Information and Regulations for FPSO Frade Terminal

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1. INTRODUCTION

1.1. GENERAL CONDITION

This Tanker Handbook contents are based upon the OCIMF, ISGOTT, ISPS, SOLAS and terminal information sheet but it is not intended to take the place of any official publications with respect to the waters and areas to which it pertains. It is also not intended to vary or override in any way the normal duties and responsibilities of Master(s) of Offtake Tanker(s) in regard to the safety and handling of their vessels, or to conflict with established standards of good marine practice. Therefore, the ultimate decision to undertake the offloading operations herein described rests with the Master of the Offtake Tanker and the FRADE OIM

The instructions and guidance notes contained in this Tanker Handbook are based on the assumption of mutual co-operation between the FRADE TERMINAL, the Mooring Master and the Master of the Offtake Tanker. Close consultation between these parties prior to undertaking mooring and any Offtake operations is essential in every case.

This Tanker Handbook shall be revised and updated whenever necessary. While every effort has been made to ensure accuracy of the contents, PETRORIO does not accept any responsibility for any omissions or errors or any consequences arising out of or connected with the use of this Tanker Handbook. Specifically, the plans and diagrams given are not to be used for the navigation of vessels approaching, leaving or navigating within the FPSO FRADE area.

Notwithstanding the foregoing or any provision of this Tanker Handbook, PETRORIO may take whatever measures may be necessary to prevent hazards to human safety and health, property and to the environment that may arise from any activity concerning the FPSO.

The Mooring Master is the person appointed by PETRORIO to advise the Offtake Tanker Master in mooring and loading operations and custody transfer of documentation, in line with operating procedures from FRADE TERMINAL and the Offtake Tanker. Where the Mooring Master observes anything of concern or deviation to procedures then this shall be brought to the attention of the Master of the Offtake Tanker, the Offshore Installation Manager of the FRADE TERMINAL (who has overall responsibility for the operation of the FPSO) of the FRADE TERMINAL and the mooring or Offtake operation stopped in a safe manner until a resolution is reached.

The Mooring Master shall complete the appropriate pre-berthing procedure.

An International Safety Guide for Oil Tankers and Terminals (ISGOTT) checklist shall be completed to PETRORIO's satisfaction before commencing offloading operations.

The mooring operations and positioning procedures mentioned in this Tanker Handbook are intended to apply to all Offtake Tankers.

1.2. OBJECTIVE

The main objective of this document is to outline the information and procedures that are necessary for safe and efficient offloading operations. As a result, some relevant details of the special equipment involved have been included. However, each Offtake Tanker shall make reference, where applicable, to their own vessel owners/managers operating instructions in respect of their installed equipment and procedures.

1.3. SCOPE OF REPORT

This Terminal Regulations and Tanker Handbook for FRADE Terminal (Information for Offtake Tanker, Masters and Crew, Conditions of Use and Regulations) (herein after referred to as “Tanker Handbook”) has been prepared for the benefit of Offtake Tanker(s) loading at the FRADE TERMINAL.

This Tanker Handbook shall be made available to ships agents in Rio de Janeiro .

Additional copies shall be held by the Marine Superintendent on the FPSO, by the Master of AHTS, by the Marine Team Leader of PETRO RIO O&G Exploração e Produção Ltda (herein after referred to as “PETRORIO”).

1.4. LEGISLATION

FPSO FRADE is a floating installation and subject to Brazilian Legal Water Regulations issued by the Brazilian Maritime Authority (Diretoria de Portos e Costas – DPC). Offtake Tankers must conform to all applicable Brazilian federal, state, and municipal laws and regulations, including but not limited to those related to safety, navigation, operating standards and protection of the environment.

The Offtake Tanker and her crew are subject to inspection and clearance by Customs, Immigration and Health authorities before proceeding to FPSO FRADE.

The local Port Captaincy may request to carry out an inspection on the Offtake Tanker.

1.5. COMPLIANCE WITH INTERNATIONAL SHIP AND PORT SECUTIRY CODE (ISPS)

It is PETRORIO policy to request the Offtake Tanker entering into a Declaration of Security with FPSO FRADE at least twenty-four (24) hours before the scheduled mooring. This procedure will apply to all Offtake Tankers, either in international or Brazilian coastal trade. At the time of first contact with the responsible party of the Offtake Tanker, FPSO FRADE will require a copy of the Offtake Tanker’s ISSC and a list of its last ten ports of call. Any Offtake Tanker that has not satisfied the Company Security Officer with regard to its ISPS status and that has not completed the Declaration of Security will not be permitted to moor to FPSO FRADE.

2. REFERENCE DOCUMENTS

The following documents were used for the elaboration of this Tanker Handbook:

1. International Safety Guide for Oil Tankers & Terminal – ISGOTT
2. Offshore Loading Safety Guidelines – OCIMF
3. International Convention for Safety of Life at Sea (SOLAS, 1974)
4. FRADE – Terminal Regulation Conditions of Use
5. FRADE – Terminal Berthing and Loading Documents
6. FRADE - Mooring Hawser Arrangement
7. API STD 2540
8. API - Manual of Petroleum Measurement Standards

Figure 1 – FPSO FRADE

3. TERMS AND DEFINITIONS

TERM	MEANING WHEN USED HEREIN
AHTS	Anchor Handling Towing Supply - Tug designed to assist the Offtake Tanker during mooring and oil transfer operations
CCR	Central Control Room
CRO	Central Control Room Operator
CPT	Master of a Vessel
ESD	Emergency Shut Down
ETA	Estimated Time of Arrival
FPSO	Floating Production Storage and Offloading Facility named FRADE, also referred to as FRADE TERMINAL
ISGOTT	International Safety Guide for Oil Tankers and Terminals
ISPS	International Ship and Port Security Code
LAT	Low Astronomical Tide
MFSV	Multi-Functional Support Vessel
LHV	Line Handling Vessel
MODU	Mobile Offshore Drilling Unit
OCIMF	Oil Companies International Marine Forum
LOA	Length Overall
MANIFOLD	A set of valves and intake/offtake connections terminating the tanker's piping system, generally located on deck amidships, that allows connection to the floating hose lines.
OIM	Offshore Installation Manager
OTT	Offtake Tanker
MM	Mooring Master
PSV	Platform Supply Vessel
ROB	Remains on Board
PETRORIO	PETRORIO JAGUAR Petróleo Ltda
SB	Support Boat, used to transport the MM and his support team, and to engage in the line handling of messenger lines, among other things.
SOPEP	Ships Oil Pollution Emergency Plan
SUPEM	FPSO Superintendent – Deck Officer responsible for the oil transfer operations on the FPSO
SWL	Safe Working Load
BS&W	Bulk Sediments and Water - Amount of sludge and water in the oil. Generally given in percentile terms
ECR	Engine Control Room
CBM	Cubic Meter
EXCLUSION ZONE	This zone may extend from a distance between 750m to 1250 m around the FPSO FRADE and are measured from their turrets. This zone takes into consideration the following: FPSO length, 110 m hawser system and Offtake Tanker length overall and towing wire hope and AHTS length
DWT	Deadweight Tonnage
GRT	Gross Registered Tonnage
IMCA	International Marine Contractor Association
IMO	International Maritime Organization
IMPA	International Maritime Pilots Association
UHF	Ultra-High Frequency (radio)

VHF	Very High Frequency (radio)
WAVE HEIGHT	(Hmax) - The probable highest wave related to the height (Hs) by means of the expression Hmax = 1.86 * Hs.
NOR	Notice of Readiness
NRT	Net Register Tonnage
Independent Inspectors	The Independent Inspector(s) appointed by PETRORIO and responsible for determining the quantity and quality of the cargo transferred.
Customs Surveyor	The Customs Surveyor is an agent acting on behalf of the Brazilian Customs Authority to verify the quantity and quality of the cargo transferred
Operational Sector	Area predefined by operational limits in which offloading operations can be accomplished
QRH	Quick Release Hook, a hydraulic hook device on the stern of the FPSO to which the mooring hawser connecting with the Offtake Tanker is attached.
TURRET	Structure composed by roll bearing that maintain the FPSO anchored and aligned the environment conditions
PPE	Personal Protective Equipment

4. CONDITIONS OF USE

This Tanker Handbook shall apply to all Offtake Tankers visiting the FPSO. The use of the FPSO or any of its facilities by an Offtake Tanker constitutes agreement to this Terminal Handbook and these conditions of use.

The Offtake Tanker shall comply with this Tanker Handbook and its conditions of use. In the event of non-compliance with this Tanker Handbook and its conditions of use, the Indemnified Parties (as defined below) shall be entitled to recover from the Offtake Tanker owners any loss or damage (including claims for loss of life and injury) incurred by the Indemnified Parties arising out of such non-compliance, (whether such loss or damage can be foreseen or not) provided always that, save for the indemnities provided for in this Tanker Handbook, nothing in these Conditions of Use should impose any liability on the Offtake Tanker in excess of the limits of liability available to it under any applicable laws or regulations.

1.6. ASSISTANCE, ADVICE AND INSTRUCTIONS

In all circumstances the Offtake Tanker Master shall remain solely responsible on behalf of the Offtake Tanker owners, charterers, contractors and personnel (including Master and crew) for the safety and proper navigation of the Offtake Tanker and protection of the environment. The Mooring Master and his assistant are supplied solely to provide assistance, in an advisory capacity, to the Offtake Tanker and in no way are responsible or liable for any action whatsoever of the Offtake Tanker. For the purposes of the Conditions of Use, the Mooring Master shall be deemed to be the servant of the Offtake Tanker and her owners.

The Mooring Master may refuse to accept an Offtake Tanker for Loading, or may Suspend or delay the loading of, or may unberth an Offtake Tanker if he/she considers the Offtake Tanker's conditions to be unsatisfactory. In the event the Master of the Offtake Tanker and the Mooring Master cannot agree to a procedure by which the Offtake Tanker can meet satisfactory conditions, both the frade Terminal and the Owner/Charterer of the Offtake Tanker shall be immediately contacted so that acceptable corrections can be made. Time required to bring the Offtake Tanker in to a satisfactory condition shall not count as used Lay time or if on demurrage as demurrage.

1.7. GENERAL INDEMNITIES

The Master of the Offtake Tanker shall always be solely responsible for the proper navigation and safety of the Offtake Tanker and her crew. OIM shall endeavor to ensure that the Terminal is safe and suitable, however, no guarantee of such safety or suitability is given, and PETRORIO presents no warranty of safe berth or any other warranty. The term "Indemnified Parties" shall include PETRORIO, its successors and assigns, parent companies, subsidiaries and affiliates and partners and joint ventures, and its directors, officers, employees, servants, contractors and agents of every tier.

The Indemnified Parties shall not be liable for or suffer loss arising out of, and the Offtake Tanker owners shall defend, indemnify and hold the Indemnified Parties harmless from any suit, claim, liability, loss, damage (including but not limited to punitive or exemplary damages),

penalty, fine, cost or expense (including, but not limited to attorney's fees and court costs) arising out of, any injury to, disease or death of persons, any loss of or damage to property and any delay or liability (including those arising out of or connected with any pollution that occurs) suffered by the Indemnified Parties, any Offtake Tanker owner and/or any third party, arising out of or connected in any way with the Offtake Tanker's use of the Terminal, including but not limited to any advice, instructions, assistance or services, Pilotage, mooring or loading, or navigational facilities (including buoy or channel markers) offered or provided. This shall apply whether or not such injury, disease, death, loss, damage, delay or liability is caused by the active or passive negligence, omission or default of the Indemnified Parties (including any breach of any warranty of workmanlike performance which may be applicable) or by any fault or defect in the Terminal, unless such injury, disease, death, loss, damage, delay, liability, fault or defect is caused by the sole negligence of the Indemnified Parties.

Notwithstanding the above, the Offtake Tanker owners shall be solely responsible with respect to the escape of hydrocarbons or any other fluid from the Offtake Tanker. The Indemnified Parties shall not be liable for or suffer loss arising out of, and the Offtake Tanker owners shall defend, indemnify and hold the Indemnified Parties harmless from any suit, claim, liability, loss, damage (including but not limited to punitive or exemplary damages), penalty, fine, cost or expense (including, but not limited to attorney's fees and court costs) arising out of, any injury to, disease or death of persons, any loss of or damage to property and any delay or liability (including those arising out of or connected with any pollution that occurs) suffered by the Indemnified Parties, any Offtake Tanker owner and any third party, arising out of or connected in any way with the escape of hydrocarbons or any other fluid from the Offtake Tanker. This shall apply whether or not such escape of hydrocarbons or other fluid or such injury, disease, death, loss, damage, delay or liability is caused by the sole or concurrent, active or passive negligence, omission or default of the Indemnified Parties (including any breach of any warranty of workmanlike performance which may be applicable) or by any fault or defect in the FPSO.

Additionally, the Indemnified Parties are not responsible for any loss, damage or delay, directly or indirectly arising out of or connected with strikes or labor disputes, or disturbances whether or not the Indemnified Parties are parties thereto.

The above indemnities apply to all such suits, claims, liabilities, losses, damages, penalties, fines, costs and expenses described above based on any theory of liability, including negligence, negligence per se, gross negligence or strict liability. In addition, in the event any applicable law, regulation or order prohibits or restricts (by amount or otherwise) enforcement of the above indemnities to their fullest extent, the relevant indemnity shall be deemed amended, but only to the limited extent necessary to make it enforceable. Notwithstanding the above, if enforcement of these indemnities would not subject the Indemnified Parties or the Offtake Tanker owners to criminal or civil sanctions under the applicable law, regulation or order which prohibits or restricts such enforcement, then these indemnities shall not be deemed amended as described above but shall nonetheless be applied in accordance with their terms.

1.8. ENVIRONMENT

If in connection with, or by reason of, the use or intended use of the FPSO and its facilities, any Offtake Tanker becomes involved in any form of marine casualty, or otherwise becomes, in the opinion of PETRORIO, an obstruction or danger to any part of the FPSO and its facilities or

the approaches thereto, and/or causes pollution of the sea, and the Offtake Tanker fails to remove the obstruction or danger, or respond to the pollution within a period of time reasonably stipulated by PETRORIO, and/or to the satisfaction of PETRORIO then PETRORIO shall be empowered to take any steps deemed necessary to remove the obstruction or danger, or respond to the pollution. Any costs, including legal costs, and or disbursements and/or expenses incurred by PETRORIO relating to such responses shall be recoverable from the Offtake Tanker owners.

1.9. GOVERNING LAW AND ARBITRATION

This Tanker Handbook shall be governed and construed in accordance with the laws of England. Any dispute, controversy or claim arising out of this Tanker Handbook shall be referred to and finally resolved by arbitration under the rules, then in force, of the London Court of International Arbitration, which rules are deemed to be incorporated by reference into this clause, the tribunal shall consist of 3 arbitrators, of which one (1) shall be appointed by the claimant(s), and one (1) by the respondent(s). The chairman of the arbitral tribunal shall be appointed, in agreement, by the two (2) co-arbitrators, in consultations with the parties to the arbitration, within fifteen (15) Days after the confirmation of the last co-arbitrator or, if that is not possible by any reason, by the Chamber, in accordance with the Rules. The place of arbitration shall be London, England. The language of the arbitration shall be English. The arbitration tribunal shall have the power to order specific performance and grant interim relief. The award of the arbitration tribunal shall be final and binding on the parties and may be enforced against them in any court or other authority of competent jurisdiction, and each party hereby waives any right of appeal.

1.10. ACKNOWLEDGEMENT OF CONDITIONS OF USE

The signature of a letter headed “Receipt and Acceptance of Terminal Information and Regulations” in the form which appears in Attachment to this Tanker Handbook shall constitute acknowledgment, receipt and agreement to this Tanker Handbook and these conditions of use by the Master of the Offtake Tanker, on his own behalf and on behalf of the Offtake Tanker owners.

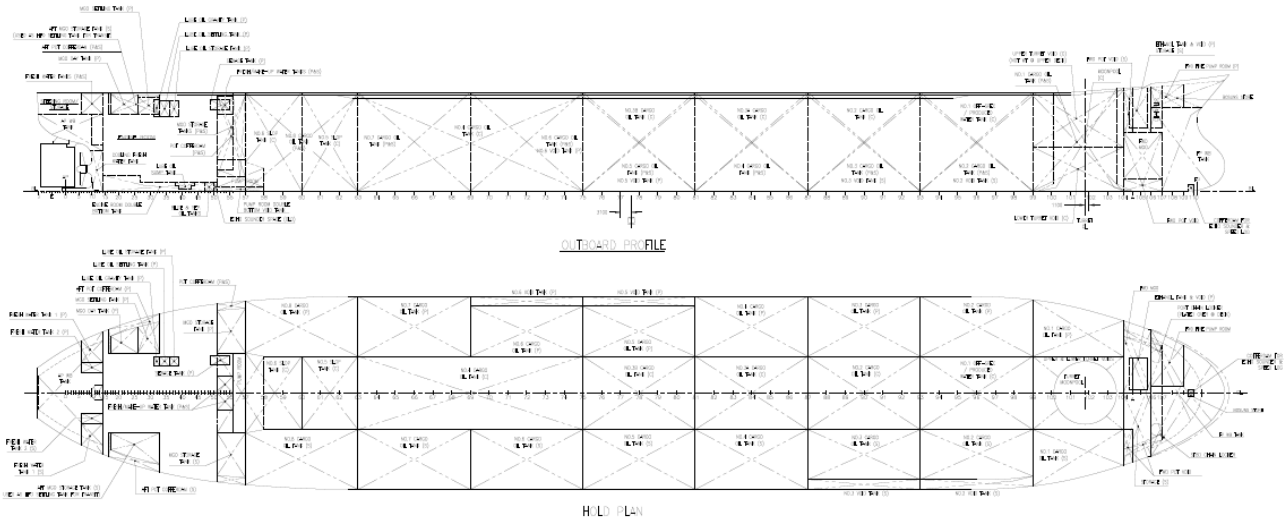

Figure 2 - FRADE Tank Arrangement

5. DESCRIPTION OF FRADE TERMINAL

1.11. LOCATION

The FPSO FRADE is positioned in the field of production called FRADE, located offshore in the northern part of Campos Basin, approximately 120 km from the Brazilian coast.

Latitude 21° 53’ 1.38" South and Longitude 39° 51' 29.2" West

Note: Drilling and marine subsea operations may take place within the field boundaries at any time. Detailed updates shall be received by the Offtake Tanker from the FPSO and plotted before entry to the field. A description of other activities shall be transmitted from FPSO radio operator to the Offtake Tanker prior to approach.

There are also other explorations and production activities close by the FRADE Terminal. The current location of other fixed and floating structures in the vicinity are:

Table 1- Geographical Coordinates of the others facilities close by the FRADE Terminal

Unit	*Latitude*	*Longitude*
P-23	21º 58’ 17.3” S	039º 44’ 15.7” W
P-52	21º 54’ 24.3” S	039º 44’ 09.7” W
P-54	21º 58’ 08.8” S	039º 49’ 31.1” W
P-55	21º 59’ 35.6” S	039º 44’ 22.4” W
P-62	21º 56’ 23.1” S	039º 47’ 07.3” W

Figure 3 - FRADE Location

1.12. FPSO INFORMATION

The FRADE FPSO consists of a converted VLCC, with an internal turret located at the bow. The FPSO is free to weathervane around the turret structure. The turret also supports the 9 lines mooring system and transfer facilities for well fluids, produced fluid/gas streams and electrical feed plus control signals to and from the FRADE Terminal and the subsea facilities. Topsides production facilities are installed on elevated decks above FRADE FPSO main deck.

The cargo and tandem offloading systems are designed for direct discharge to a tandem moored Offtake Tanker via floating hose. The FRADE FPSO is such designed and configured to berth standard double hull trading tankers of convenience of up to SUEZMAX, without thruster assist or controlled pitch propeller and fitted with standard mid-ships loading / offloading manifold.

An offloading hose protection system is installed in way of the propeller and the rudder to avoid damage to the offloading hose during the variety of operating conditions during FPSO operations on site.

The assistance of the Mooring Master in mooring and unmooring maneuvers and in the hose connections and disconnections is mandatory for all tankers.

Two LHV are provided to assist in mooring maneuvers and connection of the hose line. For unmooring maneuvers and hose line disconnection procedure only one LHV is required for operations assistance

An AHTS is provided to keep the OTT aligned and in a safe distance from the FPSO.

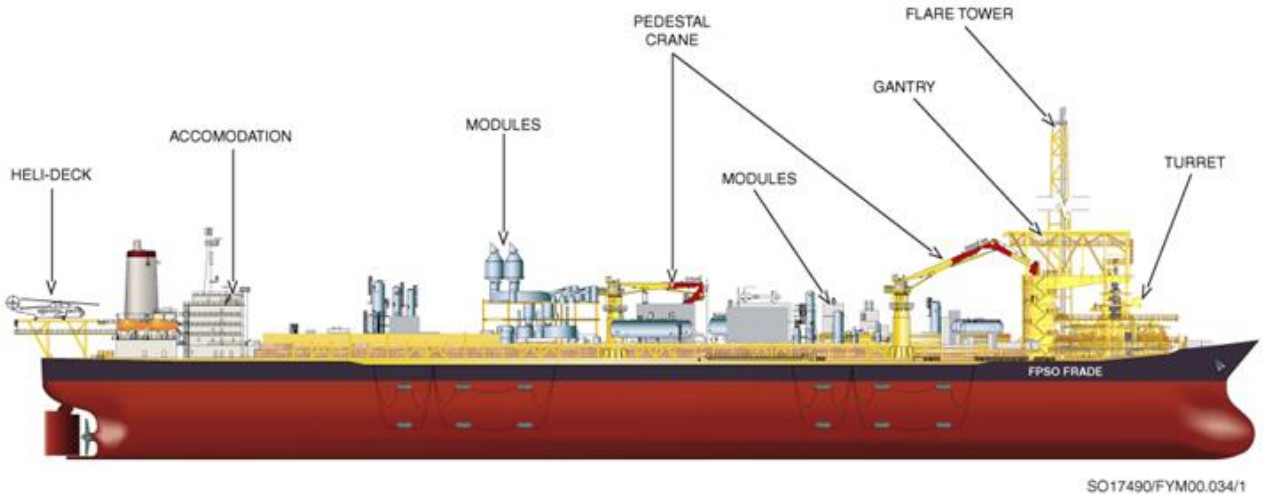

Figure 4 – FPSO FRADE General Arrangement

Table 2- FPSO FRADE Details

Type	FPSO – Floating Production Storage and Offloading
Build/Conversion Yard	IHI Japan / Dubai Dry Docks
Build Date	1976 / 2007
Hull	Single hull
Call Sign	C6WN6
Length Overall	337.06 meters
Length between perpendiculars	320.00 meters
Beam (molded)	54.50 meters
Maximum operating draft	21.484 meters
Depth	27 meters
Total Tank Capacity	313,373.58 m^3
Light Weight	39405 mt
Oil Storage Capacity (98%)	290,020.44 m^3 or 1,824,173.00 BBLS
Slops Clean/ Dirty	17085.64 m^3 or 107466.00 BBLS
Means of Export	Floating export hose
IMO Number	7522318
Class	ABS
Port of Register	Nassau
Location	Campos Basin
Legal Time	- 3 - look the observation below
Official Number	8001416

Observation:
The Campos Basin area is in the GMT -3 h Time Zone.

1.13. CRUDE OIL SPECIFICATION

FRADE Crude Oil loaded at FRADE Terminal will have an average API of 19.5 ~ 20 and Pour Point of – 24°C. Crude loaded at FRADE Terminal may contain low quantities of H2S, Hydrogen Sulphide.

The Mooring Master will provide a copy of the MSDS, Material Safety Data Sheet of the FRADE Crude. FRADE Crude loading temperature and API will be communicated to the Offtake Tanker prior the end of the cargo transfer.

1.14. WATER DEPTH

Water depth in the FRADE Field vary from approximately 900 to 1200 meters. The water depth at the FPSO is also approximately 1050 meters.

1.15. LIMITATIONS

Maximum Offtake Tanker size at the FRADE TERMINAL is up to 170,000 tones deadweight. Maximum distance from bow to manifold is 155 meters with maximum beam of 60 meters and the maximum length overall and displacement of the berth are, respectively, 275 meters and 234.635 MT.

DP Tankers calling at FRADE terminal will be moored and loaded in the conventional manner as descript in the sections of this guideline.

All hose handling equipment and fittings used on the Offtake Tanker shall be certified at a minimum 15 ton SWL.

The tongue type chain stoppers forward and the ship's manifolds shall be as per OCIMF recommendations.

Table 3- Berth Capacity

Water Depth	*Max LOA*	*Max Displacement*	*Max Breadth*	*Max BCM*	*Max Draft*
~1050 m	275 m	234.635 MT	60 m	150 m	N/A

Partial Loadings at FRADE Terminal may be allowed, however it shall be authorized by, PETRORIO OIM , FPSO Frade Cargo Superintendent and MM during the vetting process, due to the close proximity of the Wellhead Platform. Shall be mandatory follow these items described below:

- A ON Watch office on the bridge during the time OTT is moored at the terminal
- Range/Distance detector used by Forecastle based mooring master.
- Maximum final approach speed as per study in annex (0.5 knots when inside 500 meters zone). Main engines and auxiliaries shall remain at constant readiness whilst the Offtake Tanker is connected to the FPSO. No shut down of main engines for maintenance is permitted within the FRADE Field.
- TWO (2) MESSENGER ROPES FWD, 200 METRES LONG AND MINIMUM 32mm DIAMETER AND STOWED ON DRUMS IN LINE WITH THE CHAIN STOPPERS. THE SPOOL DRUM/S MUST BE CAPABLE TO ALSO STOWING 150 METRES X 80mm DIAMETER POLYBLEND ROPE. STERN, A STRONG MESSENGER READY

1.16. PARTICULARITIES TO MOOR IN THE FPSO

The mooring and unmooring operations of OTTs must be performed according to the following instructions:

- In FPSO: The Mooring Master shall be responsible for the operation with Conventional Vessels and also by the Dynamic Positioning Vessels.
- An AHTS and a SB will be provided for supporting the mooring and unmooring operations and for the relocation of the people involved.
- The AHTS shall keep connect to the Conventional OTT during all the offloading operation and to the Dynamic Positioning OTT when requested.
- If necessary, the replacement of AHTS connected to OTT, the release of the AHTS may only be done after the assignment of the Mooring Master and/or OTT CPT, which shall be realized under environmental conditions and other variables in the operation moment.
- The AHTS conditions must be evaluated during all time when connected to the OTT, especially in adverse meteorological weather.
- In meteorological adverse conditions that may affect the integrity of the AHTS, the Mooring Master and OTT CPT must evaluate the possibility of reducing the engine power of the AHTS in order to mitigate the impacts on the vessel.

6. RESPONSABILITIES

1.17. OFFTAKE TANKER MASTER

Notwithstanding Offtake Tanker Master is fully responsible for the operation and conduct of his vessel; he shall follow the operational procedures herein established, and also the recommendations, rules and procedures established by international organizations and associations. Additional duties include:

- The Offtake Tanker Master shall guarantee that safety checklist is filled before started the operation.
- To make certain that the tanker's officers and crew who are directly involved with the operation are familiar with all the procedures, include emergency procedure, that are relevant for the approach, mooring, positioning and departure operations. Ensure they are appropriately outfitted with PPE and tools.
- To establish VHF communication with the FPSO at least two hours before arrival in the 10 nm zone, on the agreed working channel to be used during all the operation.
- To ensure the Offtake Tanker should be ballasted with the bulbous bow and propeller submerged and the anchors shall be secured in their position.
- To report to the FPSO and its representative ETA notices each of 72, 48 and 24 hours prior to its arrival.
- To notify the FPSO that the Offtake Tanker is ready to approach (issue the NOR), in addition to the notification of when 5 NM zone is passed.
- To check the mooring equipment for any defects or faults and report condition of the mooring equipment shall be reported to the FPSO. The FPSO shall keep a log of these reports. Faults or damages in the mooring equipment, which may be of significance to safety during loading operations, shall be reported.
- To establish continuous communications with the FPSO, which monitors the loading operation when the tanker has been moored, positioned, and the hose has been connected.
- To ensure that the cargo system on board has been checked and the right valves are open before the FPSO is notified that the Offtake Tanker is ready to start loading.
- To notify the FPSO every hour about the progress of the loading operation (total cargo on board, last rate and available space) and the estimated time of completion.
- To monitor the hose and hawser tension especially when the weather conditions cause significant motions.
- To notify the FPSO when the Offtake Tanker is ready to disconnect loading hose. To report to the FPSO when the Offtake Tanker is out of 500 meters zone.
- To maintain the main engines and auxiliaries at constant readiness whilst the Offtake Tanker is connected to the FPSO.
- No shut down of main engines for maintenance is permitted within the FRADE Field.
- To ensure the Air Conditioner system on the Offtake Tanker should maintain positive pressure inside the accommodation all time during the loading operation.
- To ensure the cargo venting system on the Offtake Tanker shall be closed during the chopper operations at the FPSO.

1.17.1. Before Loading Operation

- On arrival at 25 NM zone, establishing radio contact on VHF channel 16 to agree the communication channel between Mooring Master, Offtake Tanker Master and FPSO FRADE; confirming Offtake Tanker's position and Estimated Time of Arrival (ETA) 10 NM zone;
- Establishing radio contact and maintaining communication with FPSO CCR on arrival at 10 NM zone, through the VHF channel to be used during the entire operation;
- Ballast condition upon arrival to be in compliance with ISGOTT/MARPOL and each specific ship to be fit for safe maneuverability;
- The maneuverability of the main engine, available starting air, rudder and thrusters (if installed) shall be thoroughly tested prior to entering FRADE Field;
- Tendering Notice of Readiness (NOR) to FPSO CCR when Offtake Tanker is ready to make final approach towards the installation;
- Ensuring that Offtake Tanker officers and crew involved in tandem operation are familiar with all procedures relevant to visual inspection, approach, mooring, loading and departure operations;
- Ensuring that Offtake Tanker officers and crew involved in tandem operation are familiar with emergency procedures and wear appropriate and approved personal protection and safety equipment;
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- Ensuring there is complete understanding with FPSO CCR and the AHTS regarding approach and mooring plans;
- Advising FPSO CCR of any defects in the maneuvering systems, navigation devices, communication system and equipment necessary for the offloading operation;
- Inspecting mooring equipment, loading manifolds (16") and associated equipment for faults and defects. Faults and defects shall be immediately reported to FPSO CCR and, upon departure, reported to the charterer and PETRORIO;
- Ensuring that ordinary safety and pollution measures are taken, including air-conditioning plant for recirculation, scuppers plugs on main deck, etc.;
- Ensuring that FPSO, Offtake Tanker and ISGOTT check lists are complied with;
- Ensuring cargo systems have been inspected and correct valves are open before FPSO CCR is advised that the Offtake Tanker is ready to start loading.

1.17.2. During Loading Operation

Throughout the entire loading operation, the following shall apply:

- Offtake Tanker shall maintain position inside the operational sector according to "Operational";

- AHTS shall assist Offtake Tanker keeping position relative to the FPSO within the acceptable operational sectors;
- Mooring hawser shall be maintained tight (as required by Mooring Master);
- During loading, Offtake Tanker's main propulsion shall be stopped, but shall remain at constant readiness;
- Vessel's pumps must be ready for immediate "back flushing" of water received from FPSO FRADE in case of need (FPSO FRADE power loss) as requested by FPSO CCR;
- Communication with FPSO CCR and AHTS is continuously maintained;
- Logbooks are kept available as required.
- Mooring hawser tension is maintained within the acceptable capability;
- Area in immediate vicinity of Offtake Tanker and FRADE is monitored for any signs of oil spill or leakage;
- Mooring equipment, loading manifold and export hose line shall be continuously monitored. Any irregularity shall be immediately reported to FPSO CCR. Irregularities and actions taken shall be logged on both FRADE and the Offtake Tanker. If a leak occurs in the export hose line manifold, the FPSO FRADE must stop the discharging immediately;
- During topping up of cargo tanks in the Offtake Tanker, the FPSO CCR shall be instructed to reduce offloading rate as required, and such instruction shall be confirmed by FPSO CCR;
- All undesirable events and emergencies arising while the Offtake Tanker is within the FRADE Field safety zone shall be reported to the Marine Supervisor, Mooring Master and PETRORIO;
- The Offtake Tanker shall fly the flag of its Flag State and the flag of Brazil during daylight hours whilst moored at FPSO FRADE;
- Offtake Tanker shall display the international code flag "Bravo" during daylights hours. During darkness, a red light shall be displayed. Such light should be of a character such as to be visible at a distance of at least one mile, and show an unbroken light all around the horizon;
- Offtake Tanker shall hourly report cargo figures and average loading rate to FPSO CCR, for comparing the amount of crude oil, if observed a discrepancy between the parts, the operation must be stopped for precaution and reverified the values again.
- Request hourly FPSO CCR to inform hawser line tension.

1.17.3. After Loading Operation

- Advising the FPSO CCR when Offtake Tanker is ready for flushing and disconnection of the export hose line;
- The FPSO CCR will pump water as 'final flushing' when Offtake Tanker is ready to receive, for removing the crude oil from the hose line.

- During the hose disconnection, the Offtake Tanker must be inform to FPSO CCR about the conditions of the tanker end valve, regarding the integrity and possibility of damage or leaks.
- Disconnecting export hose line according to Mooring Master's instructions;
- Disconnecting mooring hawser according to Mooring Master's instructions;
- Informing FPSO CCR when end of messenger rope is in the water;
- Vacate the Berth as soon as loading hoses have been disconnected;
- Reporting to FPSO CCR when the Offtake Tanker leaves the 10 NM zone.

1.18. MOORING MASTER

- The assistance of Mooring Masters is mandatory for approaching, mooring, unmooring, departure and during all offloading operation of an Offtake Tanker. The Mooring Masters assistance does not exempt the Offtake Tanker Master from his responsibilities;
- The Mooring Master shall be in direct charge of all communications between the Offtake Tanker, AHTS, FPSO and the Line handling vessel;
- The Mooring Master will commence his mooring duties at approximately 1 ½ miles from the FRADE FPSO Terminal and prior to the connection of the tug for static pull.
- To inform the Master on board the Offtake Tanker with regards to supply boat movements in the area, MODU and or DSV locations and give the geographical locations of any portable obstructions, such as marker buoys, that may be in the vicinity;
- The Mooring Master shall fill in the necessary reports, sign the NOR, Time Sheet, Safety Check List, and Letter of Protest;
- The mooring Master shall receive the cargo documents issued by the FPSO Frade, review main information prior to deliver master copies as well as obtain his signature and stamp in all required documents that shall be delivered to PetroRio onshore.

- The Mooring Master shall complete a pre-berthing inspection as soon as practicable on arrival on board the Offtake Tanker and complete the following documents:
    - **Attachment 03 - OTT/FPSO - Safety Check List**
    - **Attachment 04 - Check List #1: Before Operation Commence**
    - **Attachment 05 - Check List #2: Before Run-in and Mooring**
    - **Attachment 06 - Check List #3: Before Loading Operations**
    - **Attachment 07 - Check List #4: Before Unmooring**
    - **Attachment 08 - OTT/TERMINAL Safety Check List**
    - **Attachment 09 – Revalidation (Sign by Mooring Master)**

- The Mooring Master shall complete the appropriate pre-berthing procedure;
- The mooring master shall complete an initial inspection as soon as practicable on arrival, to confirm the condition of equipment e basic requirements for mooring e loading at the FPSO. Any deficiency shall be immediately reported to PETRORIO.
- The Mooring Master shall send the required reports to the FPSO and to the attention of the Commercial Operations focal point in the PETRORIO Office;
- The Mooring Master shall supervise the Mooring Master Assistant during the hose connection;
- The Mooring Master shall be in direct charge of all activities from the Mooring-maintenance team onboard the AHTS;
- The Mooring Master shall supervise the Mooring-Maintenance team during the pre-inspection-maintenance of hose and hawser before the offload;
- The Mooring Master shall be in direct charge for the hose flushing activities onboard the AHTS after offtake operation.

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During the entire offloading operation, the Mooring Master will carry out the duties as PETRORIO Terminal Representative on board the Offtake Tanker. He/she has an Assistant in connection with these duties.

The Mooring Master and the Mooring Assistant will board and disembark the Offtake Tanker at a Brazilian bonded and suitable port, typically Rio de Janeiro, as far as safely practicable, during daylight only and weather permitting. Disembark are only permitted at daylight hours – maximum 17:00. If ETA is later than that, disembark shall be carried out next morning.

The Mooring Master, as PETRORIO representative on board, has the responsibility to alert the Offtake Tanker Master during the mooring and loading operations. He/she needs to provide the documentation regarding custody transfer in line with operational procedures from FPSO.

The Master of the Offtake Tanker, field vessels and FRADE FPSO OIM will exercise exclusive command of their respective vessels and will be the sole parties responsible.

FRADE and Offtake Tanker Mooring Master shall observe any deviation of procedures, which he/she must inform immediately to the Master of the Offtake Tanker and the Marine Supervisor, so the mooring or the offloading operation can be aborted in a safe manner until the problem is solved.

The Mooring Master has the right to refuse, suspend or delay an Offtake Tanker for loading. The Mooring Master shall unmoor an Offtake Tanker if he/she considers the Offtake Tanker's conditions to be unsatisfactory. In the event the Master of the Offtake Tanker and the Mooring Master cannot agree on a procedure by which the Offtake Tanker can meet satisfactory conditions, both the FPSO Marine Supervisor and the Owner/Charterer of the Offtake Tanker shall be immediately contacted.

In all circumstances the Offtake Tanker Master will remain solely responsible on behalf of the Offtake Tanker Owners, Charterers, Contractors and Personnel (including Master and crew) for the safety and proper navigation of the Offtake Tanker and protection of the environment. The Mooring Master and his/her Mooring Assistant are supplied solely to provide assistance to the Offtake Tanker and in no way are responsible or liable for any action of the Offtake Tanker.

The Mooring Master and/or the Mooring Assistant are responsible for reporting any HSE incidents onboard the Offtake Tanker during offloading operations.

1.19. ANCHOR HANDLING TUG SUPPLY VESSEL (AHTS) CAPTAIN

The AHTS Captain is fully responsible for the operation and conduct of his vessel. Additional duties stated in this Tanker Handbook do not relieve the AHTS Captain from conforming to the rules and regulations given by national and/or other legal authorities. These additional duties include, but are not limited to:

- To make certain that the officers and crew who are directly involved with the operation are familiar with all the procedures, include emergency procedure, that are relevant for the approach, wire connection, positioning and departure operations. Ensure they are appropriately outfitted with PPE;

- To make all the necessary preparations before the Offtake Tanker arrives as instructed by the FPSO;
- Ensure that Mooring-Maintenance team onboard are appropriately with PPE and follow all safety procedures established by PETRORIO and/or AHTS Company;
- Monitor the radio on the agreed working channel for communication between the Offtake Tanker and the FPSO;
- Reporting any faults in the mooring, offloading or tug systems to the FPSO;
- Assisting the Offtake Tanker as instructed by the Mooring Master on board the Offtake Tanker. Assisting the Offtake Tanker with keeping clear of and aligned with the FPSO;
- Maintain the maximum distance between the Offtake tanker and the FPSO;
- Complete documentation as required, under your own risk.
- AHTS shall provide assistance in following situations: Power failure on Offtake Tanker during any phase of operation; Collision; Fire or explosion; Oil spill; Man overboard; etc.

1.20. LINE HANDLER VESSEL

Duties of the Line Handler include, but are not limited to:

- Establishing radio contact on VHF channel 16 to agree the communication channel with Mooring Master, Offtake Tanker Master and FPSO FRADE;
- Handling Mooring Master's toolbox from FPSO FRADE to the Offtake Tanker and back;
- Handling messenger line/mooring hawser from FPSO FRADE to the Offtake Tanker and back;
- Handling export hose line from FPSO FRADE to the Offtake Tanker and back;
- Handling slip rope from export hose line to the Offtake Tanker (if possible and required by Mooring Master);
- Delivering cargo sample(s) and documents to Offtake Tanker and FPSO;
- Keeping full time contact on VHF channel 16 and watching operation channel chosen during all operations;
- Providing assistance in following situations: Collision, Fire or explosion, Oil spill, Man overboard, etc.
- Maintain constant surveillance of the export hose line and report, immediately, any observed damage or leakage.

1.21. FPSO SUPERINTENDENT - SUPEM

All the operations and routines in the FPSO are controlled and monitored in the Central Control Room. The Offshore Installation Manager (OIM), usually represented by SUPEM during the offloading procedures, is responsible for all the operations on board the FPSO and around it. The OIM shall use diligence to:

- To make certain that safety check list has been completed.
- To make certain that the officers and crew who are directly involved with the operation are familiar with all the procedures, include emergency procedure, that are relevant for the offloading operations in general. Ensure they are appropriately outfitted with PPE.
- To make all the necessary preparations to the FPSO before the Offtake Tanker arrives.
- To inform the Master on board the Offtake Tanker if any problems or irregularities with the mooring and/or offloading system.
- To inform the Master on board the Offtake Tanker with regards to supply boat movements in the area, MODU and or DSV locations and give the geographical locations of any portable obstructions, such as marker buoys, that may be in the vicinity;
- To establish communication with the Offtake Tanker Master before entering 5 nm zone.
- To issue information report to the Offtake Tanker Master and the Mooring Master in case of any changes on the mooring equipment and other information that may be significance for navigation within 5 nm zone.
- After mooring and ready to load, give the loading information and local weather report to the Offtake Tanker Master.
- To check and receive Offtake Tanker MM and AHTS inspection report about mooring and offloading systems.
- Inform PETRORIO of the condition of such equipment.
- Shut down oil transfer in an emergency situation.
- The FPSO SUPERINTENDENT shall provide the weather forecast from FRADE field to Master of the OTT;
- The FPSO Superintendent shall complete the following documents:
    - **Attachment 10 – Declaration of Security between FPSO and Vessel**

1.22. OFFTAKE TANKER OPERATIONAL REQUIREMENTS

The Offtake Tanker must comply with:

- MARPOL 73/78 (International Convention for Prevention of Pollution from Ships);
- SOLAS (International Convention for the Safety of Life at Sea 1974/88);
- International Maritime Organization IMO;
- STCW Conventions and Protocols;
- International Safety Management (ISM) code;

- International Ship and Port Security Code (ISPS).

Any Offtake Tanker found to be seriously deficient or substandard in any safety requirements would be: (a) refused permission to moor; or (b) removed from berth if such safety deficiency becomes evident to the FPSO during loading.

The operations, including mooring, unmooring, de-ballasting, loading and emergency operations, as well as the equipment employed in these operations, shall be conducted in and to be in accordance with the latest editions of the following:

- FPSO FRADE Offloading Safety Manual;
- Oil Companies International Marine Forum/International Chamber of Shipping (OCIMF/ICS);
- International Safety Guide for Oil Tankers and Terminals (ISGOTT);
- OCIMF/ICS – Ship to Ship Transfer Guide;
- OCIMF – Recommendations for Equipment Employed in the Bow Mooring of Conventional Tankers at Single Point Mooring;
- OCIMF – Mooring Equipment Guidelines.

Important Comment:

If the Offtake Tanker will be found deficient during initial inspection performed by the Mooring-Masters, FPSO OIM, SUPEM and commercial operations focal point onshore will be promptly informed and necessary steps will be taken to avoid any disruption to FPSO production.

PetroRio shall not be liable for the consequences of rejection or delay (including but not limited to demurrage) of the Offtake tanker or other restriction suffered in respect of the OTT by virtue of the application of any regulations or other requirements of this Section 6.6 and the charterer/owners shall be liable for any costs or damages incurred by Petrorio arising out of any such rejection of, delay to or restriction of the OTT

7. PREVAILING WEATHER CONDITIONS

The Campos Basin area in which the FRADE Field is situated is a dynamic region in terms of oceanographic and meteorological conditions. The area is under the effect of the Brazil current flowing southwards and different water masses are present in subsurface layers.

As part of the initial arrival communications, the FRADE TERMINAL shall confirm prevailing / forecast weather conditions and advise the Offtake Tanker of the FRADE TERMINAL motions, i.e. pitch, roll and heading.

1.23. ENVIRONMENTAL CONDITIONS

The environmental conditions in Campos Basin can be considered fairly good, tending along the year to have the behavior as shown on Table 4 below.

Table 4 - Environmental Conditions

Period of year	*Weather Conditions*
November to March	Fairly good
April to June	Variable
July to October	Severe weather conditions

1.23.1. Winds and Waves

Northeast winds prevail in Campos Basin with intensity between 15 to 20 knots, northeast winds may occur with 40 knots of intensity but is not common, even in this condition the waves are not bigger than 2.5 m. Swell from the southern ocean is substantial, especially during the March through October season.

Special care must be taken during offloading operations with cold masses coming from southwest (SW), which can bring sudden wind changes in direction (from NE to SW in less than one hour) and intensity (gusts up to 55 knots). This phenomenon is more likely to happen in the two periods of the year from March to May and September to November.

Taking into consideration the probability of individual wave heights occurrences, northeast waves prevail with significant wave heights varying from (Hs) 0.5 to 5.7m.

REMARK - *Special attention shall be given to a critical condition for the FPSO operation: when heavy winds and local waves come from a specific direction, and the swell is deflected 90º, large roll motions shall occur on the FPSO. This situation tends to happen with weather inversions (SW to NE wind directions).*

1.23.2. Current

Currents at the site are controlled by two structures: the Brazil Current, which resides in the upper 300 to 400 m and flows predominantly to the south, and a counter current, made up of

South Atlantic Central Water and Antarctic Intermediate Water in the lower 400 to 1000 m, that flows predominantly to the north. The Brazil Current is fairly energetic, averaging about 0.25 m/s in the upper 100-150 m. The Brazil Current exerts a lot of influence in Campos Basin area especially in water depths of 200 m. Local winds are a negligible contributor to currents due to the depth of the mixed layer, except, perhaps, in the near surface during strong local storms.

There is some evidence of eddies and meanders affecting the upper water column, during which the direction of flow will swing away from the south; while not necessarily generating the highest currents in the upper water column, the passage of these structures tends to create conditions where total drag load through the water column is maximized due to the alignment of the upper and lower current structures. Mooring Master experience and local knowledge should assist the Offtake Tanker Master during berthing operations.

REMARK - *In view of the foregoing, masters of vessels calling at the FRADE terminal are advised that under no circumstances are engine repairs or the immobilization of main engines permitted within the limits of the terminals.*

1.24. ADVERSE WEATHER GUIDANCE

1.24.1. Mooring Approach

The Offtake Tanker approach to the mooring position is a maneuver that requires skill and seasoned judgment to be completed without incident. The table below gives limiting wave height conditions applicable for commencing the approach by Offtake Tankers of different sizes. The table is useful only as a guide to the professional judgment of the Mooring Master, Offtake Tanker Master and the OIM. Numerous other factors may combine to make otherwise acceptable sea conditions unsafe.

Table 5 - Mooring Approach

DESCRIPTION	WORST ACCEPT. OPERAT. CONDIT.	ACTIVITY	ACTION TO BE TAKEN
Wind	25 knots	Mooring approach	OIM, MM and OTT Master to review mooring approach.
Wind	25 - 35 knots	Mooring approach	OTT Master to hold at the holding point until favorable wind conditions.
Sea state	3,0 – 4,0 meters	Mooring approach	OIM, MM and OTT Master to review mooring approach, and to agree with LHV Master to operate alongside the Offtake Vessel.
Sea state	Above 4,0 meters	Mooring approach	OTT Master to hold at the holding point until favorable sea state conditions.
Surface Current	Above 2 knots	Mooring approach	OTT Master to hold at the holding point until favorable current conditions.
Visibility	Less than 1,5 miles	Mooring approach	Mooring with caution after agreement between OTT Master, MM and OIM;

			The radar shall be operating properly; The visibility shall be more than 1000 meters ahead the OTT bow.
Visibility	Less than 0,5 mile	Mooring approach	OTT Master to hold at the holding point until visibility conditions are favorable.

Important Comment:

1. Mooring shall only be attempted in daylight hours. FOR THE PURPOSES OF CALCULATING LAYTIME, NOR SHALL BE CONSIDERED RECEIVED BY THE MM AND TERMINAL ONLY BETWEEN 0600 (INCLUDING) AND 15:00 (INCLUDING) LOCAL TIME
2. Special attention is necessary when the vector of the combined forces (wind, sea state and current) acting upon the OTT within the final approach, drags the OTT towards the TERMINAL.
3. During reduced visibility situations, the OTT shall make the final approach with extreme caution and the OTT shall be aligned with the resultant of the environmental forces and FPSO FRADE.

1.24.2. Oil Transfer

Pumping cargo oil to the Offtake Tanker (as well as the mooring operation) is weather dependent. Once the mooring is secure and the export hose is connected, the offloading operation can continue in higher sea states if all other factors are acceptable, but it is mandatory to keep the Mooring Master or his assistant on standby on the bridge. The table below gives limiting wave heights, during which pumping could be sustained subject to the other factors. The table is useful only as a guide to the professional judgment of the Mooring Master, Offtake Tanker Master and the OIM. Numerous other factors may combine to make otherwise acceptable sea conditions unsafe.

Table 6 - Oil Transfer

DESCRIPTION	WORST ACCEPT. OPERAT. CONDIT.	ACTIVITY	ACTION TO BE TAKEN
Wind	25 – 35 knots	Oil Transfer	OIM, MM and OTT Master to review wind conditions and decide to continue or to suspend the oil transfer.
Wind	35 – 45 knots	Oil Transfer	The oil transfer shall be stopped, and the OTT crew should disconnect the hose line, leaving it ready to be abandoned.
Wind	Above 45 knots	Oil Transfer	The OTT shall let go of the messenger for the hose line and the mooring system.
Sea State	Above 4,0 meters	Oil Transfer	OIM, MM and OTT Master review sea state conditions and ship motions and decide whether to continue or suspend the offloading operations.
Hawser tension	Above 100 tons	Oil Transfer	OIM, MM and OTT Master should review loading operations and shall suspend loading

			operations and release OTT if Hawser pull tension exceeds 100 tons more than 5 times in one hour or exceeds a maximum pull of 150 tons.
Differences between attitude of OTT and FPSO	AHTS use engine power less than 50%	Oil Transfer	Due to the large number of concurrent vectors (wind, wave and current) and the dynamics of displacements of either vessel during the offloading operations, it is anticipated to be differences between the attitudes of the Offtake Tanker and the FPSO. The equilibrium of hawser tension between the OTT, FPSO and AHTS should be monitored at all times.
Differences between attitude of OTT and FPSO	AHTS use engine power more than 50%	Oil Transfer	**Suspend loading operations** when the AHTS cannot maintain station at 50% power or a 40° offset is approached, between hawser and centerline of FPSO. MM onboard off the AHTS shall be responsible for passing this information to MM onboard of the OTT and OIM.
Fishtailing	More than 30°	Oil Transfer	OIM, MM and OTT Master to review loading operations if fishtailing **the Offtake Tanker exceeds 30° each direction**
Fishtailing	More than 40° and AHTS use engine power more than 70%	Oil Transfer	**Suspend loading operations** if the assistance of the AHTS is not adequate at 70% power to control fishtailing, **or if fishtailing exceeds 40° each direction** and/or a 40° offset is approached, between hawser and centerline of FPSO. MM onboard off the AHTS shall be responsible for passing this information to MM onboard of the OTT and OIM.

Complementary Remarks:

The OTT Master has the authority to halt or abort mooring operation at any time, but he shall inform MM and OIM prior to taking this decision; and also give the MM and OIM an estimate of when the operations shall be restarted. The decision to halt or abort the operation shall be the result of one or more situations below:

1. Weather conditions exceeding the operating limits.
2. Fishtailing that might cause any damage to the OTT, Offloading equipment or FPSO
3. Damage to mooring or oil transfer equipment.
4. Visibility.
5. Or any other hazardous activities nearby

1.24.3. Holding Positions

If the Offtake Tanker is unable to immediately moor or if the FPSO is not ready for offloading at time of arrival, the Offtake Tanker, can hold in deep water position away from other installations.

Suggested holding positions in an area Northwest of the FPSO away from any other installations in deep water.

Offtake Tankers shall not leave the waiting area proceeding to the FRADE FPSO unless instructed so by the “FRADE Mooring Master”.

Important Comments:

There is no designated anchorage area available due to the water depth within the FRADE Terminal limits.

8. OFFTAKE TANKER OPERATIONAL REQUIREMENTS

Offtake Tanker shall have been surveyed and approved. In this item are the basic requirements for mooring equipment, the offloading hose line handling systems and the working area illumination on board the Offtake Tanker.

1.25. CRANES

The following minimum requirements are required for the traction winch:

- Outreach: 5 meters
- Pull-in capacity: 15 tf pull SWL

1.26. BOW STOPPER

It is required to use two bow stoppers for 76 mm winches to mooring system. The OTT must have at least two leads aligned with each bow stopper, able to receive 76 mm chain stretch and its accessories.

Moreover, the following minimum requirements are required for the bow stopper operation:

- Safe Working Load: 350 tones
- Chain stopper “tongue type”: capacity: 15 tf pull SWL

1.27. HANDLING SYSTEM TO MIDSHIP HOSE CONNECTION

The OTT shall be equipped with a hose handling system (derrick or crane) under minimum capacity of load equal to 15 tf.

The OTT must have two chock both on the port and starboard side as close as possible to the manifold. And, at least two cruciform bollards, one forward and one aft of the manifold area.

The tools and equipment needed for the line connection hoses are stored on the FPSO.

The Mooring Master must arrange the transfer of the Toolbox from the FPSO to the OTT through the support boat.

At the manifold, the OTT must have manometers in scale from 0 to 40 kg/cm² with core.

The other characteristics should follow the recommendations established by OCIMF.

1.28. TUG MOORING DEVICE

1.28.1. Quick Release Device

As a safety measure in case of bad weather, emergency or urgent need to disconnect the tugboat, it is desirable that the OTT is provided with quick-release device for AHTS moorings, installed on the centerline of the poop deck of the OTT and with the following characteristics:

- Load capacity of 100 SWL tf;
- Uncoupling of stressed towline, adopting the amount 200 KN (20 tf) as reference.

The nonexistence of a Quick Release System (Pelican Hook) will not be regarded as an impediment to the operation in the Campos Basin.

1.28.2. Winch Aft

The towline handling operation shall be supported by a winch or reel, located in the middle line on the OTT stern and according to the following characteristics:

- Collection speed of the tow line: 15m/min
- Pull capacity: 15 m/min – 20 tf pull SWL

1.29. WORKING AREAS ILLUMINATION

Working areas such as the manifold area, the forecastle deck and the area around the chain stopper and the manifold shall be adequately illuminated. The Offtake Tanker shall be fitted with searchlights on the forecastle deck and on the bridge with minimum reach of 250 m.

1.30. MESSENGER LINES

The OTT shall be fitted with two (02) polypropylene messenger lines of minimum 32 mm circumference, 200 m length on the forecastle and another one (01) polypropylene messenger lines of minimum 32 mm circumference, 200 m length on the poop deck. These lines are used for both mooring hawser and offloading hose line handling.

1.31. ACCOMODATIONS

The OTT shall have sufficient accommodations for the Mooring Master, Mooring Master Assistant, (2) two Independent Inspector and Customs Surveyor for the duration the offloading. In case of partial load operation the vessel shall have another accommodation for an extra Mooring Master team, if required.

1.32. SLOP TANKS

Having segregated tanks for receiving up to 270 m³ of waste washing line hoses.

1.33. BOARDING AND DISEMBARKATION AT BASIN CAMPOS

No basket transfers or any other type of transfer shall be allowed for boarding or disembarkation of Mooring Team at FRADE Field.

Exceptional cases shall analyze and agreed, only after Risk Assessment has been completed and Mooring Master, PETRORIO OIM, BW OIM, OTT Master, MRSV Captains and FRADE A OIM are in agreement.

1.34. BOARDING AND DISEMBARKATION BY PILOT LADDER IN A SHELTERED WATERS

Pilot ladder or pilot ladder/accommodation ladder combinations shall be used to transfer personnel between the pilot boat and Offtake Tankers. A pilot launch shall be used for personnel transfers.

The pilot ladder shall meet the requirements of the International Maritime Pilots Associations (IMPA) 'Required Boarding Arrangements for Pilot'.

Accommodation ladders on their own shall never be used for transfers.

Boarding by pilot ladder shall not take place in non-sheltered waters

9. MOORING AND OFFLOADING ARRANGEMENTS

1.35. MOORING HAWSER

The Mooring and offloading operation shall be conducted with the assistance of a Line Handling Vessel. The characteristics of the Line Handling Vessel (shall be under valid CMID) are:

Table 7- LHV Characteristics

LOA minimum	25 m
Beam minimum	9 m
Power minimum	1200 HP
Towing winch minimum	10 ton
Propulsion minimum	two (02) Propellers

Line and hose handling activities, are performed by the Offtake Tanker's crew lead by an experienced Deck Officer, under the advice of the Mooring Master. Prior to commencing mooring operations Offtake Tankers must have the following equipment ready:

On the forecastle:
- Two strong, buoyant messenger ropes 200 meters long and minimum 32mm Diameter;
- Crowbar;
- Sledge Hammer;
- Large Axe and sharp knife;
- Powerful Safety Flash Light (at night);
- Pail of grease.

On the poop deck:
- One strong, buoyant messenger ropes 200 meters long and minimum 32mm Diameter;
- One buoyant mooring rope, 220 meters long by 65mm diameter;
- Two heaving lines;
- Pail of grease.

Two spool drums winch leading to the chain stoppers should be kept ready with a 200 m strong buoyant messenger ready for receiving the mooring pick-up lines directly to the storage drums. A shackle must be fitted at the end of each ship's messenger to facilitate connection to the pick-up line when passed from the Offtake Tanker to the line handling boat. The Terminal mooring pick-up rope is 150 meters long and 80 mm circumference.

Note: Use of warping drums to heave pick-up lines on board is not permitted.

1.35.1. Mooring Hawser Details

The FPSO is equipped with (2) two identical 20-inches circumference for 150 meters long nylon rope mooring hawsers, chafe chains and messenger lines. Each mooring hawsers have a minimum breaking load of 560 tons.

The Offtake Tanker is moored using two mooring hawsers attached to the FPSO by a hydraulically operated PUSNES winch with built in release mechanism.

A chafe chain is fitted at the Offtake Tanker end of the mooring hawser for connection to the OCIMF approved chain stopper. The chafe chain consists of a section of 9.5 meters of 76mm diameter stud link chain with a minimum breaking load of 460 Tons.

Another chafe chain is fitted at the FPSO end of the mooring hawser for connection to the hawser storage drum with a remote controlled quick release device. The chafe chain consists of a section of 5.0 meters of 76mm diameter stud link chain with a minimum breaking load of 460 Tons. Both chafe chains are buoyed to prevent the chain and hawser from sinking, in case of an emergency release.

1.35.2. Hawser Floating Messenger

The floating messenger is attached to the outer end of the chafe chain by a special "D" type shackle. It consists of 150 m of 80mm diameter polypropylene rope with one steel thimble, known as the pick-up rope.

Offtake Tankers shall have an empty spooling drum to accommodate the messenger.

The floating messenger shall be passed from the FPSO by means of the Line-handling vessel to the Offtake Tanker in the pick-up point area using a heaving line or similar rope connection.

The pick-up line shall be led through the bow chock fairlead, through the stopper and onto the mooring winch. The winch shall pull the chafe chain of the hawser through the stopper until the stopper pawl can be set and locked.

The above operation requires the Offtake Tanker to maintain position until the pawl is set and locked in place.

When the Offtake Tanker is securely moored, the offloading hose shall be transferred to the OTT manifold for connection, using LH to tow and handle the hose messenger rope. During the offloading operations, the hose condition, positions of both vessels and the environmental conditions shall be continually monitored. The Central Control Room of the FRADE TERMINAL is manned on a 24-hour basis, CCTV and a standby man shall visually monitor the relative positions of the FRADE TERMINAL stern and Offtake Tanker bow. The hawser tension is also monitored and alarmed in the FRADE TERMINAL Central Control Room. If during the loading the Hawser tension maintain more than 81 tons continuously the loading operations shall be aborted and commence hose and hawser disconnection, prior to take this decision the PETRORIO shall be informed.

The FRADE TERMINAL is fitted with an impressed current cathodes protection system. Both the Offtake Tanker and FRADE TERMINAL shall switch off their systems before the mooring operation commences. This shall overcome the danger associated with a difference of potential between the two vessels in the event that an electrical path between the two vessels is established.

1.35.3. Offtake Tanker Bow Stopper

All Offtake Tankers shall be provided with two OCIMF approved bow stoppers that should freely pass a standard for 76-mm stud link chain and associated fittings with a minimum Safe Working Load of 350 tones and Nominal Breaking Load 438 tones. All Offtake Tankers shall have at least one panama lead aligned with the bow stopper able to freely pass a chafing chain of 76 mm and its fittings. The use of Smith Brackets or any other means of securing the chafe chain is not permitted. Forward and aft winches must be powered continuously while the vessel is at the berth.

1.35.4. Emergency Disconnection of Hawser

The emergency disconnection of the hawser can be carried out by a locally positioned hydraulic release or alternatively the Central Control Room on the FPSO. The hydraulic ESD release for the hawser shall take approximately one minute from being initiated from the FPSO.

Cargo pumping can be stopped within 10 seconds by activating the ESD system in the Central Control Room of the FPSO. This shall NOT activate the ESD system release of the hawser as described above.

The hose shall be manually released at the Camlock connector at the Offtake Tanker manifold.

If time does not allow this disconnection, the hose shall part at the dry breakaway coupling on the hose tail.

1.35.5. Mooring Hawser Failure

Sudden high tension might be experienced causing the rupture of the mooring hawsers. The hawser failure will be detected by the FPSO through its Load Monitoring System. The failure of the mooring hawser does not permit a choice of action, and the Offtake Tanker must disconnect the hose and make a prompt departure from the FRADE FPSO. The elapsed time between a hawser failure and a strain coming on the oil transfer hose is likely to be as short as only few minutes.

Should the hose not be released in time then Marine Breakaway Coupling - MBC in the hose tail should part away allowing a break point in the hose. These couplings are designed to break at 35 tons pull. The Offtake Tanker and the pull bank tug should take up a safe standby position nominally some 3 miles from the FPSO.

The Line Handling Boat should be used to control the hose and messenger line as appropriate, having due regard to the existing weather and environmental conditions.

1.36. HOSES

FRADE Terminal export system consists of one ANSI Class #150 double carcass hose string equipped with one Marine Breakaway Coupling – MBC.

Floating hose string comprised of:

- 03 each 24” x 40 Ft Submarine hoses;
- 20 each 24” x 40 Ft Mainline hoses;
- 01 each 24” to 20” x 40 Ft Tapered hose;
- 01 each 20” to 16” x 40 Ft Tapered hose;
- 02 each 16” x 40 Ft Tail hoses;
- 01 each 16” - 150ANSI Marine Breakaway Coupling;
- 04 each 16” x 40 Ft Tail hoses;
- 01 each 16” x 30 Ft Tanker-rail hose.

Tanker Rail ancillaries comprised of:

- 16in Lever operated wafer type butterfly valve;
- 16in Short spool cam-lock 150 ANSI;
- Lightweight blind flange;
- Pickup chain;
- Snubbing chain (2).

The main line hoses are electrically continuous from the FPSO overboard connection up to tail hose. The tail and rail hoses from the amidships manifold are electrically discontinuous. Each length of electrically discontinuous hose will be distinguished bearing the words “Electrically Discontinuous” permanently and legibly marked in a contrasting color.

Offtake Tanker manifold connection must be fitted on starboard side with one 16in, ANSI 150 manifold reducers and proper manifold arrangement in full compliance with the latest OCIMF publication "Recommendations for Oil Tanker Manifolds and Associated Equipment".

A hose handling crane with a minimum 15 Tons SWL and 5.0 meters outreach will be required for hose connection. The hose will be positioned adjacent to the starboard amidships manifold using the Line Handling Boat. Hose connection is carried out by Offtake Tanker’s crew, under supervision of Mooring Master and an Offtake Tanker Officer.

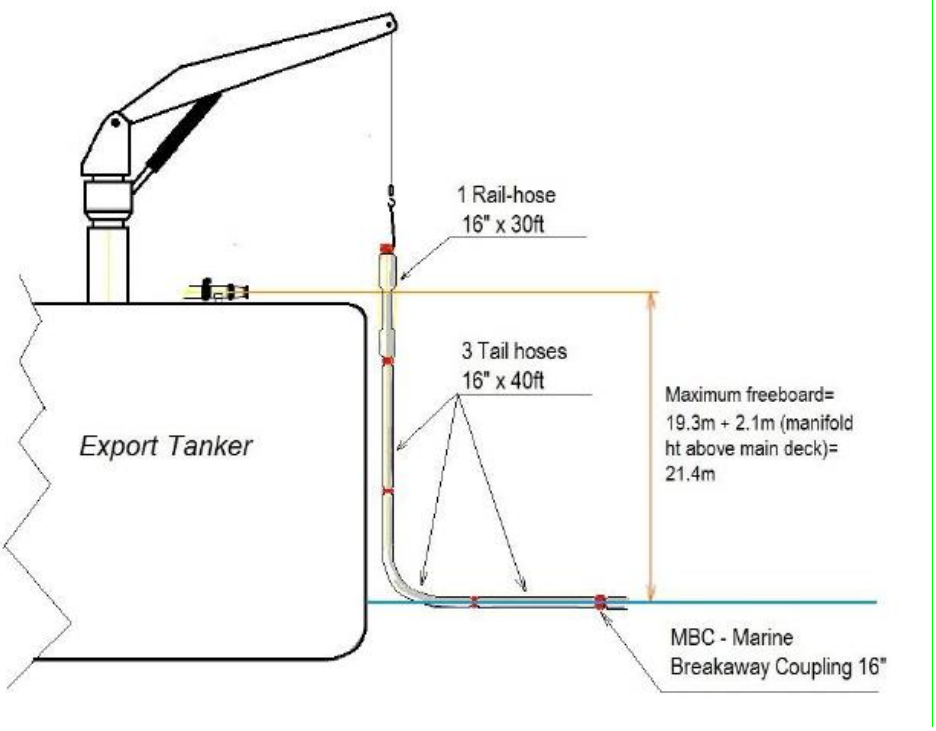


Figure 5- Cargo Hose Description

Extension lifting pennant (stinger) shall be connected to the Offtake Tankers Crane hook to protect hose handling boat deck crew from the main lifting block while connecting the cargo export hose lifting chains.

The maximum estimated weight is in the order of 12 tons with the hose end lifted 25,5 meters above the sea level.

1.37. HOSES HANDLING OPERATIONS, PRIOR AND AFTER THE OFFTAKE

Due to weight and size of the hose string and fittings, special precautions must be taken. It must be realized that when hose string is lifted out of the water, the load will increase continuously toward its maximum. All equipment is to be kept within the original specification (including hooks, wires, blocks, etc.). The Offtake Tanker's lifting equipment should be rigged to its maximum heaving capacity. Only approved equipment of the required capacity is to be used.

On arrival the Mooring Master shall verify the Crane certification and records of maintenance and inspection. The working area should be clear from obstruction prior to the beginning of the lifting operation. The crane must always be plumbed outboard of the Offtake Tanker’s side until the pick-up chain has been secured. During the lifting operation, no person should stand under the lift and/or near the hose and associated equipment.

Condition and safety of the various hose lifting gear components should be checked for excessive wear, damage, or poor connections. If there is any question of inadequacy of the lifting gear, the lift operations must be stopped until the inadequacies are corrected.

The disconnection of the hose can be dangerous and care must be taken to ensure that the hose is secured to the Offtake Tanker crane at all times, until lowered to the sea. Reference should be made to the OCIMF publication “SPM Hose Ancillary Equipment Guide”, latest edition.

One day before the lift, the AHTS and Line Handling shall proceed to the field to prepare the pressure test, because AHTS and LHV shall support all operations. Prior of berthing, the Line Handling Boat will tow the hose string to a position well clear of the berthing operation area. Towing of the floating string will be visually checked and directed by Mooring Master to avoid bending of the hose string itself.

1.37.1. Emergency Hose Disconnection

In emergency, cargo export hose can be quickly disconnected by removing the four locating bolts and operating the manifold Cam lock couplings fitted to the rail hoses and release of snubbing chains as directed by the Mooring Master.

Floating hose string is protected with a Marine Breakaway Coupling - MBC installed on hose tail. If unable to disconnect hose from the manifold and Offtake Tanker is required to un-berth in emergency or breaks-out of the mooring, the MBC will automatically part as per design.

FPSO Floating hose section and the Offtake Tanker floating hose section will be sealed by MBC couplings reducing the amount of oil spilled and allowing the Offtake Tanker to move clear from the FPSO.

10. CARGO HANDLING

The offloading hose has a capacity of about 1070 Bbls and at the time of connection will be full of water. Crude oil is discharged from the FPSO through the fiscal metering skid located on the main deck aft to the discharge manifold located on the stern of the FPSO and to the Offtake Tanker via the floating offloading hose.

Offloading operations will be restricted to maximum flow rate of 5,300 cbm/h 33,300 Bph and minimum of 1,000 cbm/h 6,300 Bph . Standard discharge parcels will be in the order of about 1.000.000 Bbls. The normal time for this size of discharge shall be about 30-33 hours.

Due to the nature of the FPSO, as a production and storage facility, crude oil is being pumped from FPSO cargo tanks as oil production continues to other available tanks.

Due to the high rates of discharge, specific controls are required to mitigate surge in the hose. The Offtake Tanker shall ensure that:

- Three tanks are available at all times during offloading;
- No valve operation to shut off flow in less than 30 seconds is initiated;
- No throttling of flow during loading operations.

The loading plan shall indicate the requirement for lower loading rates, i.e., when changing tanks. If changes of loading rates are required contact should be made immediately to the FPSO Central Control Room.

1.38. PRE- OFFLOADING CONFERENCE

Random checks will be conducted to ensure cargo tanks oxygen content is below 8%.

Pre-cargo conference shall take place immediately prior to commencement of cargo export operations. Under no circumstances should cargo export operations commence until this conference has taken place and both parties have agreed that all safety precautions are in place and that all operational procedures have been agreed upon.

The following items must be discussed and the relevant documentation exchanged:

- Cargo nomination and cargo quantity required by the Offtake Tanker.
- Approximate API gravity and temperature of the cargo to be handled.
- Maximum and minimum loading rates expected and required.
- Requirement to maintain a minimum of 30% of Summer Deadweight at all times.
- Maximum and minimum drafts and trim expected and all relevant limitations.
- Offtake Tanker / FRADE Terminal Stop procedures.
- Emergency Stop procedure.
- Maximum operating pressures at FRADE Terminal and/or the Offtake Tanker’s manifold.
- Precautions to be taken to eliminate possible surge pressures in pipeline system.
- Offtake Tanker’s loading plan and procedures.
- Offtake Tanker’s de-ballasting plan and procedures.
- Regular comparison on hourly basis of Offtake Tanker/ FRADE Terminal cargo figures.
- Material Safety Data Sheet of FRADE crude oil

The following local weather precautions must be explained and understood:

• Severe weather is regularly experienced in autumn (March to May) and spring (September to November).

• High winds and electrical storm activity are potentially hazardous to the Offtake Tanker and FRADE Terminal.

• During electrical storms precautions to prevent a major incident, the operation must be stopped

• Sudden changes in current strength and direction may result in the Offtake Tanker suddenly riding up on to the FRADE FPSO.

The following operational precautions need to be outlined:

• Offtake Tanker's main engines and deck machinery must be ready at all times, as it may be necessary to maneuver or even disconnect hoses and hawser at any time.

• Emergency Procedure.

• Deck watch requirement include FRADE Terminal Mooring Masters, as well as Offtake Tanker's Officers and Crew.

• Regular safety checks conducted at agreed intervals by Offtake Tanker crew and FRADE Terminal Mooring Masters.

• Position of FPSO relative to the Offtake Tanker's bow and condition of the mooring Hawser(s) shall be reported at regular intervals.

Note: In case of the hose connection is completed after daylight, leak test must be performed on the next day, as soon as natural lighting allowing for a proper visual inspection of the entire hose string and manifold connection. Loading operation cannot be initiated until that leak test is successfully completed.

1.39. OFFLOADING PROCEDURE

1.39.1. Conditions

One Mooring Master and 1 mooring assistant will remain on the Offtake Tanker throughout the cargo export operation to monitor the entire operation. Mooring Master will coordinate activities onboard the Offtake Tanker with the FRADE Terminal.

Offtake Tankers will be supplied with a hand-held radio for communications. The duty Mooring Master can be contacted at any time, for whatever reason, on the hand-held radio on the nominated Export Working Channel.

All communications between the Offtake Tanker and FRADE Terminal during (un)mooring and hose (dis)connection operations shall be undertaken by the Mooring Master. For an Emergency cargo stop, Offtake Tankers must communicate directly with the FRADE Terminal. The communication will be in the format described in Pre-Transfer Conference.

During the hours of darkness all available approved floodlights shall be used to illuminate the Offtake Tanker and surrounding water to facilitate the detection of any oil and generally assist in the cargo export operation. Offtake Tanker is advised that failure to provide sufficient

illumination will result in the cargo export operation being suspended during the hours of darkness. Such delays would be for the Offtake Tanker's owner / charterers account.

Offtake Tanker will, if necessary, provide approved lighting over the bow to illuminate mooring hawser arrangement and FPSO during the hours of darkness.

Maximum export rate during the crude oil transfer operation will be approximately 33,300 barrels per hour, (normal peak average rate).

During loading at maximum rate, a minimum of four cargo tanks are required to be in fully open position. In case of pressure build up at tanker's manifold, loading rate will be reduced.

Offtake Tankers may request any export rate down to a minimum of 6,300 barrels per hour at any time when required for operational reasons. Offtake Tanker must provide fifteen minutes notice for a request to change the export rate.

Offtake Tanker and FRADE Terminal cargo export figures are normally compared at hourly intervals. All comparison must be made using Gross Barrels (GSV) at 60º F.

A responsible Deck Officer shall be in charge of Offtake Tanker operations at all times, either on deck or in the control room. Offtake Tanker's with a cargo control room, shall have a deck watch in direct contact with the cargo control room. The deck watch must continuously patrol the cargo deck and monitor the manifold area.

At all times, while the Offtake Tanker is moored to the FPSO, a watch keeper shall be stationed on the forecastle to monitor FPSO hawsers and another at the manifold to monitor cargo hose. Both of them must be in radio contact with OOW in CCR.

1.39.2. Summary of Procedures

Step	Responsibility	Action
1	FPSO Cargo Superintendent	Lower mooring hawser into the water following a pre-berthing/arrival meeting. (This will depend on the berthing of the tanker.)
2	Offtake Tanker Mooring Master	Advise the Offtake Tanker master on the berthing operation and instruct standby vessel as necessary.
3	Offtake Tanker Mooring Master	Connect hawsers.
4	Independent Inspector	Responsibility for inspection of Offtake Tanker tanks and issue of Dry Tank Certificate will be by the Offtake Tanker crew witnessed by the mooring master and official cargo surveyor.
5	Offtake Tanker Mooring Master	Signed copies of the respective lists are transmitted to the other vessel as final confirmation of completion of the process.
6	FPSO	The official time of export start will be when the export valve is opened on the FPSO following line flush.
7	FPSO	When oil flow has been confirmed on the Offtake Tanker and the export hose has been checked for tightness, the export rate will be increased to the full rate agreed between the terminal and the Offtake Tanker
8	FPSO	If necessary, a COW program for Crude Oil Tank (COT)8 P/COT4 C will be carried out at a suitable time during the export, with the COW oil being discharged to the Offtake Tanker.

9	FPSO	Will give the Offtake Tanker an hourly reading of the metered quantity delivered. This must be cross-checked with the Offtake Tanker figures. If a discrepancy in excess of the metering guidelines is noted, the transfer will be suspended and investigations started on the FPSO and Offtake Tanker to confirm no loss of containment and ascertain the reason for the difference.
10	FPSO	Pumping will be stopped at the nominated quantity or when instructed by the Offtake Tanker, if their requirements are less than the nominated quantity. This will be the official completion of the export operation.
11	Offtake Tanker Mooring Master	Normally the batch completion time will be by the export meter computer.
		The Offtake Tanker crew will be advised on the disconnection of the floating hoses under the supervision of the mooring master.
12	FPSO	Following disconnection, the floating hose is held clear by the line handling boat.
13	Independent Inspectors on board the FPSO/Offtake Tanker	All cargo tanks will be dipped and sampled. Gross and net export quantities are calculated by the ullage method. A similar operation is performed on the Offtake Tanker. The Offtake Tanker gross figures are calculated and the information passed to the FPSO for completion of the Ullage Report. FPSO factor to be recorded and compared to the metered figures.
14	Offtake Tanker Mooring Master	The un-berthing operation is to be carried out immediately after export hose disconnection. The mooring master will advise Offtake Tanker master on un-berthing operations and instruct the tug as necessary.
15	FPSO	When the tandem mooring hawser is disconnected from the Offtake Tanker and lowered into the sea, it is picked up and stored on the hawser reel. Rinse with fresh water during recovery.
16	FPSO	Official documentation will be prepared by the FPSO staff for signing by the OIM or Cargo Superintendent and Offtake Tanker Master
17	Cargo Supt and Independent Inspector at the FPSO	• Bill of Lading quantity will be calculated using the figures from the LACT unit and the quality as determined from the laboratory analysis of the inline auto sample. • The information for the time sheet for the load is supplied by the mooring master.

1.40. BALLAST, SLOP HANDLING BILGE, AND DRAINS HANDLING AND SCUPPERS

Owners and the Master of the OTT are responsible for complying with all International Conventions as well as the laws of Brazil concerning pollution of the sea, having particular regard for the offshore environment. Pollution of the sea by dirty ballast water, bilge discharge or any other means may result in heavy fines being imposed, and in severe cases may result in imprisonment of the Master or the arrest of the OTT. A discharge of oil, oily slops or bilge water into the sea is strictly prohibited. All overboard discharge valves not meeting MARPOL 73/78 shall be isolated, closed and sealed.

The OTT shall arrive with clean ballast only. The FRADE TERMINAL has no facilities for the disposal of dirty ballast. It is the Master's responsibility to see that no oil of any kind is pumped, spilled or leaked overboard from the OTT. This includes oily water from bilges, decks, crude

residues from previous voyages or any other matter that may result in pollution of the sea. Any fines imposed on or by third party claims against the Indemnified Parties arising from these matters shall be for the OTT's account.

If evidence of oil appears during deballasting, the OTT shall be rejected forthwith and shall not be accepted until satisfactory evidence is produced that such ballast was disposed of in a proper manner. Any OTT rejected because of dirty ballast or pollution of the sea shall automatically nullify accepted "Notice of Readiness".

1.41. CARGO MEASUREMENT

The FRADE Terminal uses the measurement standards published by the American Petroleum Institute in their "Manual of Petroleum Measurement Standards". The FRADE Terminal uses Table 6 and 60, API Standard 2540 (equivalents: IP 200, ASTM D1250-52 and ANSI/ASTM D1250-52) for calculations of measured volumes of crude pumped into the Offtake Tanker. Offtake Tankers should have those publications available on board.

Immediately after completion of loading, the Offtake Tanker's cargo figures should be calculated by her Officer in Charge. Offtake Tankers are encouraged to use measurement standards published by API in Chapter 17 of the ''Manual of Petroleum Measurement Standards'' in the interest of uniformity.

The Vessel Experience Factor (VEF) is a statistical means of comparing Vessel cargo volume figures with the shore volume figures by ratio.

The VEF should be used for mitigating inaccuracies in the ship's tank calibration tables and should be calculated over a number of voyages to obtain an average.

The FRADE Terminal is equipped with a LACT unit and automatic in-line sampler.

Official quantity for bill of lading purposes shall be based on FPSO flowmeter measurements. If such meters are not available or determined to be unacceptable by the independent inspector, the vessel received figures (Ullage witnessed by Independent Inspector on board the OTT with valid VEF calculated by the independent inspector shall be used as official quantity.

OFFICIAL QUALITY SHALL BE BASED ON FPSO AUTOMATIC SAMPLE BLENDED DRAWN DURING LOADING. IN THE EVENT THAT INLINE SAMPLER IS NOT AVAILABLE OR DETERMINED TO BE UNACCEPTABLE, THE QUALITY SHALL BE BASED ON FPSO MANUAL COMPOSITE SAMPLE. IN THE CASE BOTH AUTOMATIC OR MANUAL SAMPLING ARE DETERMINED TO BE UNACCEPTABLE BY INDEPENDENT INSPECTOR THEN QUALITY SHALL BE BASED ON VESSEL MANUAL COMPOSITE SAMPLE.

11. APPROACH / DEPARTURE

1.42. APPROACHING AND MOORING PROCEDURES

It is a requirement that all Offtake Tankers entering the FRADE Field are in standby condition, i.e., auxiliary propulsion and steering machinery are online for immediate availability, and there is sufficient manning available on the bridge, in the engine room and on deck, as appropriate. Verbal contact between the bridge and the engine room should also have been established.

Masters of Offtake Tankers shall plan their courses in conjunction with the Mooring Master and the OIM to and from the FRADE TERMINAL such that the Offtake Tanker remains clear of other installations in the area.

The Offtake Tanker approaches to the mooring position and station keeping are maneuvers that require skill and seasoned judgment to be completed safely and without incident. Professional judgment of the Mooring Master, Offtake Tanker Master and OIM will be used to assess the numerous factors involved with such wind, sea, current and competence of the people involved in the operation. Hawser tension, fishtailing and other data shall be considered as well.

The following infield information is available, from the Central Control Room, to assist Offtake Tanker Master and the Mooring Master in their navigation within the FRADE TERMINAL location.

- FRADE TERMINAL heading.
- FRADE TERMINAL motions - pitch, roll.
- Prevailing weather conditions.
- Any temporary obstruction within the 5 mile zone of the FPSO.

For safety reasons, the approaching and mooring in Campos Basin that depend on the Support Boat and the Mooring Master Assistance must be started not less than 03 hours before the sunset. Berthing will not be carried out when visibility is impaired by fog. The Mooring Master, OTT CPT and OIM must analyze special situations.

During the approach to the berth, while mooring, secured on the berth and whilst un-berthing, the vessel's anchors MUST be secured by stoppers with the pawl bar down and wire or chain lashings.

Unmooring at FRADE Terminal may be conducted at any time day or night.

NOR may be tendered to the terminal at any time for purposes of establishing the OTT's arrival within the agreed commercial laycan. However, for purposes of calculating Laytime, NOR shall be considered received by the mooring master on be behalf of the terminal only between 0600 (including) and 1500 (including) local time.

The Laytime shall include Sundays, or local equivalent, holidays, unless loading during holidays is prohibited by the FPSO Terminal Regulations, or by applicable laws and/or regulations.

When the OTT arrives prior to the commercial laycan, the Terminal at its sole discretion and after having received formal agreement from the PetroRio Commercial Operations focal point may allow the OTT to begin loading early, provided the Agreed Lifting Quantity is available in inventory in the Crude Oil storage facilities. In such case, Laytime shall commence pursuant to (2) below:

(1) NOR tendered within COMMERCIAL LAYCAN

(A) If the NOR is tendered between 0001 (including) on the 1st day of COMMERCIAL LAYCAN and 1500 (including) on the 2nd Day of COMMERCIAL LAYCAN, Laytime shall commence six (6) hours after the NOR is received or all fast, whichever is earlier.

(B) If the NOR is tendered after 1501 (including) on the 2nd day of COMMERCIAL LAYCAN, the Terminal shall allow the OTT to become all fast at the FPSO when convenient to the Terminal, and Laytime shall begin when the OTT is all fast.

(2) NOR tendered before COMMERCIAL LAYCAN

If NOR is tendered any day before COMMERCIAL LAYCAN, then NOR is considered received at 0600 on the 1st day of COMMERCIAL LAYCAN and Laytime shall commence at 1200 on the 1st day of COMMERCIAL LAYCAN or all fast, whichever is earlier.

(3) NOR tendered after COMMERCIAL LAYCAN

If NOR is tendered after COMMERCIAL LAYCAN, then Laytime shall begin on the commencement of loading.

Laytime shall run continuously from commencement until cessation, unless prohibited by FPSO Terminal Regulations and/or applicable law and regulations, and shall cease on the disconnection of the cargo loading hose(s) after completion of loading.

Offtake Tanker Arrival Condition

The Offtake Tanker should be ballasted with the Bulbous Bow and propeller submerged. The anchors shall be secured in her stowed position.

Maneuvering restrictions

No approach shall be made by the Offtake Tanker to the FPSO unless the berthing operation can be completed in daylight.

- When navigating and maneuvering in the FRADE, the following shall be taken into account: the presence of underwater oil and gas pipelines in the vicinity, and the dangers of indiscriminate anchoring (water depth - 1050m);

- Drilling and other marine and subsea activities that may impact on the Offtake Tanker approach.

The FRADE TERMINAL is free to weathervane around the internal turret. Marked changes of wind, waves and/or current shall, therefore, affect the heading of the FRADE TERMINAL and the approach course of the Offtake Tanker.

The offloading hose shall be stored off the starboard side of the FPSO or supported by a SB for OTT approaching. The Line Handling Vessel or the AHTS shall tow the hose to a clear position until hose handling is safe to commence.

1.43. CONTINGENCY PLAN DURING OPERATION

1.43.1. Contingency On Board

The OTT must have contingency plans prepared to emergency situations that may occur when operating with an OI. These procedures must be available in the Operation Manual of OTT and in the Shipbuilder Rules and Regulations.

1.43.2. Stand by Conditions

It is mandatory to all OTTs entering the Campos Basin have their propulsion system, boilers, steering gear and auxiliary systems ready and working in a satisfactory manner to the maneuver, operating by bridge and CCM as applicable.

Communication means between bridge and CCM must be guaranteed.

Bridge and CCM must be prepared to operate while works are being carried out in the unit.

1.43.3. Approaching and Departure Plans

The OTT CPT must be careful, plan the tracks in advance and keep away from the units in safe operation conditions, during lay time in the FPSO area.

1.43.4. Approaching Direction and Speed

When the OTT is at 650 meters away from the FPSO, its heading must be different in 10 degrees from the FPSO's in order to guarantee a safe emergency escape route.

When the approaching maneuver has started, the OTT approaches the FPSO in the assigned sector, observing the maximum speed according to the table below:

Position	Maximum speed permitted
Within the limits of 10 NM from FPSO	Maximum speed permitted by COLREG
Within the limits of 3 NM from FPSO	5 knots
Within the limits of 3000 meters from FPSO	3 knots
Within the limits of 1500 meters from FPSO	2 knots
Within the limits of 500 meters from FPSO	0.6 knots
Within the limits of 300 meters from FPSO	0.4 knots
Within the limits of 200 meters from FPSO	0.2 knots

1.43.5. Low Visibility

In visibility conditions less than 1000 meters in the FPSO approaching area, the Mooring Master, OTT CPT, AHTS CPT, OIM and SUPEM must jointly assess the situation and decide the safe conditions in order to perform the operation.

1.43.6. Emergency Procedures

In case of engine or steering system failure, running into a total or partial loss of maneuvering, the OTT CPT must start ship's emergency procedures, requesting the AHTS submission in order to control the vessel drift. The Mooring Master, SUPEM and OIM must be immediately informed.

1.43.7. Pre-Operational Stage

PRE-OPERATIONAL		
STAGE	**RESPONSIBLE**	**ACTIONS**
1	PetroRio Commercial Focal Point	Provide the export program for the forthcoming months.
		Ensure that the incoming tanker has passed through the vetting process
		When the nomination is known not later than 8 days prior to laycan, to supply the following information to the FPSO superintendent: • Offtake Tanker name and deadweight • Nominated cargo quantity • Name and availability of tug • Discharge port
2	FPSO	As soon as possible prior to arrival, FPSO to establish contact with the Offtake Tanker to give pre-arrival

		instructions.
3	FPSO Cargo Superintendent	Preparation of cargo plan is started, including last basic sediment and water (BS&W) and density results. Crude Oil Washing (COW) program also to be included, if necessary, for FPSO.
Approximately 72 Hours Prior to Arrival of Offtake Tanker		
4	FPSO Safety Officer	Carry out a full tanker safety equipment check as per FPSO Safety Checklist.
5	FPSO Cargo Superintendent	Prepare Export Checklist.
		Dip nominated tanks for free water and strip as necessary. Re-sample tank after removal of water.
		Check the export hose and aft hydraulics.
		Check mooring lines. All tests and checks to be noted on checklist.
Approximately 24 Hours Prior to Arrival of Offtake Tanker		
6	FPSO Cargo Superintendent	Finalize offload plan.
		Dip nominated tanks for free water and strip as necessary. Re-sample tank after removal of water.
Day of Export		
13	FPSO Cargo Superintendent	Ullage cargo tanks, record temperatures and any free water interface using the interface tapes (MMC).
		It is not normally permitted to export free water, therefore, any tank with free water should be de-bottomed again if necessary.
14	FPSO	FPSO superintendent gives approval for the berthing operation with due regard to prevailing weather conditions. FPSO superintendent, in consultation with the berthing master, will decide on time of berthing. Berthing will not take place at night.

1.44. SUMMARY DESCRIPTION OF OPERATING PROCEDURES

1.44.1. Normal Connecting and Arrival Procedure

Table 8- Arrival – Approach - Mooring

ARRIVAL – APPROACH - MOORING			
DISTANCE TO FPSO	**STAGE**	**RESPONSIBLE**	**ACTIONS**
30 NM	1	OTT CPT	Test propulsion, steering gear, communication, mooring and cargo systems, according to Offtake Tanker internal procedures.
		AHTS CPT	Test propulsion, steering, communication, mooring and towing systems
20 NM	2	OTT CPT	Contact FPSO and nd inform: • ETA in the FPSO vicinity. • Last Port of Call and ship's position;

			• Space available for cargo, water and waste tank cleaning; • Operational restrictions, if any. • Check if propeller is submerged and Bulb (when applicable) is submerged to its centerline.
		FPSO SUPEM	Contact OTT in VHF CH16 and establish a working channel. Inform OTT CPT: • Ship's routing to approach; • Weather conditions; • Estimated time for maneuver; • • Any obstacles that may be dangerous to Navigation; • Name of the AHTS and LHV's; • Other relevant information identified; • Check the operational status of the AHTS and LHV. Report to OTT CPT: • The hose line that will be used (length, gauge...) • Quantity, temperature and density (20°C) of the oil to be transferred. • Flow scheduled for transfer (in m^3/h); • Operational restrictions, if any. • Begin preparations for the operation
5 NM	3	OTT CPT	Contact FPSO to inform the NOR. • Send NOR. • Check if the crew, systems and other facilities necessary to perform a secure operation are ready.
3 NM	4	OTT CPT	Keep maximum approaching speed of 5 Knots.
1.5 NM	5	OTT CPT	Keep maximum approaching speed of 2 Knots. • Inform Ship's Particulars to the Mooring Master Request the FPSO the following information: • FPSO Heading; • Wind (direction and intensity); • Current (direction and intensity)
		OTT CPT	Request the FPSO the following information: • FPSO Heading; • Total cargo on board; • Wind (direction and intensity); • Current (direction and intensity) • Confronting the data (direction and wind speed) reported by FPSO and OTT
		OTT CPT	In this stage the ship should be stopped. • Observe OTT's drift for 15 minutes to determine if the conditions are normal for continue operation. • If, in fifteen (15) minutes of waiting is not observed a great drift, continue the operation usually; • If you get a special situation characterized, inform

			all involved (OTT Master, OIM / AHTS CPT / LHV CPT)
		AHTS CPT	Prepare the system for towing.
		OTT CPT	Prepare to receive and connect the AHTS towing line.
		AHTS CPT	Approach his vessel to the OTT stern to pass the towline
1 NM	6	FPSO	Release the mooring system with the help of LHV and make visual inspection. Inform the Mooring Master or OTT that the mooring system is released and secured. Ready for operation.
0.5 NM	7	OTT CPT	Keep maximum speed of 1.5 Knots. Must have a 10" x 220m polypropylene messenger line and keep ready to pass to the LHV
250 m	8	LHV CPT	Get in position to receive the Messenger line from the OTT
		OTT CPT	Lower the Messenger line to the LHV. The mooring maneuvering must comply the PetroRio procedures.
		LHV CPT	Connect hawser pick-up rope to OTT Messenger line and release the system to the water; Keep clear of the maneuvering area in a safe place waiting for instructions.
		OTT CPT	Start heaving the mooring system
50 m	9	OTT CPT	When retrieval is complete and the chafing chain is on the bow stopper, the chafing chain is locked.
		OTT CPT	Inform the FPSO and MFSV that the OTT is moored and ready to receive the offloading hose system messenger line.

1.44.2. Hose Connection

Table 9- Hose Connection Procedures

HOSE CONNECTION PROCEDURES	
STAGE	**ACTIONS**
1	LHV will tow the hose string to the ship's manifold.
2	Lower the Offtake Tanker crane's hook to the hose handling boat.
3	Line handling boat crew will connect the crane hook to the hose lifting chain.
4	Hoist the hose until the 1st hose lower flange is at the of the Offtake Tanker main deck level.
5	Pull up hose snubbing chains through the selected chock.
6	Hoist the cargo export hose further as directed by the Mooring Master.
7	Secure snubbing chains using pelican hooks, previously installed on deck.
8	Lower down hose until it rests on the snubbing chains,
9	Continue lowering the hose onto the drip tray to remove the blind flange.
10	Lift the hose, align and connect to the ship's manifold using cam-lock coupling.
11	It is recommended that a minimum of five bolts (locator bolts) also to be fitted to the manifold flange to provide anti-twisting movement during cargo operation.
12	When the cam-lock is securely connected to the manifold, open the hose butterfly valve and lock it in the open position.

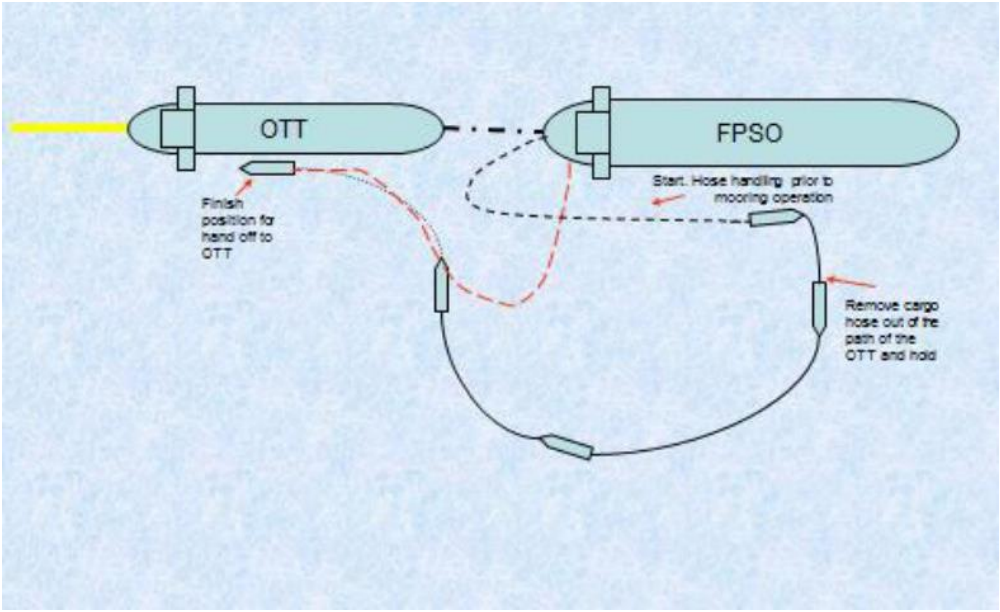


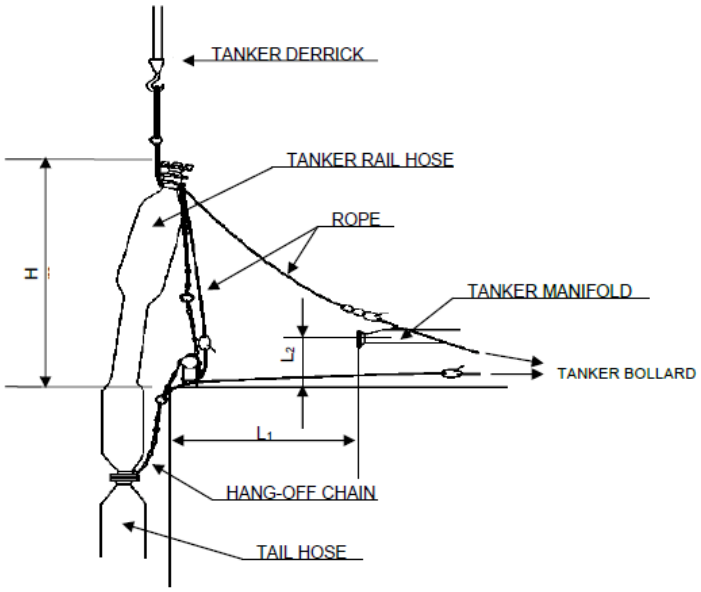
Figure 6 - Hose Handling Tug Approach Route with Hose Attached

1.44.3. Hose Disconnection Procedure

On completion of export operation the floating hose and Offtake Tanker manifold must be drained to prevent oil spillage during hose disconnection. Hose draining and disconnection shall be completed by the Offtake Tanker crew under supervision of a Mooring Master and an Offtake Tanker's Deck Officer.

Table 10- Hose Disconnection Procedures

HOSE DISCONNECTION PROCEDURES	
STAGE	**ACTIONS**
1	Close Offtake Tanker manifold valve and cargo hose butterfly valve before draining manifold operation commences.
2	After draining has been completed, attach lifting chain to Offtake Tankers crane, using a trip hook installed on the crane hook, take up the weight and carefully disconnect the cargo export hose from the ship's manifold
3	Install the blind flange and secure it by the cam-lock cams and additional bolts fully tight
4	Hoist the cargo export hose until the weight comes off the snubbing chains.
5	Release both snubbing chains by opening the pelican hooks. Make sure the chains are cleared from the chock.
6	Lower down the hose to the water level, than trig the trip hook, as directed by the Mooring Master, to finally release the hose.



1.44.4. Normal Departure Procedure

Upon completion of the cargo loading, the Offtake Tanker Master and the Mooring Master together shall estimate the time needed to prepare the Offtake Tanker for departure and report this to the FPSO by radio.

When the Offtake Tanker is ready to unmoor with offloading hose disconnected, lowered and towed away, the deck officer and ship´s crew shall clear forward, following unmooring orders under Mooring Master´s advice. Once the mooring hawser is lowered in the water and messenger all clear from bow fitting and OTT is at a safe distance from the FPSO, the Mooring Master shall advise the Offtake Tanker Master to release the aft AHTS. Cargo documents, once ready, shall be dispatched by means of AHTS or Line Handling Vessel.

After the Offtake Tanker is unmoored and the towing wire is released, she maneuvers to go clear of the FPSO and to take a safe course down wind and down current from the FPSO.

12. CHARTS AND PUBLICATIONS

Masters of vessels proceeding to load at FRADE Terminal are advised to maintain the latest sailing directions, nautical charts and publications covering the Terminal Area. British Admiralty Charts are covering the Campos Basis area and are required to be on board all vessels calling at FRADE Terminal.

The UK Hydrographic nautical publications do not show individual structures located within Campos Basis because the field is inside an “Area to be avoided”.

All vessels entering Campos Basis shall pay extra navigational precautions and be aware of the following warnings:

• “Area to Be Avoided”: Due to the high concentration of oil drilling rigs, production platforms and FPSOs and the risk of collision and damage to the environment, this area has been designated an Area to be Avoided. All vessels, except those involved in supporting oil and gas production, should avoid this area. This is IMO-adopted.

• “Campo Oilfield”: Numerous productions platform and associated structures, including tanker moorings and storage tankers exist within the oilfield limits. These structures generally exhibit Mo(U) lights, aircraft obstruction lights, and audible fog signals. Unauthorized navigation is prohibited within 500 meters of all such structures”.

• “Exploratory Drilling Rigs”: “Uncharted exploratory drilling rigs may be temporarily located within the area of Campos Basis, sometimes outside the limit of the designated oilfield. The rigs normally exhibit the same aids to navigation as production platforms. Navigation within 500 meters of the rigs is prohibited”.

All vessels are warned to approach the FRADE Terminal with extreme caution as drilling and survey work are proceeding on a continuous basis in the vicinity of the FPSO. When approaching the Terminal, Mariners shall consult with the current Notice to Mariners.

1.44.5. Nautical Charts Reference

Under no circumstances may the OTT be anchored in the Campos Basin area or areas marked by the Brazilian Navy, where navigation is prohibited. Better information sources in the following publications from Brazilian Hydrography and Navigation Directorate (DHN):

- Nautical Chart No. 23000 – Cape of São Tomé to Rio de Janeiro
- Nautical Chart No. 1550 – Campos Basin

1.44.6. Terminal Exclusion Zones

A five hundred (500) meters exclusion zone extends around FRADE Terminal. The exclusion zone provides safe access to and from the FPSO for Offtake Tanker operations and reduces the risk of interference by unauthorized vessels during offloading Offtake Tanker operations. Only authorized vessels shall enter this exclusion zone.

13. NAVIGATION SYSTEM

1.45. MARINE OBSTRUCTION

The FRADE Terminal is fitted with two (2), marine obstruction white lights, flashing in synchronism the Morse “U” (..-) signal every 15 seconds with a range of 10 nautical miles in any direction. The lights are mounted on each extremity of the FPSO, bow and stern, that at least one light is visible while the Offtake Tanker is approaching from any direction.

1.46. FOG SIGNALS

1.46.1. ON THE FPSO CHARACTERISTICS AND POSITION

On the FPSO, the fog signals, with a range of two miles, is sounded from two omni-directional foghorns. The signal has been coded to sound "U" (..-) every 30 seconds. This foghorn has been positioned to obtain an audible coverage of 360°.

The flare tower is floodlight illuminated.

1.46.2. ON THE OFFTAKE TANKER

When the Offtake Tanker is connected to the FPSO, navigation lights are not required, but the appropriate lights and shapes as per the International Regulations for Prevention of Collision at Sea shall be shown.

1.47. AVIATION OBSTRUCTION

The color of the Omni-directional aviation obstruction light is red. The aviation obstruction lights are installed at:

- 1 each at Vent Stack, Port Side;
- 1 each at Vent Stack, Starboard Side;
- 5 each at Turret Fore;
- 3 each at Flare Stack, Port Side;
- 1 each at Funnel Aft Side.

14. AHTS

The Anchor Handling Tug Supply Vessel (AHTS) shall be made available for the offloading operations. Berthing operations cannot proceed if the AHTS is unavailable. The towline shall be secured to the Offtake Tanker at approximately 1.5 miles from the FPSO.

The AHTS should be capable of producing minimum static traction (bollard pull) of up to 110 tones and minimum lateral force of up 10 tones, and shall be on station in the Frade Field. The AHTS maintains a watch on Marine VHF channel 16 and 72 and UHF where provided.

The AHTS shall offer a 3”” work wire with peewee socket + wire pennant of 2-1/4” x 40 m with a soft eye for connection to a suitable set of bollards (minimum SWL 70TM (strong point of 200 TM is preferable) on the stern of the Offtake Tanker utilizing a suitable enclosed fairlead. Offtake Tanker crew shall be provided for the securing of the AHTS. During the time that the AHTS is secured regular inspections and reports on the fairlead and towing line condition shall be carried out and reported to the Mooring Master.

The master of the AHTS shall be advised of the SWL of the tow connection point on the Offtake Tanker.

The Offtake Tanker is to confirm the SWL of the bollards utilized for the tow connection point. The AHTS shall monitor the load and advise the Mooring Master when load excursions reach pre agreed levels. The Mooring Master shall coordinate the AHTS and shall communicate by VHF radio.

15. INERT GAS SYSTEM

All crude oil tankers scheduled to load at FRADE Terminal must arrive with cargo tanks fully inert with oxygen levels at less than 8 percent by volume and pressurized as required by ISGOTT regulations. Offtake Tanker will not be berthed if the Oxygen content is above the required minimum.

Normally cargo tanks under pressure will not be inspected by the Terminal Representative provided a declaration signed by the Master prior to the commencement of oil transfer operations, confirms that all compartments of the Offtake Tanker have been prepared in accordance with ISGOTT regulations.

The Cargo Surveyor may make a random check of cargo tank oxygen content and H2S levels during initial tank inspection and report to MM and FPSO.

1.48. Failure of Inert Gas System

If at any time the Inert Gas System fails during the transfer operation or cargo tanks are not maintained in the prescribed condition, all operations will be suspended until either the Inert Gas System is again operational, or the tank oxygen atmospheres are below 8 percent as required by SOLAS. The cost of any delays so incurred will be for the owner / charterers account.

1.49. TANK INSPECTION, GAUGING, SAMPLING, WATER DIPS AND TEMPERATURES

Cargo tanks are not to be opened to the atmosphere during gauging and sampling. Should it be necessary for cargo tanks to be inspected, then inspection will be completed on a tank by tank basis. Inert gas pressure shall be maintained at around 200 mm. water gauge except for any individual tank to be opened which, if possible, is to be isolated from the inert gas system and the sighting port opened with care.

On completion of inspection, the tank shall be secured, isolations removed and re-pressurized. The next tank to be inspected is not to be isolated and opened until the proceeding tank is secured and open to the Inert Gas System.

16. CRUDE OIL WASHING (“COW”)

COW may take place on the FPSO during a discharge. On the occasions that this occurs the Offtake Tanker shall be advised prior to pumping commencing and during the COW periods.

17. COMMUNICATION

Vessels calling at FRADE Terminal are required to advice their estimated time of arrival (ETA) to FRADE Terminal at least seven (7) calendar days before arrival and/or, if at sea, as soon as orders are received to proceed to the FRADE Terminal. The ETA shall be repeated 72, 48 and 24 hours in advance of the scheduled arrival.

Table 11- Email for Arrival Time Contact

1	fradeoim@petroriosa.com.br
2	brl.mar@hotmail.com
3	crudeops@petroriosa.com.br
4	fradecargosupt@petroriosa.com.br

Additional notification shall be given if the Vessel's ETA varies from the original 72 or 48 hours notification by twelve (12) hours or more. Notwithstanding the foregoing, in case the sea passage from the Vessel's last port is less than 72 hours from the FRADE Terminal, notice shall be given immediately after leaving such port of call to update or confirm original ETA. Subsequent notices shall be given at the regular times.

During all steps of operation, it is essential to ensure a perfect communication between the FPSO and the OTT, using at least two media, which shall be tested before each transfer operation to ensure the ongoing maintenance and effective communication between these units.

Table 12- Communication FRADE

Call Sign FRADE:	C6WN6
MMSI Number:	309-864-000
VHF channel:	Channels 16 and working channel 72
Telex Sat. C	430 986 410
Email	Rio-FradeSupervisor@petroriosa.com.br
Email	FPSOFradeRadio@petroriosa.com.br

Phone (Radio Room)*	00-870-764-866-750
Fax (Radio Room)*	00-870-764-866-753
Phone (Office Room)*	00-870-764-866-755
Fax (Office Room)*	00-870-764-866-756
Phone (Radio Room)	00-55 22 2106-4962
Fax (Cargo Office)	00-55 21 2510-5119

*INMARSAT Mini-M

Table 13- Contacts in Rio de Janeiro

Contacts in Rio de Janeiro		
RIO Office PETRORIO	Commercial Operations Focal Point	+ 55 21 37212103 crudeops@petroriosa.com.br

1.50. COMMUNICATION EQUIPMENT

The FPSO and OTT must be fitted with GMDSS equipment.

The OTT must be fitted with VHF equipment in CCR and Bridge, and portable devices for the crew involved in the operation. Two portable VHF radios must be provided, one to the Mooring Master and one to his assistant.

1.51. COMMUNICATION PROTOCOL

At least two communication methods shall be established and fully tested prior to every offloading operation, to ensure that continuous and effective communications can be maintained between the Offtake Tanker and the FRADE TERMINAL in the event of any equipment failure.

On arrival of the Offtake Tanker, the Mooring Master shall test the communication networks. During all offloading operations, a strict communications procedure shall be followed. This requires that the FRADE TERMINAL repeats verbally all requests from the Offtake Tanker immediately on receipt, and follows up by advising the Offtake Tanker immediately the requested action has been carried out. The same procedure shall apply to the officer of the watch on the Offtake Tanker when information or action is requested by the FRADE TERMINAL.

1.52. VHF WORKING CHANNELS

FRADE Terminal maintains a 24 hour watch on VHF Channels 16 (156.8 MHZ) and 72 (156.x MHz). Upon arrival, Offtake Tankers are to make contact with “FRADE Terminal” when within VHF range.

VHF Marine Offloading Control Channel 16 shall be the primary means of communication throughout the loading operations. Channel 72 is a secondary.

72 – CCR-Marine Control	72 - Supply/Standby Vessel operations
16 - Listening	72 - Offtake Tanker/ FRADE TERMINAL communications as required.

To ensure standardization of radio call signs, the following names are in use for the relevant positions on the FRADE TERMINAL. The main contact for the Offtake Tanker crew shall be the ‘FRADE Control’

FRADE Control	FRADE Cargo Control Room
FRADE OIM	FRADE OIM
FRADE Cargo Supt	FRADE Cargo Superintendent
FRADE DECK	FRADE Deck Foreman

1.53. ESTABLISHING COMMUNICATION

When appointed, and two hours before entering the zone of 10 nautical miles, the OTT must make contact with the FPSO informing their estimated time of arrival. This contact can be made via VHF – channel 16, (SSB frequency 4125 MHz), telephone or email.

1.54. NOTICE OF READINESS (NOR)

Offtake Tanker's Notice of Readiness (NOR) will be accepted by the Mooring Master if satisfied that the Offtake Tanker is in all respects ready to berth and load. NOR will not be accepted during a period when the Terminal is closed due to adverse weather/ force majeure, outside daylight hours or when an Offtake Tanker arrives before the start of lay days as per commercial agreement in place.

The Notice of Readiness may be tendered any time day or night in order to establish the vessel's arrival within the Laycan. However, for purposes of commencement of lay time, Notice of Readiness will be accepted in line with foregoing paragraph and between 06:00 and 15:00 hours LT.

Notwithstanding the foregoing paragraph, in no event shall a Notice of Readiness, whether previously accepted or not, be valid or binding on the Terminal unless, and until such time as, the Offtake Tanker herself, together with her tanks and equipment are in fact, in every respect in the proper condition and the vessel operationally ready to receive the nominated cargo.

The OTT reaching the zone of 5 nautical miles from the OT, and being ready to operate, informs the NOR to the FPSO.

1.55. INFORMATION EXCHANGE

After NOR issue, there must be assigned a working channel to transfer the following information:

- Conditions of mooring and offloading systems.
- Mooring, connection, loading, and disconnection trip operations.
- Stop time of cargo pumps.
- Time to get ready to departure.

During operation, the communication between the units is of vital importance to ensuring a safe operation. A high-quality job must be achieved to ensure the technicians involved in the operation on board the FPSO and OTT, have an understanding of the complexity and limitations of the ship and operation, so that decisions are taken together.

The information to be exchanged during operation by the OTT and the FPSO each hour, are described below:

Table 14 - Hourly Information Exchange

Information	Unit
Loaded quantity, flow rate and quantity to be loaded	OTT FPSO
Medium tension in the mooring system of the last hour	OTT
Maximum tension in the hawser in the last hour	OTT

1.56. COMMUNICATION SEQUENCE FOR OFFTAKE TANKER

The procedure for arrival at FRADE TERMINAL is as follows:

1. ITS provide nominated vessel Via IMAS
2. PETRORIO commercial operations focal point shall advise FRADE TERMINAL of the arrival window of the Offtake Tanker.
3. Offtake Tanker shall send an e-mail message to all contacts in table 11 with ETA 96 hours before arrival and updates every 24 hours and any other time if the ETA is to be revised by more than 12 hours. THE FOLLOWING INFORMATION IS REQUIRED:
    a. Tankers name, call sign and ETA;
    b. Arrival and Departure draft fore and aft and free board;
    c. Amount of cargo, basic loading rate and loading plan and deballasting time;
    d. Mooring equipment, bow and aft deck;
    e. Hose and hawser handling equipment.
4. E-mail traffic shall be used by all parties as back-up to ensure consistent information.
5. The Offtake Tanker is to call FRADE TERMINAL Control on VHF Channel 16 when within range (approx. 20 miles) of the Frade Field.
6. Thereafter the Offtake Tanker shall regularly inform FRADE TERMINAL Central Control Room of position.
7. At this stage the Emergency Shut Down procedures on board the Offtake Tanker and the FRADE TERMINAL are to be tested in accordance with the check lists.

1.57. RADIO COMMUNICATION FAILURE

Should loading operations be in progress on receipt of a radio communication failure signal from the Offtake Tanker, or if the FPSO is unable to communicate with the Offtake Tanker, the FRADE TERMINAL shall immediately stop all pumps and close the export valve. The emergency signal from the FPSO and Offtake Tanker shall be a continuous blast on the vessel's whistle.

18. EMERGENCY PROCEDURES

1.58. EMERGENCY GUIDELINES

This section contains emergency guidelines for disconnection of the Offtake Tanker in the event of an emergency arising. The emergency guidelines listed below shall be used if an emergency occur, such as:

- Mooring hawser failure or defect;
- Loading hose failure or defect;
- AHTS engine break down;
- Collision between the OTT and FPSO
- If any potential hazardous occur, the FPSO OIM and OTT Master, should consider the actions below:
- Stop offloading but remain moored with the hose connected;
- Stop offloading but remain moored with the hose disconnected;
- Stop offloading and disconnected hose and hawser, and move away from the FPSO.

1.59. OIL TRANSFER ESD PROCEDURES

The manual communication which initiates an ESD of the oil transfer from the FPSO Central Control Room shall be tested prior to commencement of the offloading operations. If initiated from the FPSO the Central Control Room shall inform the Mooring Master of the emergency.

a) The FPSO systems shall automatically shutdown the pumps with the designated rate control.
b) The Offtake Tanker manifold valves and hose end butterfly valve are closed as soon as FPSO`s pumps are shut off.
c) Central Control Room operator shuts off FPSO valves.

Depending on the scale of the emergency, the Offtake Tanker shall be instructed to disconnect the hose and then the mooring hawser.

1.60. SHIPBOARD CONTINGENCIES

As required by the FRADE TERMINAL Safety Check List, the Offtake Tanker Master and Mooring Master should discuss and agree upon the action to be taken in the event of an emergency or a fire on board the Offtake Tanker, or on FRADE Terminal. Actions taken should include means of communication in addition to emergency procedures. The Offtake Tanker Master must provide the Mooring Master with a copy of the Offtake Tankers Emergency Organization and Contingency Plan.

In all cases of shipboard emergency, Offtake Tanker Masters are required to notify the FRADE TERMINAL immediately in addition to satisfying the requirements of the Offtake Tanker's Owner. Also, in all cases of shipboard emergency, Mooring Master shall immediately notify FRADE Terminal Central Control Room (CCR.)

1.61. FIRE ON THE OFFTAKE TANKER OF FRADE TERMINAL

In the event of fire on either the FRADE TERMINAL or the Offtake Tanker, the manual ESD should be activated IMMEDIATELY and confirmation obtained by the parties that all offloading operations have been stopped and the cargo system has been shut down. This action should be followed by releasing the hose string and unmooring.

Offtake Tanker's firefighting equipment, including main and emergency fire pumps, shall be kept ready for immediate use at all times whilst the Offtake Tanker is berthed at FRADE Terminal.

Before cargo export operations commence, at least two fire hoses with jet/fog nozzles shall be laid out on the tank deck, connected to the fire main and tested as required by the Mooring Master. Two fire monitors immediately adjacent to the manifold must be elevated and made ready for immediate use. Two portable fire extinguishers, preferably of the dry chemical type, must be available in the proximity of the manifold area.

Should fire occur on Offtake Tanker, the Master or a responsible Officer shall make an immediate signal by a continuous blast on the whistle, sound the general alarm, main engines must be ready for use at all times. All export operations must immediately cease. Offtake Tanker shall be solely responsible for and must be capable of fighting, any fire occurring on board, without assistance from FRADE Terminal.

1.62. FPSO BLACKOUT

In the event of FRADE Terminal black-out occurring the Mooring Master shall ensure Cargo export is stopped and back-up communication is in place to communicate with FRADE OIM.

Mooring Master must consult the Offtake Tanker Master and OIM to consider unmooring the Offtake Tanker. Safety of personnel, Offtake Tanker, assisting tug-boat and/or FRADE FPSO must be considered.

1.63. OFFTAKE TANKER BLACKOUT

In the event of Offtake Tanker black-out the cargo export must be stopped immediately and FRADE Offshore Installation Manager (OIM) informed.

A total blackout on the Offtake Tanker with a complete loss of main engine and auxiliary power should not result in the Offtake Tanker closing and colliding with the FRADE TERMINAL. The AHTS shall maintain the Offtake Tanker position and heading.

If the time required to rectify a total blackout is relatively short, i.e. less than 3 hours, the hose need not be disconnected. Nevertheless, as in all emergency situations, the cargo transfer shall be stopped and the FRADE TERMINAL alerted.

In those cases, where the blackout rectification is likely to take longer than 3 hours and, it is possible to disconnect and lower the hose, then the hose should be released by the Offtake Tanker from the manifold. The Offtake Tanker Master may then elect to unmoor from the FRADE

TERMINAL and depart. The Offtake Tanker can then be towed clear by the AHTS. Before deciding on this course of action, the Offtake Tanker Captain, Mooring Master and OIM shall give the adequate consideration to the risk of collision with nearby oil field structures.

1.64. AHTS MECHANICAL FAILURE AND BLACKOUT

In the event of mechanical failure, towing rope parted or blackout on any support boats involved with export operations the Mooring Master must ensure cargo export operations are suspended and back-up communication is in place to communicate with concerned Support Boat.

A total blackout on the AHTS with a complete loss of main engine power should not result in the AHTS or the Offtake Tanker closing and colliding with the FRADE TERMINAL or with each other, however, the cargo transfer shall be stopped and the FRADE TERMINAL and the Offtake Tanker alerted.

The Offtake Tanker Captain may, in consultation with the AHTS, Mooring Master and FRADE TERMINAL OIM run his main engine astern to prevent the Offtake Tanker closing on the FRADE TERMINAL.

The AHTS shall decide whether to let go or not from the Offtake Tanker, however, the FRADE TERMINAL OIM shall summon assistance as soon as possible to assist the AHTS, only to minimize the risks we can connect the LHV on the AHTS bow, to towing it away from the OTT.

In those cases, when the wind speed is below 25 knots, or the AHTS blackout rectification is likely to take longer than 30 minutes or there is no immediate assistance available or there is a tendency for the Offtake Tanker to move towards the FRADE TERMINAL, then the OTT shall release the hose. The Offtake Tanker Master may unmoor from the FRADE TERMINAL and depart if the FRADE TERMINAL or his vessel is endangered in any way.

1.65. MOORING HAWSER AND HOSE FAILURE

Sudden, height tension can be expected to rupture the mooring hawser. In the event of this occurring or the hawser tension exceeding 100 tons, an alarm is activated in the Central Control Room. The failure of the mooring hawser does not permit a choice of action, and the Offtake Tanker shall disconnect the hose and make a prompt departure from the FRADE TERMINAL. The elapsed time between a hawser failure and a strain coming on the oil transfer hose is likely to be short and may amount to only a few minutes.

Should the hose not be released in time then the MBC (Marine Breakaway Coupling) in the hose tail should part allowing a break point in the hose. This coupling is designed to break at 35 tones pull.

The Offtake Tanker and the AHTS should take up a standby position outside the 500 meters exclusion zone.

The Line Handling Vessel should be used to control the hose and messenger lines as appropriate, having due regard to the existing weather and environmental conditions.

The failure or burst of the hose may constitute a pollution event. The Offtake Tanker shall disconnect the hose and prepare for the hawser to be disconnected. Notice shall be given from the OIM to the Offtake Tanker on what actions to take.

1.66. POLLUTION

1.66.1. Oil leak originating in the Offtake Tanker

In the case of an Offtake Tanker onboard oil spill, immediate response shall be given in accordance with the Offtake Tanker SOPEP. All cargo transfer shall cease regardless of the cause of the leak and the FRADE TERMINAL OIM shall be immediately informed. Every effort should be made to prevent spillage from going overboard.

In the event of an overboard oil spill from or caused by the Offtake Tanker, the FRADE TERMINAL OIM shall take command of any oil-spill abatement and clean up activities. **Incident Command from PETRORIO-IMT shall be informed immediately**. Notwithstanding the foregoing, the Offtake Tanker owners shall take full responsibility, including financially, for any such oil-spill.

Under no circumstances shall dispersant be used without the authorization of PETRORIO Incident Command. The AHTS has oil spill response capability and can assist in the event of oil spilling overboard, as instructed by the FRADE TERMINAL OIM.

Any first response provided by the FRADE TERMINAL, the AHTS and other associated resources, whether conducted independently or directed by the Offtake Tanker Master, shall not relieve the Offtake Tanker owners of their responsibility.

1.66.2. Oil leak originating outside the Offtake Tanker

The oil slick spotter shall inform immediately the Mooring Master or the FRADE Terminal, furnishing data that shall enable the evaluation of its origin, extent of the accident (oil slick approximate size, travel direction, wind and current).

1.67. COMMUNICATIONS FAILURE

In the event of the total failure of radio communications, all berthing/unberthing and cargo operations should be suspended until normal communications are restored.

Communications failure is to be signaled by continuous sounding of the ship’s whistle (either FPSO or OTT). This signal stops all loading. Emergency communications are to be maintained using written messages and boat transfer, until normal communications.

On failure of VHF only the, communication shall be attempted on SSB, frequency 4125 MHz and loading shall be stopped until VHF communications are re-established.

Upon an emergency occurring, the ESD system shall be activated to stop the cargo transfer. FRADE TERMINAL is alerted via the VHF radio and advised of the situation and intended action

(if any). If an emergency occurs on the FRADE TERMINAL, the staff shall activate the ESD system to stop the cargo and inform the Offtake Tanker of the situation and the action required.

On receipt of confirmation from the FRADE TERMINAL that the cargo transfer has been stopped, the hose string can be released. Unmooring should then proceed. If time allows, the hose and mooring disconnection and release should follow the normal procedure.

If time does not permit a normal departure, then the FRADE TERMINAL manual emergency hawser release system should be operated. The hose shall be manually released from OTT manifold. Alternatively, the breakaway coupling shall part. The hawser shall be released from the FPSO and the Offtake Tanker shall take care not to overrun the hose or hawser and make her way assisted by the AHTS to a safe position.

19. DOCUMENTATION

The following documents, checklists and sailing advice telexes shall be completed and distributed as appropriate, with respect to every Offtake Tanker loading at the FPSO. In all cases the Mooring Master shall remain on board of the Offtake Tanker until the signature of the cargo documentation and the departure clearance of the Offtake Tanker.

1.68. PRE-MOORING / PRE-LOADING CHECKLIST

A pre-mooring and a pre-loading checklist have been provided by the FRADE TERMINAL to visiting Offtake Tankers. Copies of checklists are included in the appendices of this Tanker Handbook. Those shall be completed, signed by the Master of the Offtake Tanker and returned to the OIM. Offtake Tankers, which have loaded at the FPSO previously, are exempt from this requirement unless there has been a change.

- **Attachment 1 – Conditions of Use of FPSO Terminal Facilities**
- **Attachment 3 – OTT/FPSO - Safety Check List**
- **Attachment 4 - Check List #1: Before Operation Commence**
- **Attachment 5 - Check List #2: Before Run-in and Mooring**
- **Attachment 6 - Check List #3: Before Loading Operations**
- **Attachment 7 - Check List #4: Before Unmooring**
- **Attachment 8 - OTT/TERMINAL SAFETY CHECK LIST**
- **Attachment 9 – Revalidation (Sign by Mooring Master)**
- **Attachment 10 - Declaration of Security Between FPSO and Vessel**

1.69. BILL OF LADING

The Bill of Lading figure can be issued either by ship agency onshore after offtake tanker's departure or by FRADE TERMINAL based on the Quality and Quantity Certificates issued by Frade terminal based on flowmeter/inline sample information and approved by independent inspectors as final and binding. If there a difference above 0.5% between FPSO figures and Offtake Tanker's measurements a notification by the Master of the Offtake Tanker to the OIM shall be given. This shall draw attention to the discrepancy and stating that the Bill of Lading is signed under protest. Under no circumstances should the Bill of Lading be endorsed to this effect or altered in any way. A non-negotiable copy can be sent by fax, if requested.

1.70. NOTICE OF READINESS

Subject to the Offtake Tanker being ready in all respects (including all licenses and permits required by the Brazilian authorities regarding clearance of the Offtake Tanker and cargo and/or bunker aboard) to moor to the FRADE TERMINAL and load cargo, the Notice of Readiness should be presented verbally, via the VHF radio, to the FRADE TERMINAL Central Control Room. Notice

of Readiness should be given when the Offtake Tanker is approximately 5 miles from FPSO. If on arrival at location the Offtake Tanker is not ready to load because of some shipboard deficiency, the Notice of Readiness should not be presented until the Offtake Tanker is ready in all respects to proceed with mooring and loading operations. Mooring Master shall sign the Notice of Readiness.

1.71. TIMESHEETS

This is completed by the Mooring master on board of the OTT.

1.72. CERTIFICATE OF QUALITY AND QUANTITY

These certificates are produced by the Frade Terminal based on acceptable flowmeter and inline sampler figures and approved by the Independent Inspector representatives on board the FRADE TERMINAL and are used to produce the Bills of Lading.

1.73. CERTIFICATE OF ORIGIN AND AUTHENTICITY

This is produced by FRADE TERMINAL operations staff to indicate origin of the cargo for future discharge ports. Upon request by charterers, commercial operations focal point onshore may prepare another certificate issued by Firjan that will be sent later.

1.74. CARGO MANIFEST

This mat be prepared either by ship agency or Frade terminal operations staff .

1.75. ULLAGE REPORT

This is required to be completed by the Offtake Tanker Master and Independent Inspector on board the Offtake tanker and contains a section for declaration of slop residue before loading. This is also used for comparison between Offtake Tanker and FPSO figures.

1.76. DISTRIBUTION OF DOCUMENTS

This shall be prepared by the FRADE TERMINAL operations staff and presented to the Offtake Tanker Master along with all the required documentation. A Typical distribution follows the table below:

	ORIGINALS		COPIES			
DOCUMENT	To Mooring master on board	Signed by	To Master - For own use	To Master - For Receiver	To OIM (FPSO records)	To Mooring Master on vessel
Bill of Lading (B/L) (**)	3	Master	1	0	0	3
Certificate of Origin	1	OIM	1	0	0	2
Cargo Manifest	1	OIM + Master	1	0	0	2
Certificate of Quality	1	OIM/ Surveyor	1	0	0	2
Certificate of Quantity	1	OIM/Surveyor	1	0	0	2
Timesheet	1	Master + Mooring Master	1	0	0	2
Master Receipt of Documents	1	Master	1	0	0	2
Master Receipt of Samples	1	Master	1	0	0	2

1.77. RECEIPT FOR SAMPLES

This shall be prepared by the FRADE TERMINAL operations staff and sent to the Master of the Offtake Tanker for signature when 2 final composite samples from the FPSO in-line sampling system are transferred.

1.78. SAILING MESSAGE

This shall be completed by Independent Inspector and sent to all concerned parties including ship agency, charterer and PetroRio's staff

1.79. RECEIPT AND ACKNOWLEDGEMENT OF TANKER HANDBOOK – CONDITIONS OF USE AND REGULATIONS

The Offtake Tanker Master shall sign this document.

20. COMPLIANCE WITH REGULATIONS / SAFETY GUIDELINES

Offtake Tankers shall conform to all applicable Brazilian federal, state and local laws and regulations, including but not limited to those related to safety, navigation, operation standards and protection of the environment. The Offtake Tanker and crew are subject to inspection and clearance by Customs, immigration, Navy, and health authorities. The local port authority may also request to carry out an inspection on the Offtake Tanker.

The Offtake Tanker shall comply with:

- MARPOL 73/78 (International Convention for Prevention of Pollution from Ships)
- SOLAS (International Convention for the Safety of Life at Sea 1974/88)
- International Safety Management ISM code
- Oil Company International Marine Forum (OCIMF) standards and procedures, including International Safety Guide for Oil Tankers and Terminals (ISGOTT), Marine Terminal Survey Guides and International Chamber of Shipping/OCIMF Ship to Ship Transfer Guide (Petroleum).

Any Offtake Tanker found to be deficient or substandard in any safety requirements shall be refused permission to moor or load or removed from berth if such safety deficiency becomes evident to the FPSO during loading.

During loading operations, the Offtake Tanker's HF/MF radio antenna shall be grounded in accordance with the requirements of ISGOTT. If the Master of the Offtake Tanker has reason to contact the shore, he should call via the Offtake Tanker's marine satellite link or pass his message through the PETRORIO communications network as appropriate.

1.80. RESPONSIBILITY FOR SAFE CONDUCT OF OPERATIONS

Responsibility for the safe conduct of operations on board the Offtake Tanker, while moored at the Terminal, rests with the Offtake Tanker Master. Nevertheless, since personnel, property and other shipping may suffer serious damage in the event of an accident, there must be full co-operation and understanding on the safety requirements set in the Offtake Tanker / Terminal Pre-transfer checklist.

The FPSO OIM reserves the right, in the event of continued or flagrant disregard of these safety requirements, to stop all operations and order the Offtake Tanker out of the mooring, pending appropriate action to be taken by the Vessel's Charterers and/or Owners.

1.81. SAFETY REGULATIONS

Nothing in these regulations will relieve Offtake Tanker Masters of their responsibility in observing the normal safety, fire prevention and security precautions. Mooring Masters are authorized to advice and request Offtake Tanker Masters to take additional measures to ensure safe operations should circumstances so require. Mooring Masters are also authorized to suspend oil transfer operations in the event of an infringement of safety regulations or if any other hazardous situation is encountered.

The following safety regulations have been developed in an effort to reduce the possibility of an incident involving fire, explosion or other hazard.

1.82. SAFETY REQUIREMENTS

Offtake Tanker Masters will be provided the FRADE Terminal Information, Regulations and Conditions of use Booklet by the Mooring Master prior to commencement of berthing operations. The Offtake Tanker Master is required to sign for acknowledgement and receipt. See Attachment #8. This booklet is also provided to master during vetting process, as part of pre-arrival questionnaire.

It is the right and the responsibility of the Mooring Master to make periodical inspections on board Offtake Tankers in respect of any breach of the Terminal Safety and Fire Regulations. For this purpose, the Mooring Master shall be allowed free access to all parts of the Offtake Tanker at all times, accompanied by a responsible ship's Officer to assist him in carrying out such inspections. The Mooring Master will advise the Offtake Tanker's Master when a safety inspection shall be carried out. It is the responsibility of the Offtake Tanker's Master to ensure that the Mooring Master is given suitable assistance to carry out this duty.

1.83. SHIP/SHORE SAFETY CHECK LIST

On completion of berthing and prior to commencement of Oil Transfer Operations, the Offtake Tanker / FRADE Terminal Check List shall be completed following a joint inspection by the Mooring Master and a responsible deck officer. The FRADE Offtake Tanker / FRADE Terminal Check List are based on the recommendations of the "International Safety Guide for Oil Tankers and Terminal" (ISGOTT).

21. TERMINAL USAGE

1.84. TERMINAL FACILITIES

The FRADE TERMINAL cannot provide any facility for provisions, water, or fuel at the FPSO.

1.85. TERMINAL SERVICES

There are no terminal services available except in the event of a medical emergency aboard the Offtake Tanker. The FPSO normally has on board a specialist in medical first aid. If notified of a medical emergency on the Offtake Tanker, the OIM shall arrange for his transport to the Offtake Tanker to render first aid. If necessary and the victim can be transported by boat to the FPSO, the OIM can arrange for the patient's transportation by helicopter to a medical facility in the city of Rio de Janeiro, on a reimbursable basis. In a situation for MEDVAC the Incident Command from PETRORIO shall be notified.

- Bunkers are not available at FRADE Terminal.
- Repairs will not be permitted when the vessel is in berth. Repair facilities are not available.
- All Offtake Tanker's requirements will be handled by the Owners / Charters designated local Agent. COMPANY does not perform any vessel agency functions. Vessels calling at the FRADE Terminals are required to arrange their own agency representation
- Owners/charters designated local agent is also responsible for providing safe personnel transfer (including boarding party composed by mooring team, independent inspectors and customs surveyor) from onshore to the offtake tanker at inner anchorage area and sheltered waters.
- Limited medical facilities may be available in an emergency.
- Repairs will not be permitted when the Offtake Tanker is berthed. Engines must be ready for immediate use at all times.
- Offtake Tanker Masters and Owners are advised that crew changes is not permitted at FRADE Terminal. It is allowed in port during Inward Clearance process.

22. COMPLIANCE WITH INTERNATIONAL SHIP AND PORT SECURITY (ISPS)

FRADE FPSO ISPS Security is currently at Level 1 and arriving vessels must also be at the same security level. The Ship Security Officer (SSO) is the FPSO Cargo Superintendent and the Offshore Security Coordinator. They can be contacted through the (Email: fradecargosupt@petroriosa.com.br).

The Declaration of Security (DOS) Certificate must be issued and duly signed during the exchange of Terminal Security Information with the Offtake Tanker Ship Security Officer (SSO). The Terminal request a copy of the Offtake Tanker's DOS, ISSC and a list of last ten ports of call, which can be sent by e-mail.

23. SAFE OPERATIONS

1.86. APPROACH AND MOORING

In order to circumvent the problem of determining with some precision, environmental variables such as wind, wave and current, it is mandatory to use an AHTS connected to the OTT during the approach maneuver and mooring, ready to act. As the OTT is tied to the FPSO, all equipment essential for maneuvering should be kept in standby, in a condition that allows the OTT to escape using its own resources in emergency situations.

1.87. OPERATIONAL SECTORS

GREEN ZONE: area in which the OTT can freely move safely while in transfer operation with the FPSO. The limits for normal operations are +/– 35 degrees of heading to the Oceanic Terminal central line.

YELLOW ZONE: area in which the OTT can stay long enough for the master to try to bring it back to THE GREEN ZONE using all available means at the moment, beyond the help of the AHTS. When the ST reaches the mark of 55 degrees, the CPT informs the OIM or the FPSO Superintendent so there is an immediate discontinuation of the transfer. The OTT should be ready to perform emergency disconnection of the hose line and disconnection of the mooring system.

RED ZONE: area in which the OTT cannot remain. When the OTT reaches the mark of 75 degrees, the OTT captain should immediately execute the emergency disconnection of the hose line and disconnection of the mooring system, and move the ship away from the FPSO, heading to a safe area.

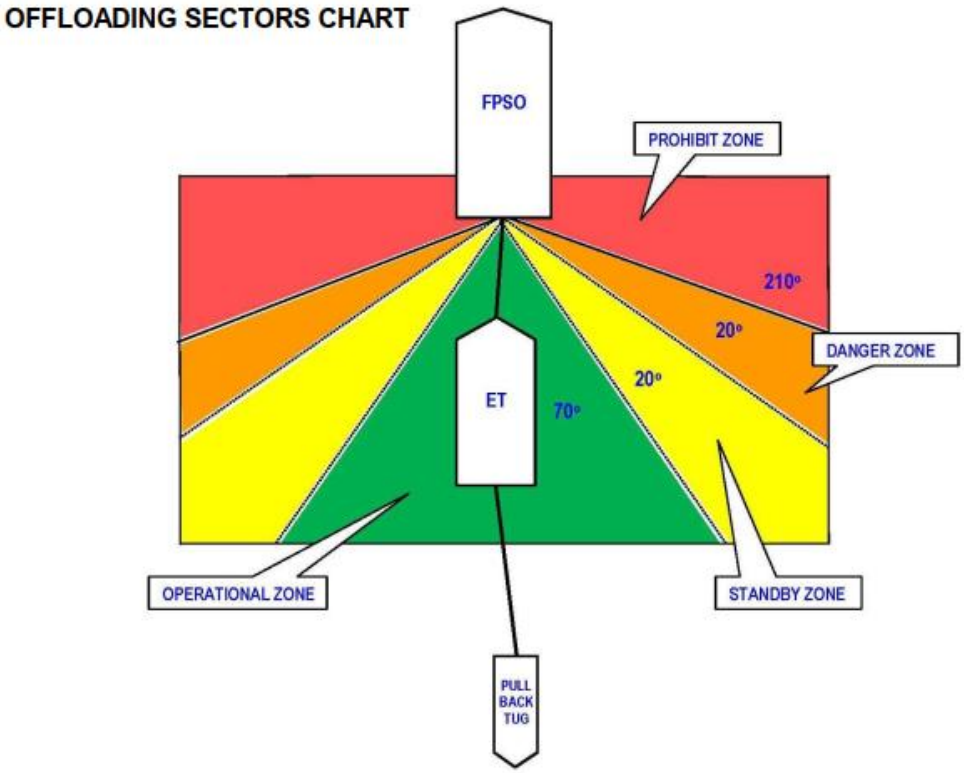


Figure 7- Operational Zones

1.88. EXCLUSION AREA FOR NAVIGATION AND MANOUEVERING

Table 15-

Name of the Ocean Terminal	FRADE
Length of Ocean Terminal	337.06 m
Length of Mooring System	155 m
Length of the Shuttle Tanker	310
Tow Wire + Length of the AHTS	592
AHTS	92
Attention Zone	1,394,06 m

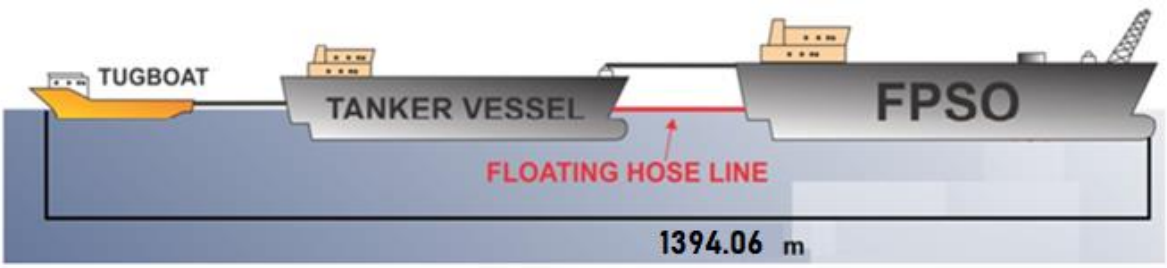


Figure 8- Offloading Operation

1.89. STATE OF ALERT

State of Alert is a condition characterized by an adverse environmental condition that may threaten the safety of the FPSO and OTT during oil transfer operations. The main objective of the stages is to raise the alert level of security by avoiding the occurrence of faults in the premises of PETRORIO and contractors. The alert has three stages:

ALERT 1: It begins when the sea reaches force 8 on the Beaufort scale. The FPSO Superintendent, the OTT and AHTS Captains must maintain constant alert on VHF channel 16 and channel agreed to the operation. The facilities of the units should be ready to stop loading.

ALERT 2: It begins when the sea reaches force 9 on the Beaufort scale. The transfer of oil should be stopped. The OTT should be ready to perform emergency disconnection of the hose line and disconnection of the mooring system.

ALERT 3: It begins when the sea reaches force 10 BEAUFORT scale. The OTT shall immediately execute the emergency disconnection of the hose line and disconnection of the mooring system and get away from the FPSO.

1.90. AIRCRAFT OPERATIONS

Helicopter operations should only be conducted in accordance with the ICS 'Guide to Helicopter / Ship Operations'.

The OIM, the OTT Captain and AHTS Captain shall be previously informed about aircraft operations next to the FPSO during the transfer operations. Approaching, mooring, unmooring and departure of the OTT will not be programmed during the aircrafts landing and departing procedures.

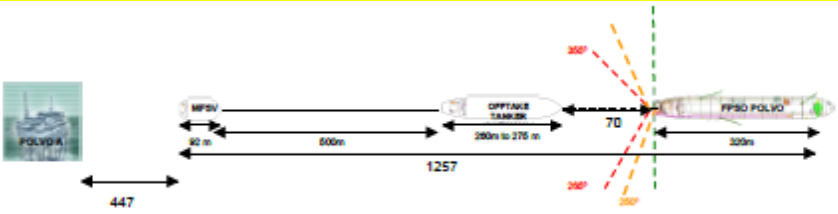
1.91. IDENTIFICATION LIGHTS

For Offshore Facilities and Shuttle Tankers, the proper lights and shapes shall be used in compliance with the International Regulations for Preventing Collisions at Sea (RIPEAM).

When connected to the FPSO, the OTT is moored and its navigations lights shall not be alighted.

1.92. FIRE FIGHTING EQUIPMENT

The firefighting equipment of the FPSO and OTT must be operational and ready for immediate use. The main pipeline for firefighting must be pressurized. The fire pump must be on stand-by condition and ready for immediate operation.



Platform Heading 130 º FSPO turret centre.

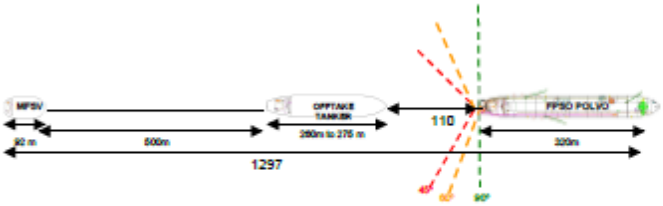
"FPSO HEADING" Decision Points

10º TO 250º ALERT ZONE

355 º TO 265º DISCONECTION ZONE

Note.: This decision shall be made with concurrence between PETRORIO OIM, BW OIM, Mooring Master, Master of Lifting Vessel and Marine Team Leader

B – Zone of Conflict to the Fish Tail



00º TO 45º OPERATIONAL ZONE

45º TO 60º ALERT ZONE

60º TO 90º DISCONECTION ZONE

Note: This decision shall be made with concurrence between PETRORIO OIM, BW OIM, Mooring Master, Master of Lifting Vessel and Marine Supervisor

24. ATTACHMENTS

ATTACHMENT 1 – Conditions of Use of FPSO Terminal Facilities (Sign by Offtake Tanker's master)

THE FACILITIES AND ASSISTANCE THAT MAY BE PROVIDED BY PETRORIO (ITS AFFILIATES AND PARENT COMPANIES – HEREIN AFTER REFERRED TO INDIVIDUALLY AND COLLECTIVELY AS "THE PARTIES") TO VESSELS VISITING THE FPSO TERMINAL FOR ANY PURPOSE WHATSOEVER ARE SUBJECT TO THE FOLLOWING CONDITIONS:

1. Neither the parties, the FPSO nor their employees, servants, agents, contractors, or representatives (in whatever capacity they may be acting), shall be responsible for any loss, damage, injury, or delay whatsoever arising from any cause whatsoever in consequence of any assistance, advice, or by way of navigational facilities including buoys, light, horns, or otherwise. In all circumstances, the master of any vessel visiting the terminal shall remain solely responsible for the safety and proper navigation of the vessel and the owner of said vessel shall indemnify the parties, the FPSO, their employees, servants, agents, contractors, representatives, or its agents against all loss or damage sustained by the parties, their employees, servants, agents, contractors, or representatives by reason of the use by any vessel or any facility belonging to or provided by the parties, their employees, servants agents, contractors, or representatives.

2. The parties do not represent or warrant that berth, loading lines, gear, equipment, or any other articles used in connection with the mooring of a visiting vessel are safe or suitable for any vessel, and any vessel using them shall do so at the sole risk of the vessel and the owners thereof. The parties do not warrant the seaworthiness of any craft hired or used by any vessel nor its fitness for any particular purpose.

3. The parties shall not be responsible for acts or defaults whether caused by negligence or not, of any of their employees, servants, contractors, agents, or representatives nor for any loss, damage, injury or delay arising from any cause whatsoever that may occur to the vessel or her cargo or equipment or to the master or any member of her crew, whether on board or otherwise, or which may occur in the course of mooring or unmooring of the vessel, or lowering or raising of the loading line, which may occur in the course of loading or discharging or otherwise, including any damage, loss, injury, or delay to any third party. The vessel and her owners shall hold the parties, the FPSO, their employees, servants, contractors, and agents harmless and indemnified against all claims, damages, cost and expenses arising therefrom.

4. The parties shall not be responsible for any loss, damage, injury, or delay directly or indirectly caused by or arising from strikes, lock-outs or labor disputes or disturbances whether the parties, their employees, servants or agents are parties thereto or not.

5. If during or by reason of the use of the vessel of the terminal or its agents or the gear or equipment used in connection therewith or any craft of the parties, any of them shall be damaged or become dangerous or unusable and irrespective of whether or not such damage has been caused or contributed to by the negligence of the parties or their

servants or agents, the vessel and her owners shall hold the parties, the FPSO and their employees, contractors, servants, agents, or representatives harmless and indemnified against all loss arising therefrom.

These conditions shall be construed, according to the laws of England. Any dispute, controversy or claim arising out of these conditions shall be referred to and finally resolved by arbitration under the rules, then in force, of the London court of international arbitration, which rules are deemed to be incorporated by reference into this clause, the tribunal shall consist of a sole arbitrator. The place of arbitration shall be London, England. The language of the arbitration shall be English. The arbitration tribunal shall have the power to order specific performance and grant interim relief. The award of the arbitration tribunal shall be final and binding on the parties and may be enforced against them in any court or other authority of competent jurisdiction, and each party hereby waives any right of appeal.

Acknowledged and Agreed to:

SS/MV _____ Signed (Master) _____

Date _____ Time _____

ATTACHMENT 2 – Check List #1: Before Operation Commence ()

Shipment:

Vessel:

Date: **Time:**

FPSO/	OTT	
1. Radio communications established.		
2. All walkie-talkie sets in order.		
3. Language of operation agreed.		
4. Checked for maneuvering/mooring/loading operation suitability.		N/A
5. Checked cathode protection. (Can remain “on” if not Insulating Flange is mounted at Manifold)		
6. Ship upright and in suitable trim.		

7. Engines, steering gear, controls and navigational equipment tested and found in good order.		N/A
8. Chief Engineer briefed on engine requirements.		N/A
9. Weather forecasts for area obtained.		
10. Hose lifting equipment checked and found correct and ready for use. Boom to swing by power slew not by hand.		N/A
11. Manifold reducers in the place and fully bolted		
12. Manifold connections ready and marked.		
13. Signals ready.		
14. Mooring equipment in good order.		N/A
15. Mooring winches in good order.		N/A
16. Messengers, stoppers and heaving lines ready in place.		N/A
17. Toolbox with Cargo Hose equipment on board		N/A
18. Crew briefed on mooring methods.		
19. Towing lines checked and found correct.		
20. Offtake Tanker/FPSO informed Check List No. 1 completed in the affirmative.		

Offtake Tanker

MASTER'S SIGNATURE

TERMINAL REPRESENTATIVE

ATTACHMENT 3 – Check List #2: Before Run-in and Mooring (Sign by OTT)

Shipment:

Vessel:

Date: **Time:**

FPSO/ OFFTAKE TANKER	OTT	
1. Check List NO. 1 Completed.		
2. Proficient helmsman at the wheel.		N/A
3. Scuppers plugged and sealed.		
4. Fire fighting and anti-pollution equipment checked and ready for use.		
5. Bridge/Navigational equipment and machinery operational		
6. Adequate lighting available.		
7. Power on winches.		
8. Mooring gangs in position and briefed with reference to dangers of OFFTAKE tanker using gun.		
9. Communications established with mooring gangs.		
10. Offtake Tanker/FPSO informed Check List No. 2 completed in the affirmative		

Offtake Tanker _____

MASTER'S SIGNATURE

_____

TERMINAL REPRESENTATIVE

ATTACHMENT 4 – Check List #3: Before Loading Operations (Sign by OTT)

Shipment:

Vessel:

Date: **Time:**

FPSO/ OFFTAKE TANKER	OTT	
1. Emergency signals and shutdown procedures agreed.		
2. Efficient Deck Watch established.		

3. Check Offtake Tanker loading plan for stress and stability		
4. Initial loading rate agreed with FPSO/ Offtake Tanker _____ M^3PH/BPH		
5. Maximum loading rate agreed with FPSO/ Offtake Tanker _____ M^3PH/BPH		
6. Topping-off rate agreed with FPSO/ Offtake Tanker _____ M^3PH/BPH		
7. Line flush + Line displacement (Total volume ~ 270 m^3 1700 bbls)		
8. Sea and overboard discharge valves tightly closed and sealed.		N/A
9. Air-conditioning plant off or in re-circulation.		
10. All cargo tanks lids closed and secured		
11. All unused manifold connections closed and blanked.		N/A
12. Procedures for Cargo & Ballast handling agreed.		
13. Is the pump room bilge alarm system operational?		
14. Have measures been taken to ensure sufficient pump room ventilation.		
15. Is the cargo tanks level alarm system operational?		
16. Inert gas system operation (FPSO).	N/A	
17. Manifold & Cargo line lined up		
18. SHIP / SHORE Safety Check List completed.		
19. Offtake Tanker/FPSO informed Check List NO. 3 completed in the affirmative		

Offtake Tanker

MASTER'S SIGNATURE

TERMINAL REPRESENTATIVE

ATTACHMENT 5 – Check List #4: Before Unmooring (Sign by FPSO)

Shipment:

Vessel:

Date: **Time:**

FPSO/ OFFTAKE TANKER	OTT	
1. Floating hose string disconnected and cleared from the vessel.		
2. AHTS and LHB ready.		
3. Unmooring authorized by the terminal.		
4. Cargo hose or manifold blanked.		
5. Unmooring procedures agreed with Offtake Tanker / FPSO.		
6. Power on winches and windlass.		N/A
7. Messengers, rope stoppers etc. at all mooring stations.		
8. Engines, steering gear, controls and navigational equipment tested and found in good order.		N/A
9. Crew at stations standing by.		
10. Communications confirmed with Offtake Tanker/FPSO		
11. Proficient helmsman at the wheel.		N/A
12. Communications established with mooring gangs.		
13. Mooring gangs instructed to cast off only in the manner and when requested by MM.		
14. Offtake Tanker /FPSO informed Check list NO. 4 completed in the affirmative		

Offtake Tanker

MASTER'S SIGNATURE

TERMINAL REPRESENTATIVE

ATTACHMENT 6 – OTT/TERMINAL Safety Check List (Sign by FPSO)

Ship's Name:

Berth: **FPSO FRADE** **Port:** **FPSO FRADE**

Date of Arrival: **Time:**

Instruction for completion:

The safety of operations requires that all questions should be answered affirmatively by clearly ticking the appropriate box. If an affirmative answer is not possible, the reason should be given and agreement reached and upon appropriate precautions to be taken between the OTT and TERMINAL. Where any question is considered to be applicable, them a note to that effect should be inserted in the remarks column.

Code:

- **A** - any procedures and agreements should be in writing in the remarks column of this Check List or other mutually acceptable form. In either case, the signature of both parties should be required.
- **P** - in the case of a negative answer, the operation should not be carried out without the permission of the Port Authority.
- **R** - indicates items to be re-checked at intervals not exceeding that agreed in the declaration.

Part 'A' – BULK LIQUID GENERAL

General	OTT	Terminal	Code	Remarks
1. Is the ship securely moored?			R	Stop cargo at: ____kts (wind vel) Disconnect at: ____kts (wind vel) Unberth at: ____kts (wind vel)
2. Are emergency towing wires correctly positioned?			R	
3. Is there safe access between ship and shore?			R	
4. Is the ship ready to move under its own power?			PR	
5. Is there an effective deck watch in attendance on board and adequate supervision on the terminal and on the ship?			R	
6. Is the agreed OTT/terminal communication system operative?			AR	

7. Has the emergency signal to be used by OTT and TERMINAL been explained and understood?			A	
8. Have the procedures for cargo, bunker and ballast handling been agreed?			AR	
9. Have the hazards associated with toxic substances in the cargo being handled been identified and understood?				
10. Has the emergency shutdown procedure been agreed?			A	
11. Are fire hoses and fire-fighting equipment on board and ashore positioned and ready for immediate use?			R	
12. Are cargo and bunker hoses/arms in good condition, properly rigged and appropriate for the service intended?				
13. Are scuppers effectively plugged and drip trays in position, both on board and ashore?			R	
14. Are unused cargo and bunker connections properly secured with blank flanges fully bolted?				
15. Are sea and overboard discharge valves, when not in use, closed and visibly secured?				
16. Are all cargo and bunker tank lids closed?				
17. Is the agreed tank venting system being used?			AR	
18. Has the operational of the P/V valves and/or velocity vents been verified using the checklist facility, where fitted?				
19. Are hand torches of an approved type?				
20. Are portable VHF/UHF transceivers of an approved type?				
21. Are the OTT's main radio transmitter aerials earthed and radars switched off?				
22. Are electric cables to portable electrical equipment disconnected from power?				
23. Are all external doors and ports in accommodation closed?			R	
24. Are window-type air conditioning units disconnected?				
25. Are air conditioning intakes which may permit the entry of cargo vapours closed?				
26. Are the requirements for use of galley equipment and other cooking appliances being observed?			R	
27. Are smoking regulations being observed? R			R	

28. Are naked light regulations being observed? R			R	
29. Is there provision for an emergency escape?				
30. Are sufficient personal on board to deal with an emergency?			R	
31. Are adequate insulating means in place in the OTT/TERMINAL connection?				
32. Have measures been taken to ensure sufficient pump room ventilation?			R	
33. If the ship is capable of closed loading, have the requirements for closed operations been agreed?				
34. Has a vapour return line been connected?				
35. If a vapour return line is connected, have operating parameters been agreed?				
36. Are OTT emergency fire control plans located externally?				

If the OTT is fitted. Or required to be fitted with an inert gas system the following questions should be answered:

Inert Gas System	OTT	Terminal	Code	Remarks
37. Is the Inert Gas System sully operational and in good working order?			P	
38. Are deck seals in good working order?			R	
39. Are liquid levels in P/V breakers correct?			R	
40. Have the fixed and portable oxygen analyzers been calibrated and are they working properly?			R	
41. Are fixed IG pressure and oxygen content recorders working?			R	
42. Are all cargo tank atmospheres at positive pressure with an oxygen content of 8 % or less by volume?			PR	
43. Are all the individual tank IG valves (if fitted) correctly set and locked?			R	
44. Are all the persons in charge of cargo operations aware that in the case of failure of the Inert Gas Plant, discharge operations should cease and the terminal be advised?			R	

If the ship is planning to tank cleaning alongside, the following questions should be answered.

Inert Gas System	Ship	Terminal	Remarks

Are tank cleaning operations planned during the ship's stay mooring at the TERMINAL installation?		Yes/No	
If so, have the OTT Master and Terminal authority been informed?	Yes/No	Yes/No	

DECLARATION

We the undersigned have checked, where appropriate jointly, the items on this check list 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 with the letter 'R' in the column 'Code' should be re-checked at intervals not exceeding ___ hours.

For Ship		**For Shore**	
Name:		Name:	
Rank:		Rank:	
Signature:		Signature:	
Date:	Time:	Date:	Time:

Revalidation of Ship/Terminal Safety Checklist and Anti-Pollution Checklist where applicable. Inspections to be carried out at intervals not exceeding ___ hours.

We have concluded a routine inspection and can confirm all the Checklist (s) questions continue to be answered in the affirmative.

For Ship		**For Terminal**		**Date**	**Time**
Name	***Signature***	***Name***	***Signature***		

ATTACHMENT 07 – Certificate of Quality and Quantity (Sign by Field Superintendent)

FPSO FRADE

FPSO FRADE CRUDE OIL OFFLOAD

QUALITY CERTIFICATE

SCAC CODE: 0

Shipment No:	FRAxxx
Vessel:	0
Loading Concluded on:	0
Product:	Frade Crude Oil
API at 60 deg. F:	0,0
Density at 15 deg C:	0,0000
BS & W (%):	0,00%
Salinity (ptb):	0
Density at 20 deg C:	0,0000

	GROSS (GSV)	NET (NSV)
US Barrels @ 60 deg. F.	0,000	0,000

We certify that the above loading volumes and quality determination, were completed by the vessel in accordance with the appropriate API publications and ASTM-IP Petroleum Measurement Tables.

For FPSO FRADE

FPSO FRADE
NASSAU
Off. No. 8001416
GRT 132361
IMO No. 7522318

FPSO FRADE

FPSO FRADE CRUDE OIL OFFLOAD

QUANTITY - CERTIFICATE

COMMENCE LOADING ON : 0/1/00 0:00 SCAC CODE: 0
FINISHED LOADING ON: 0/1/00 0:00

The undersigned company PETRORIO JAGUAR PETRÓLEO LTDA. hereby certifies that the entire quantity of the following described shipment, loading of which was concluded on at FPSO FRADE, BRAZIL, on board the vessel

At 60 degree F.	GROSS (GSV)	NET (NSV)
U.S. Barrels	0,000	0,000

consists exclusively of Frade Crude Oil and is of current quality originating from the Frade oil and gas production field, BRAZIL, and that it has been subject to no process other than dehydration and stabilization.

Shipment No.
FRAxxx

For FPSO FRADE

FPSO FRADE
NASSAU
Off. No. 8001416
GRT 132361
IMO No. 7522318

ATTACHMENT 08 – Certificate of Origin and Authenticity

FPSO FRADE

FPSO FRADE CRUDE OIL OFFLOAD

CERTIFICATE OF ORIGIN

SCAC CODE 0

The undersigned company PETRORIO JAGUAR PETRÓLEO LTDA. hereby certifies that the entire quantity of the following described shipment:

At 60 degree F.	GROSS (GSV)	NET (NSV)
U.S. Barrels	0,000	0,000

consists exclusively of Frade Crude Oil, loading of which was concluded on at FPSO Frade, Brazil, on board the vessel and is of current quality originating from the Frade oil and gas production field, BRAZIL, and that it has been subject to no process other than dehydration and stabilization.

Shipment No.
FRAxxx

For FPSO FRADE

FPSO FRADE
NASSAU
Off. No. 8001416
GRT 132361
IMO No. 7522318

ATTACHMENT 09 – Time Sheet

Terminal: **FRADE** **Shipment:**

Vessel: **Date:**

OPERATION	DAY	MONTH	HOUR	MIN	COMMENTS
NOR Tendered					
NOR Accepted					
End of Passage					
Mooring Master on Board					
Start Approaching					
AHTS Fast					
Commenced Mooring					
Completed Mooring					
Commence Connecting Hose					
Completed connecting Hose					
Start deballasting					
Finish deballasting					
Start tank inspection					
Finish tank inspection					
Line Displacement					
Commenced loading					
Rate reduced					
Completed loading					
Flushing commenced					
Flushing completed					
Hoses disconnected					
Start unmooring					
AHTS clear					
Documents on board					
Documents signed					
Completed unmooring					
Vessel FAOP					
ETANextPort					
Loading stoppage					
Loading stoppage					
Delays					
Delays					

ATTACHMENT 10 – Crude Oil Shipment Manifest (Sign by Agency)

CRUDE OIL SHIPMENT MANIFEST

Vessel: **Shipment:**

Master: **Departure:**

From: **To:**

Nº BL	Shipper	Consignee	Destination / Marks of Cargo		Metric Tons	Volume CBM		Volume US Barrels
						@ 60°F	@20°C	
				GROSS				
				NET				
				B.S.W.				

ATTACHMENT 11 – Distribution of Documents (Sign by Offtake Tanker's Master)

Terminal: **FRADE** **Shipment:**

Vessel: **Date:**

DISTRIBUTION OF DOCUMENTS

	ORIGINAL	DUPLICATE	TRIPLICATE	COPY NON-NEGOTIABLE	NOTICE OF READINESS		CERTIFICATE OF AUTHENTICITY		CERT. OF QUALITY AND QUANTITY		LOADING TIME SHEET		ULLAGE REPORT		CARGO MANIFEST		RECEIPT FOR SAMPLES		DISTRIBUTION OF DOCUMENTS	
	BILL OF LADING				Or	C	Or	C	Or	C	Or	C	Or	C	Or	C	Or	C	Or	C
Masters																				
Receivers																				
Consignee																				
Shipper																				
Totals																				

CONSIGNEE

DESTINATION

Master

Signed for Master and Receiver documents only

ATTACHMENT 12 – Receipt for Samples (Sign by Offtake tanker's master)

FPSO FRADE

MASTER'S RECEIPT OF SAMPLE

Shipment No: FRAxxx

Vessel: 0

Consignee: 0

Date: 0

I, the undersigned Master of M.V. certify that I have received from FPSO FRADE, Two (2) gallon samples, representative of the cargo loaded at FPSO FRADE on .

Master

ATTACHMENT 13 – Disclaimer ()

THE REGULATIONS AND TERMINAL INFORMATION CONTAINED IN THIS DOCUMENT ARE INTENDED TO ACQUAINT OWNERS, CHARTERERS AND MASTERS OF VESSELS CALLING AT THE FPSO TERMINAL WITH THE GENERAL CONDITIONS, FACILITIES AND SERVICES AVAILABLE AT THIS TERMINAL.

THE TERMINAL IS OPERATED ON BEHALF OF PETRORIO, WHO, WITH THEIR AFFILIATE AND PARENT COMPANIES AND CONTRACTORS ARE REFERRED TO INDIVIDUALLY AND COLLECTIVELY AS "THE PARTIES".

THIS BOOKLET DOES NOT REPLACE OR MODIFY ANY OFFICIAL PUBLICATIONS COVERING THE WATERS, AREAS OR SUBJECTS TO WHICH IT PERTAINS, AND IS PROVIDED SUBJECT TO THOSE CONDITIONS SET OUT IN THE "DISCLAIMER" AND "CONDITIONS OF USE OF THE FPSO TERMINAL FACILITIES" INCLUDED HEREIN. REFERENCE SHOULD BE MADE TO THE APPROPRIATE HYDROGRAPHIC OFFICE PUBLICATIONS, ADMIRALTY PUBLICATIONS AND OFFICIAL CHARTS FOR PURPOSE OF OBTAINING NAVIGATIONAL INFORMATION.

IN ALL CASES WHERE THE PARTIES REPRESENTATIVE IS REFERRED TO, THIS SHALL BE THE FPSO OIM OR THE MOORING MASTER (WHEN PRESENT).

THOSE CONSULTING THESE **FPSO TERMINAL PORT REGULATIONS AND INFORMATION** ARE ADVISED TO SATISFY THEMSELVES THOROUGHLY AS TO THE INFORMATION, PROCEDURES AND GUIDELINES AS THEY APPLY TO THE MATTERS IN WHICH THEY ARE INTERESTED. ANY USER OF THESE **REGULATIONS AND INFORMATION** SHOULD BE AWARE OF THE POTENTIAL FOR ERROR IN THE INFORMATION IN VIEW OF BOTH ITS SCOPE AND THE PASSAGE OF TIME. MOREOVER, NO ONE SHOULD USE THE INFORMATION CONTAINED IN THESE **REGULATIONS AND INFORMATION** WITHOUT INDEPENDENT VALIDATION AND ANY PERSON WHO USES OR RELIES ON THE INFORMATION AND GUIDELINES CONTAINED HEREIN DOES SO AT HIS OR THEIR OWN RISK. PETRORIO, BW AND THEIR AFFILIATED AND PARENT COMPANIES EXPRESSLY DISCLAIM ALL LIABILITY OR RESPONSIBILITY FOR ERRORS, OMISSIONS OR INACCURACIES OR FOR ANY MISAPPLICATION OR MISINTERPRETATION OF ANY OF THE PROCEDURES, GUIDELINES OR INFORMATION, OR FOR ANY CONSEQUENCES THEREOF. NO EXPRESS OR IMPLIED WARRANTIES OF ANY TYPE WHATSOEVER ARE MADE WITH REGARD TO THE USE OR APPLICATION OF THESE TERMINAL REGULATIONS AND INFORMATION.

AS MASTER OF THE SS/MV ("VESSEL"), I HAVE READ AND HAVE FAMILIARISED MYSELF WITH THE FPSO TERMINAL PORT REGULATIONS AND INFORMATION. I SPECIFICALLY ACKNOWLEDGE AND AGREE TO THE PROVISIONS OF SECTIONS 5 AND 7 OF SUCH RULES. I ALSO ACKNOWLEDGE AND AGREE TO THE FOLLOWING:

1. THAT I HAVE RECEIVED A COPY OF THE FPSO TERMINAL PORT REGULATIONS AND INFORMATION.

2. THAT THE SERVICES AND FACILITIES EXTENDED BY PETRORIO AND BW (WHO WITH THEIR AFFILIATES, PARENT COMPANIES AND CONTRACTORS ARE INDIVIDUALLY AND COLLECTIVELY CALLED "THE PARTIES") AT FPSO TERMINAL ARE PROVIDED IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF THOSE REGULATIONS AND INFORMATION.

3. THAT A VISITING VESSEL, OWNER AND CREW SHALL BE SOLELY RESPONSIBLE FOR ANY DAMAGES OR CLAIMS WHICH MAY ARISE FROM THE USE OF THE SERVICES AND FACILITIES REGARDLESS OF ANY NEGLIGENCE OF THE MOORING MASTER AND OF THE PARTIES'S EMPLOYEES, AGENTS, OR SERVANTS.

4. THAT I, MY VESSEL, ITS CREW, EMPLOYEES, AGENTS, AND REPRESENTATIVES AGREE TO ABIDE BY THE TERMS AND CONDITIONS OF THOSE RULES.

5. THAT I HAVE SPECIFICALLY READ AND AGREED TO THE "DISCLAIMER" WHICH IS LOCATED ON PAGE 4 APPENDIX A HEREOF AND HAVE READ AND AGREED TO "CONDITIONS OF USE OF THE FPSO TERMINAL FACILITIES" LOCATED ON PAGE 2 AND 3 of APPENDIX A.

Signed: _____ **Name:** _____

Master SS/MV: _____

Time/Date: _____

ATTACHMENT 14 – Safety Requirements

Safety Requirements

Responsibility for the safe conduct of operations on board your Offtake Tanker while at FRADE Terminal rests with you as Master. Nevertheless, since personnel, property and other shipping may also suffer serious damage in the event of an accident aboard your ship, we request, before operations start, your full cooperation and understanding on the safety requirements set out in the FRADE Terminal Safety Check List.

These Safety Requirements are based on safe practices widely accepted by the oil and tanker industries. We therefore expect you and all under your command to adhere strictly to the stated safe practices throughout your stay at FRADE Terminal. We, for our part, have instructed our personnel to do likewise and cooperate fully with you in the mutual interest of a safe and efficient operation. In order to ensure compliance with these safety requirements, we shall, prior to the start of operations and thereafter from time to time, instruct a member of our staff to conduct a compliance inspection of your Offtake Tanker. After reporting to you or your deputy, one of your officers will be requested to participate in a routine inspection of your Offtake Tanker.

If we observe any infringement on board your Offtake Tanker of any of these Safety

Requirements, we shall bring this immediately to the attention of yourself or your deputy for corrective action. If such action is not taken in a reasonable time, we shall initiate measures which we consider to be the most appropriate to deal with the situation and we shall notify you accordingly. If you observe any infringement of these Safety Regulations by FRADE Terminal staff on board your ship, please bring this immediately to the attention of the Mooring Master who is nominated as your contact during your stay at FRADE Terminal. Should you feel that any immediate threat to the safety of your Offtake Tanker arises from any action on our part, or from the equipment under our control, you are fully entitled to demand an immediate cessation of operations.

In the event of continued or flagrant disregard of this Safety Requirements COMPANY reserve the right to stop all operations and to order the Offtake Tanker off the berth. Appropriate action will then be taken by the Charterer and Owners concerned.

For and on behalf of
PETRO RIO JAGUAR PETROLEO LTDA.

_____

Mooring Master

Please acknowledge and acceptance of this letter by countersigning and returning the attached copy.

Ship's stamp

_____

Master

Name:

_____

M/T

_____

Date:_____ Time: _____

ATTACHMENT 15 – Emergency Procedures

Emergency Procedures

Ship's Name:_____ Date and Time of Arrival:

_____ _____

Following document provides requirements and procedures that Your Offtake Tanker must follow whilst moored at FRADE Terminal Brazil.
The following should be read as integral part of the Safety Check List.

1. All routine liaison/communication with FRADE Terminal should be carried out by the Mooring Master on duty.
2. **Emergency Stop Procedures** – In the event of an "EMERGENCY", cargo export must be stopped using the following procedure:
   2.1. Using either, hand held radio provided by the Terminal or Marine VHF Channel 10 (Ship's set), and call:

"FR
ADE
TER
MIN
AL"
X 3
"EM
ERG
ENC
Y
STO
P" X
3

(Repeat until acknowledged)

   2.2. In the event of communication failure Offtake Tanker General Alarm will be activated.
   2.3. Any crew member can order an Emergency Stop in any unusual instance, oil spill, tanker braking loose from moorings, manifold leak, etc.
   2.4. Having stopped cargo export, you should contact the Mooring-Master to allow Him to resume all communications / liaison with FRADE Terminal.

Whilst moored at FRADE Terminal, Offtake Tanker main engines must be ready for immediate use. Deck machinery shall be available at all times.
During the Offtake Tanker stay at the berth, the Offtake Tanker **must post one man forward and another man at the manifold throughout the export operation**. Lookouts must be provided with a hand held radio so that they can contact the Duty Officer.

One Mooring Assistant could also be stationed forward with direct

communication to the Mooring-Master. The lookout shall monitor:

- Bad weather / electrical storms approaching;
- Oil pollution from the Offtake Tanker, FPSO, hose or any other source
- FPSO / FRADE Terminal position and distance (See accompanying poster);
- In any of the above situations, the Mooring Master must be informed immediately.

Ship's stamp

Chief Officer

Name: _

Date:_____Time: _____

ATTACHMENT 16 – Loading Information For Frade Terminal

Loading information

- **EXPORT OPERATIONS**
  - Volume figures are normally compared with FRADE Terminal every hour (Gross BBLS @ 60F).
  - Offtake Tanker **MUST** give 15 minutes notice for any rate change.

- **TERMINAL STOP PROCEDURE**
  - Offtake Tankers must give fifteen (15) minutes notice before restricting export into two (2) cargo tanks.
  - Export rate will be reduced (approximately 10,000 BBLS/HR) by FRADE Terminal approximately 1 hours before completion of cargo transfer.
  - However, Offtake Tanker may call for a transfer rate reduction at any time.

- **EXPORT STOP PROCEDURE**
  - Fifteen minutes before restricting cargo flow into two (2) cargo tanks, export rate shall be reduced to approx. 10,000 BBLS/Hr.
  - FRADE Control Room must be given 30 minutes and then 10 minutes notice prior to the FINAL STOP.
  - Offtake Tanker can expect to receive approximately 100 BBLS before flow stops completely.

- **EXPORT RATES**
  - FINAL EXPORT RATE 10,000 BBLS/HR
  - MINIMUM EXPORT RATE 6,300 BBLS/HR
  - MAXIMUM EXPORT RATE 33,300 BBLS/HR
  - NORMAL EXPORT RATE 31,000 BBLS/HR
  - AVERAGE RECENT API 19 ~ 21 @ 60 F
  - APPROXIMATE CARGO TEMPERATURE 30°C

- **AT EXPORT COMPLETION**
  - Offtake Tanker crew must be ready for hose disconnection.
  - Cargo Surveyor and ship's staff must be ready for tank inspection.

Mooring-Master

ATTACHMENT 17 – Over Pressure Letter

Over-pressure of Loading Hoses

To the Master:_____ Date: _____

Name of Vessel:_____ Moored at Frade FPSO

Captain,

Terminals have experienced a number of incidents of Offtake Tankers restricting or closing valves against the flow of cargo, causing over-pressure of loading systems. In some cases this has resulted in bursting of hoses and/or damage to the FPSO TERMINAL. **Disruption to FRADE Terminal operations would be costly and any Offtake Tankers involved in such incidents are immediately reported as being "Unacceptable" at COMPANY Terminal Worldwide.**
We seek your cooperation in avoiding these incidents. It is essential that your officers maintain valve arrangement adequate for the export operation at all times. Over-pressure incidents have invariably been caused by failure to observe one or more of the following standard operating practices:

- Verify correct line up of the system and reconfirmed prior to starting and reported to the Mooring Master.
- Verify that valves to empty tanks are fully opened before closing any other tank valves.

Mooring Master must be informed before major alterations of the lineup are executed. Valve control system (including valve indicators) shall be in good working order. Adequate supervision of the cargo transfer must be maintained at all times and the person in charge must be aware of risks to Terminal facilities if cargo flow is restricted.

Receipt Acknowledged:

Ship's stamp

Master

Chief Officer

ATTACHMENT 18 – Mooring-Master & Support Vessel Information

Mooring Master and Support Vessel Information

Ship's Name: _____

Mooring Master #1	**Captain**			
	Cabin		**Telephone**	
Mooring Master #2	**Captain**			
	Cabin		**Telephone**	
Cargo Surveyor #1	**Mr.**			
	Cabin		**Telephone**	
Cargo Surveyor #2	**Mr.**			
	Cabin		**Telephone**	
Customs Officer	**Mr.**			
	Cabin		**Telephone**	

COMUNICATION	**Location**	**Call Sign**	
	Offtake Tanker	**Export One**	
	FRADE Terminal	**FRADE Terminal**	
Export Working Channel		**Marine VHF**	
		UHF	

Support Vessel Name			
Stern Tug			
Line Handling boat			
_____ Mooring-Master			
Date		**Time**	

ATTACHMENT 19 – Dedicated Smoking Areas

Ship's Name: _____ Date: _____ Time: _____

Smoking is allowed in maximum of two locations within the accommodation house as designated by Offtake Tanker Master and Mooring Master in agreement.

Location # 1: _____

Location # 2: _____

Master and Officers must ensure that these smoking restrictions are strictly adhered to. Only approved electric and steam galleys, in selected location in the after part of the vessel, agreed to by Master and the Mooring Master, are permitted.

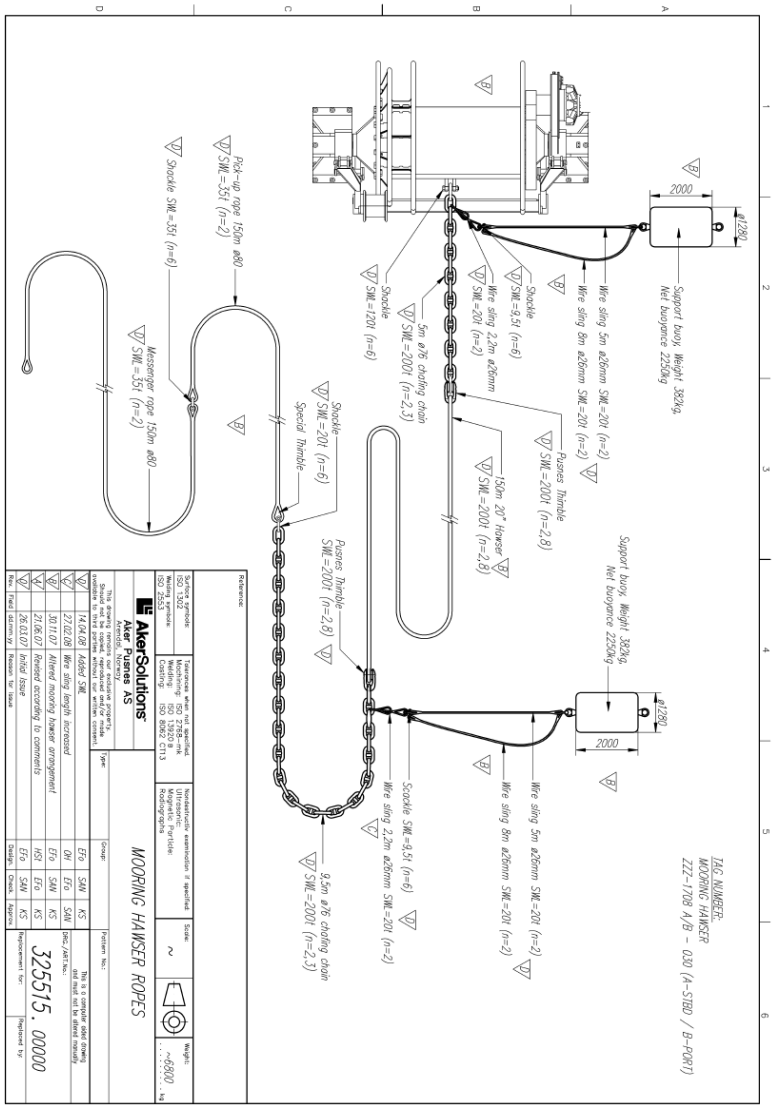
CIGARETTES ENDS, HOT OR ANY OTHERS MATERIALS MUST NOT BE THROWN IN THE WATER AT ANY TIME.

Ship's stamp

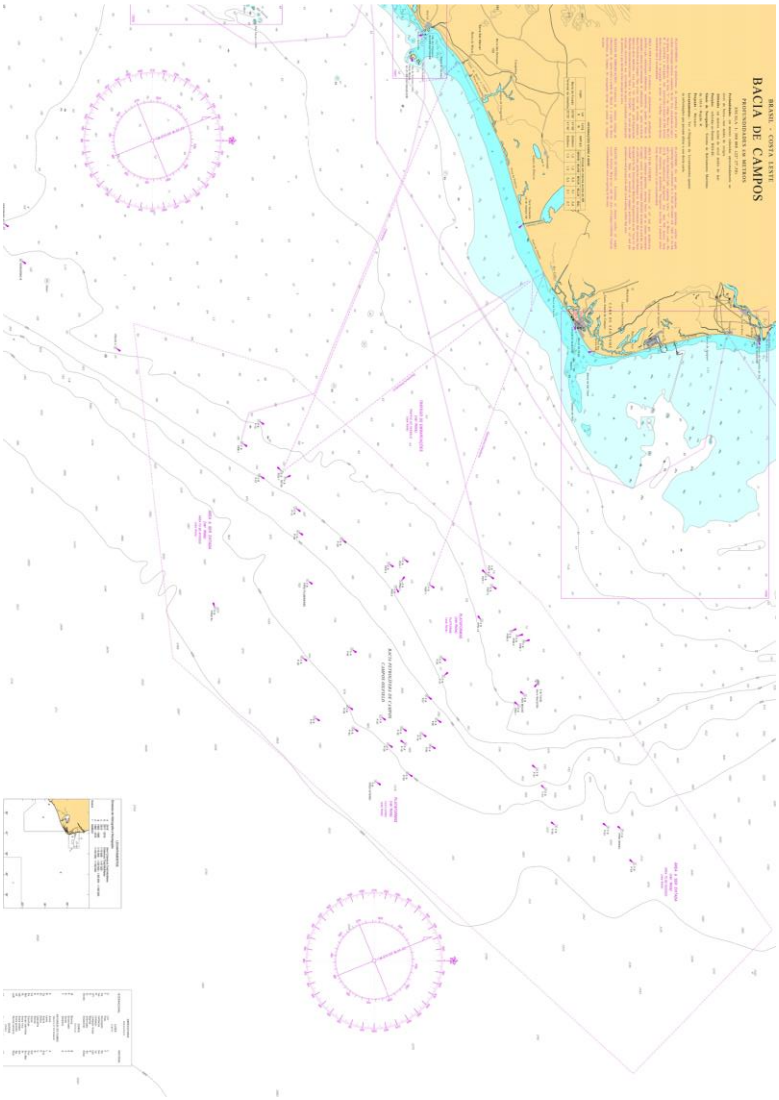
Chief Officer

Mooring Master

ATTACHMENT 20 – Shuttle Tanker Hawser Arrangement & Details



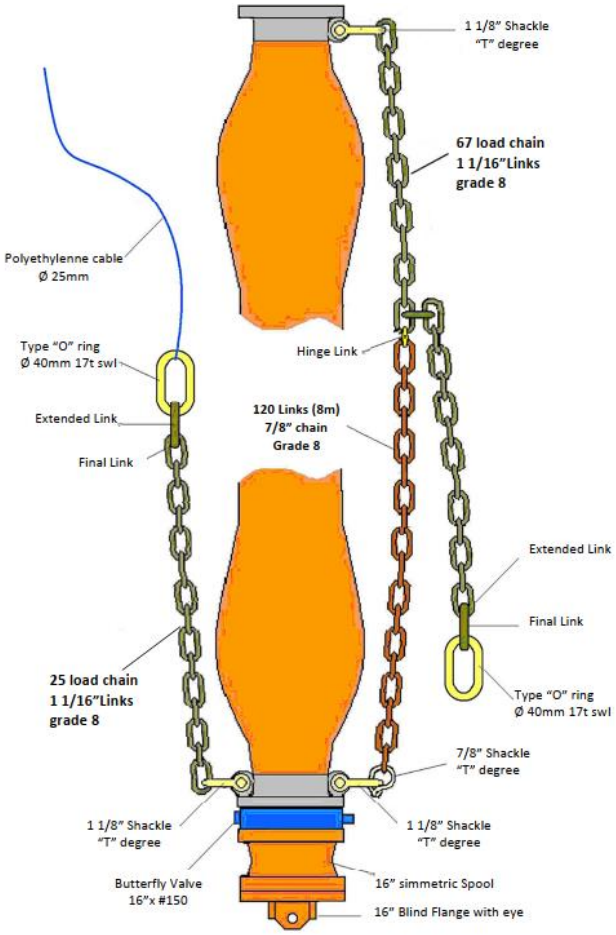
ATTACHMENT 21 – Nautical Chart



ATTACHMENT 22 –Offloading Hose Arrangement

Seção	Tipo	Diâmet	L [ft]	Modelo
-	Hang Off Spool	24"	1,09	-
1	DC Sub Catenary End Hose with Extra Reinforcement EC FF 300/150	24"	40	ISOLA S DUPLEX CATENARY END
2	DC Sub Catenary Line Hose EC FF 150	24"	40	ISOLA S DUPLEX CATENARY LINE
3	DC Sub Catenary Line Hose EC FF 150	24"	40	ISOLA S DUPLEX CATENARY LINE
-	Holdback Spool	24"	1,28	-
4	DC Floating Hose EB at one end EC FF 150	24"	40	ISOLA G DUPLEX EB EXTRA
5	DC Main Line Floating Hose EB EC FF 150	24"	40	ISOLA G DUPLEX EB
6	DC Main Line Floating Hose EB EC FF 150	24"	40	ISOLA G DUPLEX EB
7	DC Main Line Floating Hose EB EC FF 150	24"	40	ISOLA G DUPLEX EB
8	DC Main Line Floating Hose EB EC FF 150	24"	40	ISOLA G DUPLEX EB
9	DC Main Line Floating Hose EB EC FF 150	24"	40	ISOLA G DUPLEX EB
10	DC Main Line Floating Hose EB EC FF 150	24"	40	ISOLA G DUPLEX EB
11	DC Main Line Floating Hose EB EC FF 150	24"	40	ISOLA G DUPLEX EB
12	DC Main Line Floating Hose EB EC FF 150	24"	40	ISOLA G DUPLEX EB
13	DC Main Line Floating Hose EB EC FF 150	24"	40	ISOLA G DUPLEX EB
14	DC Main Line Floating Hose EB EC FF 150	24"	40	ISOLA G DUPLEX EB
15	DC Main Line Floating Hose EB EC FF 150	24"	40	ISOLA G DUPLEX EB
16	DC Main Line Floating Hose EC FF 150	24"	40	ISOLA G DUPLEX
17	DC Main Line Floating Hose EC FF 150	24"	40	ISOLA G DUPLEX
18	DC Main Line Floating Hose EC FF 150	24"	40	ISOLA G DUPLEX
19	DC Main Line Floating Hose EC FF 150	24"	40	ISOLA G DUPLEX
20	DC Main Line Floating Hose EC FF 150	24"	40	ISOLA G DUPLEX
21	DC Main Line Floating Hose EC FF 150	24"	40	ISOLA G DUPLEX
22	DC Main Line Floating Hose EC FF 150	24"	40	ISOLA G DUPLEX
23	DC Full Floating Reducer Hose EB EC FF 150	24"/20"	40	ISOLA G DUPLEX RIDUX EB
24	DC Full Floating Reducer Hose EB EC FF 150	20"/16"	40	ISOLA G DUPLEX RIDUX EB
25	DC Full Floating Tail Hose EB PU ED FF 150	16"	40	ISOLA G DUPLEX TAIL EB PU
26	DC Full Floating Tail Hose EB PU ED FF 150	16"	40	ISOLA G DUPLEX TAIL EB PU
27	DC Full Floating Tail Hose EB PU ED FF 150	16"	40	ISOLA G DUPLEX TAIL EB PU
28	DC Full Floating Tail Hose EB ED FF 150	16"	40	ISOLA G DUPLEX TAIL EB
29	DC Tail Floating Hose 19 Bar	16"	40	7740 F EB
30	DC Full Floating Tail Hose EB PU ED FF 150	16"	40	ISOLA G DUPLEX TAIL EB PU
31	DC Full Floating Tanker Rail Hose EB PU ED FF 150	16"	30	ISOLA GT DUPLEX TANKER EB PU
-	Válvula Borboleta 16" - tipo Wafer	16"	-	-
-	Camlock Short Spool	16"	-	-

ATTACHMENT 23– Description of the 16” Tanker End



ATTACHMENT 24– Watch- Keeper Duties