EXCELERATE ENERGY

PETROBRAS TRANSPORTE S.A. TRANSPETRO

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TRBA Terminal Manual Annex 05

STS Contingency Management Plan

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Contents

1.0 CONTACTS

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FSRU maintains a listening watch on VHF Channel 14 & 16.

TRBA Control Room maintains a listening watch on VHF Channel 16.

EE TRBA Operations trba@excelerateenergy.com **shall** be copied on all correspondence.

2.0 CONTINGENCY MANAGEMENT

001 This annex is to be followed in addition to individual asset specific Emergency Response Plans (ERP).

002 A copy hard copy of this document **shall** be printed and made available in the CCR of the FSRU and LNGC.

003 After interruption due to an abnormal situation, the operation **shall** only be recommenced after the immediate cause of the issue is known, correct action (as necessary) is implemented and there is an agreement between the FSRU and LNGC Master that the risk to proceed is low and acceptable. The POAC has the overriding authority even when a green light to proceed is giving by the LNGC.

3.0 EMERGENCY SIGNAL

004 The emergency alarm to be used during for both the FSRU and LNGC during STS operations is five or more short blast on the ship's whistle.

005 The same alarm is to be used for a total loss of communication between the FSRU and LNGC.

006 Any changes to this signal **shall** be agreed upon in the Pre-Transfer meeting including the agreed mutual response to it.

4.0 EVACUATION

007 The LNGC **shall** have their own means to escape and rescue personnel.

008 The TRBA gangway can be used by FSRU if considered safe.

009 The rescue of injured personnel from FSRU or LNGC **shall** be done by any means available.

5.0 COMMUNICATION FAILURE

010 In the event of a communications failure between the vessels and the communication cannot be re-established within a reasonable timeframe, cargo transfer operation **shall** be stopped until the cause has been identified and communications between the vessels have been re-established.

011 The timeframe to re-establish the communication **shall** depend on the level of criticality during the cargo transfer.

6.0 EMERGENCY DEPARTURE

012 An emergency departure of the LNGC from the FSRU **may** be necessary due to various emergency situations which develop during the STS transfer operation:

- Unexpected deterioration in wind, wave, swell or current above set limitations
- Fire on one of the vessels

- Primary fender failure
- Mooring system failure
- Major cargo system malfunction or failure
- Major vapor release
- Any other shipboard emergency or failure which presents a risk to either vessel involved in the STS cargo transfer operation which cannot be addressed and corrected with the two vessels remaining moored together.

013 Emergency separation is a complex manoeuvre and **shall** not be accepted as the primary response to an event. In any case, the procedure would be discussed and agreed between the FSRU and LNGC.

014 Through active monitoring of conditions and subsequent early notification to Tugs and Pilots, this **will** enable timely support and therefore reduce the likelihood of an emergency departure without tugs or a pilot. Additionally, the on duty Transpetro Safety Inspector can assist is calling for additional tugs and pilots as necessary.

015 Emergency separation is a complex manoeuvre and **shall** not be accepted as the primary response to an event. In any case, the procedure **shall** be discussed and agreed between the FSRU and LNGC so both parties are aware of each other's actions.

016 The emergency anchorage area is considered as the Turning Circle area off the berth unless greater separation distance is required.

7.0 INCIDENTS ONBOARD THE LNGC

017 The LNGC is considered a self-contained unit, fully equipped to deal with major fires and other emergencies on board and capable of providing the initial response to most incidents.

018 All fire-fighting equipment **shall** be in good working order. Portable equipment **shall** be correctly positioned, and ready for immediate use.

019 The type of incident that can occur onboard a carrier berthed alongside the FSRU can, in some instances have a significant impact on the integrity of the FSRU and the safety of its personnel.

020 Incidents with the potential to develop into a major event are:

- Fire / Explosion
- Oil Spills
- Uncontrolled release of cargo vapour or cargo system leaks
- Other examples of incidents, which **shall** require a response to minimize the outcome, or to avoid escalation into a significant event, are:
- Mechanical failure (affecting cargo operations)
- Man overboard

- Accident (medical emergency)
- Failure of the carrier's moorings

021 The following section deals with the specific immediate actions to be taken by the principal parties in the event of incidents. Subsequent actions to be taken **shall** depend on how the incident develops and how well it is managed.

7.1 Fire or Explosion onboard LNGC

7.1.1 Action by LNG Carrier:

- □ Initiate emergency shutdown procedures: ensure all manifold(s) and tank valves are closed.
- □ Mobilize onboard fire-fighting response.
- □ Establish communications with FSRU Control Room and advise the nature & location of the incident.
- □ Prepare to disconnect STS Hoses.

7.1.2 Action by FSRU:

- □ Inform TRBA Operations
- □ Initiate emergency shut down; stop cargo operations
- □ Implement Emergency Response Procedure
- □ Start a log of events
- □ Contact Tugs and request assistance
- □ Tug (upon arrival) to start fire pumps and assist as directed
- □ Establish a line of communications with LNG Carrier
- □ Coordinate with MLNG Operations for marine resources and support

7.1.3 Action by Tugs:

- □ Tug to start fire pump and assist as directed by FSRU Master
- □ Remaining tugs to mobilize and assist as directed.
- □ Prepare to remove the LNG Carrier from the FSRU under the direction of Mooring Master.

7.2 Oil Spill from LNGC

022 Specific action to be taken in the event of an oil spill **shall** depend on the nature, type, and amount of the product spilled. The following general rules **should** be adhered to, to ensure a fast and efficient response at the same time minimizing the environmental impact.

- For all spills, regardless of the product involved, a total ban on smoking onboard is to be imposed on the vessel concerned.
- All other sources of ignition **should** be isolated/secured.
- All loading or cargo-related operations are to be stopped and cargo tank valves closed.
- On no account **shall** dispersants be used (whether approved for use or otherwise) by either ships or the FSRU, without the express permission of the MLNG Terminal Operations Manager.

7.2.1 Action by LNG Carrier:

- □ Initiate emergency shutdown procedures: ensure all manifold and tank valves are closed
- □ Isolate the source of pollution and take whatever steps necessary to prevent or minimize further pollution
- □ Impose a total smoking ban on board
- □ Mobilize onboard pollution response plan
- □ Initiate clean up on board
- □ Establish communications with FSRU CCR

7.2.2 Action by FSRU CCR:

- □ Initiate emergency shutdown of cargo operations
- □ Secure all sources of ignition
- □ Verify the source/type of pollutant.
- □ Initiate Oil Spill Response Procedure and Emergency Response
- □ Inform MLNG Operations
- □ Commence log of events
- □ Contact Tugs and request assistance

7.2.3 Action by Tugs:

- □ Standby Tug prepares to assist and stands off upwind until nature and type of spill have been established.
- □ FSRU Control Room when standing by.
- □ Other tugs to prepare for standby to assist.

7.3 Uncontrolled Release of LNG from LNGC

7.3.1 Actions by LNGC:

- Initiate emergency shut down
- Secure all sources of ignition and impose a total smoking ban
- Mobilize ship emergency response plan
- Establish communications with FSRU and advise the nature and location of spill

7.3.2 Actions by FSRU:

- Inform MLNG Operations
- Initiate emergency shut down on LNG (if applicable)
- Secure all sources of ignition
- Operate fire monitors if applicable
- Initiate Emergency Response Plan (if applicable)
- Contact Tugs and request assistance

7.3.3 Actions by Tugs:

- Stand-by tug to activate firefighting and deluge systems and stand well clear upwind and await instruction from FSRU
- Secure all ignition sources and impose a total smoking ban
- Remaining tugs to mobilize and stand offshore as in above

7.4 Man Overboard Incident

023 The response to this type of incident **shall** depend on the circumstances. In the event of a man overboard situation within the SSZ, all movements are to be suspended whilst search and rescue activities take place. Extreme caution is required by the search vessels, particularly during hours of darkness, when approaching or entering the search area.

7.4.1 Actions by LNGC:

- Place lookout and constantly monitor the position of person in the water
- Deploy lifebuoy into the water
- Raise the alarm by sounding three long blasts on the ship's whistle
- Stop transfer

- Request FSRU Control to mobilize rescue from tugs
- Direct responding vessel to the person in the water, or last sighted position

7.4.2 Actions by FSRU CCR:

- Inform MLNG Operations
- Stop Loading / REGAS if required
- Request Tugs to assist
- Put shipboard medical assistance on alert
- Pilot to be advised too standby

7.4.3 Actions by Tugs:

- Stand-by tug to respond as directed by FSRU Master
- Remaining tugs to be mobilized, if required.

8.0 FSRU INCIDENT

024 Action required by LNGC moored alongside the FSRU **shall** depend on the nature, location, and proximity of the incident.

8.1 Actions by FSRU:

- Inform MLNG Operations
- Initiate Emergency Response Plan
- Shut down all cargo operations on LNG, if required.
- Advise carrier of the nature of the incident and keep them informed of the status
- Request all tugs to go to stand by and Pilot to stand-by to assist as directed.

8.2 Action by LNGC:

- Mobilize crew, stand-by to disconnect STS Hoses and prepare to vacate the berth.
- Mobilize onboard emergency response to provide support to FSRU
- Maintain radio contact with FSRU

8.3 Actions by Tugs:

- Stand-by tug to provide immediate fire-fighting support as required

- Remaining tugs to proceed as directed to the scene as directed by FSRU
- Pilot to stand by and establish communications with FSRU

9.0 OTHER INCIDENTS

9.1 Power Failure

9.1.1 Power Failure Prior to Berthing

025 The berthing operation **shall** be aborted and the LNGC removed to a safe anchorage or to an area clear of the FSRU. The berthing operation **shall** not re-commence until the cause of the failure is determined and action is taken to prevent re-occurrence. Same applies for LNGC power lost situation.

9.1.2 Power Failure During Berthing Operation

026 If mooring lines are already connected, consideration **shall** be given as to whether it is safer to continue mooring and secure LNGC or to activate the emergency release of any moorings made fast and abort the operation as above. Tugs **shall** be considered to assist in keeping the LNGC in position.

9.1.3 Loss of Tug Power During Berthing Operations

027 Action to be taken **will** depend upon prevailing environmental conditions, which tug has failed, proximity to the FSRU at time of failure and whether mooring lines have been made fast. If there is any doubt in whether the position of the LNGC can be controlled or the potential to lose control is likely, then the operation **shall** be aborted immediately.

9.2 Other Incidents

028 The response **shall** depend on a large extent to the nature, location and severity of the event. Swift action **shall**, in most cases prevent an escalation of these events. Where marine craft are required to approach or to go alongside the LNG Carrier they **shall** only do so after FSRU CCR has confirmed that cargo transfer has been stopped.

9.2.1 Action to be taken by LNG Carrier:

- Advise FSRU CCR of nature, location of the incident, and action being taken by LNGC and assistance required from FSRU.
- Initiate emergency shut down if required (e.g. mooring failure)

9.2.2 Action to be taken by FSRU:

- Inform MLNG Operations

- Initiate emergency shut down if required
- Establish communications with a stand-by tug and alert remaining tugs if considered necessary (e.g. mooring failure)
- If medical assistance required, FSRU **shall** organize transportation to shore.

9.2.3 Action to be taken by Tugs:

- Stand-by tug to respond as directed by FSRU Master
- Remaining tugs to be mobilized, if required
- FSRU Master to request Pilot to stand by in the event assistance is required.

9.3 Security Incidents or Increased Threat

029 Any Security related incidents between FSRU and LNGC **shall** be reported to the TRBA PFSO and Port Security in accordance with ISPS Code.

030 Vessels **shall** follow their Ship Security Plans.

031 The Port Security Officer **shall** contact the FSRU and LNGC Ship Security Officer (SSO) and **shall** decide the course of action to take in accordance with Ship Security plans.

032 The FSRU Master/SSO **shall** report all Security related incidents by utilizing the EE Incident Notification Procedures outlined in the Ship Security Plan (SSP).

9.4 Emergency Shut Down 2 – ERC Release

033 In the event of a vessel separation – ESD2 and ERCs release, the visiting LNGC **will** have the hoses suspended from the manifold.

034 LNG **will** be trapped between the ESD Valve at the LNGC Manifold and the split closed half of the ERC at the end of the hose.

035 Recovery procedures steps are as follows:

- Liquid Freeing
- Purging
- Disconnection
- Temporary storage on LNGC
- Transfer to FSRU via service vessel.

036 The LNGC crew needs to immediately monitor the manifold pressures and provide a path for the hoses vapor's to be released back into the cargo tanks. Preferably, the LNGC **should** use they ESD Bypass valves thus avoiding opening the ESD Valve which can put liquid back into the hose.

037 LNGC to stablish communications with the FSRU for guidance and assistance. Depending on the prevailing circumstances the FSRU **will** send staff to the LNGC.

038 LNGC to recover VSD (Vessel Separation Detector) Cable.

039 Water Curtain, deluge and water dam need to be running until the hoses are liquid free.

9.4.1 Liquid freeing

040 fire hoses to be directed to the suspended STS hoses to evaporation of the LNG inside the hose.

041 Throughout the liquid freeing process, pressures **should** be carefully monitored at the LNGC manifold to avoid over pressurization which can lead to damage to the STS hoses.

042 Liquid hoses pressures **will** be greater that the vapor hose(s)

043 STS Hoses **shall** be determined to be liquid free when:

- There is no more ice at the ERC half (bottom end of the hose).
- No pressure increases when Manifold / ESD bypass valves are closed.

9.4.2 Purging

044 Purge hoses at the Nitrogen purging point at the LNGC manifold.

045 Purging is expected to be time consuming as the purging method **will** be dilution rather than displacement (which is used for normal disconnection of the STS Hoses), in addition to the LNGC using its own nitrogen plant.

046 LNGC to close Manifold Double Shut Valve (isolating manifold from main liquid line).

047 Pressurize with Nitrogen until 4-4.5 bar.

048 Close nitrogen supply.

049 Open Manifold / Bypass valves or return valve to stripping line (depending on vessel design).

050 Allow pressure in the STS hoses and connection to reduce back to 0.5 bar. Pressures to be monitored to avoid gas to go back into the hose.

051 Repeat above steps until ≤40 % LEL.

9.4.3 Hose Disconnection

052 The LNGC already has the Tools and Equipment to handle and disconnect the STS Hoses and Reducers. These are intentionally left onboard the LNGC after connection.

053 Prior to the disconnection the LNGC **shall** prepare its crane and a suitable location within reach, where the hoses and flanges can be landed and protected.

054 The crane of the LNGC **should** have no problems handling the weight of the equipment. Heaviest item is a 10” STS Hose weighting 500 Kg approx.

9.4.3.1 Disconnection Steps

055 Recover the Vessel Separator Detector cable from the LNGC Manifold.

056 Disconnect purged STS Hoses using the LNGC crane, starting from and using hose buns and slings for lifting. STS hoses to be protected by Wooden pallets, padding and other protective materials at the temporary storage location onboard the LNGC.

057 Recover the fall arresting roped from the ERC half connected to the STS Hose.

058 Additional purge the STS hoses at the temporary storage location onboard the LNGC.

059 Disconnect the ERC half from the STS hoses.

060 Saddles and reducers to be removed if the STS Hoses **will** not be resumed.

9.4.3.2 Post Disconnection

061 LNGC **must** provide temporary protection and securing to the STS equipment temporarily stored onboard.

062 When operational circumstances permit, all STS equipment **must** be returned to the FSRU.