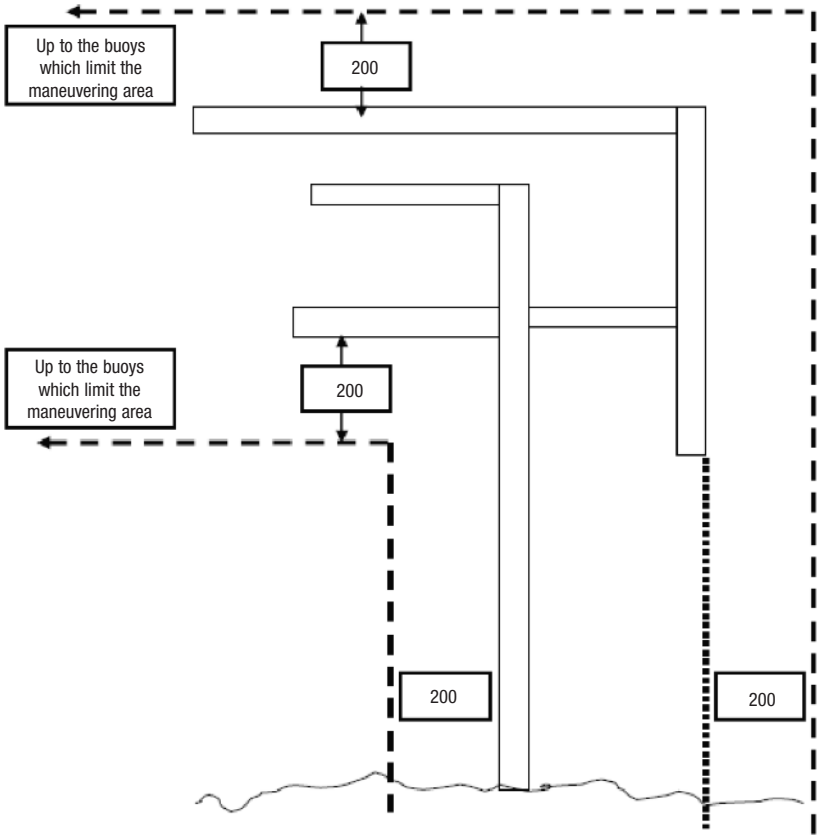
Number	Location	Radius	Depth	Note
01	03º28' S 38º49' W	0.6	15.5	There is an exclusive anchorage for LNG ships

5.3.3 Navigation Aids

There is no signaled access channel and the docking facilities are connected directly to the open sea, limited by the breakwater and the west buoy in the maneuvering basin.

5.3.4 Port Limits

The authorized limits in the Pecém Port Terminal are 200 meters away from the port structure (piers, bridge, and breakwater), and extend to the buoys that limit the maneuvering basin as illustrated in the following figure:



5.3.5 Port Control or VTS

Maritime authority at the Pecém Port Terminal is exercised by the State of Ceará Port Authority under the Ministry of the Navy.

Capitania dos Portos – CP-CE
Avenida Vicente de Castro, 4917
Bairro Mucuripe – Fortaleza – CE
Postal Code: 60180-410
Telephone (85) 3219-7555
Email: **info@cpce.mar.mil.br**

Use of the anchorage area and port access by ships will be authorized by CEARÁPORTOS, according to previous approval by the Maritime, Customs, Sanitary, and Maritime Police Authorities.

Except in the case of a stopover, the ship-owner, forwarder or its agent, as applicable, should apply for previous authorization and to this end should provide the following information at least 24 hours before the ship's arrival:

- Name of vessel;
- Flag under which it sails;
- Nature and direction of journey;
- Last port of call and next port of call;
- Name and address of the party responsible for the vessel and for payment of port fees;
- Characteristics of vessel: (1) total length and width; (2) deadweight tons, gross registered tonnage, and net registered tonnage; (3) maximum draft, draft on entry and estimated draft on exit;
- Nature of operation;
- Copy of the bill of lading to be unloaded or shipped, or a provisional detailed cargo list undersigned by the person in charge for the ship or its agent;
- Number of passengers coming ashore or boarding;
- Estimated arrival and departure dates;
- Any irregular or abnormal fact likely to affect navigation security or to jeopardize the efficient use of the port facilities;

→ Indication of the need to use equipment and services, and the load / unload rate;

→ Time estimated to handle and accommodate cargo;

→ Ancillary services to be used.

In the case of vessels carrying hazardous goods, the ship-owner, the carrier or its agent should provide the following specific and additional data, jointly with the information contained in the above items:

→ Name of goods according to the IMDG Code, by the United Nations Organization's International Maritime Organization – IMO, and flash point, if applicable;

→ The amount of hazardous cargo on board, describing which is to be unloaded at the Terminal and which will remain on board, with the latter's location in the vessel;

→ The state of the hazardous goods and the likelihood of incidents taking place;

→ Information on whether the vessel has an insurance certificate to carry hazardous goods.

5.3.6 Pilotage

Pilotage inside and outside of the port area is mandatory for all ships bound for the Pecém Port Terminal. Pilots may be requested through the vessel's agent 24 before arrival. They may be requested by means of VHF radio-telephone channel 10 or 16. If the ship has a mobile telephone available, a pilot may be requested through the Petrobras Agency at telephone number 55 85 3266 3582 or mobile number 55 85 9909 5771.

The pilot's **boarding** and unboarding location is in position:

→ LAT = 03º 29' 0" S and LONG = 038º 48' 4" W.

Ships should have sufficient ballast and be duly equipped with mooring gear and the respective accessories.

When unmooring, pilots may be requested according to the operation's estimated conclusion and time for clearing cargo, informed by the ship.

Each captain is the only person responsible for maneuvers, and who will provide the pilot with all information on any particularity, specific conditions, or existing difficulties, such as: deficiency in engines, boilers, problems or failures in navigation aiding devices, mooring cables, or any other item likely to result in danger with regard to mooring, detaching mooring lines, loading and unloading the ship.

5.3.7 Tugboats and Port Services

Tugboat services are listed in item 8.3. "Tugboats and other Maritime Services."

5.3.8 Navigation Risks

The key obstacles to navigation are fishing boat traffic, such as j*angadas* (a type of light raft-like small boat), canoes, and rowing boats close to the port. With regard to draft, please see item 5.4.2.

5.3.9 General Restrictions

There are no restrictions in maneuvering ships, which may moor and unmoor under any tide, save specific conditions such as the lack of lighted signaling, the existence of cyclical events, whether or not natural, or other joint decision between pilots and the companies involved, likely to require time restrictions. In the case of LNG ships, there are specific recommendations in the KNAPP-CE (pilotage norms). Please note that it is the responsibility of Cearaports, the port authority, to define the times and sequence of maneuvers, according to its business interests. When defining maneuvering procedures, the parties involved (ship, terminal, and authorities) should attempt to reconcile the interests of the Norms (KNAPP), the Port Authority, and safety of the LNG ship / terminal operation.

5.4 Maneuvering Basin

Between Pier 02 and the breakwater's NW arm, the distance is of 450 meters and with a depth from 16 to 18 meters, the maneuvering basin in which ships of as much as 300 meters in length may be maneuvered. In the case of ships in excess of 300 meters, maneuvers should take place with the support of tugboats and outside the docking area.

5.4.1 Assistance for Berth

For mooring and unmooring tasks, the Pecém Port Terminal has its own labor force and individual labor agreements.

5.4.2 Bathymetric Surveys

The Ceará Basin is located on the continental platform on Brazil's equatorial shore, covering an area of roughly 34,000 km^2. The sea bottom morphology in this area is composed of three very distinct levels. The first, located on the inner platform of not more than 30 meters in depth, displays a surface leveled by sedimentation processes, with undulation marks of around 20 cm in height.

On the second level, from 30 to 50 meters in depth, there is topographical gradient, which varies from gradual to abrupt. The contours begin to appear irregular, probably

resulting from erosive remnants, with the presence of coralline algae banks and dispersed depressions of gradual contours. The third level detected proceeds to as much as 70 meters in depth and displays a more abrupt topographical gradient with the presence of coralline algae banks.

The sea bottom topography in the Pecém Port Terminal region has a great occurrence of rocks in the surf area. Next to Ponta do Pecém there are considerable areas covered by such outcroppings.

The results of a seismic survey point to volcanic rocks that form a sea bottom base covered by sandy sediments and mud. Thickness of the sediment layer varies from zero to 16 meters for the on-shore and off-shore directions, and parallel to the coastline. This is cause chiefly by fluctuation of the limit level of the rocky base's lower layer.

Thickness of the sandy layer is not expressive at depths below 10 meters.

At depths of roughly 10 to 16 meters, volcanic rock prevails. At depths greater than 16 meters, the bottom's surface is covered predominantly by sandy sediments.

5.4.3 Minimum and Maximum Dimensions

In principle, the supply of LNG may be undertaken by ships between 70,000 and 210,000 m^3 in capacity, with the following dimensions:

Minimum:

→ Total length (LOA): 235 meters;

→ Molded breadth: 34 meters;

→ Molded draft: 10 meters;

→ Deadweight (DWT): 48,500 tons;

→ Cargo capacity: 70,000 m^3.

Reference – Methane Arctic and Methane Polar LNG Ships

Maximum:

→ Total length (LOA): 315 meters;

→ Molded breadth: 50 meters;

→ Molded draft: 15.50 meters;

→ Cargo capacity: 218,000 m^3.

Reference – Q-FLEX LNG Ship

5.5 Meteorological Conditions

5.5.1 Prevailing Winds

Strong winds are very common in the region and may prevent docking maneuvers as well as interrupt operations. The prevailing winds are described in the table below:

Direction	Frequency	Average speed
SE / NO	70%	15 Km/h

In the case of winds above 30 knots in the direction 67 – 112 degT, with a 2.4 meter wave height and Tp 15s period, operations with ships should be interrupted and the arms disconnected.

In the case of winds above 35 knots in the direction 67 – 112 degT, with a 2.4 meter wave height and Tp 23s period, ships should leave the pier.

5.5.2 Waves

In Pecém at latitude 03° 29' 31" and longitude 38° 59' 03", there is a directional wave gauge.

The occurrence of waves above 3 meters is of 11.23%. Above 4 meters it is of 0,22%, and the maximum wave is in the 4.6 to 4.7 meter class, which occurred twice between March 13, 1997 and January 23, 1999.

The most frequent Significant Wave Height (Hs) varies in the Hs grouping between 0.90 and 2.10 meters and is of 96.32%. The maximum significant wave class varies from 2.4 to 2.5 meters, with three occurrences in the period from March 13, 1997 to January 23, 1999.

With regard to direction, there are two dominant groups:

→ 90° ≤ D ≥ 120° with 66.74 % of occurrences;

→ 30° ≤ D ≥ 60° with 21.19 % of occurrences;

5.5.3 Rainfall and Humidity

Rainfall varies and may rise to the monthly average from 13.4 mm (November) to 336.3 mm (March), with air humidity varying from 70% to 85%.

5.5.4 Atmospheric Pressure

→ Minimum: 1.0074 bar

→ Average: 1.0087 bar

→ Maximum: 1,0100 bar.

5.5.5 Visibility

Normally considered from good to excellent, may be reduced during the rainy season. The months with a greater percentage of cloudiness extend from January to June.

5.5.6 Sea Currents

The tide's current has a 1-knot speed in the SE direction.

The current in the inner berths are weak owing to the protection by the NW arm.

5.5.7 Tides

→ Average level: 1.42 meter

→ Average spring tide amplitude: 2.36 meters

→ Average spring high tide: 2.70 meters

→ Average neap high tide: 2.08 meters

→ Maximum Amplitude: 3.01 m.

5.5.8 Measurements

The Terminal has available immediate information on the intensity and direction of winds and currents. When vessels approach to berth, this information may be made available by VHF radio to the ship by the Terminal operator.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Description of Terminal

6.1 Overall Description

The Pecém LNG Flexible Terminal has a type I pier for LNG transshipments, with an outer (north) and an inner (south) berth, both with a 15.5 meter draft.

6.2 Physical Details of Berths

Pecém Pier						Pecém Port Terminal			
Berth's Name/ Number	Type	Length (m)	Depth (m)	Tides (m)		Breadth (m)	Length of Vessel (m)	Goods Handled	Notes (Describe any docking assistance)
				Spring	Neap				
2	Pier	482	15.5	3.01	1.9	34	315	LNG and by-products	**North Berth:** LNG unloading **South Berth:** Loading LNG and unloading CNG

6.3 Docking and Mooring Arrangements

Berth	Pilot	Vessel Deadweight DWT	Tugboat Nº and BP				Approach (maximum)		Mooring Points		Mooring Cables		
			Docking		Sailing		Speed	Angle	Bollard	Hook	Line	Breast	Spring
			Nº	BP	Nº	BP	cm/s						
North	Yes	100,000	4	150t	4	150t	12	005º	10	20	4	2	2
South	Yes	175,000	4	150t	4	150t	12	005º	10	22	Bow prow 4 Stern 2	2 4	2 2

6.4 Fenders

Fenders of the type SUC-2000-H rubber grade RH are employed in Pier 2, and both berths have four of these. The maximum acceptable limit of final reaction per unit is 246.10 tons.

6.5 Characteristics of Loading and Unloading Berth

The outer berth (north) where the supply ship will dock, is endowed with three unloading arms with the following sequence LNG – Steam-LNG. The inner berth (south) where the VT will dock, is endowed with five unloading arms, two of which for LNG, one for steam return, and two for CNG. Manifolds and transfer lines interconnect both berths and allow transshipment of cargo and exports of natural gas. The table below contains technical data on the arms.

Arms of the LNG Pier

Berth	Arm	Manufacturer	Product	Diameter	Flow (m^3/h)	Pressure (kgf/cm^3 g)	Temp. (°C)
North	MLA-01	Emco Wheaton	LNG	16"	5,000	3.5	-162
	MLA-02	Emco Wheaton	Steam	16"	15,000	0.13	-140
	MLA-03	Emco Wheaton	LNG or Steam	16"	5,000	3.5	-162
South	MLA-04	Emco Wheaton	LNG or Steam	16"	5,000 / 15,000	1.6	-162
	MLA-05	Emco Wheaton	Steam	16"	15,000	0.2	-140
	MLA-06	Emco Wheaton	CNG	16"	5,000	1.6	-162
	MLA-07	Emco Wheaton	CNG	12"	7,000	58 to 100	5 to 50
	MLA-08	Emco Wheaton	CNG	12"	7,000	58 to 100	5 to 50

LNG Pier's work performance

→ **North berth's LNG arms:**
Breadth: 8.9 meters
Maximum height = 28.75 meters
Minimum height = 15.89 meters

→ **South berth's LNG arms:**
Breadth: 8.9 meters
Maximum height = 26.20 meters
Minimum height = 18.04 meters

→ **South berth's CNG arms:**
Breadth: 8.9 meters
Maximum height: 26.20 meters
Minimum height: 18.04 meters

6.6 Management and Control

The Terminal has an entirely automated electronic operating supervisory control center, whereby all the terminal's operations are monitored 24 hours per day.

The points monitored encompass:

Item	Loading	Unloading	Transshipment	Supplies	Transfers to Companies
Pumps	X	X	X	—	—
Shore manifold	X	X	X	—	—
Ship manifold	X	X	X	—	—
Pier pipelines	X	X	x	—	—

6.7 Main Risks

Communications between forwarder and receiver is immediate and made by means of a UHF/VHF radio, in addition to other means. In case of abnormal events, any of the parties, terminals, or ships may execute or request the immediate interruption of operations. In case of leakages, pollution, pressure surges, or contamination of products, fluctuations in tensions of the mooring cables and/or storms with rays in any periods during the day, the terminal or ship will stop operating immediately, isolate the area, activate the contingency plan (if required), and start mitigating the incident.

7

PROCEDURES

7.1 Before Arrival

7.1.1 Ships bound for the Pecém terminal should inform their Estimated Arrival (ETA) 72, 48, 24, and 4 hours in advance directly to the respective agent and the operating area, by email, telex, or telephone. Changes to or confirmation of the ship's arrival should be informed at least 12 hours in advance. The ETA should always be informed, using UTC time.

7.1.2 The Terminal reserves itself the right to refuse berth or operations by any ship deemed to be inadequate, that does not comply with safety or mooring conditions, or any circumstances likely to put the Terminal at risk, caused by: Personnel, equipment, the environment, or non-compliance with recommendations provided for under the ISGOTT.

7.2 Arrivals

7.2.1 The port authorities will be activated by the ship agents owing to arrivals, who will also provide docking estimates. In general, visits will occur after docking.

7.2.2 Information from Terminal to ship and vice-versa are described in item 4.

7.2.3 In order to optimize the transfer operation, it is recommended that supply ships arrive at the Terminal with steam pressure in their cargo tanks of not over 80 mBar. For the same reason, it is recommended that the cargo and transfer lines be cooled during berth procedures.

7.3 Berth

7.3.1 The ship's mooring system

Mooring lines should be given permanent attention in order to always maintain the ship moored. All the lines should be kept under adequate tension during the operation, with winches blocked and monitored on board and at the terminal.

All the mooring lines should be of the same type, gauge, and material (fiber or wire), and mixed mooring lines cannot be employed.

Mixed mooring lines are those in which cables for the same functions are of different types, gauges, and materials.

Mooring lines should be placed as symmetrically as possible in relation to the mid-ship section.

Breast lines should be placed as perpendicularly as possible to the ship's longitudinal axis, and all other cables should be arranged in accordance with the type of mooring approved in item 6.3, according to the configuration shown in Annex F.

7.3.2 Ship to shore access

The Terminal's inner (south) and Outer (north) berths have telescopic stairs for easy access to the docked ships.

When coming ashore, crew members who wish to use the Terminal's facilities should comply with the procedures in the ISPS Code, moving only in the marked areas and recommended to use closed footwear, long pants, and shirt with sleeves.

The gangway on the opposite side of the berth should be kept ready and hoisted next to the deck during all the time that the vessel is docked, for the terminal's and the ship's safety. The gangway should be used only in emergencies.

7.3.3 Previous information of docking procedures

In order to optimize assistance to ships, including support by tugboats, motorboats, lashers, and safety inspectors, the ship should inform the terminal through its VHF maritime channel 16 or channel 10 as soon as it moves on to the maneuvering basin for berth.

The Terminal's recommendation for LNG ship maneuvers on pier 2 is that they should begin at daybreak, and if possible at least 30 minutes before the tide changes from ebb to flood.

7.4 Before Transferring Cargo

7.4.1 During the initial meeting with the mandatory attendance by the supply ship, receiving ship, and terminal, the following parameters will be agreed on and recorded: Connection, ESD tests, opening of valves, cool down, return pressure, initial flow (ramp up), temperature, operating flow and pressure, Final flow (ramp down), inertizing, disconnection, final release and unmooring.

The ship should make personnel support available as soon as possible when loading in order to enable connecting the loading arms. Please note that the first arm to be connected should be the steam return line. After connecting the arms, these should be tested in sequence.

The ship's representative should monitor all the testing operations, remaining close to the ship's cargo intake.

The operation will begin only after performance of the operating safety inspection, based on ISGOTT recommendations, performed by a terminal representative together with the receiving and supply ships' representatives and following the signature of the documents by all the parties involved in the operation, ensuring acceptance of the operating variables, emergency stops, and communications system discussed in the initial meeting.

7.4.2 Electrical insulation between ship and Terminal is done by means of an insulating flange installed on the loading arms, in order to ensure the connection's safety in accordance with ISGOTT recommendations.

7.4.3 On-board measurements will take place by the ship's personnel and monitored by terminal representatives, officials, and other inspectors.

7.4.4 The Ship/Shore Check List (ISGOTT) is checked and completed by a GIAONT inspector and submitted to the Operator during the ship's initial meeting. Following this safety inspection, if there are any pending items that the crew is unable to solve, the ship will not be authorized by the Terminal to begin operations, and may or may not be requested to unmoor the ship, which will be accountable for all the implications and costs resulting from its non-conformity, and the already issued notice of readiness to operate will be cancelled.

7.4.5 It is recommended to prohibit blowing soot or cleaning boiler pipes with the ship moored. Care should be taken so that sparks do not escape from the stack. Non-compliance with these regulations will imply the issue of a letter of protest, which creates one of the following sanctions:

→ The immediate interruption of operations;

→ A fine by the competent authorities;

→ The ship's mandatory unmooring from the pier;

→ Notice of the violation to the ship-owners;

→ The ship's accountability for fines, loss of time, and any other related expenses resulting from this fact.

7.4.6 The restriction on small unauthorized vessels remaining alongside or close to docked ships should be strictly respected. Only vessels authorized by the Terminal may remain close by or alongside, provided that they comply with every safety condition. This rule's violation will have to be informed to the competent authorities.

7.4.7 A berthed) ship cannot turn its propeller (s) while it is connected to the arms. The ratchet may be used only after examination and permission by the terminal operator, but the propeller should be turned slowly and in a controlled manner to ensure absolute safety. Ships will be held responsible for any damages arising from this maneuver.

7.5 Transferring Cargo

7.5.1 Monitoring pressures and temperatures during cargo transfers is recorded by the supervision and control system in Transpetro's CCO. Flows on the operation's both sides are gauged every hour and compared by the parties, and according to the system employed there is a limit parameter for operating control. Any change in operating conditions should be informed and documented by the parties. It is expressly forbidden to close valves during operations, likely to cause a counter-pressure in the system. Check communications with the ship so that operations do not start without perfect communications. Check the entire alignment before operations begin. Full-time monitoring of the arms connected to the ship during operations. Monitoring the volume transferred at both ends of the pipeline. Perform preventive maintenance of lines and accessories. Any defects in the equipment and accessories will require immediate corrective maintenance.

7.5.2 The ship's ballast and deballast pipe lines and tanks should be used for this purpose only, and they are isolated from all other on-board pipe lines. When water ballast unloaded into the sea should be entirely free from oil, any oily residue, or other substances likely to cause pollution in the seawater. Ships will be responsible for controlling operations and the quality of ballast water discharged at the port.

7.5.3 The terminal does not have a system to discharge slop.

7.5.4 Normally, the conventional tank cleaning operation will not be accepted. Therefore COW operations are allowed, depending on the program's prior approval for the purpose of the ship's stay in the port, and by the Terminal Supervisor for the purpose of operating safety.

7.5.5 Repairs or maintenance work of any kind cannot be performed when they involve or will involve a risk of sparks or other means of ignition, while the ship is berthed at the Pier. In extreme cases, every safety rule should be respected and complied with. Repairs involving pier facilities or implying in any restriction to the ship during its stay, should be approved previously by the Terminal.

7.5.6 Intermediary inspections during LNG transfers, as in the Annex – ISGOTT Safety Check List, are performed by a GIAONT inspector and submitted to the Operator at intervals defined in the initial meeting and not in excess of ISGOTT recommendations (every 6 hours), and the daily presence should be recorded.

7.5.7 Interruption of loading and unloading by the ship should take place under any situation likely to be dangerous, either to the ship or to the Terminal. Operations may be temporarily suspended during storms, thunder and/or strong winds, pursuant to the limits defined in 5.5. The terminal's operations personnel is authorized to interrupt or suspend operations in case of non-compliance with any rules and norms concerning safety, as universally accepted and adopted in the sea transportation of petroleum. The ship's captain is entitled to interrupt operations if he has reason to believe that on-shore operations do not provide safety, provided that he informs the pier operators in advance.

7.5.8 In any emergency situation, the terminal may interrupt operations in progress, so that all actions are directed to mitigating the occurrence. Actions and contacts for each type of emergency are provided for and described in the management's ERP and in Annex A and the key telephones are listed for a communications flow in emergency situations.

7.6 Measuring Cargo and Documentation

7.6.1 Once the operation is concluded, the loading arms employed should be drained. Operators will drain the (arms) to the closed system on the pier. The ship's representative will be in charge of draining the on-board portion, as defined in the initial meeting.

7.6.2 On-board measurements will take place by the ship's personnel and monitored by terminal representatives and other inspectors. The material employed should be duly grounded and measuring accessories should be explosion-proof.

7.6.3 The ship's liberation should occur after comparing the amounts handled and the stay documentation's complement.

7.7 Unmooring and Departure Port

7.7.1 During unmooring and port departure maneuvers, the channel limits should be respected as well as hazards listed in sub-item 5.3 and its correlated items.

7.7.2 The pilot normally disembarks at the same point of boarding described in sub-item 5.3.6, where a port pilot boat will wait for him.

7.8 Compliance with ISPS CODE

7.8.1 The Pecém Terminal is certified and has a Security Plan with measures implemented for the control and managerial safety applicable to ships and port facilities, as required by the International Maritime Organization – IMO, by adopting the ISPS – International Ship and Port Facility code.

In case of need, these protection measures may be mobilized by the ship through the terminal's PFSO – Port Facility Security Officer or through the VHF radio, cannels 16, 06, or 10.

The Pecém Terminal normally operates at safety level 01. For further details, the terminal's PFSO – Port Facility Security Officer may be reached at Telephone (55 85) 3315-1977 and Cell Phone (55 85) 9981-2414.

8

Port or Anchorage Organization

8.1 Port Control or VTS and Maritime Authority

8.1.1 The Maritime Authority at the Pecém Terminal is exercised by the COTP of the Ceará State, the Brazilian Navy local representative, with Norms and Procedures established by means of CPCE Ordinance no. 15.

8.1.2 Use of the anchorage area and port access by ships will be authorized by CEARÁPORTOS, according to previous approval by the Maritime, Customs, Sanitary, and Maritime Police Authorities.

8.1.3 Except in the case of a stop-over, the ship-owner, forwarder or its agent, as applicable, should apply for previous authorization and to this end should provide the following information at least 24 hours before the ship's arrival.

8.2 Pilotage

Pilotage is mandatory for all ship maneuvers, as of the pilot's boarding point (sub-item 5.3.6).

Pilotage organizations that operate in the Port of Pecém may be freely selected by users, and the following are accredited:

a) Ceará Marine Pilots – Empresa de Praticagem do Estado do Ceará Ltda, located at Rua Osvaldo Cruz, no. 1, suites 1307/1308, Meireles, Fortaleza-CE, ZIP Code 60125-

150, may be reached through telephone/fax (85) 3242-4638 and through VHF-FM Channel 16, permanently connected. It acts as a Pilotage representative entity as provided for in item 0119 of NORMAM-12/DPC;

b) Ceará State Pilots – Empresa de Praticagem do Estado do Ceará Ltda, located at Avenida Monsenhor Tabosa, 111, suites 39/41, Praia de Iracema, Fortaleza-CE, Postal Code 60165-010, and may be reached through telephone/fax (85) 3219-3849.

8.3 Tugboats and Other Maritime Services

Tugboat	Agency or Shipowner	Traction Force (Metric Tons)
AQUARIUS	WILSON, SONS	55
RIGEL	WILSON, SONS	50
REBRAS IGUAÇU	WILSON, SONS	53
LAGOA CAPIXABA	WILSON, SONS	30
ERIDANUS	WILSON, SONS	25

Wilson, Sons – Rebocadores
Rua Costa Barros no. 915 – 11th floor, suites 1101 to 1105, Centro
Postal Code 60.160-280 – Fortaleza – CE
Telephone: (85) 4005-1651
Fax: (85) 4005-6161
Email: afi@wilsonsons.com.br

8.4 Other Oil and Gas Terminals

The Pecém Port Terminal does not have another pier for bulk liquid and/or LNG operations. Pier 1 is intended for unloading solid bulk cargoes.

8.5 Other Users

The LNG transfer pier is for the sole use of Transpetro operations.

9

Emergency and Combat Safety and Planning

9.1 Communications

Communications between ship and terminal in case of emergencies should take place by Hotline (Terminal), VHF channel 06 or UHF exclusive channel, the UHF equipment being loaned by the terminal during the initial visit. Emergency details should be informed as quickly as possible between the parties involved, pursuant to Annex A – general contacts.

The terminal's SSL system has three kinds of connections: Optical, electrical, and pneumatic. The first choice should be the optical connection, and in case this fails, the electrical connection should be employed.

9.2 Areas Sensitive to the Environment

In the ERP – Emergency Response Plan, the areas most sensitive to environmental impacts are listed in pages containing environmental sensitivity maps, evidencing according to the area selected the points subject to a greater impact when this kind of event should take place in the neighborhood of the Pecém Port Terminal.

9.3 Overall Description of Combat and Emergency Organization

The bodies responsible for dealing with likely emergencies involving vessels arriving at the Terminal are listed below:

Incidents Within the Pecém Terminal's Area

Type of Incident	Organization Responsible	Other Organizations Involved			
Collision in Channel	Port Authority	Maritime Authority	Transpetro	Civil Defense	–
Vessel Running Aground	Port Authority	Civil Defense	Transpetro	Maritime Authority	–
Collision in Berth	Port Authority	Transpetro	Civil Defense Authority	Maritime	–
Vessel Sinking	Port Authority	Civil Defense	Fire Department	Transpetro	–
Fire in Vessel	Transpetro or Ship	Maritime Authority	Fire Department	Civil Defense	Port Authority
Fire in Berth	Transpetro or Ship	Fire Department	Civil Defense	Port Authority	Maritime Authority
Pollution	Transpetro or Ship	Port Authority	Transpetro SMS – MCR	Ibama	Maritime Authorit

9.4 Emergency Plan

The ERP (Emergency Response Plan) is the terminal's plan to combat emergencies in all of its facilities. It is available in all the operating areas, on notice boards in the entries to operating and maintenance rooms, and managerial buildings. The area in charge of its updating is the local HSE (health, safety and the environment).

Actions to combat and control emergencies will be given priority over other activities in LNG operations undertaken by TRANSPETRO, while the situation lasts.

Any occurrence with a potential impact on the environment should be immediately informed to the local government authorities and to the State and Federal environmental inspection bodies.

Actions to combat and neutralize the event's effects should be centralized under one sole coordination. The emergency's combat coordination will be exercised full-time and with exclusive dedication.

This ERP's coverage includes the Mucuripe/Pecém Waterway Terminal at the Pecém Port Terminal, consisting in pier 2, the control room building, the 20" gas pipeline, and the scraping pig launcher. This coverage has its boundaries defined by the sum of the vulnerable

areas pointed out by the risk analysis arising from the different assumptions for accidents.

Berthed ships should keep their emergency fire wires attached to the on-board bollards and hanging down to the water line during the operation, on the side opposite to the berthing side. Emergency and fire-fighting equipment should be kept ready for use while the ship is berthed. Operating fire hoses should be rolled out, one before and one aft of the cargo manifolds.

A anti-pollution kit should be maintained ready to use (sawdust, rags, buckets, transfer pumps, etc.) for use in case of an oil spill. Additional precautions should be taken in order to avoid oil pollution in the seawater.

9.5 Combat and Emergency Public Resources

In the Pecém Port Terminal, only TRANSPETRO has resources in the terminal and other operating units that may be employed in mitigating events of sea pollution.

The port authority, the maritime authority, the Fire Department and Civil Defense all have the necessary resources for their actions, and are mobilized as in Annex A.

9.6 Mutual Support Plans

At the Pecém Port Terminal, TRANSPETRO is empowered by means of the terminal supervisor and has the means to get in touch with the port authority, represented by Ceará Portos, which will mobilize the other port operators in Mutual Support emergency situations and training.

9.7 Combating Oil and Chemical Spills

There is an EDC (Environmental Defense Center) in the port of Mucuripe, roughly 70 km from the Pecém Port Terminal, and depending on the type of emergency and degree of seriousness the EDC may be mobilized and make available all of its human resources and equipment. The EDC operation is performed by regularly enabled and trained personnel.

The resources available at the Terminal for combating oil spills are listed in the ERP, which is available in all of the Terminal's managerial, operating and maintenance areas.

The Ceará Environmental Agency does not have resources for combating oil spills in the sea.

The EDC lists the actions and the persons in charge of each kind of event provided for and likely to occur in their units, pipeline segments, or vessels, and involving third parties. In case of events not covered by this document, TRANSPETRO / PETROBRAS will make available all the domestic and international resources within their reach.

9.8 Combating Other Large-Scale Emergencies

The Emergency Response Plan lists the actions and the persons in charge of each kind of event provided for and likely to occur in the Terminal's coverage area involving vessels or third parties. In case of events not covered by this document, TRANSPETRO / PETROBRAS will make available all the domestic and international resources within their reach.

10

General Contacts

10.1 Terminal

Location	Contact	Telephone (55 85)	Fax	Email	VHF/UHF Channels	
					Calls	Conversation
Pier 2	Operator	3266-4311	nil	Josenildo@petrobras.com.br	06	06/09/10/12
Control Center	Supervisor	3266-4312	nil	albertsilva@petrobras.com.br	16/06	06/09/10/12
SMS	Coordinator	3266-4310	nil	maryhelem@petrobras.com.br	06	06/09/10/12

10.2 Port Services

Organization	Contact	Telephone (55 85)	Fax (55 85)	Email	VHF/UHF Channels Calls
Maritime Authority	COTP	3219-1978	3219-7555	secom@cpce.mar.mil.br	16
Port Control	Supervisor	3315-1977	3315-1974	Waldir@cearaportos.ce.gov.br	10
Pilots' Association	Expediter	9643-3200	Nil	cemapi@cearapilots.com.br	10
Tugboats (1)	Wilson, Sons	9996-0925	Nil	afi@wilsonsons.com.br	10

10.3 Selected Shipping Agents and Suppliers

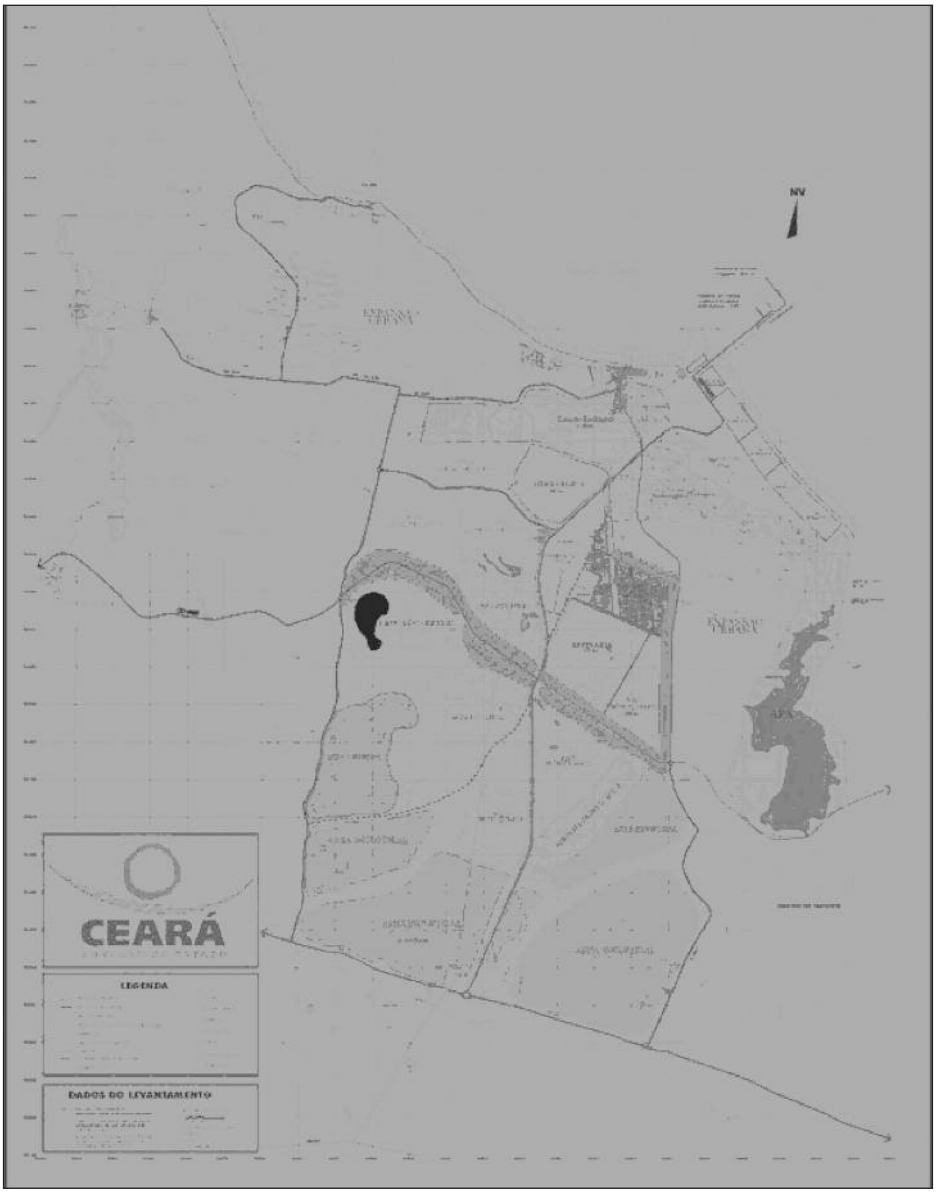
Organization	Business	Telephone (55 85)	Fax (55 85)	Email	VHF/UHF Channels Calls
Petrobras	Agency	3266-3596	3266-3006	agfortaleza@petrobras.com.br	16
Agencia V. Castro	Agent	3261-4433	3264.2074	www.vcastro.com.br	16

10.4 Local Officials, State and Federal Agencies

Organization	Contact	Telephone	Fax	Email	VHF/UHF Channels	
					Calls	Conversation
Police	Assistance	190	–	–	–	–
Fire Department	Assistance	193	–	–	–	–
Ambulance	Assistance	192	–	–	–	–

Annexes

A – Pecém Port Terminal's Master Plan



B – Photo of Terminal

Bird's eye view of Pier 2 and NW arm

Aerial view of Port of Pecém

C – Pecém Port Terminal's Basic Data

Date of Origin	November 2001
Administration	Companhia de Integração Portuária do Ceará/Ceará Portos
Address	Esplanada do Pecém, s/ nº - Distrito do Pecém
City, State, Postal Code	São Gonçalo do Amarant – CE, Postal Code 62674-000
Users' Telephone	(85) 3315-1122
Home Page	www.cearaportos.ce.gov.br
Email	cearaportos@cearaportos.ce.gov.br
Coordinates	Lat 3º30'00"S Long 39º50'00"W

ACCESS TO PORT

Highway	BR-222 / BR-116 / CE-422
Railway	Companhia Ferroviária do Nordeste – FN
By Sea	None

ACCESS CHANNEL

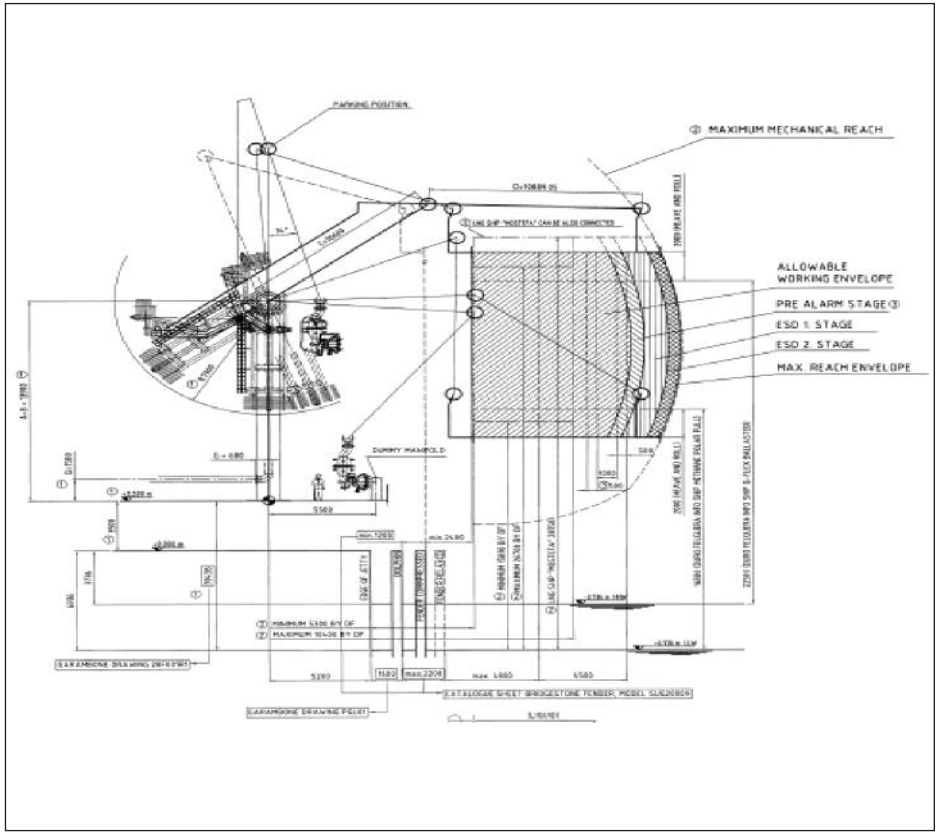
Length	None
Width	None
Maximum Depth	15.5m

PORT DIMENSIONS

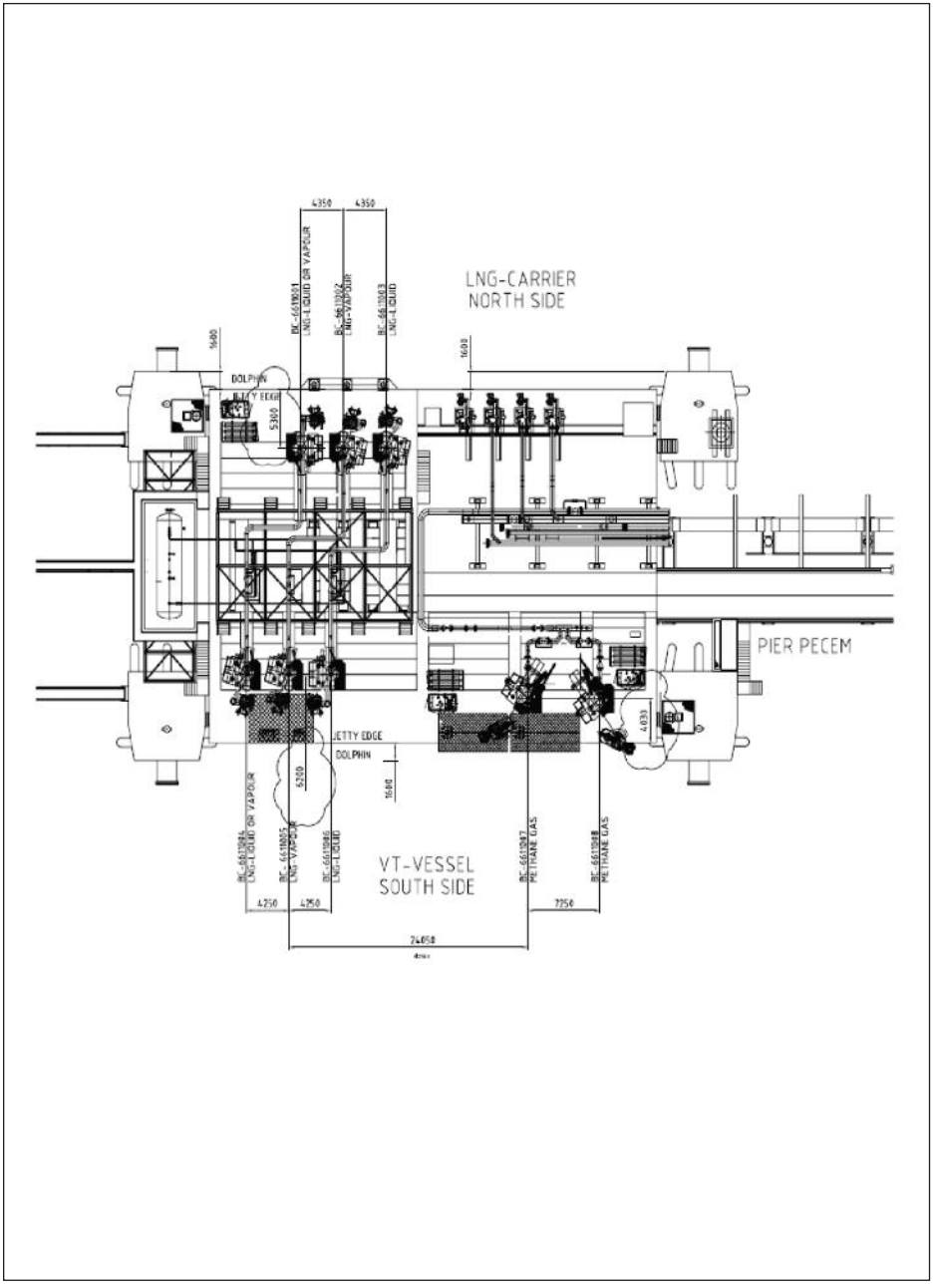
Total Area	75.000 m^2
Storage Area	380.000 m^2
Length of Quay	600 m
Number of Berths	2

D – Arms and Manifold

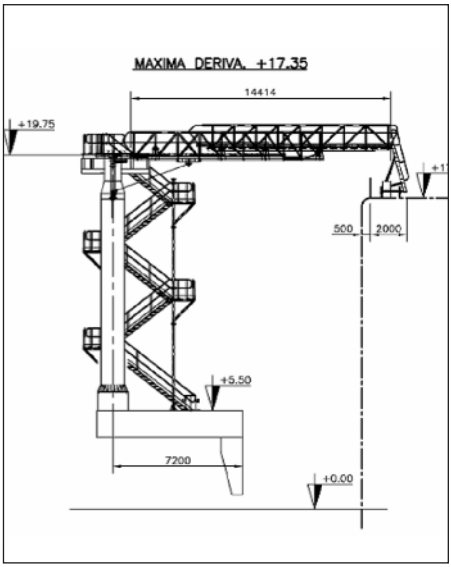
D1 – Arms

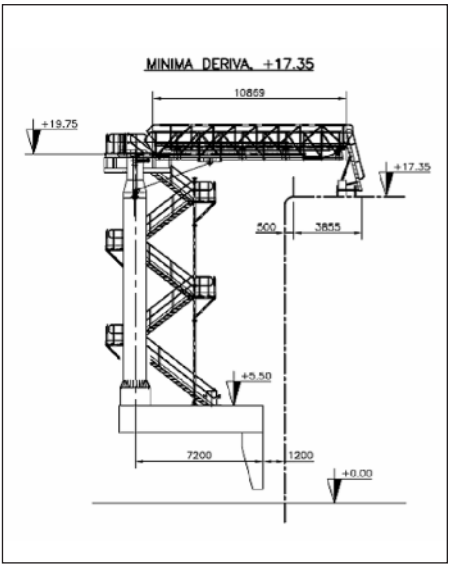


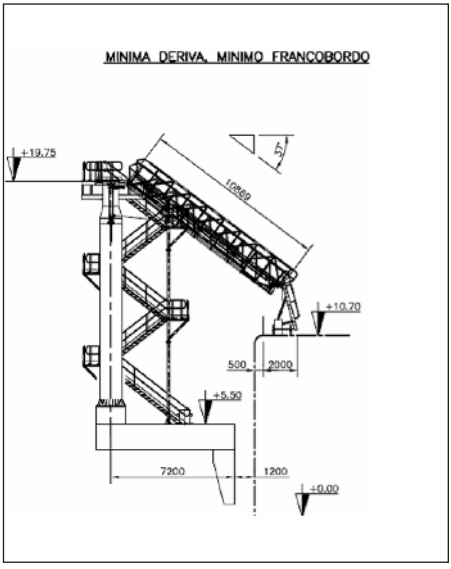
D2 – Location of Arms

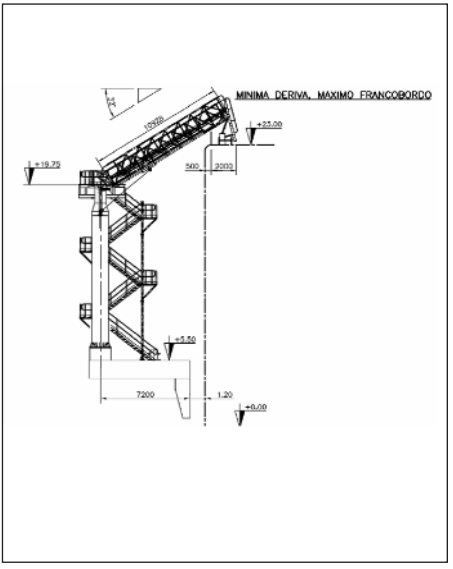


E – Access Stairs



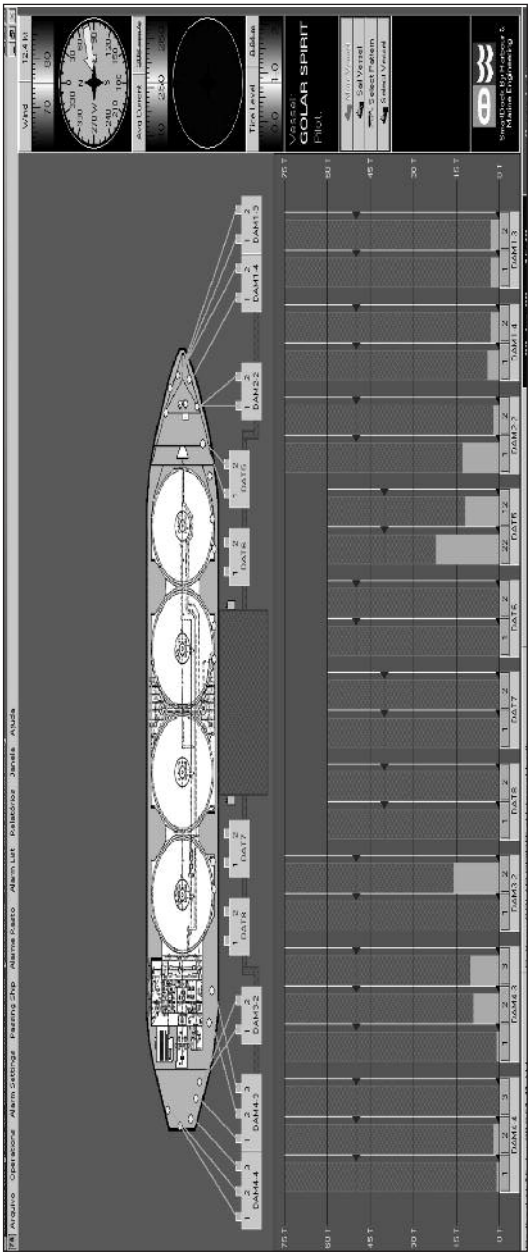




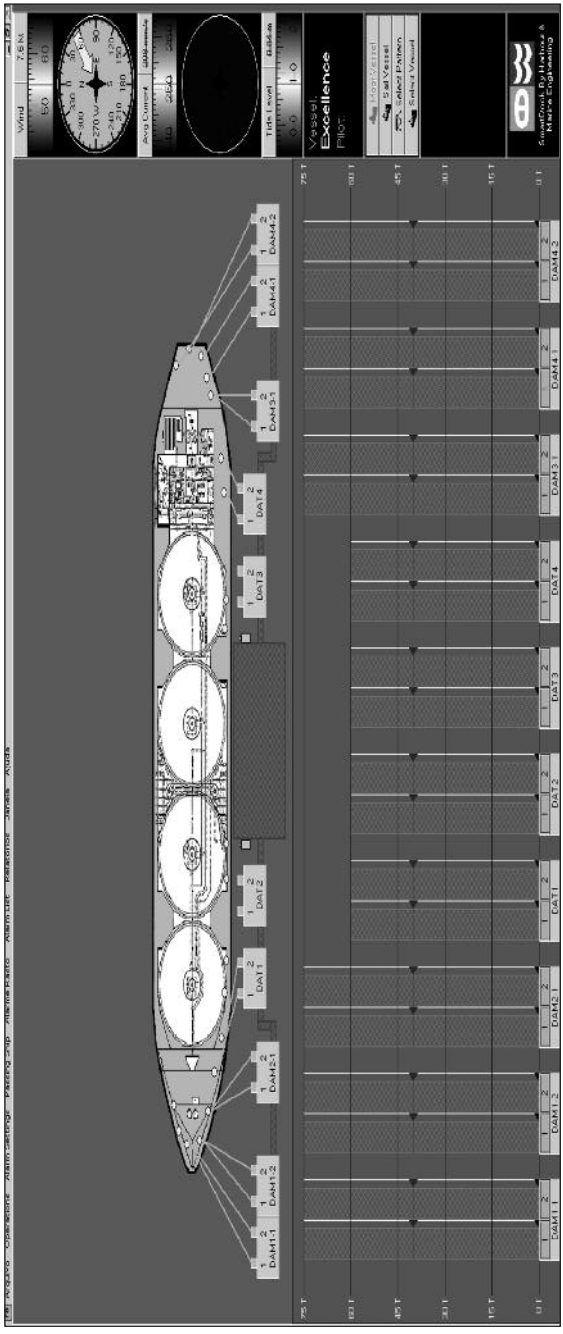


F – Layout of Mooring Conceptual Plan

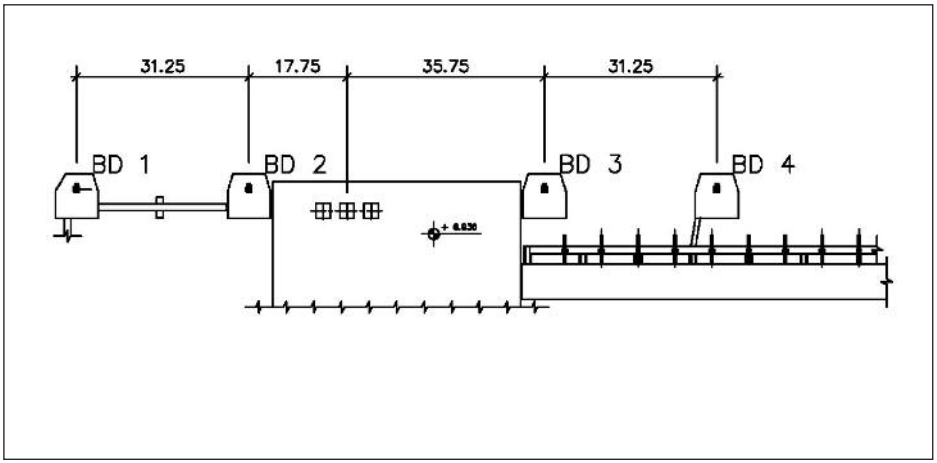
F1 – Inner Pier – FSRU Ship

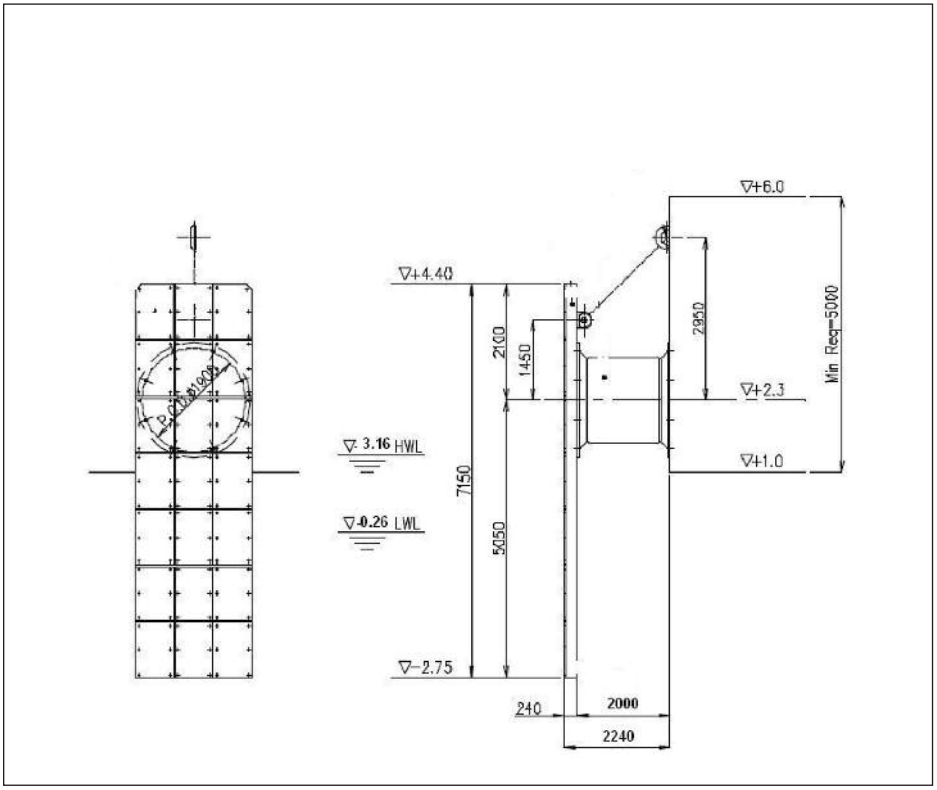


F2 – Outer Pier – CARRIER

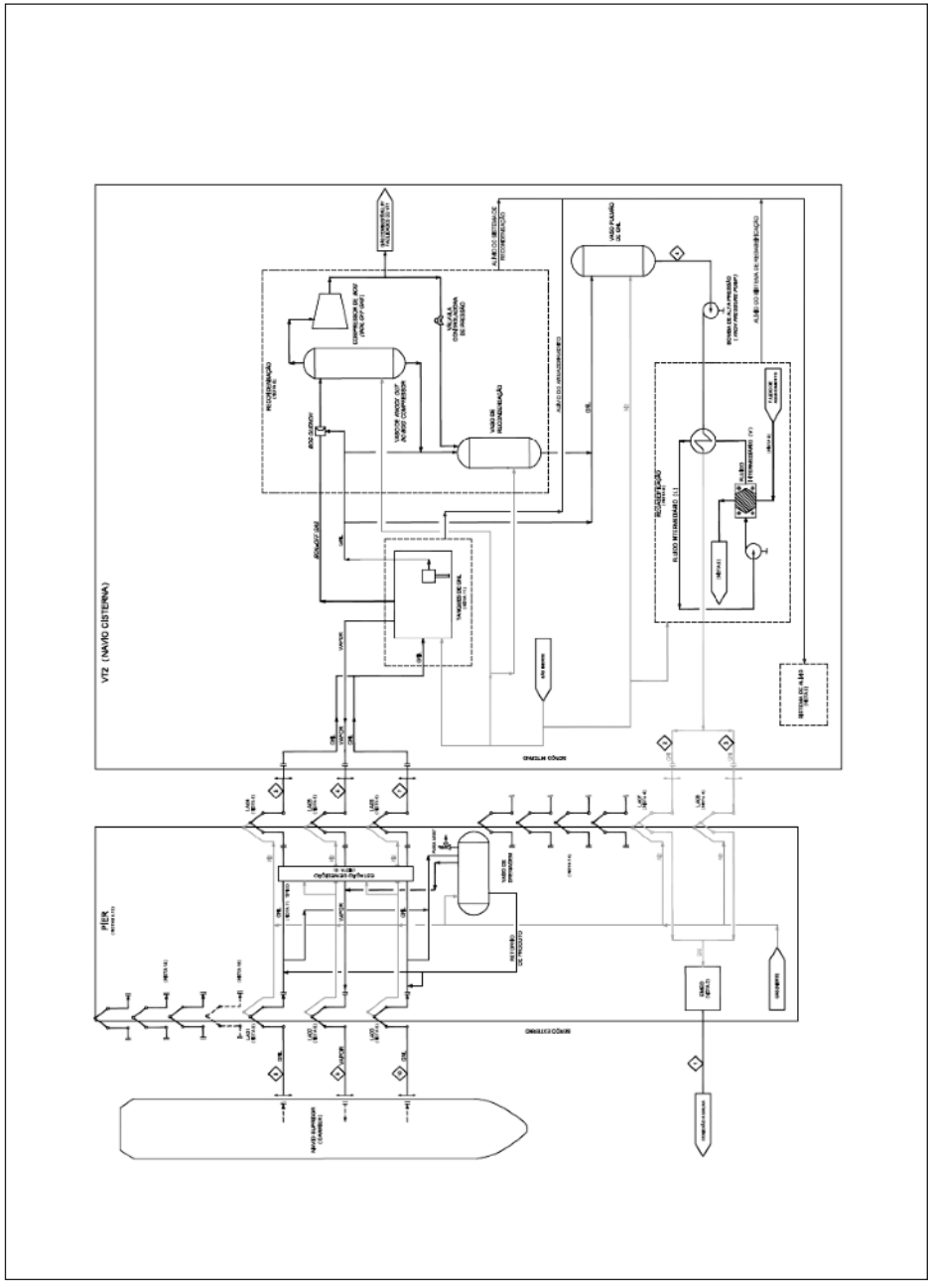


F3 – Fenders


31.25
17.75
35.75
31.25
BD 1
BD 2
BD 3
BD 4


▽+6.0
▽+4.40
2100
1450
2950
Min. Req=5000
▽+2.3
▽+1.0
▽ 3.16 HWL
▽-0.26 LWL
7150
5050
▽-2.75
240
2000
2240

G – Simplified Diagram of LNG – Pecém System



H – Ship/Shore Safety Check List

(For LNG and CNG Operations)

Ship's Name: **Voy:**

Berth: **Port:**

Date of Arrival: **Time of Arrival:**

Part A – Bulk Liquid General – Physical Checks

Item	Bulk Liquid – General	FRSU	LNG	Terminal *Carrier*	Code	Remarks
1.	There is safe access between the ship and shore?				R	
2.	Are the FSRU and the LNG carrier securely moored?				R	
3.	The agreed ship/shore communication system is operative.				A R	System Back up system
4.	Emergency towing-off pennants are correctly rigged and positioned.				R	
5.	The ship's fire hoses and fire-fighting equipment is positioned and ready for immediate use.			NA	R	
6.	The terminal's fire-fighting equipment is positioned and ready for immediate use.NA	NA			R	
7.	The ship's cargo and bunker hoses, pipelines and manifolds are in good condition, properly rigged and appropriate for the service intended.			NA		
8.	The terminal's cargo and bunker hoses or arms are in good condition, properly rigged and appropriate for the service intended.	NA	NA			
9.	The cargo transfer system is sufficiently isolated and drained to allow safe removal of blank flanges prior to connection.					
10.	Scuppers and save alls on board are effectively plugged and drip trays are in position and empty.			NA	R	
11.	Temporarily removed scupper plugs will be constantly monitored.			NA	R	
12.	Shore spill containment and sumps are correctly monitored.	NA	NA		R	
13.	The ship's unused cargo and bunker connections are properly secured with blank flanges fully bolted.			NA		
14.	The terminal's unused cargo and bunker connections are properly secured with blank flanges fully bolted.	NA	NA			
15.	All cargo, ballast and bunker tank lids are closed.			NA		
16.	Sea and overboard discharge valves, when not in use, are closed and visibly secured.			NA		

17.	All external doors, ports and windows in the accommodation, stores and machinery spaces are closed. Engine room vents may be open.			NA	R	
18.	The ship's emergency fire control plans are located externally.			NA		Location:
19.	Fixed IG pressure and oxygen content recorders are working.			NA	R	

Part B – Bulk Liquid General – Verbal Verification

Item	Bulk Liquid – General	FRSU	LNG	Terminal *Carrier*	Code	Remarks
20.	he ship is ready to move under its own power? How long time required before move under own power?			NA	P R	
21.	There is an effective deck watch in attendance on board and adequate supervision of operations on the ship and on the terminal.				R	
22.	There are sufficient personnel on the FSRU, LNG carrier and ashore to deal with an emergency.				R	
23.	The procedures for cargo, bunker and ballast handling have been agreed.				A R	
24.	The emergency signal and shutdown procedure to be used by the FSRU, LNG carrier and shore have been well explained and understood.				A	
25.	The hazards associated with toxic substances in the cargo being handled have been identified and understood.					
26.	An International Shore Fire Connection has been provided.					
27.	The agreed tank venting system will be used.				A R	Method
28.	The requirements for shutdown operations have been agreed.				R	
29.	The operation of the P/V system has been verified.			NA		
30.	Has a vapor return line been connected?					
31.	Where a vapor return line is connected, operating parameters have been agreed. FSRU and LNG carrier to enter requested tank pressure.				A R	FSRU Tank Pressure _____mb LNG Carrier Tank Pressure: _____mb
32.	Independent high level alarms, if fitted, are operational and have been tested.			NA	A R	
33.	Adequate electrical insulating means are in place in the ship/shore connection.	NA			A R	
34.	Shore lines are fitted with a non-return valve or procedures to avoid back filling have been discussed.	NA			P R	

35.	Smoking rooms have been identified and smoking requirements are being observed.				A R	Nominated smoking room
36.	Naked light regulations are being observed.				A R	
37.	Ship/shore telephones, mobile phones and pager requirements are being observed.				A R	
38.	Hand torches (flashlights) are of an approved type.					
39.	Fixed VHF/UHF transceivers and AIS equipment are on the correct power mode or switched off.			NA		
40.	Portable VHF/UHF transceivers are of an approved type.					
41.	The ship's main radio transmitter aerials are earthed and radars are switched off .			NA		
42.	Electric cables to portable electrical equipment within the hazardous area are disconnected from power.					
43.	Window type air conditioning units are disconnected.			NA		
44.	Positive pressure is being maintained inside the accommodation, and air conditioning intakes which may permit the entry of cargo vapour ,are closed.			NA		
45.	Measures have been taken to ensure sufficient mechanical ventilation in the pump room.			NA	R	
46.	There is provision for an emergency escape.					
47.	The maximum wind and swell criteria for operations have been agreed.				A	Stop cargo at: Disconnect at: Unberth at:
48.	Security protocols have been agreed between the Ship Security Officer and the Port Facility Security Officer, if appropriate.				A	
49.	Where appropriate, procedures have been agreed for receiving nitrogen supplied from shore, either for inerting or purging ship's tanks, or for line cleaning into the ship.				A P	
50.	Are the requirements for use of Galley equipment and cooking appliances being observed?					

If the ship is fitted, or is required to be fitted, with an Inert Gas System, the following statements should be addressed.

Item	Inert Gas System	FRSU	LNG	Terminal *Carrier*	Code	Remarks
51.	The IGS is fully operational and in good working order.			NA	P	
52.	The fixed and portable oxygen analyzers have been calibrated and are working properly.			NA	R	
53.	All the individual tank IG valves (if fitted) are correctly set and locked.			NA	R	
54.	All personnel in charge of cargo operations are aware that, in the case of failure of the inert gas plant, discharge operations should cease, and terminal be advised.			NA		

Part C – Bulk Liquefied Gases – Verbal Verification

Item	Bulk Liquefied Gases	FRSU	LNG	Terminal *Carrier*	Code	Remarks
1.	Material Safety Data Sheets are available giving the necessary data for the safe handling of the cargo.					
2.	The water spray system is ready for immediate use.					
3.	There is sufficient protective clothing and equipment (including self-contained breathing apparatus) is ready for immediate use and is suitable for the product being handled.					
4.	Hold and inter-barrier spaces are properly inerted or filled with dry air, as required.			NA		
5.	All remote control valves are in good working order.					
6.	The required cargo pumps and compressors are in good order, and the maximum working pressures have been agreed between ship and shore.				A	
7.	Re-liquefaction or boil off control equipment is in good order.					
8.	The gas detection equipment has been properly set for the cargo, is calibrated, has been tested and inspected and is in good order.					
9.	Cargo system gauges and alarms are correctly set and in good order.					
10.	Emergency shutdown systems have been tested and are working properly.					
11.	The FSRU, the LNG carrier and Terminal have informed each other of the closing rate of ESD valves, automatics valves or similar devices.				A	FSRU _____ s LNG Car ___ s Terminal ____s
12.	Information has been exchanged between FSRU – LNG carrier and the Terminal on the maximum / minimum Tank & Manifold pressure, cargo transfer rates, Ramp Up/Ramp down?				A	See LNG Cargo Handling Agreement
13.	Cargo tanks are protected against inadvertent overfilling at all times while any cargo operations are in progress.			NA		
14.	The compressor room is properly ventilated, the electrical motor room is properly pressurized and the alarm system is working.			NA		
15.	Cargo tank relief valves are set correctly and actual relief valve settings are clearly and visibly displayed. (Record settings below.)					

	FSRU	CARRIER		FSRU	CARRIER
TANK NR. 1	700 mb		TANK NR. 4	700 mb	
TANK NR. 2	700 mb		TANK NR. 5	700 mb	
TANK NR. 3	700 mb		TANK NR. 6	NA	

Remarks

Coding of Items: The presence of the letters "A", "P" or "R" in the column entitled "Code" indicates the following:

A ('Agreement') This indicates an agreement or procedure that should be identified in the "Remarks" column of the Checklist or communicated in some other mutually acceptable form.

P ('Permission') In the case of a negative answer to the statements coded "P", operations should not be conducted without the written permission from the appropriate authority.

R ('Re-check') This indicates items to be re-checked at appropriate intervals, as agreed between both parties, at periods stated in the declaration.

A crew seaman must stay full time nearby ship's manifold while operating.

VHF Call's Channel – 16	Conversation's channel – 9/14
Telephones :	
Seals Numbers:	
Oil Water Separator:	
ODME/Oil Discharge Monitoring Equipment:	
Emergency Bilge: Sewage Tank:	
Sea Chest:	

LNG Carrier Name/Stamp	LNG Fsru Name/Stamp	Safety Inspector Name/Stamp	Loading Master Name/Stamp

I – Report of Inspection of Ships

(Ship's Inspection Team/Inspection Report)

Vessel:	**Jetty:**	
Date:	**Time:**	
Flag:	**Type:**	**Year Built:**
Call Sign:	**VGM/ VOY:**	

Outstanding Items	Required Actions

Remarks

Received:

Vessel Person-in-Charge Name Rank / Stamp	Safety Inspector Name/Stamp	Loading Master Name/Stamp

AFFIDAVIT

Company:

Terminal: **Date:**

To the Captain of: **Port:**

Dear Sir,

The responsibility for the safe performance of operations while the ship is at this Terminal, will be jointly between you, as Captain, and the representative in charge of this Terminal.

Therefore, before operations begin we wish to obtain your full cooperation and understanding with regard to the safety requirements found in the Ship / Terminal Safety Check List, which are based on safety practices broadly accepted by the oil and tanker industries.

We expect that while your ship remains berthed at this Terminal, you and everyone under your command should strictly comply with those requisites, and on our part, we assure you that our personnel will do the same and will cooperate fully with you in the common interests of safe and effective operations.

Prior to the beginning of operations and regularly thereafter, for our mutual safety, a member of the Terminal team will perform a routine inspection on your ship, in the company of an Official in Charge whenever appropriate, to ensure that the requisites found in the scope of the Ship / Terminal Safety Check List are being managed in an acceptable manner. When corrective measures are required, we will not agree with the start of operations, or if they have already begun, we will require that they are interrupted.

Equally, if you consider that safety is in jeopardy through any actions by our personnel, or due to any equipment controlled by the Terminal, you should require the immediate interruption of operations.

THERE CAN BE NO COMPROMISE WITH SAFETY

We request that you acknowledge receipt of this letter and return a duly signed copy.

Signature:

Terminal Representative:

Terminal Representative on duty: Post or Title:

Telephone number: UHF/VHF channel:

Signature:

Captain:

NT: Date: Time:

Received:

Declaration:

We have checked, where appropriate jointly, the items of Check List in accordance with the instructions and have satisfied ourselves that the entries we have made are correct to the best of our knowledge.

We have also made arrangements to carry out repetitive checks as necessary and agreed that those items coded “R” in the Check List should be re-checked at intervals not exceeding _____ hours.

If, to our knowledge, the status of any item changes, we will immediately inform the other part.

J – Assessment of Ships

(Ship's Inspection Team/Ship's Evaluation)

Vessel:	**Jetty:**
Date:	**Time:**
Flag:	**Type:**
Year Built	**Call Sign: VGM/VOY**

Evalueted Aspects	**Ship's Performance**				
Not Evaluated	**Bad**	**Regular**	**Good**	**Very Good**	**Excellent**
Crew Ability					
Fluency In English Language					
Performance During Operation					
Cooperation					
Communication System					
Equipments' Condition					
Connection					
Mooring Condition					
Safety Condition					
Shipowner Support					
Vessel's General Condition					

K – Quick Guide for LNG Handling (MOP attachment)

TO THE CARRIER MASTER:

DIFFERENCES BETWEEN PECEM LNG TERMINAL AND A CONVENTIONAL LNG TERMINAL

In the Pecém Terminal, the LNG is transferred to another vessel, referred to as **FSRU** (Floating Storage and Re-gasification Unit), instead to shore tanks as in conventional LNG Terminals. The supplier vessel is referred to as **Carrier**.

The **FSRU** operating at this pier is the ***GOLAR SPIRIT***.

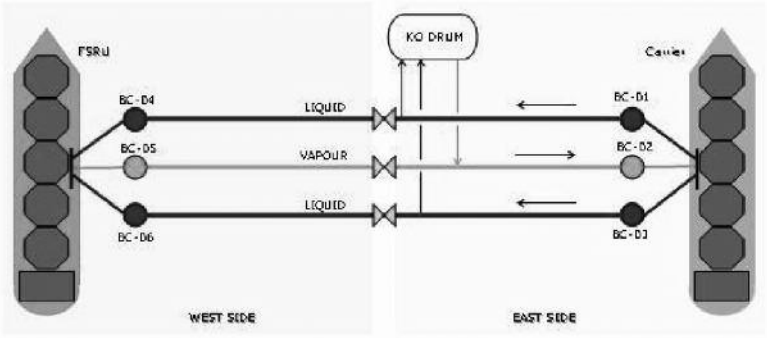
The **FSRU** is a conventional LNG vessel provided with a re-gasification plant to convert LNG into CNG, pumping it subsequently to the **TRANSPETRO** gas pipeline network. **FSRU** retain all original capabilities of a LNG vessel, however its engine will be temporarily disabled.

The re-gasification and CNG dispatch can occurs simultaneously with the LNG transference.

The emergency shutdown system activated by the Ship-Shore Link (SSL) will operate in a similar way as a conventional LNG terminal with pumps shutoff and valves closing.

The cool-down process, which consists on cooling shore lines and loading arms, is expected to take around four hours. The terminal operator will control the process so that flow rates should be slow enough to avoid damaging stresses on the lines being cooled. The resulting BOG will be returned to the vessel.

As there is no LNG storage tank on shore, the cool-down of the transfer lines will have to be carried out by the two vessels alongside. The **FSRU** will be in charge of cooling the lines on the western side of the berth whereas the **Carrier** will be in charge of cooling lines in the eastern side.

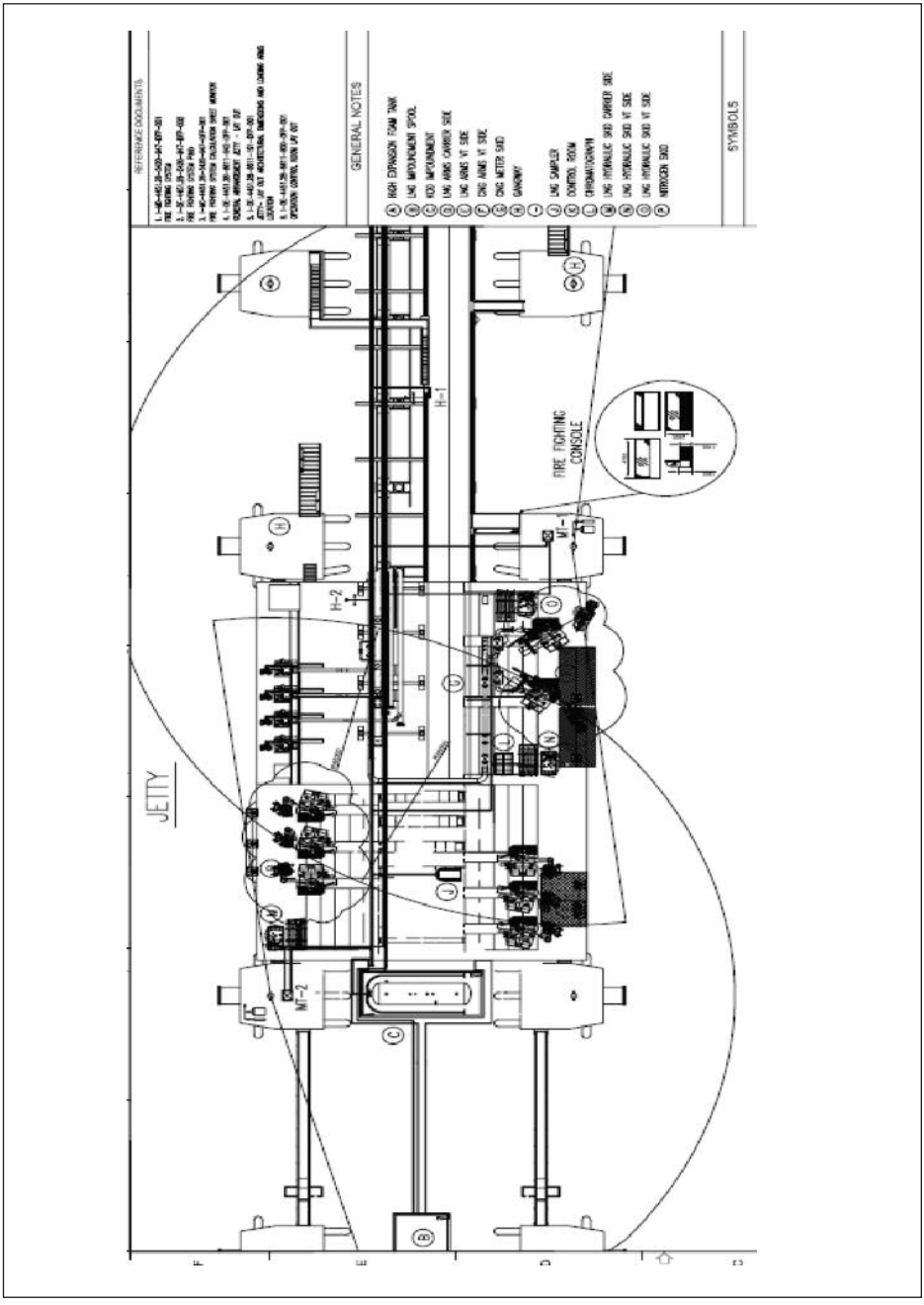


All relevant safety and operational information will be exchanged and registered during the initial clearance, as usually occurs; except that in this case the terminal operators will be accompanied by the **FSRU** officers.

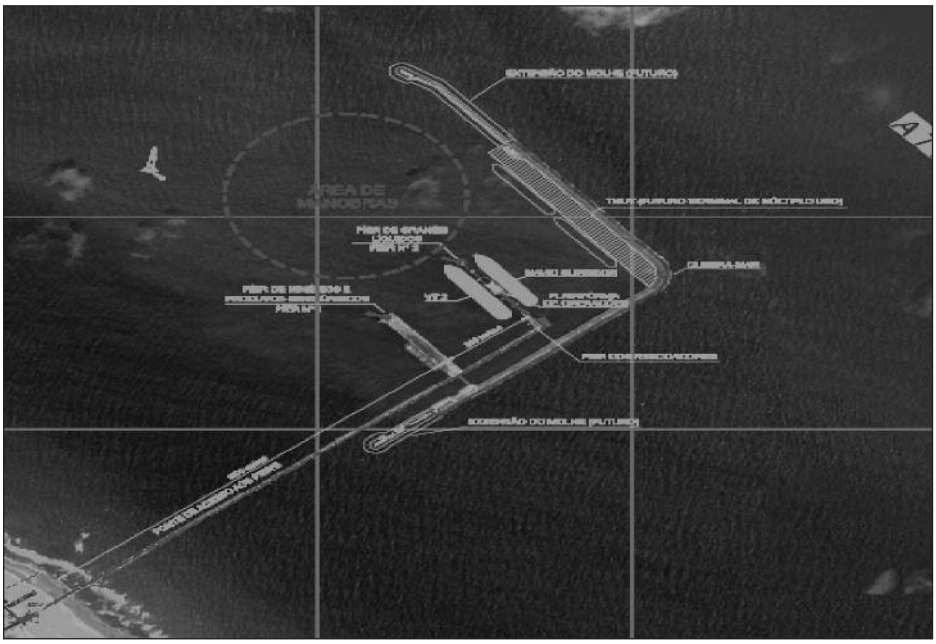
During operation **FSRU** and **Carrier** will communicate directly by radio while terminal operating staff will follow the communication.

Terminal operating staff, as well as the **FSRU** personnel, will be at your assistance for further enquires.

L – Fire-Fighting System



M – Maneuvering Area



N – Terminal-Ship Information Exchange

Port and Terminal:		
Request for Information on Vessel:		
Name of Ship: Flag: Name of Captain: Ship owners:	Estimated Time Arrival (ETA): Last port of Call: Next port of Call Agents:	
Is the ship fitted with an inert gas system? Oxygen content:		
Total Length (LOA): Length between perpendiculars: Breadth:	Draft on arrival: Maximum draft during transfer: Draft on Departure:	
Number of engines: Number of screws:	Sideways Propulsion: Bow (No. and power): Stern (No. and power):	
Tugboats – the least required: No. and static traction (Bollard Pull):		
Number and size of manifold: Cargo: Ballast: Bunkers:	Distances: Bow to manifold: Side to manifold: Height from manifold to main deck:	
Programming Loading (Complete as applicable)		
Appointment Type and amount: Type and amount: Type and amount:	**Discharge of ballast into sea** Amount: Estimated time:	**Discharge of slop / ballast ballast on shore** Amount: Estimated time:
Programming Unoading (Complete as applicable)		
Type and amount: Type and amount: Type and amount:		Ballast: Volume: Time:
Fuelling requested (Bunkers)		
Type and amount: Type and amount:		
Additional information (if any):		

Please send via fax or e-mail to the Terminal Supervisor

Fax number: 55 85 3266-4300 Email: **Josenildo@petrobras.com.br**

0 – Waves and Winds

0 1 – Significant wave height (Hs)

4.2. EXTREME WAVE PARAMETERS

Direction	Wave Parameters	Return Period in Years					
		1	10	20	30	50	100
N	Hs	2.17	2.60	2.72	2.78	2.87	2.98
	Tp	10.0	11.2	11.5	11.7	12.0	12.4
NE	Hs	2.15	2.60	2.74	2.82	2.92	3.05
	Tp	9.3	11.5	12.2	12.5	13.1	13.8
E	Hs	2.57	3.09	3.24	3.33	3.45	3.60
	Tp	8.7	9.8	10.1	10.4	10.5	10.9
SE	Hs	3.38	3.76	3.86	3.92	4.0	4.09
	Tp	11.9	12.8	12.9	13.0	13.2	13.3

where: Hs is the Significant Wave Height (m) and Tp is the Peak Wave Period (s).

02 – Winds

DIRECTION	EXTREME WIND (m/s)	RETURN PERIOD (YEARS)					
		1	10	20	30	50	100
N	10 min.	11.33	12.78	13.14	13.34	13.57	13.88
	1 min.	12.55	14.16	14.56	14.78	15.04	15.38
	30 sec.	12.92	14.58	14.99	15.22	15.48	15.83
	3 sec.	14.15	15.96	16.41	16.66	16.95	17.34
NE	10 min.	12.30	14.22	14.72	15.01	15.36	15.81
	1 min.	13.63	15.76	16.31	16.63	17.02	17.52
	30 sec.	14.03	16.22	16.79	17.12	17.52	18.03
	3 sec.	15.36	17.76	18.39	18.75	19.18	19.75
E	10 min.	14.45	17.11	17.90	18.36	18.94	19.73
	1 min.	16.01	18.96	19.83	20.34	20.99	21.86
	30 sec.	16.48	19.52	20.42	20.94	21.60	22.51
	3 sec.	18.05	21.37	22.36	22.93	23.66	24.64
SE	10 min.	13.23	14.96	15.40	15.64	15.94	16.32
	1 min.	14.66	16.58	17.06	17.33	17.66	18.08
	30 sec.	15.09	17.06	17.57	17.84	18.18	18.62
	3 sec.	16.52	18.69	19.23	19.53	19.91	20.38
S	10 min.	12.28	14.42	14.93	15.21	15.55	15.99
	1 min.	13.61	15.98	16.54	16.85	17.23	17.72
	30 sec.	14.01	16.45	17.03	17.35	17.74	18.24
	3 sec.	15.34	18.01	18.65	19.00	19.42	19.97
SW	10 min.	10.74	12.66	13.15	13.42	13.75	14.17
	1 min.	11.90	14.03	14.57	14.87	15.24	15.70
	30 sec.	12.25	14.44	15.00	15.31	15.68	16.16
	3 sec.	13.41	15.81	16.42	16.76	17.17	17.70
W/NW	10 min.	11.08	13.02	13.51	13.79	14.12	14.54
	1 min.	12.28	14.43	14.97	15.28	15.64	16.11
	30 sec.	12.64	14.85	15.41	15.73	16.11	16.59
	3 sec.	13.84	16.26	16.87	17.22	17.64	18.16

Where: the wind gusts (1-minute, 30-sec and 3-sec sustained wind gusts) were calculated using the formulation 2.1.2 from DNV Classification Notes 30.5 (REF [2]) from the averaged 10-minute wind speed. The Designers may use any other formulation recommended by their used design codes.

SHIP/SHORE SIGTTO QUESTIONNAIRE

FOR COMPATIBILITY STUDY OF LIQUEFIED GAS SHIPS WITH LOADING/UNLOADING JETTIES PECÉM TGAN — PIER 2 NW

Introduction

With the expansion of liquefied gas trades worlwide, increasing number of ships are calling at a wider cross section of terminals.

A developing market for LNG spot cargoes, means that modern contracts may be long or short term.

Although a wealth of operational guidance has been published, in practice many differences still exist.

The safety of berthing/unberthing operations and the safety of ship at berth including cargo transfer, is a direct consequence of:

a) a good understanding of the ship/shore compatibility issues

b) a good knowledge of ship/shore loading and unloading procedures

(including, as the case may be, pre- and post- drydocking procedures).

These issues must be addressed properly prior to the ship first call at a liquefied gas jetty.

The ship/shore questionnaire enclosed has been prepared in order to help both ship side and shore side to address these ship/shore compatibility issues. It constitutes a synthesis of already existing procedures in place in Japan, South-East Asia, Middle-East and other countries, mature in the field of exporting and importing LNG cargoes. These procedures are however also valid, although some simplifications might be

required, for LPG and other liquefied gases.

Once both ship and shore side have filled the questionnaire it is recommended that both parties meet together ("ship/shore meeting") in order to discuss the various issues of ship/shore compatibility and cargo transfer procedures.

Bibliography

[1] Tramping with LNG Carriers? – B. Lanquetin TOTALFINAELF and R. Tanudjaja PERTA MINA LG/JTG – GASTECH 93 Paris

[2] Ship Information Questionnaire for Gas Carriers – 2nd Edition 1998 – SIGTTO; OCIMF

[3] Port Information Questionnaire for Liquefied Gas Terminals – SIGTTO, 1st Edition 1998

[4] Port Information for LNG Export and Import Terminals – SIGTTO

[5] The Ship/Shore Interface – Communicatoins Necessary for Matching Ship to Berth, Information Paper No.5 SIGTTO, 2nd Edition 1997

[6] A Guide to Contingency Planning for the Gas Carrier Alongside and Within Port Limits – SIGTTO, OCIMF, ICS 1987

[7] A Guide to Contingency Planning for Marine Terminals Handling Liquefied Gasses in Bulk – SIGTTO, 2nd Edition 2001

Table of contents

SHIP/SHORE COMPATIBILITY

GENERAL

PORT

Port name: Terminal Portuário do Pecém
Terminal name: Terminal Portuário do Pecém
Lat 03° 32' 00" S **Long** 38° 47' 48" W
Name of terminal operating company: TRANSPETRO - PETROBRAS TRANSPORTE S.A.
Name / title of person to contact regarding terminal information:
Name: Francisco das Chagas Peixoto Marques
Address: Esplanada do Pecém, s/n. Distrito do Pecém, São Gonçalo do Amarante - CE
Tel: +55 (85) 3266 4300
Fax: +55 (85) 3266 4300
Tlx:
E-mail: fpmarques@petrobras.com.br
Name of Port Authority:
Name or title of person to contact regarding port regulations:
Name: Capitania dos Portos
Address: Rua Dragão do Mar, 160. Praia de Iracema, Fortaleza - CE.
Tel: +55 (85) 3219-7555
Fax: +55 (85) 3219-7555
Tlx:
E-mail: secom@cpce.mar.mil.br

General procedure for port approval (to be attached):

authorities to contact,	Capitania dos Portos
documents to be provided,	contact Agent
overall duration.	contact Agent

SHIP

Ship name: MG Asclepius; Umm Bab; Simaisma; Al Jassasiya
Owners Maran Gas Maritime Inc.
Name: MGM Inc,
Address: 354 Sygrou Avenue; GR-17674 Kallithea, Athens, Greece
Tel: +30 210 9483750
Fax: +30 210 9480023
Tlx:
E-mail: mail@marangas.com

Technical managers

Name: MGM Inc,
Address: 354 Sygrou Avenue; GR-17674 Kallithea, Athens, Greece
Tel: +30 210 9483750
Fax: +30 210 9480023
Tlx:
E-mail: mail@marangas.com

Commercial managers

Name: MGM Inc,
Address: 354 Sygrou Avenue; GR-17674 Kallithea, Athens, Greece
Tel: +30 210 9483750
Fax: +30 210 9480023
Tlx:
E-mail: mail@marangas.com

Charterer

Name:
Address:
Tel:
Fax:
Tlx:
E-mail:

SHIP/SHORE COMPATIBILITY

GENERAL

PORT/SHIP	Shipping Agents:
Owner's	**Charterer's**
Name: Address: Tel: Fax: Tlx: E-mail:	Name: PETROBRAS AGÊNCIA MARÍTIMA FORTALEZA Address: Av. Leite Barbosa, s/n , 60180-420 MUCURIPE FORTALEZA - CE BRAZIL Tel: 55 85 3266-3596 and 3266-3582 Fax: 55 85 3266-3006 Tlx: 851071 E-mail: agfortaleza@petrobras.com.br
Other (1):(specify)	Contacts : Mobile: 55 85 9603-3535 - 24H - A.O.H. Name :FRANCISCO DE A. SILVA (COORDENADOR) Mobile: 55 85 9909-5771 - 24H - A.O.H. Name :JOSÉ WAGNER CORREIA () Mobile: 55 85 9603-3535 - 24H - A.O.H. **Other (2):(specify)**
Name: Address: Tel: Fax: Tlx: E-mail:	Name: Address: Tel: Fax: Tlx: E-mail:

Utilities:

	FO	GO	LN2	Drinking Water	Clean Water	Return Metering	Cooldown	Gas-Freeing	Inerting	Dirty Oil Reception	Garbage Reception	Chemist	Water Receptoin
Available (Y/N)	N	N	N	N	N	Y	Note 1	N	Note 2	Note 0	Note 0	Note 0	Note 0
Max quantity (unit?)	na	na	na	na	na	10000m³/h	na	na	na	na	na	na	na
Grade	na	na	na	na	na	na	na	na	na	na	na	na	na
Jetty/Barge	na	na	na	J	na	J	J	na	J	B	B	B	B

Note 0 To be contracted by the ship owner.
Note 1 Carrier will be responsable for the cooldown of loading arms (Carrier side)
Note 2 Only to jetty supply

SHIP/SHORE COMPATIBILITY

MAIN CHARACTERISTICS

PORT	Jetty Name/Number	TGAN / Píer 2 NW	
	Type of Berth		
Vessel Limitations			
Maximum Dimensions			
	LOA:	315	m
	Beam:	50	m
	Draught:	15.50	m
	Air draft (@MHWS):	no restriction	m
	Gross tonnage:	-	t
	Deadweight:	175,000	t
	Displacement:	142900	t

Normal side of berthing: Port side

Tidal Information

Chart Sounding at Berth 16 m

Water levels (m):

3.16m	Max High Water Level (MHWL)
2.67m	Average High Water Level (AHWL)
1.39m	Mean Sea Level (MSL)
0.27m	Average Low Water Level (ALWL)
-0.26m	Max Low Water Level (MLWL)
0.00m	Chart Datum (CD)

Datum Level Used: Chart Datum

Dock Water Density: 1,025 kg/m³ Flood

1,025 kg/m³ Ebb

Other

Approved Port (Facility) Security Plan in Place Y / N	Y
ISO 9000 accreditation Y / N	N
Safety Accreditation e.g. ISRS Y / N	N
Is the terminal part of a public port. Y / N	Y

SHIP	Ship Name/Number		
Nominal size:		cu.m	145,700
LOA:		m	285.4
LBP:		m	274.4
Beam:		m	43.436
Depth:		m	26
Summer draught:		m	12.521
Loaded draught:		m	11.5
Ballast draught:		m	9.4
Air draught:		m	45.2
Displacement:		t	105,354
Gross tonnage:		t	97,496.00
Deadweight:		t	74,535.00
Cargo Containment Type:		GTT096	

SHIP/SHORE COMPATIBILITY

PORT INFORMATION

Weather Limitations

Limits for Berthing		
	Wind Speed/Direction	25 knts
	Wave Height	2,0 m Tp 13s
	Visibility	na
Limits for Cessation of Cargo Operations		
	Wind Speed/Direction	25 knts
	Wave Height	2,0 m Tp 17s
	or	
	Wind Speed/Direction	30 knts
	Visibility	na
Limits For Disconnection of Loading arms		
	Wind Speed/Direction	25 knts
	Wave Height	2,4 m Tp 15s
	or	
	Wind Speed/Direction	35 knts
	Visibility	na
Limits for Leaving Berth		
	Wind Speed/Direction	25 knts
	Wave Height	2,4 m Tp 23s
	or	
	Wind Speed/Direction	50 knts
	Visibility	na
Limits for Resumption of Cargo		
	Wind Speed/Direction	25 knts
	Wave Height	2,0 m Tp 13s
	Visibility	na
Other e.g. Icing, river bore etc.		

Action in the Event of Electrical Storms		
	Stop Cargo	Y / N na
	Disconnect Hoses/Arms	Y / N na
Night Time Berthing/Unberthing Y / N		Y

Tidal Rates at Berth

Flood Spring tides speed knts, direction degT	na
Ebb Spring tides speed knts, direction degT	na
Flood Neap tides speed knts, direction degT	na
Ebb Neap tides speed knts, direction degT	na

Tugas Available

Name	Bollard Pull	HP	Fire-fighting Y/N	Propulsion
AQUARIUS	73,08 TON	5600	Y	AZIMUTHAL
RIGEL	51,14 TON	4290	N	AZIMUTHAL
ÃQUILA	15,39 TON	1010	N	MONO PROPELLER KAPLAN TYPE
ERIDANUS	25,89 TON	1830	N	2 PROPELLER AND 2 SHAFT KAPLAN TYPE
LAGOA CAPIXABA	29,04 TON	2100	N	MONO PROPELLER KAPLAN TYPE
REBRAS JAU	50,00 TON	2 X 1650 KW	N	AZIMUTHAL - 2 PROPELLERS
REBRAS IGUAÇU	50,00 TON	2 X 1650 KW	N	AZIMUTHAL - 2 PROPELLERS
REBRAS JURUBATIBA	50,00 TON	2 X 1650 KW	N	AZIMUTHAL - 2 PROPELLERS
BELATRIX	30,00 TON	2170 KW	N	MONO PROPELLER KAPLAN TYPE

Tugs Required according to the Brazilian Maritime Authority expressed in PORTARIA Nº 15 / CPCE,09.09.2008.

Cargo Capacity smaller or equal to (m³)	Minimum required bollard pull	Required Tugs Number
140.000	>=150t	4, being 3 of azimuthal type

Where made fast

Reduction in tugs if thrusters fitted	N
Ship's or Tug's Line	
Escort tug used	Y
Stand-by Tug provisoin	Y

SHIP/SHORE COMPATIBILITY

PORT INFORMATION

Maximum Wind speed and Direction

Month	Speed	Direction
Jan	14 m/s	E ESE
Feb	14 m/s	E ESE
Mar	12 m/s	E ESE
Apr	12 m/s	E ESE
May	12 m/s	E ESE
Jun	12 m/s	E ESE
Jul	14 m/s	E ESE
Aug	14 m/s	E ESE
Sep	14 m/s	E ESE
Oct	14 m/s	E ESE
Nov	14 m/s	E ESE
Dec	14 m/s	E ESE

Temperatures

	Winter	Summer
Sea Temp	25	25
Min Air Temp	23	31
Max Air Temp	23	31

Terminal Storage Capacity

Product	Capacity m3	press/refrig.	import rate m3	export rate m3
LNG	125000	refrig	5000/h(min)	na
Ethylene	na	na	na	na
Propane	na	na	na	na
Butane	na	na	na	na
Ammonia	na	na	na	na
VCM	na	na	na	na
Butadiene	na	na	na	na
Propylene	na	na	na	na

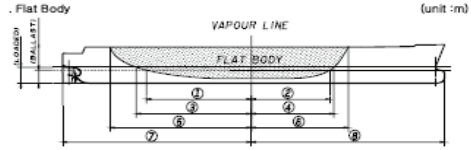
Comments, e.g. rates with/without vapour return

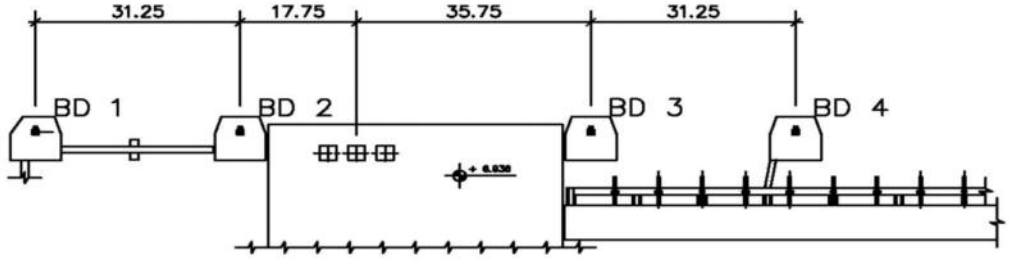
Average Number of days per year that the port is closed due to weather conditions Zero
Is the terminal subject to sudden local severe weather conditions? Y / N N
Details

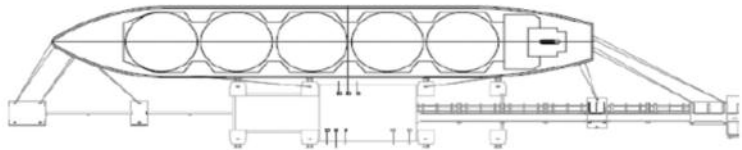
Time Zone GMT: -03:00
Daylight Saving Y/N N
Any Other Berth/Port Restrictions N

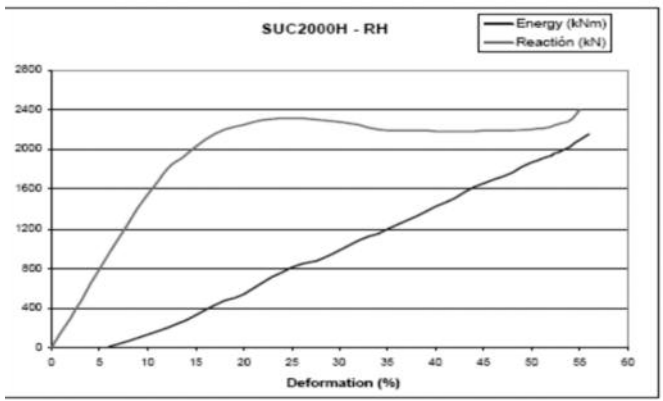
SHIP/SHORE COMPATIBILITY

CONFIRMATION LIST BETWEEN SHORE AND SHIP

Items Fender/flat body	Shore specification	Ship specification	Remarks
1. Arrangement - Include drawings. Include ship's parallel body dimensions at different intervals. Include fender height, width, height above datum and facing material.	1. Arrangement (Layout, Fender topview,side view) (unit: m)	1. Flat body (under ballast conditions) (unit: m)	. Flat Body (unit :m)  Length of Flat body from Vapour Line Center Aft Part / Fwd Part Length of Ballast draft ① 79.320 ② 60.625 Length of Loaded draft ③ 86.737 ④ 63.482 Length of upper deck part (fro reference) ⑤ 105.900 ⑥ 74.087 Length of stem/stern (for reference) ⑦ 140.800 ⑧ 144.600
2. Strength	2. Strength (unit:t/sq.m) See attached reaction/deflection curve Energy Absortion: 2111 kNm Reaction Force; 2413 kN @55% compression Max. berthing speed = 12 cm/s Berthing angle = 3 deg	2. Strength (flat body) (unit:t/sq.m) 20 t/sq.m.	To indicate here max. berthing speed (in cm/s),berthing angle and offset (from loading arm center to manifold center) Maximum berthing speed according to company SMS is 5 cm/sec; Flat body strength is 20 t/m2; maximum berthing angle 5 deg; no offset.







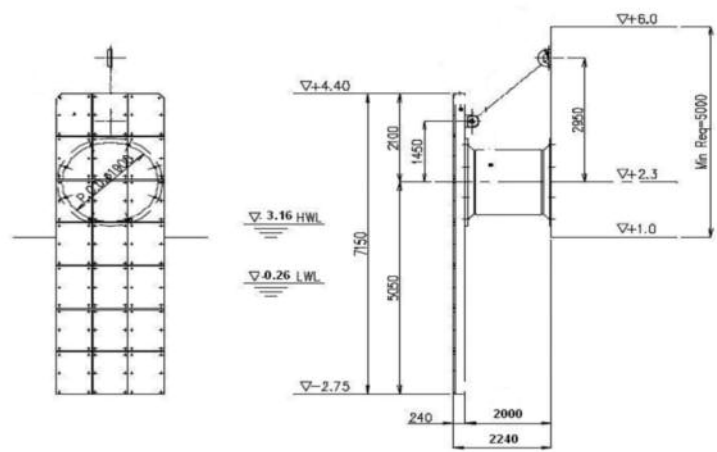


Figure 5.- SUC 2000H deformation curves

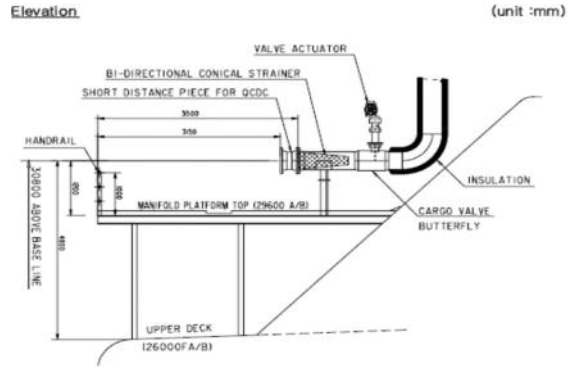
SHIP/SHORE COMPATIBILITY

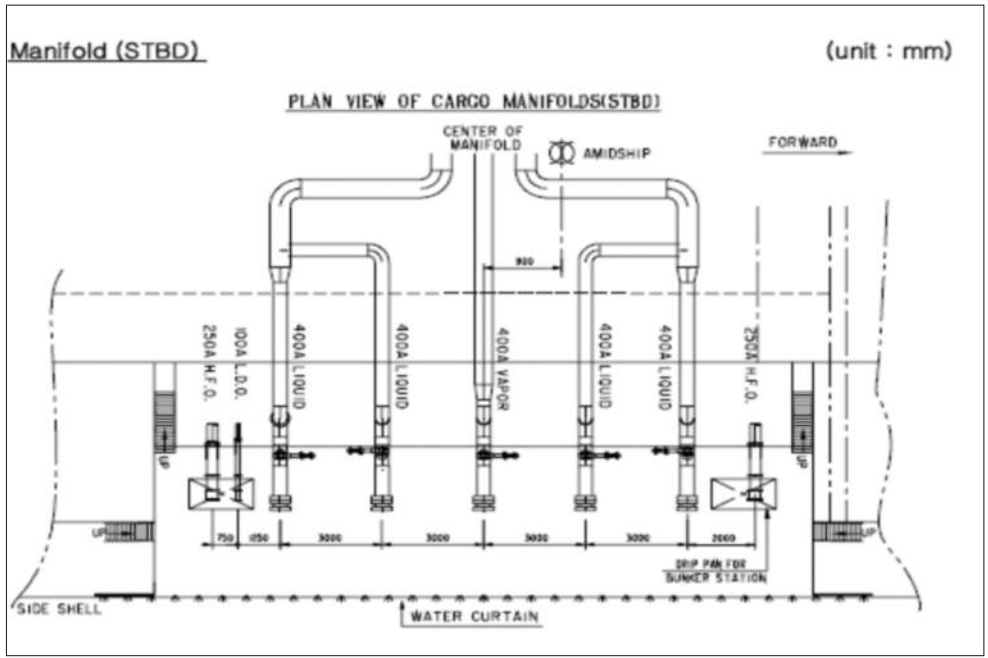
CONFIRMATION LIST BETWEEN SHORE AND SHIP

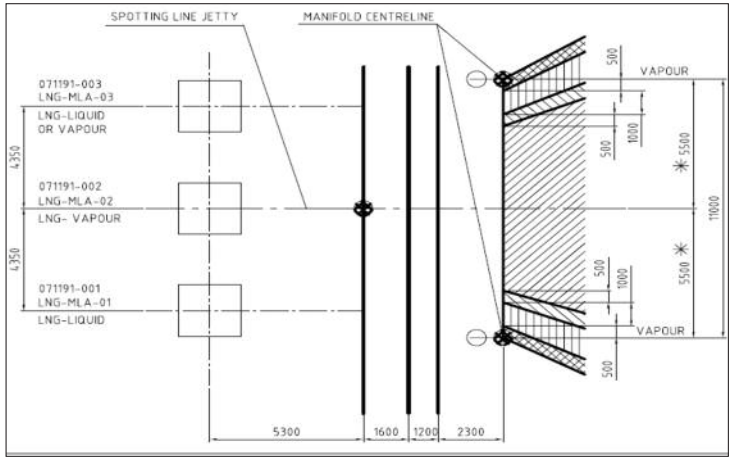
Items	Shore specification	Ship specification	Remarks
Loading arms and manifold lay-outs			
1.Loading arm/manifold	Loading arm composition and spacing (indicate position of bow/stern and ship side P/S) (units: Dia: mm; Distances: m) See "Manifold Envelope" Sheet	Manifold composition and spacing (indicate position of bow/stern and ship side P/S) (units: Dia: mm; Distances: m)	Manifold side view (indicate distance to ship side,height above manifold platform and height above water line at summer draught) (unit: m) Also document conditions if Port and Starboard arrangements differ. Port and stbd arrangement indentical; see attached drawings
2.Arms envelopes	*See "Manifold Envelope" Sheet*	Spotting line: 0.00 cm fore/aft shore vapour arm	To attach drawing of arms envelopes. Illustrate max/min ht above datum
3. Hoses	*No*		Number, size, product, temperature, pressure, rate drawings n/a

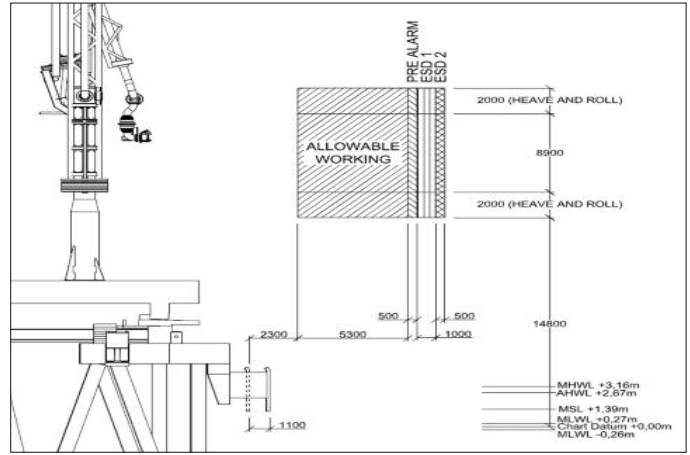
Distances to Initiate PERC; See "Manifold Envelope" Sheet	
Pre Alarm	Forward
	Aft
	Seaward
ESD1	Forward
	Aft
	Seaward
ESD 2	Forward
	Aft
	Seaward
Distance from Ship's Side to Flange Face	
Spacing Between Manifold Centres	
Centreline of manifold above the waterline	

Ship or shore supplied strainer?	Normally not
Number of grades that can be handled simultaneously?	LNG only
Is vapour return available for each grade handled simultaneously	LNG only




Manifold (STBD)
(unit : mm)
PLAN VIEW OF CARGO MANIFOLDS(STBD)
CENTER OF MANIFOLD
AMIDSHIP
FORWARD
920
250A H.F.O.
100A L.D.O.
400A LIQUID
400A LIQUID
400A VAPOR
400A LIQUID
400A LIQUID
250A H.F.O.
UP
750
1750
3000
3000
3000
3000
2000
DRIP PAN FOR BUNKER STATION
SIDE SHELL
WATER CURTAIN

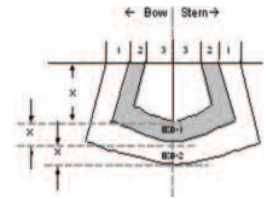

SPOTTING LINE JETTY
MANIFOLD CENTRELINE
071191-003
LNG-MLA-03
LNG-LIQUID
OR VAPOUR
071191-002
LNG-MLA-02
LNG- VAPOUR
071191-001
LNG-MLA-01
LNG-LIQUID
VAPOUR
VAPOUR
4350
4350
500
1000
500
5500
5500
500
1000
500
11000
5300
1600
1200
2300


PRE ALARM
ESD 1
ESD 2
ALLOWABLE
WORKING
2000 (HEAVE AND ROLL)
8900
2000 (HEAVE AND ROLL)
500
500
1000
2300
5300
14800
1100
MHWL +3,16m
AHWL +2,67m
MSL +1,39m
MLWL +0,27m
Chart Datum +0,00m
MLWL -0,26m

SHIP-SHORE COMPATIBILITY - MANIFOLD ENVELOP

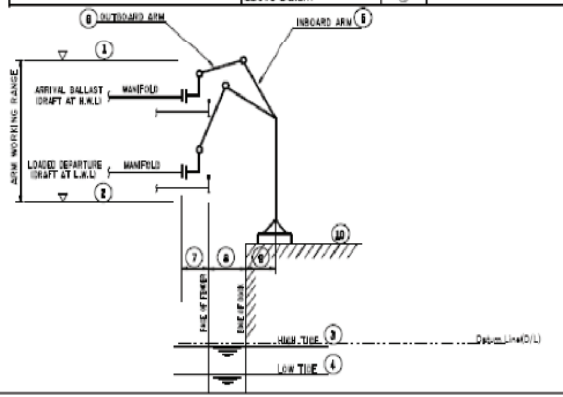
Angle(deg)

	LNG-MLA-01 (L)		LNG-MLA-02 (V)		LNG-MLA-03 (L)	
	left	right	left	right	left	right
pre alarm	16.8	16.8	16.8	16.8	16.8	16.8
ESD1	19.0	19.0	19.0	19.0	19.0	19.0
ESD2	23.3	23.3	23.3	23.3	23.3	23.3



2. Loading Arm Working Range

Item			(m)
Working Range of Loading Arm above Datum	High (above CD)	①	27.7
	Low (above CD)	②	14.8
Tide Level	High (above CD)	③	3.16
	Low (above CD)	④	−0.26
Heave & List	High & Low		
Loading Arm Length	Inboard Arm	⑤	
	Outboard Arm	⑥	
Distance		⑦	
		⑧	
		⑨	
	above Datum	⑩	



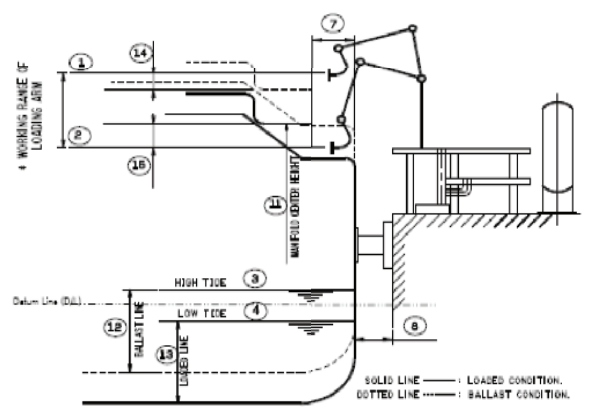
2. Loading Arm Compatibility

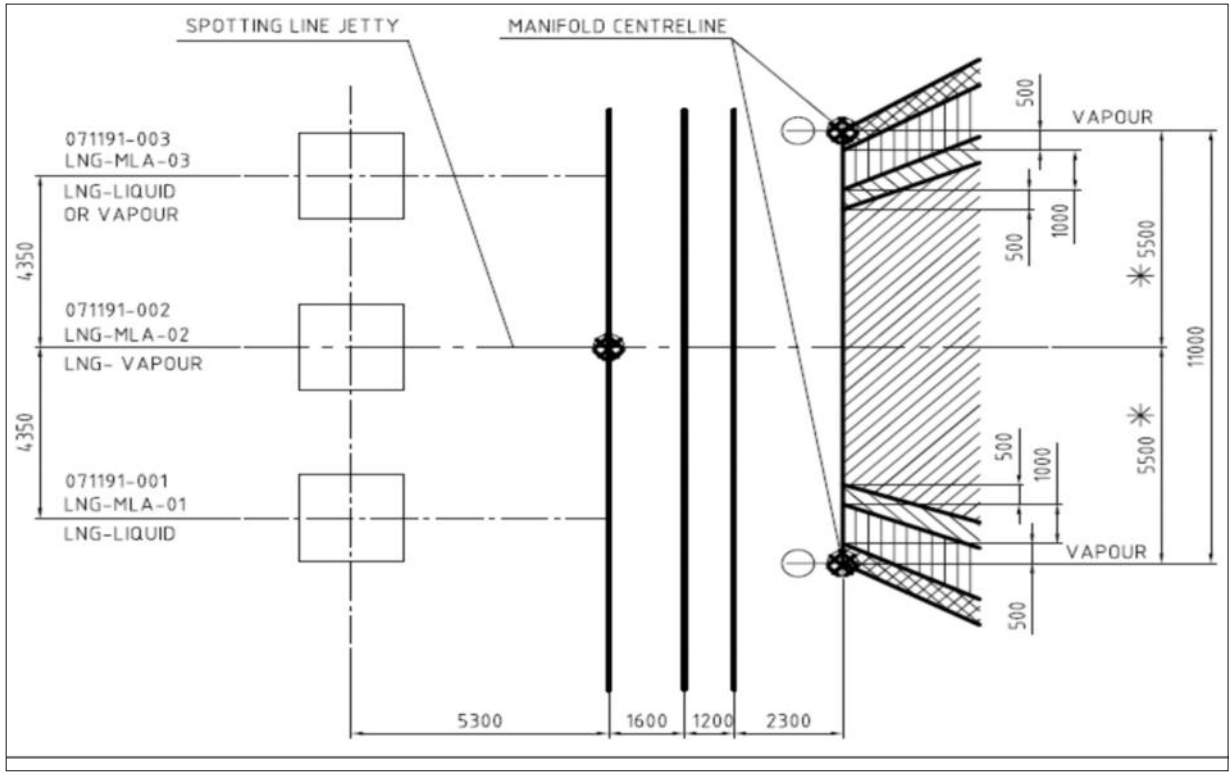
(unit : m)

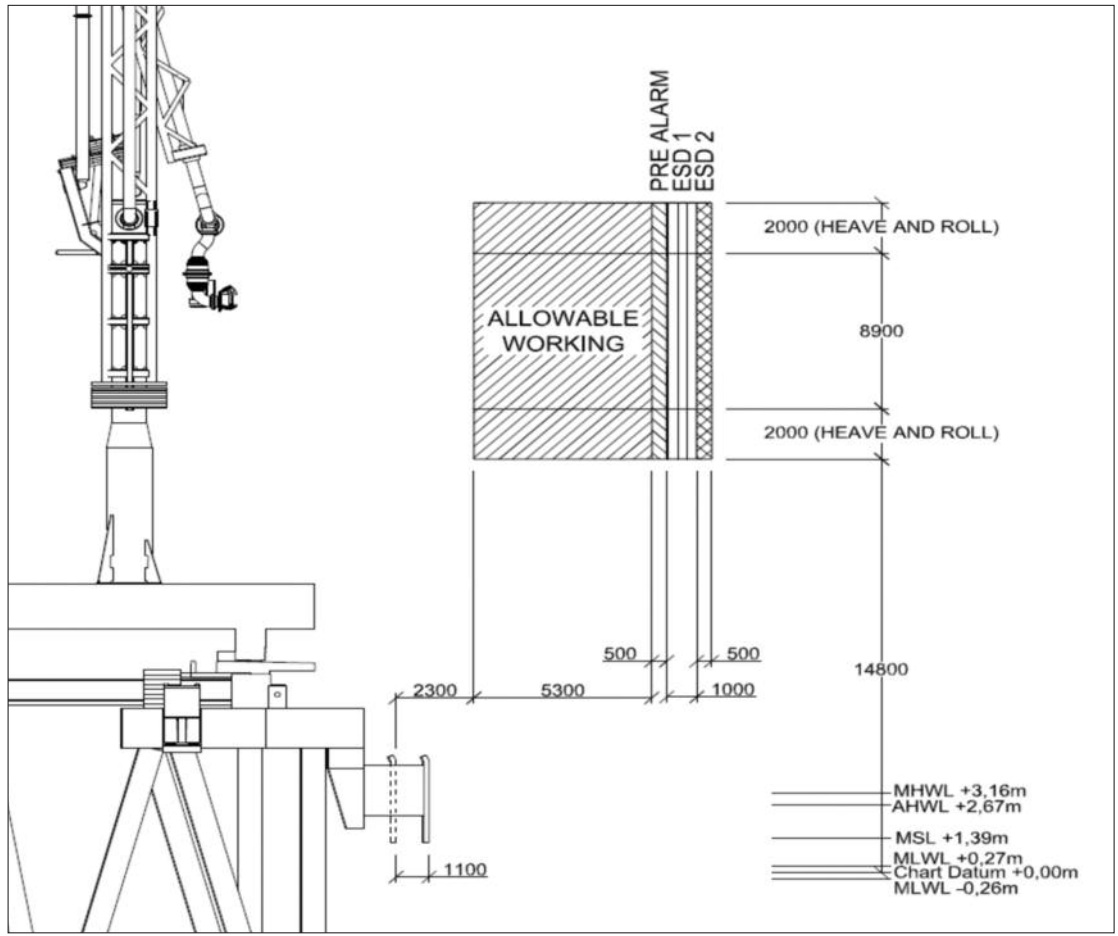
Manifold Height above base line		⑪	30.900
Ballast draft		⑫	9.400
Loaded draft		⑬	11.500
	Clearance (m)		
	Normal		w/Heave & List
Upper Position	⑭	3.140	–
Low Position	⑮	4.760	–

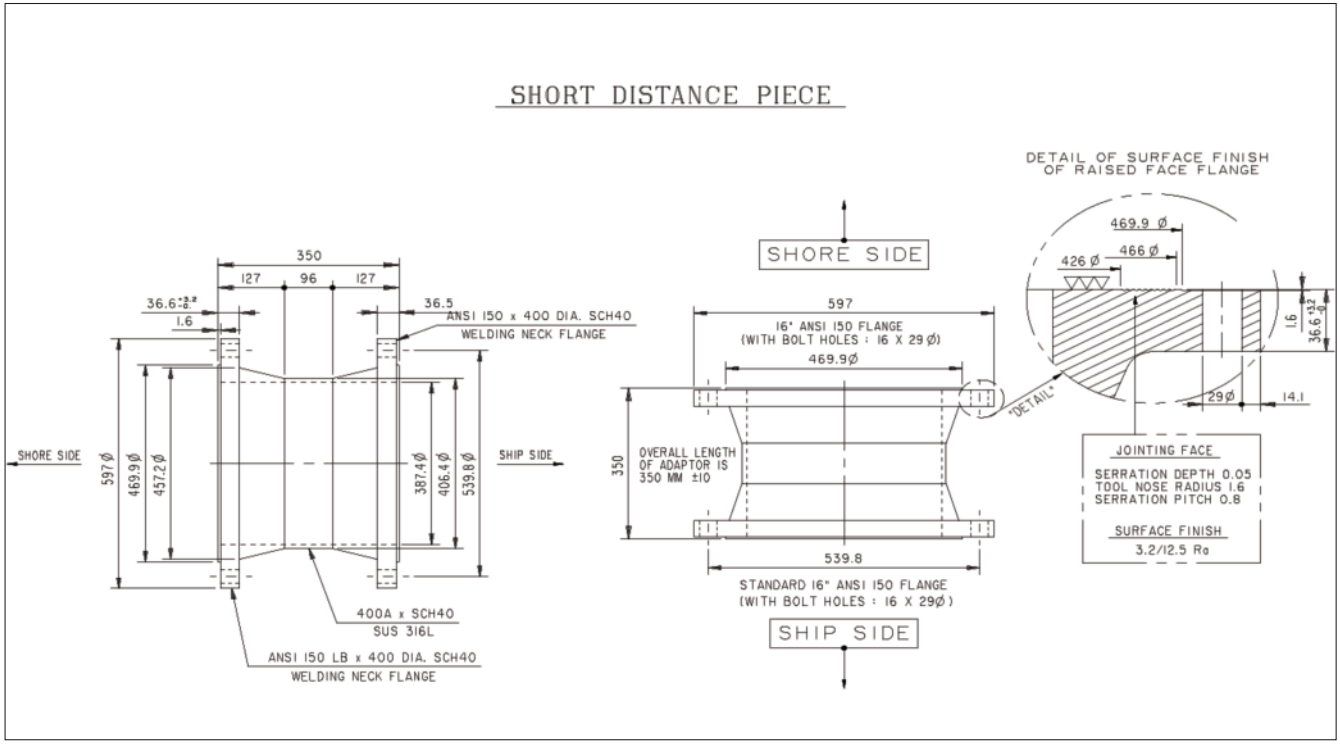
⑭ = ① − (⑪ − ⑫ + ③), ⑮ = (⑪ − ⑬ − ④) − ②

Typical Section




SPOTTING LINE JETTY
MANIFOLD CENTRELINE
071191-003
LNG-MLA-03
LNG-LIQUID
OR VAPOUR
071191-002
LNG-MLA-02
LNG- VAPOUR
071191-001
LNG-MLA-01
LNG-LIQUID
4350
4350
VAPOUR
VAPOUR
500
1000
500
5500
11000
500
1000
500
5500
500
5300
1600
1200
2300


PRE ALARM
ESD 1
ESD 2
2000 (HEAVE AND ROLL)
ALLOWABLE WORKING
8900
2000 (HEAVE AND ROLL)
500
500
14800
2300
5300
1000
MHWL +3,16m
AHWL +2,67m
MSL +1,39m
MLWL +0,27m
Chart Datum +0,00m
MLWL -0,26m
1100

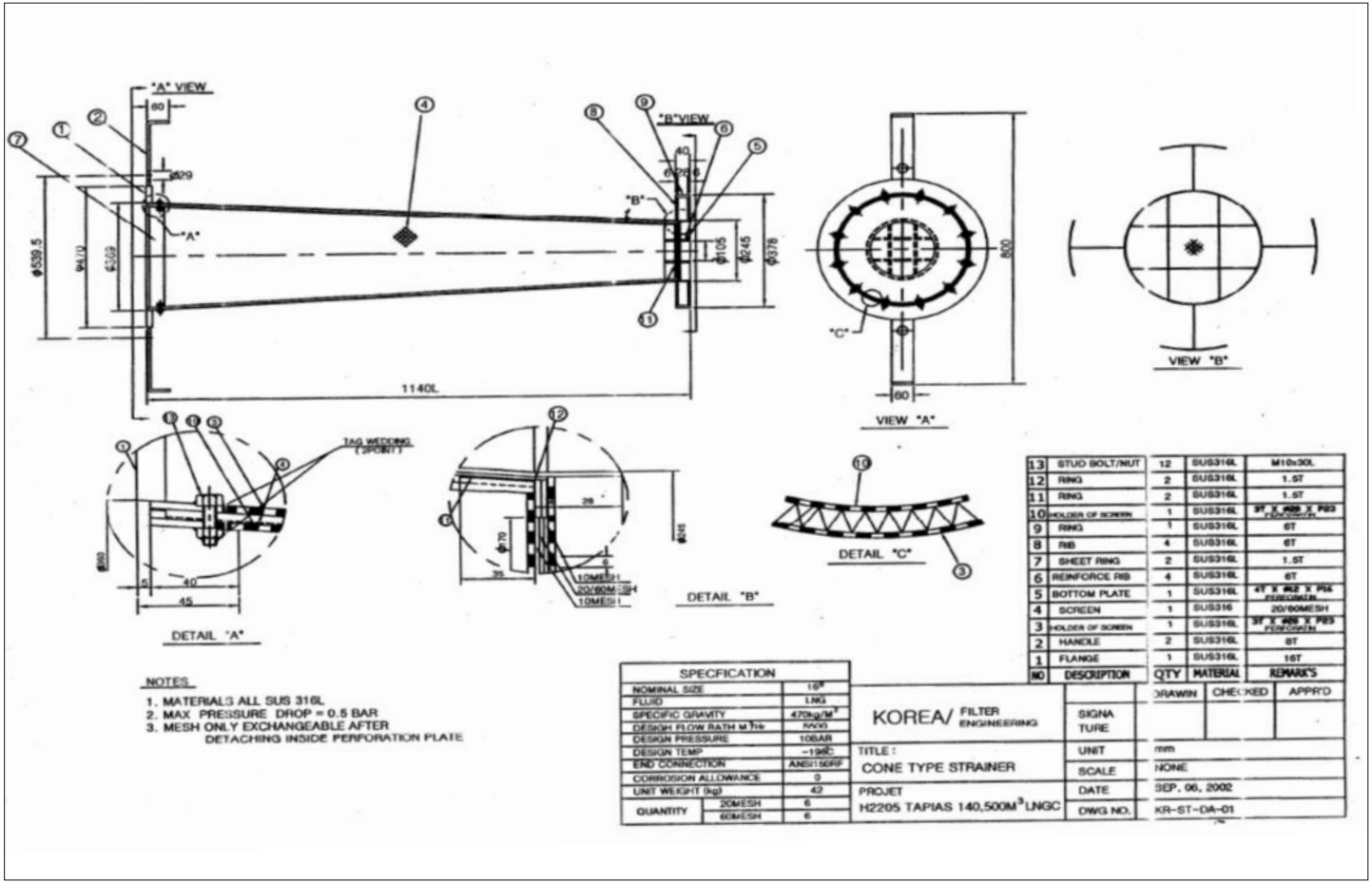

SHORT DISTANCE PIECE
350
127
96
127
36.6
1.6
36.5
ANSI 150 x 400 DIA. SCH40
WELDING NECK FLANGE
SHORE SIDE
SHIP SIDE
597 Ø
469.9 Ø
457.2 Ø
387.4 Ø
406.4 Ø
539.8 Ø
400A x SCH40
SUS 316L
ANSI 150 LB x 400 DIA. SCH40
WELDING NECK FLANGE
SHORE SIDE
597
16" ANSI 150 FLANGE
(WITH BOLT HOLES : 16 X 29 Ø)
469.9Ø
350
OVERALL LENGTH
OF ADAPTOR IS
350 MM ±10
539.8
STANDARD 16" ANSI 150 FLANGE
(WITH BOLT HOLES : 16 X 29Ø)
SHIP SIDE
"DETAIL"
DETAIL OF SURFACE FINISH
OF RAISED FACE FLANGE
469.9 Ø
426 Ø
466 Ø
1.6
36.6
29Ø
14.1
JOINTING FACE
SERRATION DEPTH 0.05
TOOL NOSE RADIUS 1.6
SERRATION PITCH 0.8
SURFACE FINISH
3.2/12.5 Ra

SHIP/SHORE COMPATIBILITY

CONFIRMATION LIST BETWEEN SHORE AND SHIP

Items	Shore specification	Ship specification	Remarks
Arms/cargo pumps/ compressors (cont'd)		**There is no arm on the ship**	
1. Loading arm (cont'd)			
Loading strainer		60 mesh	To attach drawing
Discharge strainer		bidirectional see attached	To attach drawing
2. LNG-MLA-01 arm	LNG-Liquid or LNG-Vapour		Indicate availibility of LN2
(1)Flow rate	5000 or 15000 m3/h		hose on ship and hose
(2)Size	16"		characteristics,
(3)Flange spec.:	16" Hydraulic QC/DC		Indicate availibility of
a.Flange	ANSI 150 lbs FF		suitable reducers on ship.
b.Bolt and nut			
Number			
Material bolt			
Material nut			
Size			
Packing			
(4)Rated pressure	6/19 bar g (Oper/Design)		
Separate from vapour line?	Can operate in both condition		
Max outreach from fenderline	na		
3. LNG-MLA-02 arm	LNG-Vapour		Indicate availibility of
(1)Flow rate	15000 m3/h		suitable reducers ship & shore.
(2)Size	16"		
(3)Flange spec.:	16" Hydraulic QC/DC		
a.Flange	ANSI 150 lbs FF		
b.Bolt and nut			
Number			
Material bolt			
Material nut			
Size			
Packing			
(4)Rated pressure	6/19 bar g (Oper/Design)		
4. LNG-MLA-03 arm	LNG-Liquid		Indicate availibility of
(1)Flow rate	5000 m3/h		suitable reducers ship & shore.
(2)Size	16"		
(3)Flange spec.:	16" Hydraulic QC/DC		
a.Flange	ANSI 150 lbs FF		
b.Bolt and nut			
Number			
Material bolt			
Material nut			
Size			
c.Packing			
(4)Rated pressure	6/19 bar g (Oper/Design)		
5. Fresh water hose	Not avaliable		
(1)Flow rate	na		
(2)Flange spec.	na		
(3)Rated pressure	na		
(4) Coupling Type	na		
6. Fire connection	Not avaliable		
(1)Coupling type/size	na		

Are insulating flanges used ? Y / N — No



NO	DESCRIPTION	QTY	MATERIAL	REMARKS
13	STUD BOLT/NUT	12	SUS316L	M10x30L
12	RING	2	SUS316L	1.5T
11	RING	2	SUS316L	1.5T
10	HOLDER OF SCREEN	1	SUS316L	PL
9	RING	1	SUS316L	6T
8	RIB	4	SUS316L	6T
7	SHEET RING	2	SUS316L	1.5T
6	REINFORCE RIB	4	SUS316L	6T
5	BOTTOM PLATE	1	SUS316L	PL
4	SCREEN	1	SUS316	20/60MESH
3	HOLDER OF SCREEN	1	SUS316L	PL
2	HANDLE	2	SUS316L	6T
1	FLANGE	1	SUS316L	16T

SPECFICATION		
NOMINAL SIZE		16"
FLUID		LNG
SPECIFIC GRAVITY		470kg/M³
DESIGN FLOW RATH M³/Hr		RATED
DESIGN PRESSURE		10BAR
DESIGN TEMP		-196℃
END CONNECTION		ANSI150RF
CORROSION ALLOWANCE		0
UNIT WEIGHT (kg)		42
QUANTITY	20MESH	6
	60MESH	6

NOTES
1. MATERIALS ALL SUS 316L
2. MAX PRESSURE DROP = 0.5 BAR
3. MESH ONLY EXCHANGEABLE AFTER DETACHING INSIDE PERFORATION PLATE

KOREA/ FILTER ENGINEERING

	DRAWN	CHECKED	APPR'D
SIGNATURE			
UNIT	mm		
SCALE	NONE		
DATE	SEP. 06, 2002		
DWG NO.	KR-ST-DA-01		

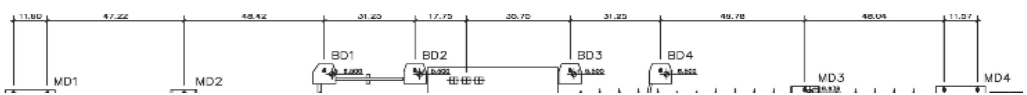
TITLE : CONE TYPE STRAINER

PROJET H2205 TAPIAS 140,500M³ LNGC

SHIP/SHORE COMPATIBILITY

CONFIRMATION LIST BETWEEN SHORE AND SHIP

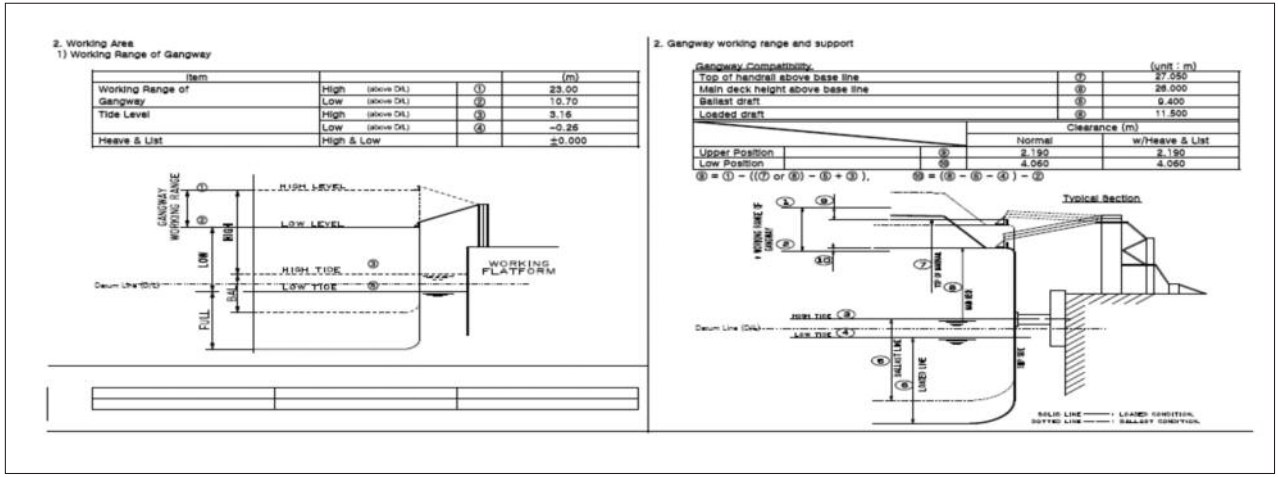
Items	Shore specification	Ship specification	Remarks
Mooring line /winch			
1.QRH/winch number	1.QRH: Y MD No1 2x2 (HooksxSets) MD No2 2x1 BD No1 2x1 BD No2 2x1 BD No3 2x1 BD No4 2x1 MD No3 2x1 MD No4 2x2	1.Winch (1) Windlass: 49.5 tx 9 m/Min x 2 sets tx m/Min x sets (2) Winch: 30 tx 15 m/Min x 7 sets tx m/Min x sets tx m/Min x sets No. of drums 20 No. of wires (P) side 18 No. of wires (S) side 18 Brake capacity 99.2/74.5 t/drum No. of hawser drums no	Indicate if QRH is operated locally or remotely. Indicate if QRH is used Indicate load limits for each hook
2.Strength	2. 750 kN SWL for all MD hooks / / / / and 600 kN for all BD hooks / / / / .	2.Wire strength (1) HMPE Rope Dynema Dia. 42 x Length 280 m (2) MBL 124 t	If not wire mooring line, indicate material and construction
3.Tail rope	11 m pennants required	Tail rope characteristics To be attached PE 22 m; MBL - 164 tons	
4.Lay out	Attached Recommended total No. of mooring lines= 16 as follow: H=2 / B=4 / S=2 / S=2 / B=4 / ST= 2		Indicate height above datum Indicate distance from spotting line Indicate setback from berth face. Indicate mooring line type.
5.Design weather Criteria for mooring forces calculation	OCIMF:N Wind: speed = 55 knots direct. = 60 /90 /130 degrees or Wind: speed = 25 knots; direct. = 60 /90 /130 egrees; plus Waves: Hs =2,5 Tp = 23s direct.= NE Current speed not considered		
6. Any specific data which may be needed for in depth mooring analysis	None		e.g. Optimoor data

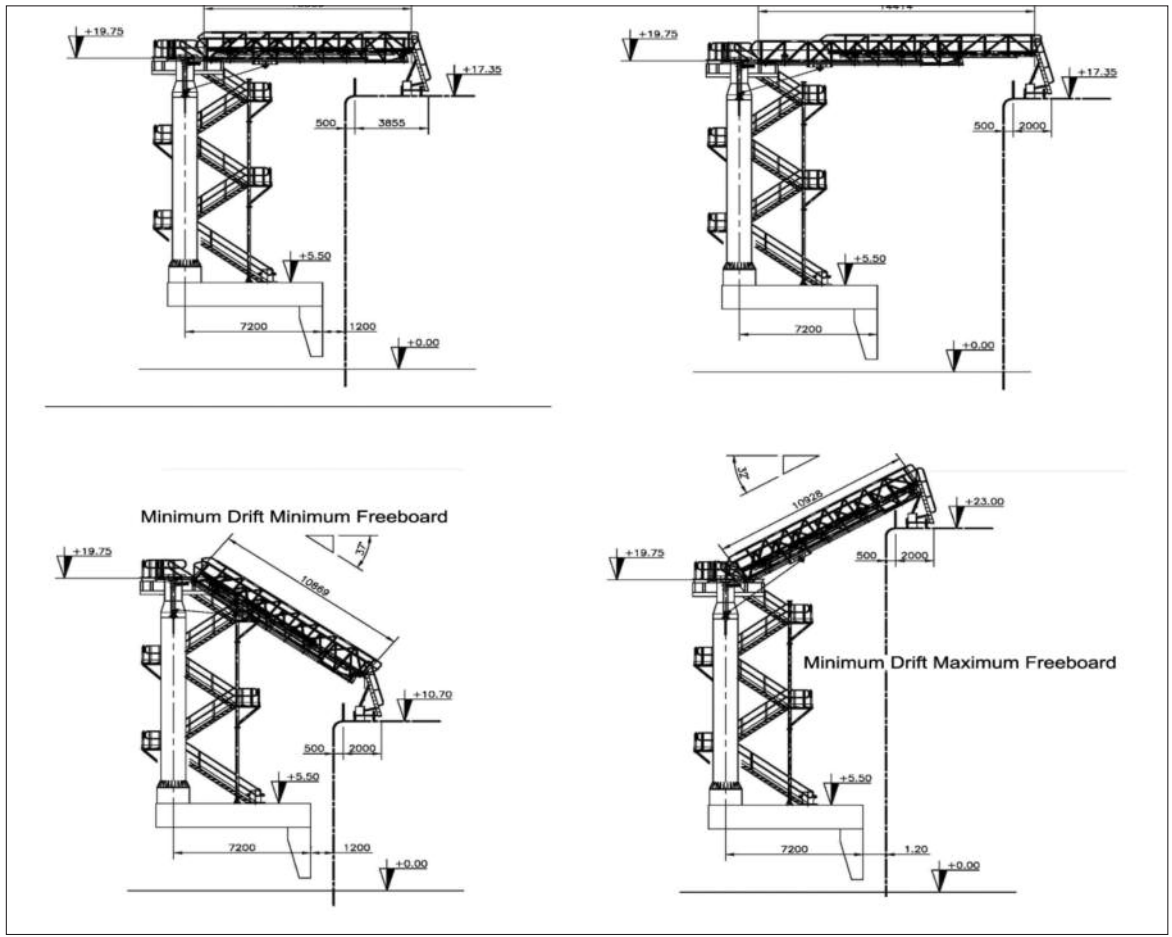


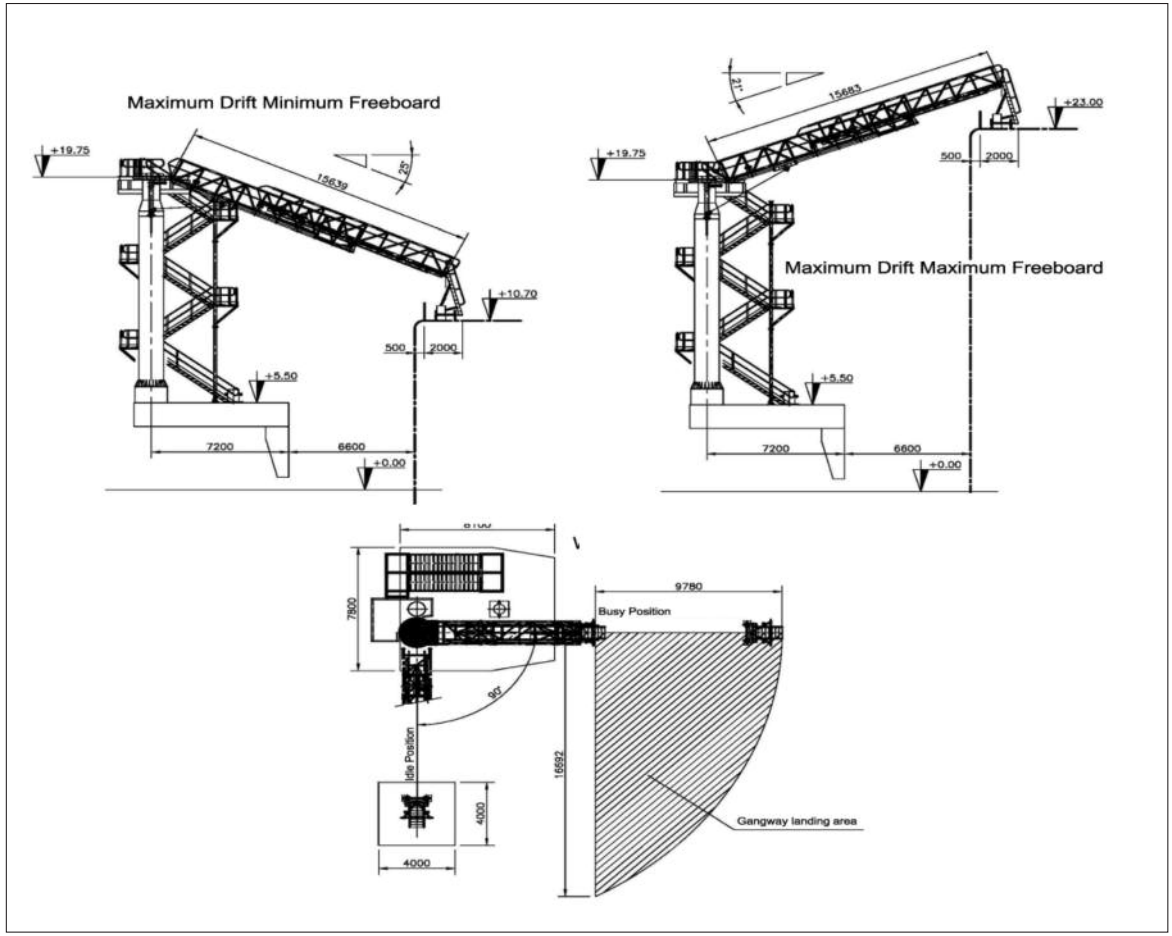
SHIP/SHORE COMPABILITY

CONFIRMATION LIST BETWEEN SHORE AND SHIP

Items Gangway/support	Shore specification	Ship specification	Remarks
1.Position of gangway	1.Position At BD 3 37,30 m AFT from vapour line 7,10 m from uncompressed berthing line	1.Position (units: m)	
2.Gangway support	2.Detail of gangway extremity	2.Detail of gangway landing area or gangway support see attached	See attached drawing.
3.Gangway working area	3.Working area (top view,side view)	3.Sketch (elevation,side view) Indicate (P) or (S) side	See attached drawing.
4.Weight of gangway on support	4.Weight Longitudinal: kg Transverse: kg Vertical: kg		
5. Is the gangway electrically insulated to prevent static discharge? Y / N			




+19.75
+17.35
500
3855
+5.50
7200
1200
+0.00
+19.75
+17.35
500
2000
+5.50
7200
+0.00
Minimum Drift Minimum Freeboard
+19.75
47
10669
+10.70
500
2000
+5.50
7200
1200
+0.00
37
10928
+23.00
+19.75
500
2000
Minimum Drift Maximum Freeboard
+5.50
7200
1.20
+0.00


Maximum Drift Minimum Freeboard
+19.75
15639
25°
+10.70
500
2000
+5.50
7200
6600
+0.00
21°
15683
+23.00
Maximum Drift Maximum Freeboard
7900
9780
Busy Position
90°
Idle Position
16592
4000
4000
Gangway landing area

SHIP/SHORE COMPATIBILITY			
CONFIRMATION LIST BETWEEN SHORE AND SHIP			
Items **service platform**	**Shore specification**	**Ship specification**	**Remarks**
	Insert here lay out	Insert here lay out of ship's spare parts and provisions crane(s)	Crane(s) capacity and speed: (units:t and m/min)
Is storing allowed during cargo operations? Y / N		N	
Is storing allowed during cargo sampling etc.? Y / N		N	
Any restrictions on soft/hard store over the jetty		Y	
Are barges allowed alongside? Y / N		N	
Are crew changes permitted? Y / N		Y	
Is the immobilisation of engines for routine maintenance permitted? Y / N			**N. Clarify "routine maintenance"**
Is the survey and maintenance of radar and communications equipment permitted? Y / N			Y
Are taxis allowed in the terminal? Y / N			Y
Details of crew access to shore		To be defined	
Reqiurements for visitors to vessel.		To be defined	
Languages spoken by terminal operations staff		Portuguese / English	

AGUARDANDO NOVO ARQUIVO
ESD_SSL

Partido em formato A4

SHIP/SHORE COMPATIBILITY

CONFIRMATION LIST BETWEEN SHORE AND SHIP

Items Safety items (cont'd)	Shore specification	Ship specification	Remarks
2.Tension monitoring system **2.1 in case ship/shore link is provided** **(1)Optical fiber** **Same as ESD?** a.Manufacturer b.Computer type c.Connector type d.Conn. box position e.Cable length	YES - Harbour & Marine	**(1) SEATECHNIK** **(2) HP D5063A PC compatible with strainstall and Yewmac**	Information displayed,tension alarms: Y/N
(2)Other 1 a.Manufacturer b.Computer type c.Connector type d.Connector position e.Cable length			In case of electric link, to check if protection against over-currents is adequate (e.g. Zener barrier ,etc.)
(3)Other 2 a.Manufacturer b.Computer type c.Connector type d.Connector position e.Cable length **2.2 in case ship/shore link is not provided**			 specify appropriate procedure for mooring watching

SHIP/SHORE COMPATIBILITY

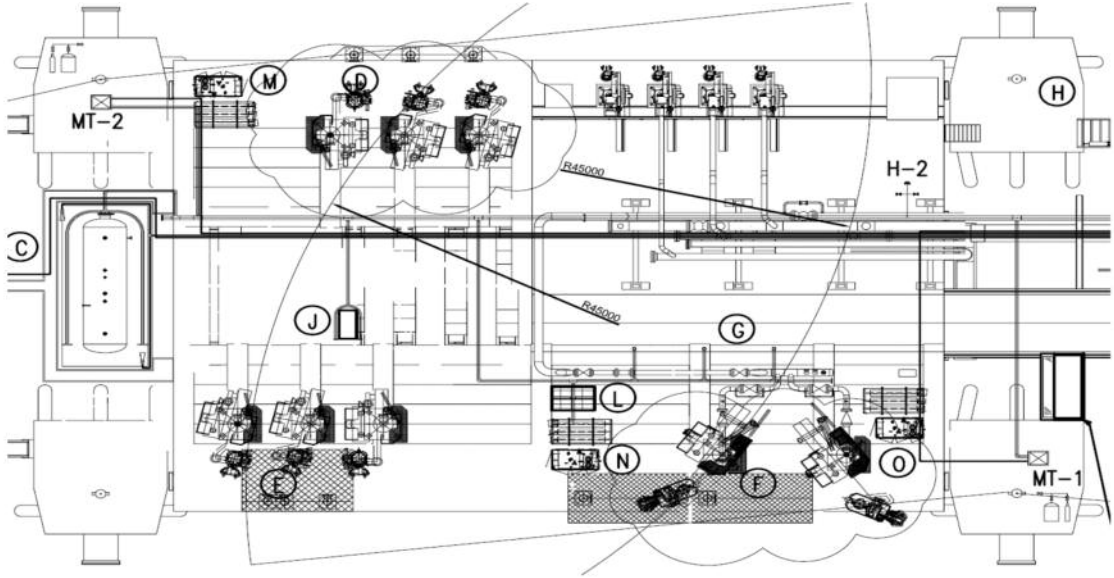
CONFIRMATION LIST BETWEEN SHORE AND SHIP

Items Safety items (cont'd)	Shore specification	Ship specification	Remarks
3.Approach radar (1) Position (2) Manufacturer (3) Specification (4) Operational?	Yes Sensors located on inner breasting Harbour & Marine Yes	Ship lateral dimensions: (unit: m)	Nature of information: approach speed, angle of approach and distance off.
4.Bonding cable Is bonding cable used ? (1) Position a.Cable 1 b.Cable 2 (2) Connector type (3) Cable a.Size b.Length (4) Bolt & nut	N (unit: mm)	(unit: mm)	
What is the maximum speed of approach during berthing?		12cm/s	
What is the usual angle of approach during berthing?		3 degrees	

SHIP/SHORE COMPATIBILITY

CONFIRMATION LIST BETWEEN SHORE AND SHIP

Items Safety items (cont'd)	Shore specification	Ship specification	Remarks
5. Fire fighting	1. Platform: Two elevated monitors Two water hydrants Dry powder extinguishers Foam extinguishers	(1) Exposed Deck in Cargo Area : D/P, S/W (2) Loading Station : D/P, S/W, W/S (3) Accom. House Front Wall : W/S (4) Side Plating : W/C (5) Cargo Machinery Room : Co2, S/W (6) Cargo Dome Area : D/P, S/W, W/s (1) Exposed Deck in Cargo Area : D/P, S/W (2) Loading Station : D/P, S/W, W/S (3) Accom. House Front Wall : W/S (4) Side Plating : W/C (5) Cargo Machinery Room : Co2, S/W (6) Cargo Dome Area : D/P, S/W, W/s (1) Exposed Deck in Cargo Area : D/P, S/W (2) Loading Station : D/P, S/W, W/S (3) Accom. House Front Wall : W/S (4) Side Plating : W/C (5) Cargo Machinery Room : Co2, S/W (6) Cargo Dome Area : D/P, S/W, W/s	
6. Alarms	Gas, criogenic & fire alarms High mooring loads Over extension of loading arms	D/P S/W W/S W/C	: Dry Powder : Sea Water : Water Spray : Water Curtain



7.6. Systems Reactions description

All automatic fire respond systems will have the ability to be activated by human action.
The automatic reaction of the systems depends upon the type of detection:
When cold is detected in certain area, an automatic foam injection will occur, only in the area detected. Also at this moment different types of alarms will be started.

When CNG is detected in certain area, there will be no automatic response but the alarms.
When heat is detected, spray nozzles cooling system will start automatically, but only in the area involved. There should also be alarms at the same time.

After the reaction of the automatic systems, the other non automatic systems, like the elevated monitors, hydrants and dry powder will have to be started by human intervention.

SYMBOLS	
	DRY POWDER TANKS
	HYDRANTS
	FOAM MAKER CHAMBER
	FIRE FIGHTING CONSOLE
	TOWER MONITOR

SHIP/SHORE COMPATIBILITY

CONFIRMATION LIST BETWEEN SHORE AND SHIP

Items Communications	Shore specification	Ship specification	Remarks
1.Communications link	YES	To be provided by Transporter in due time	To attach ship/shore communication diagram with indication of hot line and interphone
(1) Optical fiber	YES		
Same as ESD?	YES		Y/N
a. Manufacturer	Seatechnik, model DSL-8900		
b. Connector type	Type 6 way connector		
c. Conn. box position	HOLD		
d.Cable length	50 m		
(2) Electric Cable	YES		
a. Manufacturer	Seatechnik, model DES-8950		
b. Connector type	37 way Pyle Plug		Male/female
Same as ESD electric link?			Y/N . To attach connector pin arrangement and identification
c.Conn. box position	YES HOLD		Detail if more than one connection
d.Cable length	50 m		
2.Telephone sets			In addition to telephone types, indicate if sets are of rotating or button dialing types and attach wiring diagram
(1) Hot line	YES		Indicate location of terminal phones on board e.g. Bridge/CCR/Office
(2) Public line	YES		
(3)Interphone	(HOT LINE)		
In case ship/shore communication link is not provided	Portable VHF/ UHF radios UHF for communications with AIS		To specify adequate communication procedure

Terminal Information

Details of sound signals for :	
Fire	General intermittent sonorous alarm
Gas Release	General intermittent sonorous alarm
Other	NA

Is the use of moble phones and pagers permitted? Y / N	Y (only Intrinsically-Safe Cellular Phone)
Is the use of ship's satellite communications system permitted? Y / N	Y
Are ships VHF sets required to transmit on 1W? Y / N	Y

Dedicated Ship/terminal VHF channels:

Are portable UHF/VHF radios issued by the terminal for ship/shore communications ? Y / N	Y - VHF: TX (162.350 MHZ) and RX (157.750 MHZ)
Details :	Quantitative Radios: Terminal (6); VT1/VT2 (2); Carrier (2)
Does the terminal require the ship to provide a portable VHF/UHF radio for back-up communications? Y / N	Y

SHIP/SHORE COMPATIBILITY

PROCEDURES BETWEEN SHORE AND SHIP

Items	Procedure	Remarks
1.Loading/unloading operations manual	Typical procedure to consist in: a) loading/discharge sequence diagram b) for each item of the sequence diagram: description of action ship side or shore side and associated sequence of communication c) attached to the procedure are LNG (LPG) & vapour line-up diagrams FO, DO & LN2 line diagrams	To be reviewed between ship and shore during pre-loading (discharge) meeting on board include cooldown procedure, line purging, hydrocarbon content limits, ramp up/down procedure and timings
Safety Procedures	Is a ship/shore safety checklist in use? Y Is a pre cargo transfer meeting held? See Procedure Are cargo data safety sheets available for grades handled? n/a Is an anti pollution boom used? Y Is a post cargo transfer meeting held? See Procedure Does the terminal supply safety cards for visitors? Y	
2. Post docking procedures (1) purging/cool down procedures after drydock (2) gas test procedure of ship alongside		Confirm sequence Indicate if all vapour returned Ship to supply cooldown tables for calc of LNG coolant used
3.Emergency procedures	For example: a) communication b) alertness and necessary actions during emergency situations (like high winds, lightning during thunderstorms, LNG (LPG) leaks, fire onshore or aboard, etc.) Is international ship/shore fire connection available? Y Does Terminal have a written safety policy? Y Does terminal have a written safety plan? Y Is a fire on a ship included in the terminal plan ? Y Are fire fighting tugs available at short notice? N Is there a local/terminal fire department? Y Is there a secondary means of escape from the jetty head? Y In the event of a shipboard fire is the policy to remove the vessel from the berth? See Is there a gas detection system on the jetty? Y	Ideally a loading/discharge operating manual during emergency scenarios should be provided
4. Port information book (also called port regulation)		To be onboard Indicate from whom available
5. Contingency plan for the LNG (LPG) harbour		To be onboard