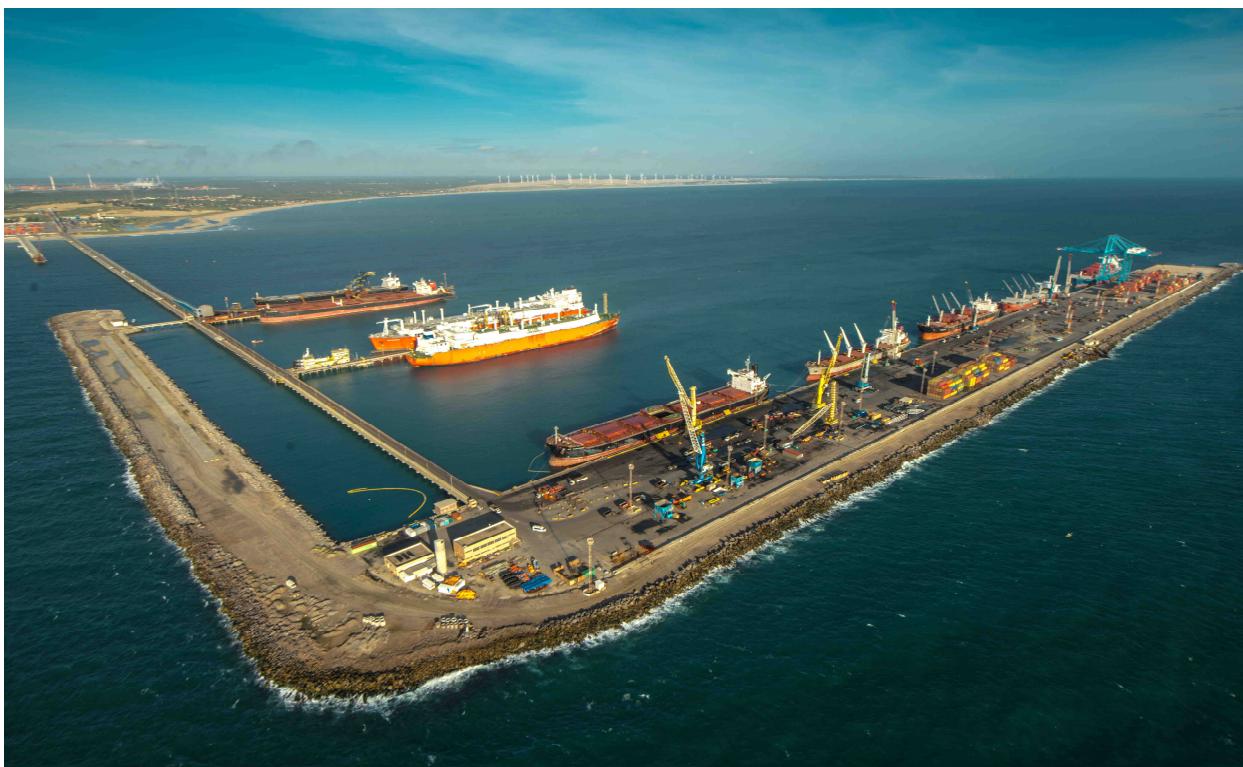


## **PORT INFORMATION**

### ***PECÉM TERMINAL***



Review	Changes	Date	Prepared by	Approved by
0		09/2008	Josenildo/ Tavares	Jorge Luiz
1	Updating Procedures	02/2010	Josenildo/ Tavares	Francisco
2	Updated	03/2019	Marlon/Tavares	Mateus
3	Updated	07/2020	Marlon	Heronildes

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## 1. 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 SIGTTO/ISGOTT - Society of International Gas Tanker and Terminal Operators / 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 do Terminal Aquaviário do Pecém**

Esplanada do Pecém, s/n - Distrito do Pecém  
Postal Code 62674-000 São Gonçalo do Amarante – CE  
Phone: (+55 85) 3266-4360  
Cell Phone: (+55 85) 98812-4952

**Petrobras Transporte S.A. – Transpetro**

Avenida Presidente Vargas, 328, 9<sup>th</sup> 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>

## 2. 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.

**UTC** – Universal Time Center (Standard Universal Time).

**VTs** – Vessel Traffic Service (Vessel Traffic Control Service).

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

### 3. 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](http://www.dhn.mar.mil.br).

## 4. 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							
Details on cargo / slop / ballast on board		X		X			
Information essential to the operation <i>(complete on the spot)</i>	X				X		
Ship / Shore Safety Check List			X			X	According to MOP
During transshipment							
Repeat Ship / Shore Safety Check List			X			X	As established by ISGOTT
After transfer of cargo, 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

## 5. DESCRIPTION OF PORT AND ANCHORAGE

### 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

CGF: 06.983.506-3

Municipal Enrollment: 450058-0.

Telephone: (85) 3372-1500 (24-hour assistance)

Email: cearaportos@cearaportos.ce.gov.br

## **Pecém Port Terminal**

The Pecém Port Terminal is composed basically of an L-shaped with protection breakwater to parallel jetty – Berma style of 1900 meters, and another perpendicular to the beach of 2000 meters, away from coastline with three berthing facilities, being two in the shape of a Pier, with two mooring berths each, and one continuous berth, used for commercial operations, being pier 1 reserved for solid cargo bulk 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	Draft	Notes
01	03° 28' S 38° 49' 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 shown in the picture below:





### 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 by:

Capitania dos Portos - CP-CE  
Avenida Vicente de Castro No. 4917  
Bairro Mucuripe, Fortaleza/CE  
Postal Code: 60180-410  
Telephone (85) 3133-5100 / 31335106  
Email: cpce.secom@marinha.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 Agency by telephone.

The pilot's **boarding** and unboarding location is in position:  
LAT = 03° 29' 0" S and LONG = 038° 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 main obstacles to navigation are fishing boat traffic, such as *jangadas* (a type small wooden sailboats boat) and canoes nearby the port.

### 5.3.9 General Restrictions

There are no restrictions in maneuvering ships, which may moor and unmoor under any tide, unless 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 Maritime Authority (pilotage norms) to berth and unberth during day light.

Please note that it is the responsibility of CEARAPORTOS, 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 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 maneuverings mooring and unmooring, the Pecém Port Terminal has its own labor force with 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<sup>2</sup>. 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 caused 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<sup>3</sup> 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<sup>3</sup>.

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<sup>3</sup>.

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 above 35 knots the arms should be disconnected.

In the case of winds above 40 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:

- $90^{\circ} \leq D \leq 120^{\circ}$  with 66.74 % of occurrences;
- $30^{\circ} \leq D \leq 60^{\circ}$  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: 3.20 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.

## 6. 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

<b>Pecém Pier</b>						<b>Pecém Port Terminal</b>			
Berth's Name or Number	Type	Length (m)	Draft (m)	Tides (m)		Breadth (m)	Length of Vessel (m)	Goods Handled	Notes (Describe any docking assistance)
				Spring Tide	Neap Tide				
2	Pier	482	15.5	3.20	1.9	50	315	LNG and CNG	→ North Berth: LNG unloading → South Berth: loading LNG and unloading CNG

### 6.3 Docking and Mooring Arrangements

Docking Arrangements													
Berth	Pilot	Vessel Deadweight (DWT)	Tugboat No. and BP				Approach		Mooring Points		Mooring Cables		
			Docking		Sailing		Speed (maximum)	Angle (maximum)	Bollard	Hook	Head / Aft Line	Breast	Spring
			Nº	BP	Nº	BP							
North	Yes	100,000	4	150t	4	150t	12 cm/s	005º	10	20	Prow 4	2	2
South	Yes	175,000									Stern 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 on the LNG Pier							
Berth	Arm	Manufacturer	Product	Diameter	Flow (m³/h)	Pressure (kgf/cm² g)	Temp. (°C)
NORTH	MLA-01	Emco Wheaton	LNG	16"	5,000	5.0	-162
	MLA-02	Emco Wheaton	Steam	16"	15,000	0.2	-140
	MLA-03	Emco Wheaton	LNG or Steam	16"	5,000/15,000	5.0	-162
SOUTH	MLA-04	Emco Wheaton	LNG or Steam	16"	5,000/15,000	5.0	-162
	MLA-05	Emco Wheaton	Steam	16"	15,000	0.2	-140
	MLA-06	Emco Wheaton	LNG	16"	5,000	1.6	-162
	MLA-07	Emco Wheaton	CNG	12"	7,000 m³	58 to 100	5 to 50
	MLA-08	Emco Wheaton	CNG	12"	7,000 m³	58 to 100	5 to 50
<p>LNG Pier's work performance</p> <p>North berth's LNG arms:</p> <ul style="list-style-type: none"> <li>Breadth – 8.9 meters</li> <li>Maximum height = 28.75 meters</li> <li>Minimum height = 15.89 meters</li> </ul> <p>South berth's LNG arms:</p> <ul style="list-style-type: none"> <li>Breadth – 8.9 meters</li> <li>Maximum height = 26.20 meters</li> <li>Minimum height = 18.04 meters</li> </ul> <p>South berth's CNG arms:</p> <ul style="list-style-type: none"> <li>Breadth = 8.9 meters</li> <li>Maximum height = 26.20 meters</li> <li>Minimum height = 18.04 meters</li> </ul>							

## 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	Transshipments	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 supplier and receiver is immediate and made by means of a UHF/VHF radio, in addition of the other secondary ways. 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 electrical 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 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 ready to operate. 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, hold on identification documents moving only in the marked areas and recommended to use closed footwear, long pants, and shirt with sleeves.
- The accommodation ladder 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 accommodation ladder should be used only in emergency evacuation.

### 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 low to high tide.

## 7.4 Before Transferring Cargo

### 7.4.1 Meeting before Operation

- During the initial meeting with the mandatory attendance by the supply ship, receiving ship, and terminal, the following parameters, defined at MOP (Mutual Operation Procedures/ SIGTTO), will be agreed on and recorded: Connection, ESD tests, survey to custody transfer survey (CTS), authorization customer, opening of valves, cool down, return pressure, initial flow (ramp up), temperature, operating flow and pressure, Final flow (ramp down), purging, 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 and ships during the initial meeting for signatures. 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(s) 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 lines and tanks should be used for this purpose only, and they are isolated from all other on-board 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. So, any no planned operations depend on the previous approval by the Terminal Supervisor with focusing at 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 4 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 electrical 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**

**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 access 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, channels 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) 3372-1621 and Cell Phone (55 85) 99420-6499 or email: [supervisorseguranca@cearaportos.ce.gov.br](mailto:supervisorseguranca@cearaportos.ce.gov.br).

## **7.9 Drug and Alcohol Policy**

**7.9.1** According ISGOTT, item 13.4, for safety and health personnel reasons, the use of drugs and alcohol have dangerous effect on work performance, behavior and unsafety in the work place. Hence, consumption of alcohol or use of illegal drugs at the Transpetro Terminal is not permitted.

**7.9.2** The Transpetro to support international authorities efforts to combat illegal drug trafficking and use of alcohol in not permitted place, comply on relevant preventive measures to avoid use, possession, distribution these criminals substances.

## **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 Norms 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**

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

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

- **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;

- **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

**8.3.1** The Agente is responsible for make a contact with tugs approved to LNG Ships manoeuvre, at least 24 hours before the ship's arrival.

#### **Wilson, Sons - Rebocadores**

Rua Costa Barros no. 915 – 11th floor, suites 1101 to 1105, Centro  
Fortaleza-CE Postal Code 60.160-280  
Telephone (85) 4005-1651 / +55 85 999960343 Fax (85) 4005-6161  
Email: valdemar.lopes@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 and Berth 3 are intended for unloading solid bulk cargoes and commercial operations.

### 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 list.

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:

<b>INCIDENTS WITHIN THE PECÉM TERMINAL'S AREA</b>					
<b>Type of Incident</b>	<b>Organization Responsible</b>	<b>Other Organizations Involved</b>			
<b>Collision in Channel</b>	<i>Port Authority</i>	Maritime Authority	<i>TRANSPETRO</i>	<i>Civil Defense</i>	
<b>Vessel Running Aground</b>	<i>Port Authority</i>	<i>Civil Defense</i>	<i>TRANSPETRO</i>	Maritime Authority	
<b>Collision in Berth</b>	<i>Port Authority</i>	<i>TRANSPETRO</i>	<i>Civil Defense</i>	Maritime Authority	
<b>Vessel Sinking</b>	<i>Port Authority</i>	<i>Civil Defense</i>	<i>Fire Department</i>	<i>TRANSPETRO</i>	
<b>Fire in Vessel</b>	<i>TRANSPETRO or Ship</i>	Maritime Authority	<i>Fire Department</i>	<i>Civil Defense</i>	<i>Port Authority</i>
<b>Fire in Berth</b>	<i>TRANSPETRO or Ship</i>	<i>Fire Department</i>	<i>Civil Defense</i>	<i>Port Authority</i>	Maritime Authority
<b>Pollution</b>	<i>TRANSPETRO or Ship</i>	<i>Port Authority</i>	<i>TRANSPETRO SMS – MCR</i>	<i>IBAMA</i>	Maritime Authority

## 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 intakes.

An 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 Transpetro Terminal

Location	Telephone	e-mail	VHF/UHF Channels
Control Room	+55 85 32664311	oppcem@petrobras.com.br	06/16
Terminal Coordinator	+55 85 32664360	heronildesfilho@transpetro.com.br	06/16
QHSE Manager	+55 85 32664520	nadynni.soeiro@transpetro.com.br	----

### 10.2 Port Services

Organization	Telephone	e-mail	VHF/UHF Channels
Maritime Authority	+55 85 31335106	cpce.secom@marinha.mil.br	16
Port Control	+55 85 33721500	waldir.sampaio@complexdopecem.com.br	06/16
Pilot Station - Atalaia	+55 85 999850293 +55 85 997160001	atalaia@cearapilots.com.br	10
Tugboats	+55 85 999960343	valdemar.lopes@wilsonsons.com.br	10/16

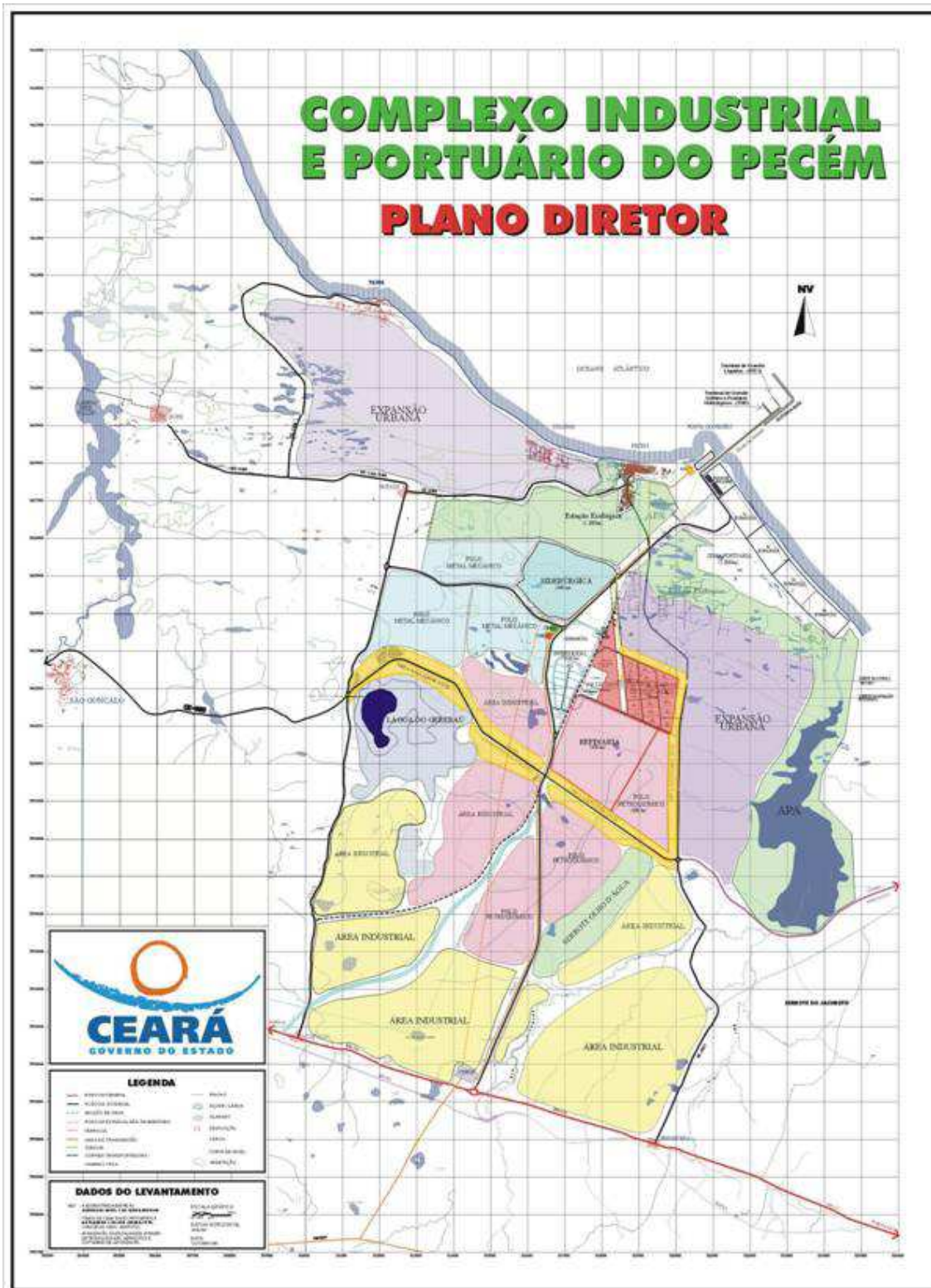
### 10.3 Selected Shipping Agents and Suppliers

Company	Telephone	e-mail	VHF/UHF Channels
North Star - Petrobras Agency	+55 85 31141568 +55 85 998500016	fortaleza@nsshopping.com.br	

### 10.4 Local Officials

Organization	Telephone
Police	190
Health Service	192
Fire Department	193

## ANNEX A – PECÉM PORT TERMINAL'S MASTER PLAN





## **ANNEX B – PHOTO OF TERMINAL**

### **Bird's eye view of Pier 2 and NW arm**



### **Bird's eye view of Pecém Port Terminal**



**ANNEX C – PECÉM PORT TERMINAL'S BASIC DATA**

<b>Date of Origin</b>	November 2001
<b>Administration</b>	Companhia de Integração Portuária do Ceará – Ceará Portos
<b>Address</b>	Esplanada do Pecém, s/n - Distrito do Pecém
<b>City, State, Postal Code</b>	São Gonçalo do Amarante – Ceará, Postal Code 62674-000
<b>Users' telephone</b>	(85) 3372-1500
<b>Home Page</b>	www.complexodopecem.com.br
<b>Email</b>	comunicacao@complexodopecem.com.br
<b>Coordinates</b>	Lat 3º30'00"S Long 39º50'00"W

**Access to Port**

<b>Highway</b>	BR-222 / BR-116 / CE-422
<b>Railway</b>	Companhia Ferroviária do Nordeste-CFN
<b>By Sea</b>	None

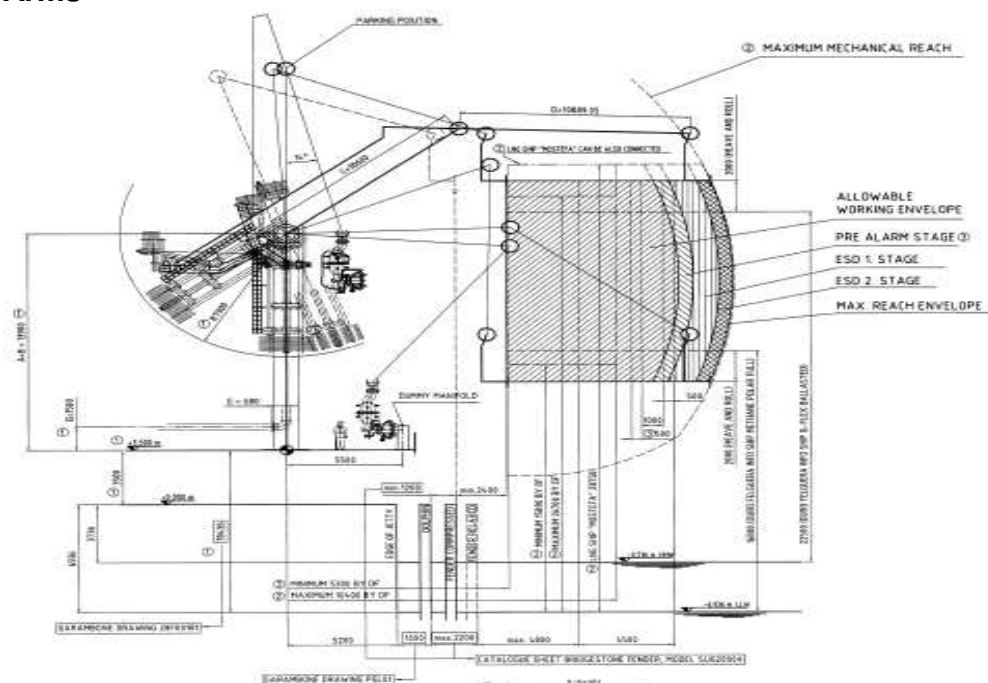
**Access Channel**

<b>Length</b>	None
<b>Width</b>	None
<b>Maximum Depth</b>	18,00m

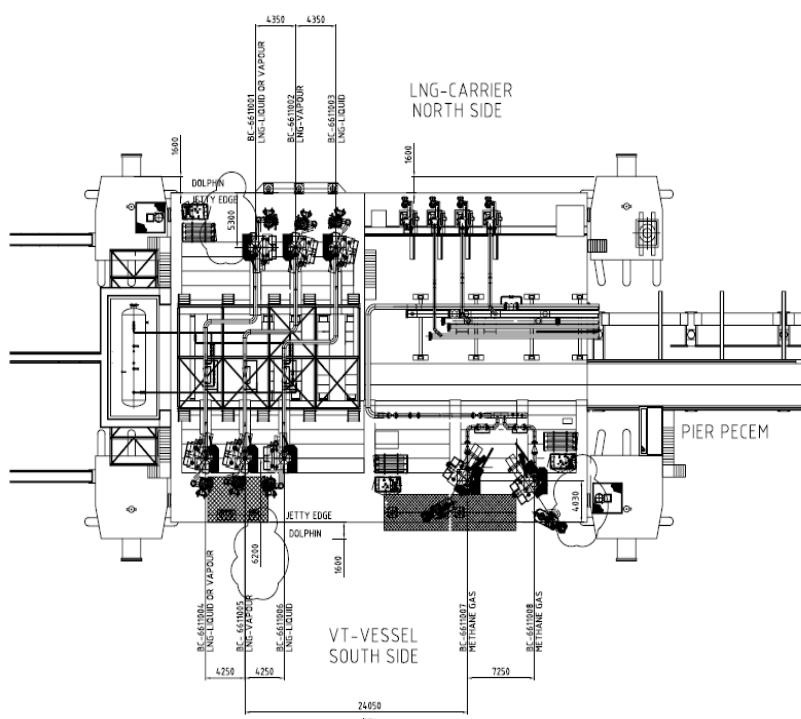
**Port Dimensions**

<b>Total Area</b>	75,000 m <sup>2</sup>
<b>Storage Area</b>	380,000 m <sup>2</sup>
<b>Length of Quay</b>	600 m
<b>Number of Berths</b>	9 (including TMUT)

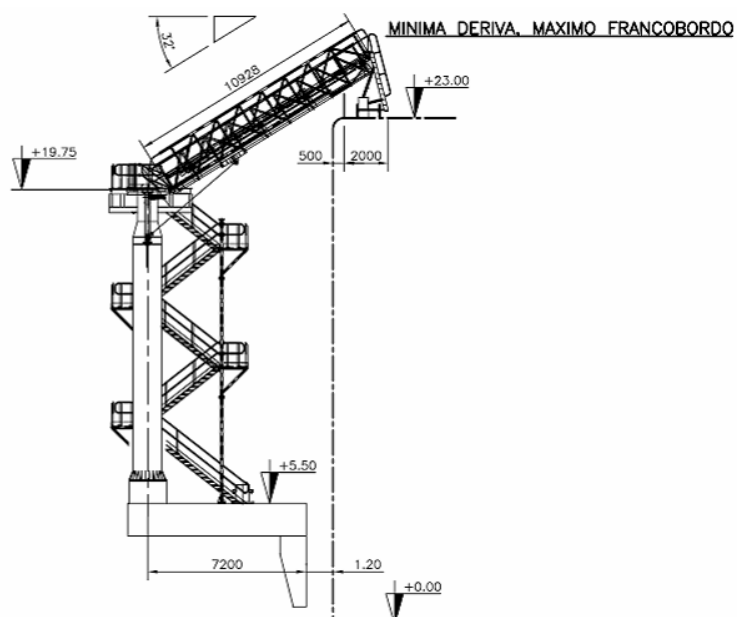
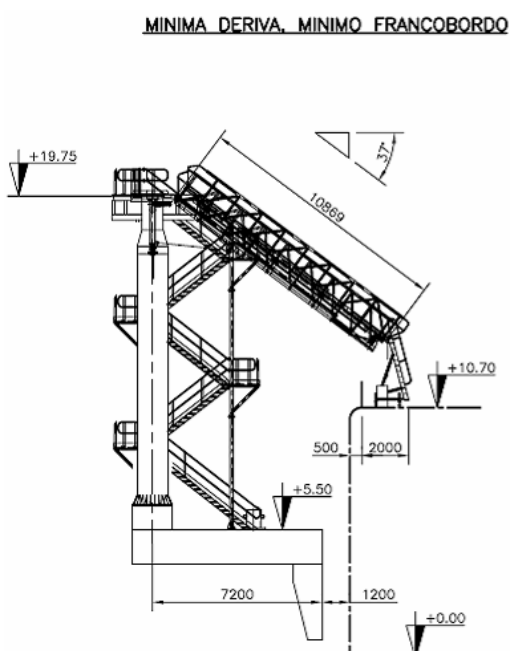
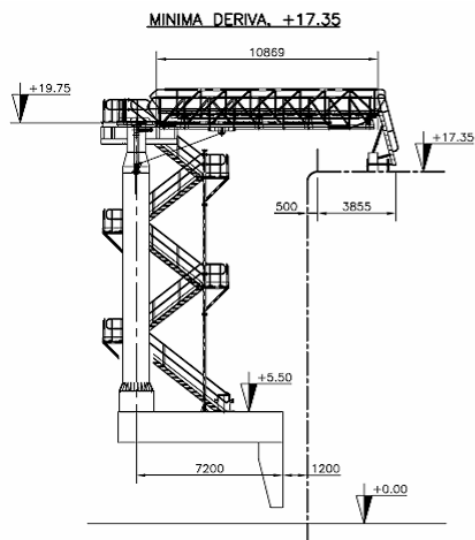
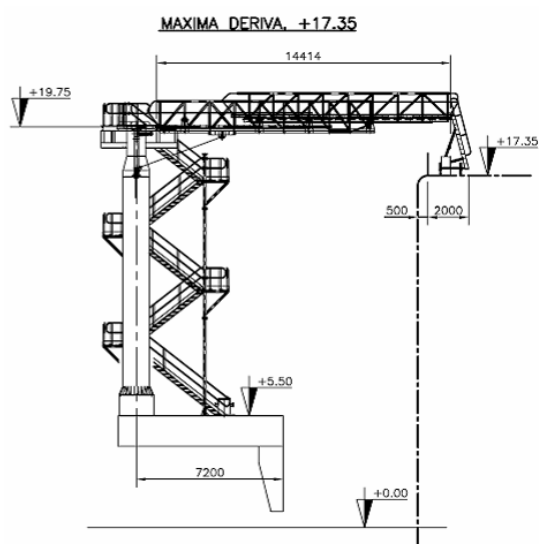
## ANNEX D – ARMS AND MANIFOLD



## Location of Arms

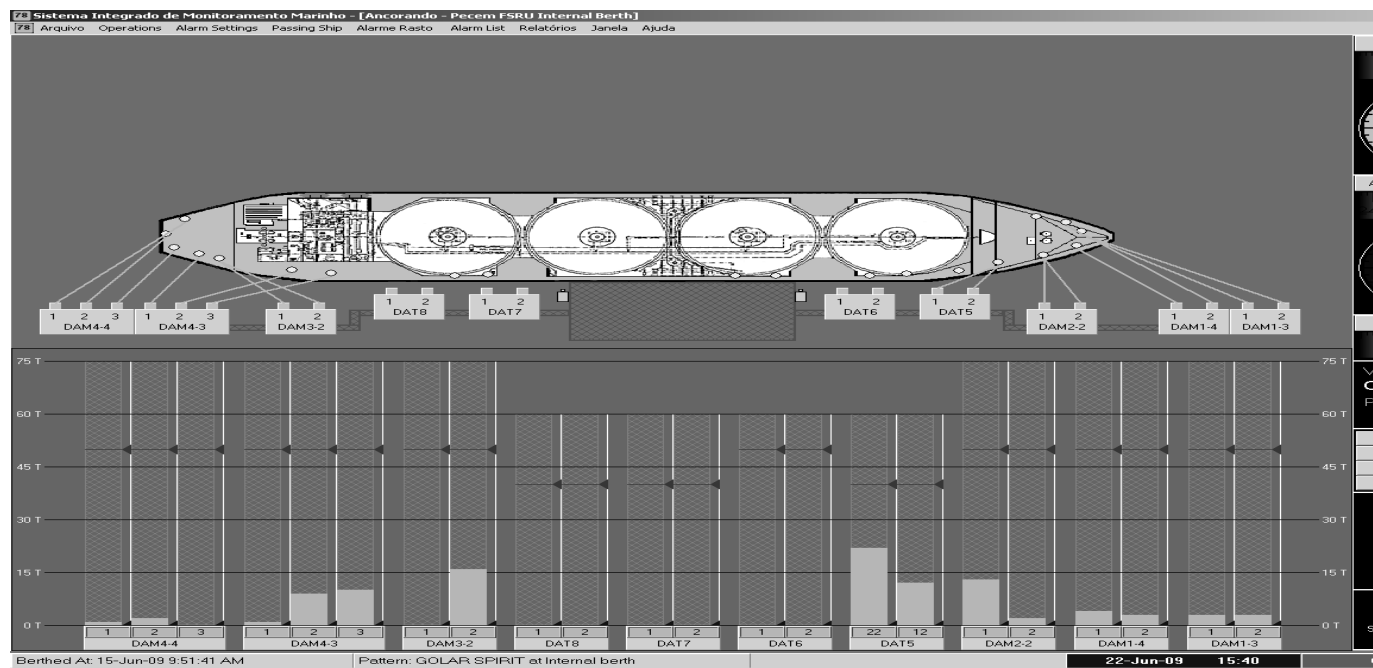


## ANNEX E – ACCESS STAIRS

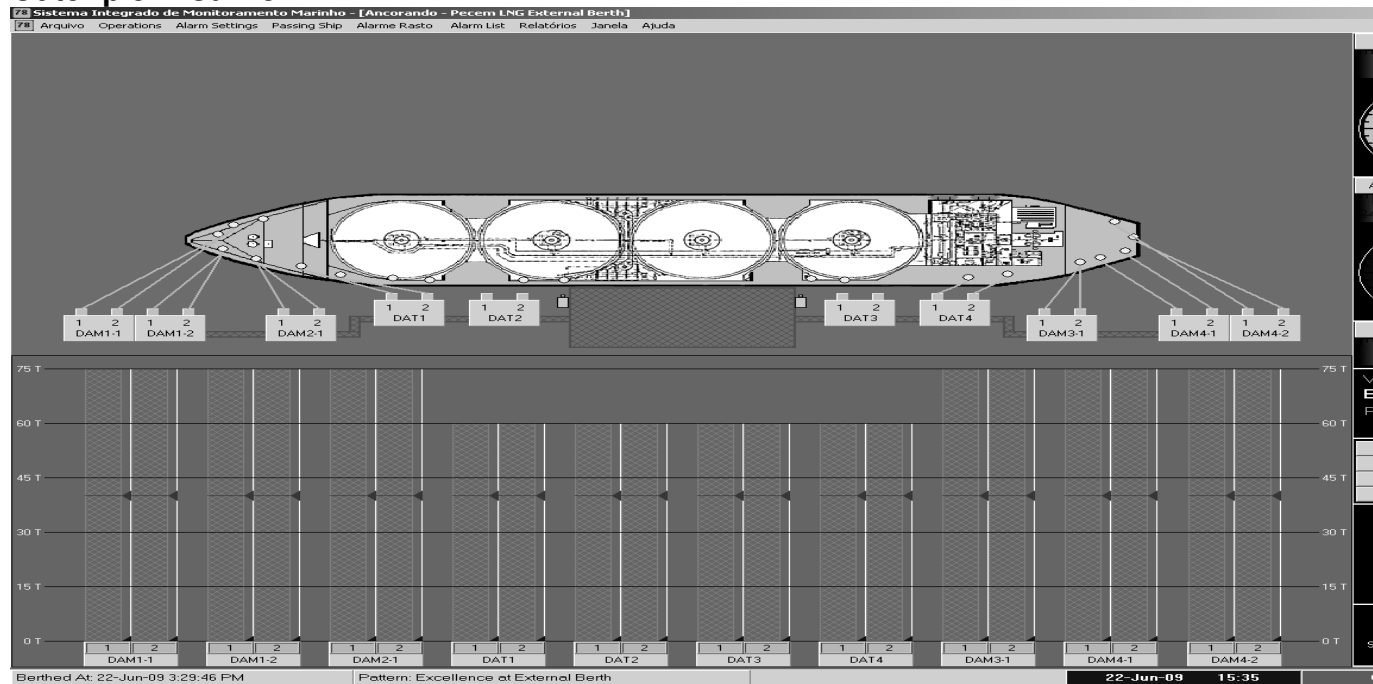


## ANNEX F – LAYOUT OF MOORING CONCEPTUAL PLAN

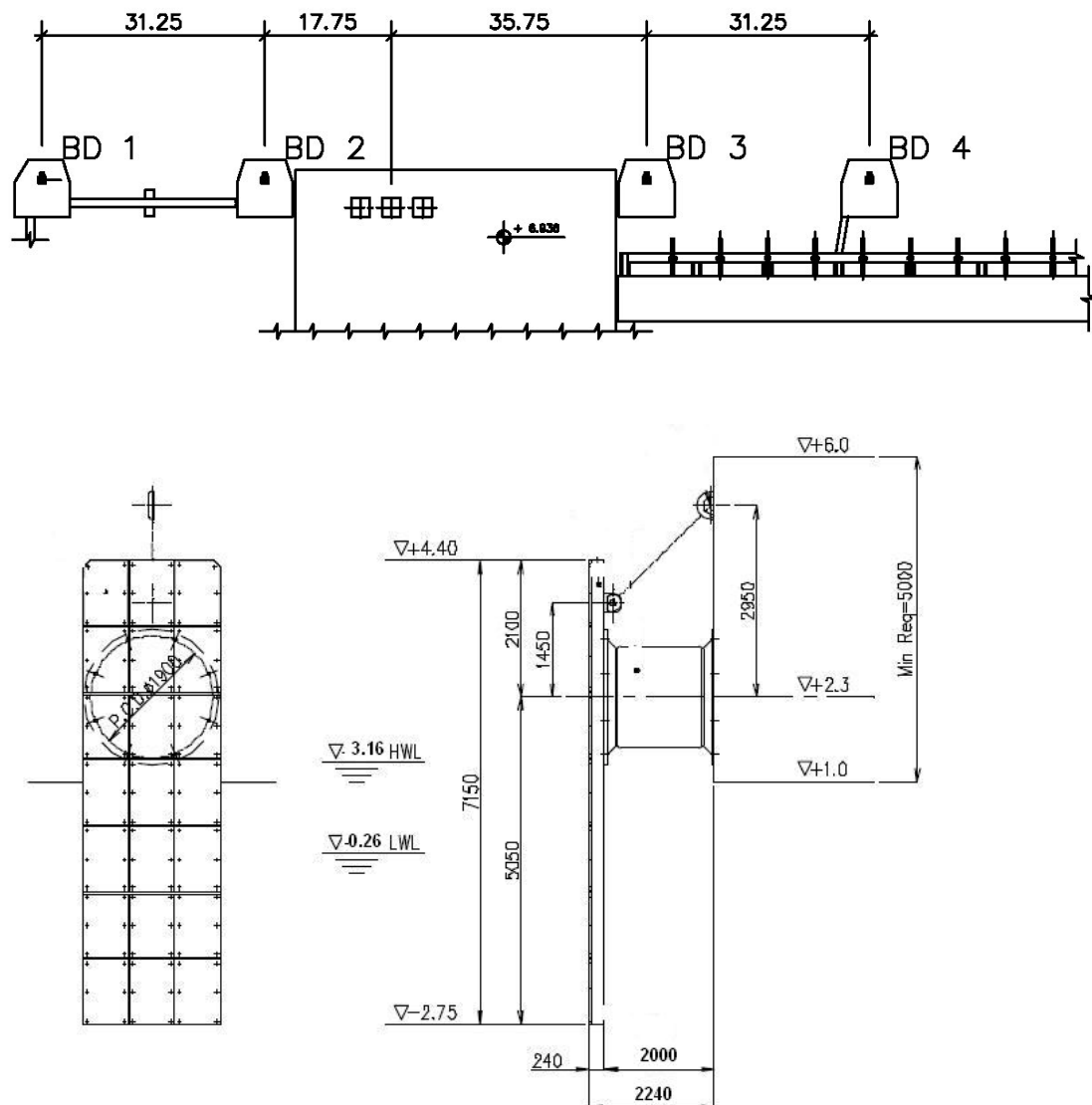
### Inner pier – FSRU ship



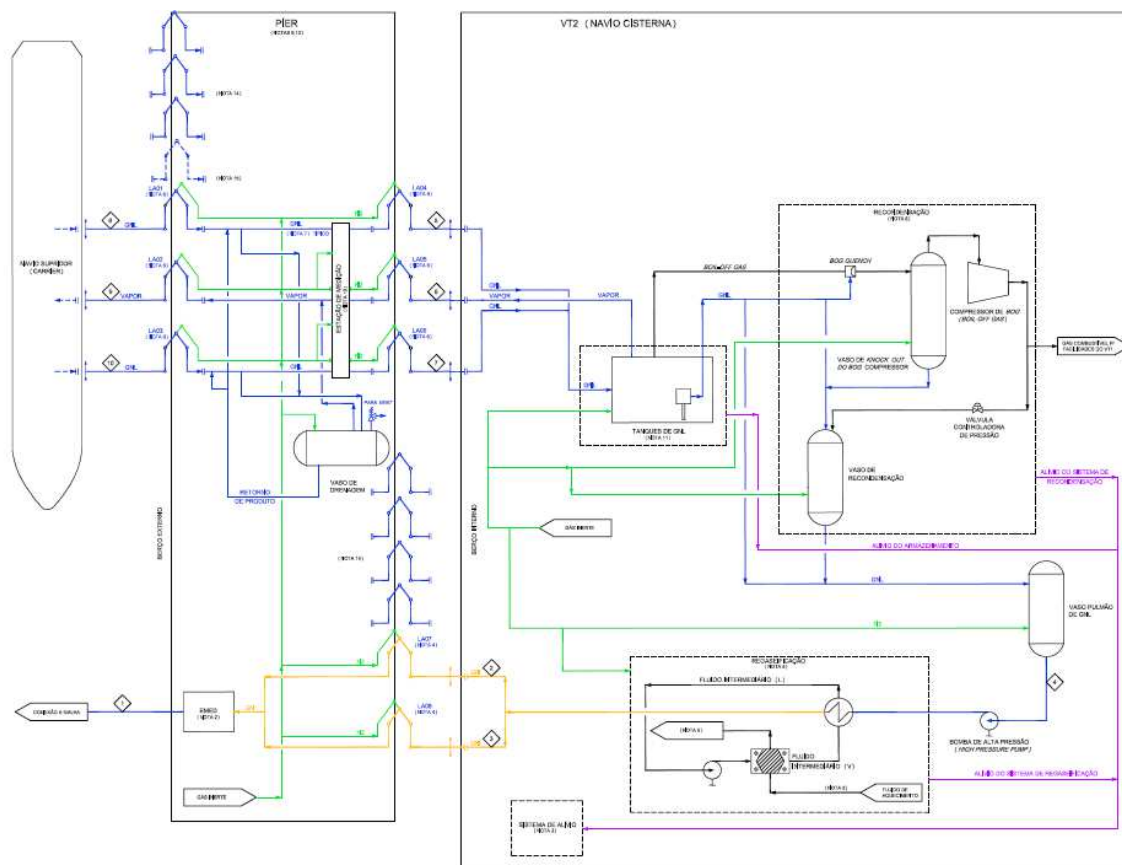
### Outer pier - Carrier



## Fenders



## ANNEX G – SIMPLIFIED DIAGRAM OF LNG – PECÉM SYSTEM



**ANNEX H – SAFETY CHECK LIST**
**ANNEX 1**
**SHIP/SHORE SAFETY CHECK LIST**  
**FOR LNG AND CNG OPERATIONS**

<b>SHIP'S NAME</b>		<b>VOY</b>	
<b>BERTH</b>		<b>PORT</b>	
<b>DATE OF ARRIVAL</b>		<b>TIME OF ARRIVAL</b>	

**PART “A” - BULK LIQUID GENERAL – PHYSICAL CHECKS**

<b>BULK LIQUID – GENERAL</b>	<b>FSRU</b>	<b>LNG CARRIER</b>	<b>TERMINAL</b>	<b>CODE</b>	<b>REMARKS</b>
1. There is safe access between the ship and shore.				<b>R</b>	
2. Are the FSRU and the LNG carrier securely moored?				<b>R</b>	
3. The agreed ship/shore communication system is operative.				<b>A R</b>	System Back up system
4. Emergency towing-off pennants are correctly rigged and positioned.				<b>R</b>	
5. The ship's fire hoses and fire-fighting equipment is positioned and ready for immediate use.			<b>NA</b>	<b>R</b>	
6. The terminal's fire-fighting equipment is positioned and ready for immediate use.	<b>NA</b>	<b>NA</b>		<b>R</b>	
7. The ship's cargo and bunker hoses, pipelines and manifolds are in good condition, properly rigged and appropriate for the service intended.			<b>NA</b>		
8. The terminal's cargo and bunker hoses or arms are in good condition, properly rigged and appropriate for the service intended.	<b>NA</b>	<b>NA</b>			
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.			<b>NA</b>	<b>R</b>	
11. Temporarily removed scupper plugs will be constantly monitored.			<b>NA</b>	<b>R</b>	
12. Shore spill containment and sumps are correctly monitored.	<b>NA</b>	<b>NA</b>		<b>R</b>	
13. The ship's unused cargo and bunker connections are properly secured with blank flanges fully bolted.			<b>NA</b>		



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

BULK LIQUID – GENERAL	FSRU	LNG CARRIER	TERMINAL	CODE	REMARKS
20. The 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 rooms:
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.

<i>Inert Gas System</i>	FSRU	LNG CARRIER	TERMINAL	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

<b>Bulk Liquefied Gases</b>	FSRU	LNG CARRIER	TERMINAL	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 Carrier____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
<b>TANK NR. 1</b>	700 mb		<b>TANK NR. 4</b>	700 mb	
<b>TANK NR. 2</b>	700 mb		<b>TANK NR. 5</b>	700 mb	
<b>TANK NR. 3</b>	700 mb		<b>TANK NR. 6</b>	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

# REPORT OF INSPECTION OF SHIPS

*RECEIVED:*

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: \_\_\_\_\_

## DECLARATION

We have checked, where appropriate jointly, the items of the 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 party.

## ANNEX 3

### ASSESSMENT OF SHIPS

<b>SHIP'S INSPECTION TEAM</b> <b>SHIP'S EVALUATION</b>							
Vessel:		Jetty:	Date: ____/____/____		Time:		
Flag:	Type:	Year Built	Call Sign:		VGM/VOY		
EVALUATED 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							
REMARKS							

RECEIVED:

\_\_\_\_\_  
Vessel Person-in-Charge  
Name Rank / Stamp

\_\_\_\_\_  
Safety Inspector  
Name / Stamp

\_\_\_\_\_  
Loading Master  
Name / Stamp

Quick Guide for LNG Transference


# P E C E M

PMO ATTACHMENT

**TO THE CARRIER MASTER:**  
DIFFERENCES BETWEEN PECÉM 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*.



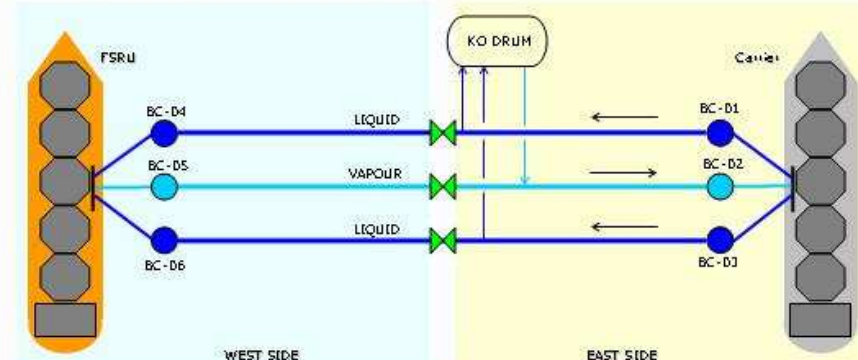
The **FSRU** is a conventional LNG vessel provided with a re-gasification plant to convert LNG into CNG, pumping it subsequently to the **TRANSPETRO** gas pipeline network. **FSRU** retain all original capabilities of a LNG vessel, however its engine will be temporarily disabled.

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.



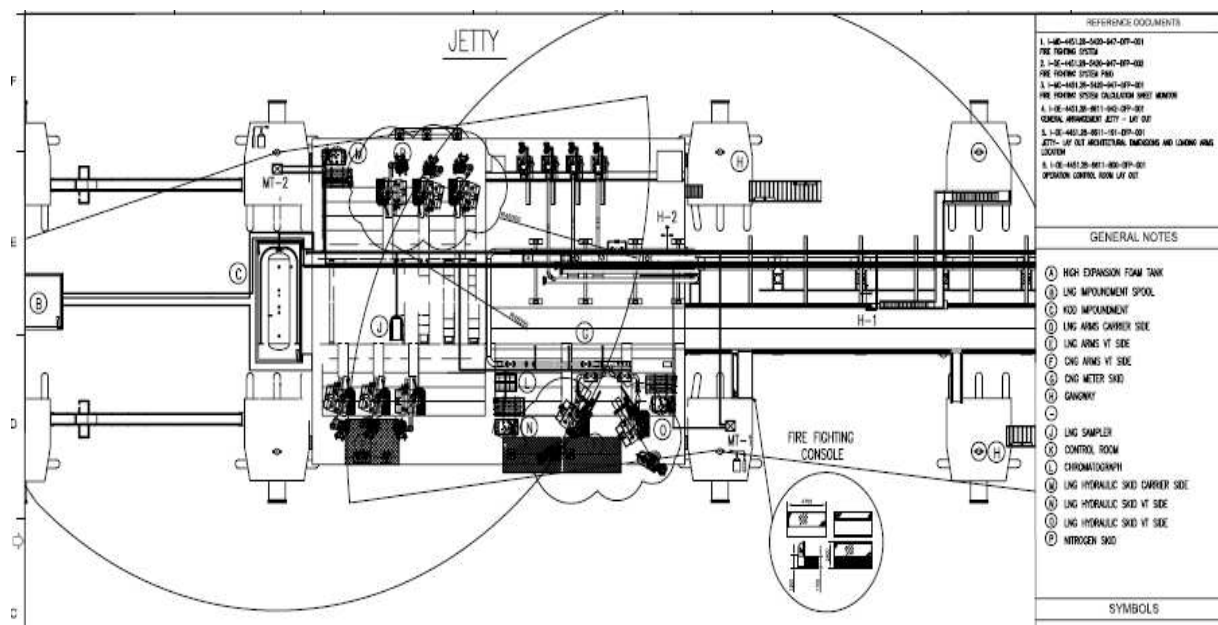
PETROBRAS TRANSPORTES S.A.  
**TRANSPETRO**



**GOLAR LNG LIMITED**



## ANNEX I – FIRE-FIGHTING SYSTEM



## ANNEX J – MANEUVERING AREA



**ANNEX K – TERMINAL – SHIP INFORMATION EXCHANGE**

<b>PORT AND TERMINAL</b>			
<b>Request for Information on Vessel</b>			
<b>Name of Ship:</b>		<b>Estimated Arrival (ETA):</b>	
<b>Flag:</b>		<b>Last Port of Call:</b>	
<b>Name of Captain:</b>		<b>Next Port of Call:</b>	
<b>Ship-owners:</b>		<b>Agents:</b>	
<b>Is the ship fitted with an inert gas system?</b>			
<b>Oxygen content:</b>			
<b>Total length (LOA):</b>		<b>Draft on Arrival:</b>	
<b>Length between Perpendiculars:</b>		<b>Maximum Draft during Transfer:</b>	
<b>Breadth:</b>		<b>Draft on Departure:</b>	
<b>Number of engines:</b>	<b>Sideways Propulsion:</b>		<b>Tugboats – the least required:</b> (No. and static traction (Bollard pull))
<b>Number of screws:</b>	<b>Bow (no. and power)</b>		
	<b>Stern (no. and power)</b>		
<b>Number and Size of Manifold Flanges:</b>		<b>Distances:</b>	
<ul style="list-style-type: none"> <li>• Cargo</li> <li>• Ballast</li> <li>• Bunkers</li> </ul>		<ul style="list-style-type: none"> <li>• Bow to Manifold</li> <li>• Side to Manifold</li> <li>• Height from Manifold to Main Deck</li> </ul>	
<b>PROGRAMMING LOADING (complete as applicable)</b>			
<b>Appointment:</b>	<b>Discharge of ballast into sea:</b>	<b>Discharge of slop / ballast on shore</b>	
<b>Type and amount</b>	<b>Amount:</b>	<b>Amount:</b>	
<b>Type and amount</b>	<b>Estimated time:</b>	<b>Estimated time:</b>	
<b>Type and amount</b>			
<b>PROGRAMMING UNLOADING (complete as applicable)</b>			
<b>Type and amount</b>	<b>Ballast:</b>		
<b>Type and amount</b>	<b>Volume:</b>		
<b>Type and amount</b>	<b>Time:</b>		
<b>Fuelling requested (bunkers)</b>			
<b>Type and amount</b>		<b>Type and amount</b>	
<b>Additional information (if any):</b>			

Please remit by email to Terminal Coordinator,  
 Email: [heronildesfilho@transpetro.com.br](mailto:heronildesfilho@transpetro.com.br)

## ANNEX L – WAVES AND WINDS

### Height of Significant Wave (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).

### 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.

## **ANNEX M - SIGTTO SHIP SHORE COMPATIBILITIES QUESTIONNAIRE**