



ONSHORE TERMINAL REGULATIONS

Manual

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2	6.2	Jetty Communication System edits
2	7.10	Shore Leave edits
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Amendments

INPEX retains the right at any time to amend this document or in its discretion vary its implementation.

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1 Glossary

Term	Definition
ABF	Australian Border Force
ACS	INPEX ILNG Access Control Card
AHD	Australian Height Datum
AIS	Automatic Identification System
AMSA	Australian Maritime Safety Authority
Beaufort Scale	A scale of wind force ranging from 0 (calm) to 12 (hurricane), corresponding with the velocity of wind at a set distance above ground or sea level
BD	Breasting Dolphin
BOG	Boil-Off Gas
BWTP	Ballast Water Treatment Plant
CCR (Terminal)	Central Control Room
CCR (Vessel)	Cargo Control Room
CoQQ	Certificate of Quality and Quantity
Cth	Commonwealth
cm/s	Centimetres per second
CTMS	Custody Transfer Measurement System
DAWE	Department of Agriculture, Water and Environment
DGPS	Differential Global Positioning System
DP	Darwin Ports - The port operator
DUKC	Dynamic Under Keel Clearance
DWT	Deadweight Tonnage
EDP	Early Departure Procedure

Term	Definition
ERT	Emergency Response Team
ESD1	Emergency Shut Down of loading
ESD2	Emergency Shut Down of loading - disconnect loading arms
ETA	Estimated Time of Arrival
ETOP	Emergency Tow-Off Pennant
FOSSL	Fibre Optic Ship Shore Link
GPS	Global Positioning System
HAT	Highest Astronomical Tide
HF	High Frequency
ILNG	Ichthys LNG Pty Ltd
IMO	International Maritime Organisation
Independent Third Party Surveyor	Onshore quantity and quality surveyor responsible for verifying the correct quantity and quality of cargo has been transferred.
Inert gas	a non-flammable gas
Intrinsically safe	Equipment or wiring incapable of causing ignition of a hydrocarbon Oxygen mix atmosphere
ISGOTT	International Safety Guide for Oil Tankers & Terminals
ISM	International Safety Management
ISSC	International Ship Security Certificate
LAT	Lowest Astronomical Tide
LPG	Liquefied Petroleum Gas
LNG	Liquefied Natural Gas
LOA	Length Over All
Loading Master	Refer to Terminal Representative
LOI	Letter of Indemnity

Term	Definition
LSA	Life Saving Appliance
MARSEC	Maritime Security Level
MBL	Minimum Breaking Load
MD	Mooring Dolphin
MLMS	Mooring Load Monitoring System
MHWS	Mean High Water Springs
MHWN	Mean High Water Neaps
MLWN	Mean Low Water Neaps
MLWS	Mean Low Water Springs
MLA	Marine Loading Arm
MSL	Mean Sea Level
MSIC	Maritime Security Identification Card
MTOFSA	Maritime Transport and Offshore Facilities Security Act
MT	Motor Tanker
NOR	Notice of Readiness
OBQ	On-Board Quantity
OCIMF	Oil Companies International Marine Forum
Offtake Coordinator	The ILNG representative responsible for developing, maintaining and modifying berth lifting programs in coordination with various internal and external parties to prevent business interruptions.
OPBG	Outer Pilot Boarding Ground. The OPBG's location is as described on the official chart for Darwin Harbour.
OTL	Operations Team Lead
PERC	Powered Emergency Release Coupling
PFSO	Port Facility Security Officer

Term	Definition
PLJ1	Product Loading Jetty 1 - for the export of LPG and Condensate
PLJ2	Product Loading Jetty 2 - for the export of LNG
PoB	Pilot on Board
PPE	Personal Protective Equipment
QCDC	Quick Connect Disconnect Coupling
QRH	Quick Release Hooks
SDL	Shut Down Loading
SDS	Safety Data Sheet
Shipping Agent	is the designated person or agency responsible for handling the general interests and administrative affairs of vessels, at ports on behalf of ship owners, managers, and charterers
SIGTTO	Society of International Gas Tanker and Terminal Operators
SIRE	Ship Inspection Report
SSP	Ship Security Plan
SPA	Sales and Purchase Agreement
SDP	Short Distance Piece
SSSC	Ship Shore Safety Checklist (ISGOTT rev.6)
SUKC	Static Under Keel Clearance
Terminal Representative	Focal point who is the interface between the vessel and Terminal whilst the vessel is alongside the Jetty otherwise known as Loading Master
UHF	Ultra-High Frequency
Vessel	The term Vessel refers to a LNG / LPG / condensate ship as defined in the respective sales purchase agreement.
VHF	Very High Frequency

2 GENERAL INFORMATION

The onshore plant is located at Bladin Point near Darwin in the Northern Territory. Gas and residual condensate is separated at the onshore plant inlet facilities. The condensate is stabilised and stored for export while the gas is processed and liquefied in two LNG trains each producing 4.45mtpa of LNG for storage and export. Liquefied propane and butane is also produced in the LNG trains for export as separate products.

The Terminal has two loading jetties for the export of hydrocarbons. LPG and Condensate are exported from Product Loading Jetty No.1 (PLJ1), whilst LNG is exported from Product Loading Jetty No.2 (PLJ2). Both PLJ1 and PLJ2 are dredged to -13.5 metres from Lowest Astronomical Tide (LAT).



Figure 1 - Ichthys Onshore Facilities

3 Reporting

3.1 Time Zone

Ichthys Onshore facilities operate on UTC +09.5 hrs.

3.2 Pre-Arrival Reporting

As soon as reasonably practicable after a vessel sails from the point of departure en-route to the Loading Port (Ichthys Terminal) the Master of the vessel is to give notice to the Terminal of the estimated time of arrival (ETA) to the Port of Darwin Outer Pilot Boarding Ground.

In addition to the initial ETA notification, LNG, LPG and Condensate vessels shall report ETAs to the Outer Pilot Boarding Ground (OPBG) in accordance with APPENDIX A: Information in ETA Notice and Notice of Readiness.

LNG carriers must send 12-hour and 5-hour pre-arrival notices based on the expected Pilot Onboard (POB) time.

Please forward notices to DLOnshoreMarineTerminal@inpex.com.au

3.3 Deviation Notifications

If the ETA changes by more than 6 hours after the 96 or 48 hour notice is given or more than 2 hours after the 24 hour notice is given, the Master of the vessel must immediately notify the INPEX Terminal Coordinator & Local Agent of the revised ETA.

3.4 Notice of Readiness

The Master of the vessel shall tender a NOR to the Terminal Coordinator upon the vessel's arrival at the safe anchorage area or passing the (OPBG) having received all necessary port clearances and being able to receive cargo for loading. The acceptance of NOR by the Terminal will be when the vessel is all fast.

3.5 Port Communications and Procedures

For the documentation, pre-arrival messages and communication required by vessels arriving at the Darwin Port, the Master of the vessel should contact their Shipping Agent for latest procedures, documentation and any other information required by Department of Immigration, Customs and Darwin Ports.

4 Port Of Darwin

4.1 Climate and Meteorological Conditions

The meteorological conditions in the area with descriptions aligned to the Beaufort Scale can be summarised as follows:

- The winter/dry season (May to October) is characterised by steady northeast to southeast winds of 10 to 24 kts, which bring predominantly fine conditions throughout the north of Australia.
- The summer/wet season (November to April) is characterised by northwest to southwest winds of 10 kts for periods of 5 to 10 days with surge in airflow of 16 to 24 kts for periods of 1 to 3 days. During summer season, weather is largely determined by the position of the monsoon trough, which can be in either an active or an inactive phase.
- The active phase is usually associated with broad areas of cloud and rain, with sustained moderate to fresh north-westerly winds on the north side of trough. Widespread heavy rainfall can result if the trough is close to or over land.
- The inactive phase occurs when the monsoon trough is temporarily weakened or retreats north of Australia; it is characterised by light winds, isolated shower and thunderstorm activity, sometimes with gusty squall lines.
- The region is subject to severe tropical cyclone activity. Tropical cyclones can develop off the coast in summer season, usually forming within an active monsoon trough.
- Visibility is generally good, although hazes can occur from June to October, with most dense and widespread hazes from August to October. Fog at sea is rare, but there is occasional radiation fog in coastal areas during the dry season. Reduced visibility may be experienced during wet season.

4.2 Terminal Weather Conditions

Weather Forecasting & Monitoring

Onshore Terminal weather forecasting is available. Vessels are to make a request through their Shipping Agent to be included on the INPEX forecast report distribution list.

The Terminal Representative (Loading Master) boarding a vessel will update the vessel Master with the latest weather forecast for the intended loading period.

Wind

During the wet season (November - April), winds are predominately from the Northwest, with 300 degrees being the most frequent direction and light.

In the dry season (May - October), the winds are mostly from the East-Southeast, with winds predominately from 090 through to 150 degrees up to 25 knots.

The median annual wind speed is 4.2 kts and the 90th percentile wind speed is 12.4 kts. The average wind speed is slightly higher during the wet season at 6.8 kts.

There is a diurnal oscillation in the wind direction, with a morning SE land breeze and an afternoon NW sea breeze.

Micro-burst

Wind micro-bursts occur during the wet season, with isolated wind speed up to 50 knots. These micro-bursts are difficult to forecast.

Cyclones

Cyclonic activity may occur in the Darwin area during the wet season in the period from November to April. The area most prone to cyclonic activity is to the east of Darwin and in the Gulf of Carpentaria region.

Darwin Ports will manage shipping during any such cyclonic event, likely to impact upon the Port of Darwin area.

Current

Maximum Flood: 092 degrees @ 1.6 kts

Maximum Ebb: 273 degrees @ 1 kt

Tides

The spring tidal range for the Port of Darwin is approximately eight (8) metres.

Thunderstorms and Lightning

Thunderstorms and lightning are prevalent during the wet season. Lightning warnings are broadcast on the loudspeakers on the Jetty as well as on the UHF radios used by Terminal personnel. Mooring operations and Manifold activities are suspended during a "Red Alert".

Level	Detail	Action Required
Green	Cloud to ground lightning within 30-50 km of the Terminal	LNG – LM to check location of squall activity and assess potential development. LPG – as per LNG Condensate – Standby to reduce rate and stop loading.
Yellow	Cloud to ground lightning within 15-30 km of the Terminal	LNG – LM continue to monitor development and movement of storm cell. LPG – as per LNG Condensate – controlled reduction and STOP loading
Red	Cloud to ground lightning within 15 km of the Terminal	LNG – LM continue to monitor cell development and movement. Consider reducing rate and calling standby tug. LPG – as per LNG. Condensate – controlled rate reduction and STOP loading.

4.3 Legislation

As with any port, each vessel Master should seek their own independent legal advice as to the laws that apply to his or her circumstances. The laws that might apply could include the following legislation and regulations as amended from time to time:

- Work Health and Safety (National Uniform Legislation) Act 2011 No. 39 (NT) and related regulations
- Ports Management Act 2015 No. 11 (NT) and related regulations
- Marine Pollution Act 1999 No. 43 (NT) and related regulations
- Maritime Transport and Offshore Facilities Securities 2003 No. 131 (Cth) and related regulations
- Environment Protection and Biodiversity Conservation Act 1999 No. 91 (Cth) and related regulations
- Navigation Act 2012 No. 128 (Cth) and related regulations
- Occupational Health and Safety (Maritime Industry) Act 1993 1994 No. 10 (Cth) and related regulations
- Biosecurity Act 2015 No. 61 (Cth) and related regulations
- AMSA Marine Orders.

References to "NT" are to the "Northern Territory" and references to "Cth" are to the "Commonwealth".

The laws referred to above are not intended to be exhaustive nor is there any warranty or representation by INPEX and its joint venture partners that any one or more of the laws from the list above is applicable or relevant to the circumstances of each vessel or anyone else. The vessel Master should seek his or her own independent legal advice and, in the absolute discretion of the vessel Master, he or she may decide to consult with his or her Ships Agent. The obligation to comply with law always remains with the vessel Master. INPEX and its joint venture partners exclude all liabilities that may arise from any reliance on the laws referred to above or otherwise referred to in any other part of this document. INPEX and its joint venture partners do not undertake to publicly update or revise the laws referred to above or otherwise referred to in any other part of this document after the date of this document.

4.4 Pilotage

Darwin Port provides unrestricted (day / night) pilotage services within Darwin port limits.

Pilotage is compulsory within the Port limits and provided by Darwin Ports and arranged through Shipping Agents. The Outer Pilot Boarding Ground (OPBG) is located within Darwin Harbour and Masters are to refer to an up to date chart for the position of the OPBG.

Refer Appendix B for Pilot boarding arrangements. Masters should consult the latest information pertaining to pilotage and arrival and departure passage plans prior to arrival which can be found on the Darwin Port website Pilotage and Port Notices

<https://www.darwinport.com.au/facilities-services/pilotage>

[Port Notice PN/009 – Safe Pilot Transfer Arrangements](#)

Initial contact with Darwin Ports is via VHF radio channel 16, 2 hours prior to arrival at the OPBG, then a working channel as advised by the Vessel Traffic Service (VTS).

4.5 Darwin Harbour Sub-areas

Darwin Harbour is a compulsory pilotage area divided into a number pilotage of sub-areas. These sub-areas are described in the Technical and Safety Standards for Pilotage and the Provision of Pilotage Services for the Port of Darwin. Specific details are shown on the official Chart for Darwin Harbour.



Figure 2 - Darwin Pilotage Sub-areas

4.6 Commercial Vessel Speed Limits

Prescribed commercial vessel speed limits are as follows:

- Zone A – 16 knots
- Zones B & C – 12 knots
- Zone D – 10 knots
- Zones E, F & G – 8 knots.

4.7 Anchorage

LNG vessels are not permitted to anchor within the Darwin port limits.

Condensate vessels are permitted to anchor in the 'Alpha' anchorages, which are inside the outer port boundary.

The positions of these anchorages are:

Alpha 1: Lat. 12 degrees 18.65 mins SOUTH Long. 130 degrees 42.35 mins EAST

Alpha 2: Lat. 12 degrees 18.72 mins SOUTH Long. 130 degrees 42.90 mins EAST

4.8 Declared Depths

The Bladin Point Channel, Swing Basins and Berth Pockets were dredged to a depth of 13.5m below Lowest Astronomical Tide (LAT).

Masters should consult the latest information pertaining to declared depths prior to arrival which can be found in NT Department of Transport Marine Notices- Declared Port Depths.

<https://nt.gov.au/marine/marine-safety/notice-to-mariners/port-of-darwin-local-notice>

4.9 Under Keel Clearances

The Regional Harbourmaster's direction for under keel clearance (UKC) requirements for the Port of Darwin applies to every vessel >25m LOA within the gazetted port limits. The table below presents the currently prescribed minimum static UKC which is set to account for dynamic and accuracy factors. These figures may be changed at the direction of the Regional Harbour Master and vessel Masters are to refer to the latest directions from the Harbourmaster.

Table 1 - Minimum UKC Requirements

Where	Minimum UKC
Whilst underway in the outer Harbour (Zone A)	2.0m
Whilst underway in the inner Harbour (Zone B, C,D,F [except as below])	1.5m
Alongside (in accordance with PIANC Guideline)	0.6m

4.10 Port of Darwin Site Map

The follow drawing shows significant areas within the Port of Darwin.



Figure 3 - Port of Darwin Map

4.11 Towage

Harbour towage is compulsory within the Port limits and provided by Svitzer Terminals Australia Pty Ltd. Towage services can be arranged through a number of Shipping Agents located in Darwin.

Masters should consult the latest information pertaining to Harbour Towage prior to arrival through Port Notices which can be found in the Darwin Port website – Port Notices.

<https://www.darwinport.com.au/facilities-services/compliance-regulations/port-notice>

4.12 Quarantine

All vessels must comply with the Biosecurity Act 2015 No. 61 (Cth) and Regulations 2016, issued by the Department of Agriculture Water and Environment (DAWE).

Vessel Masters are to consult their Shipping Agent for the latest documentation and information requirements to obtain a biosecurity clearance.

4.13 Immigration and Customs

An immigration clearance will be sent to the vessel Master by the Ship's Agent prior to the vessel's arrival. Maritime Crew Visas are compulsory for all crew arriving in Australia on board a vessel.

Crew flying to Australia to join a vessel require a Transit Visa, which is valid for five (5) days. Vessel Masters must advise their Shipping Agent of any item to be removed from or taken onboard, whilst in port.

For latest information with regards to immigration requirements and crew visas refer to the Department of Home Affairs web page at:

<https://immi.homeaffairs.gov.au/visas/getting-a-visa/visa-listing/maritime-crew-988>

4.14 Crew Change

Crew changes are permitted at Darwin anchorage, outside port limits, and when alongside a berth. Approval to conduct a crew change alongside a berth is at the discretion of the Terminal. Requests for crew changes must be submitted to the Shipping Agent. The Agent is required to provide the necessary documentation, as specified below, to the Terminal Coordinator at least two (2) business days prior to the vessel's arrival. Requests made after this timeframe may be denied.

On-signing crew changes:

1. Terminal ship crew change document.
2. ABF document B522.

Off-signing crew changes:

1. Terminal ship crew change document.
2. ABF documents B521.
3. ABF documents B465.

For vessel personnel that are not part of the ship's crew and need to transit via the Terminal, the ships master must advise the vessels agent and an ILNG onshore access form must be completed and submitted for such personnel.

The Shipping Agent is to arrange transportation and PPE (section 5.31 Transiting Personnel) for the crew to and from the ILNG security gate.

While full crew changes may not be permitted however, emergency crew changes due to sudden illness or injury may be permitted at short notice if a direct request is made by the Master to the Terminal Representative or via the Shipping Agent.

Crew changes undertaken at Darwin anchorage or outside of port limits prior to a vessel berthing at Ichthys Terminal should be advised to INPEX Terminal Coordinator for prior approval.

Where crew change is permitted, as best practice, senior officers forming part of the vessel management team should remain on board until completion of all loading operations.

Masters are to consult their Shipping Agent for further information.

4.15 Bunkering

Bunkering services for Marine Diesel Oil only can be arranged outside port limits.

This service is not available when the vessel is alongside.

Masters are to consult their Shipping Agent for further information.

4.16 Ballast Water

Vessels will require a Bio Security Status Document (BSD), which gives permission to berth and discharge water ballast.

For the latest DAWE requirements and forms, vessels must contact their Shipping Agent. Evidence of compliance shall be provided to the Pilot, prior to approval to proceed to the Terminal.

Visiting vessels are to ensure compliance with the Biosecurity Act 2015 No. 61 (Cth) and related regulations. There are no facilities for treating ballast water at the Terminal. Vessels must arrive with clean ballast only, complying with requirements of Department of Agriculture, Water and Environment (DAWE).

Deballasting at the Terminal is permitted through a ship's Ballast Water Treatment Plant (BWTP), provided such system has been Class approved.

4.17 Garbage

MARPOL Annex V waste can only be disposed at Fort Hill or East Arm wharves, by an approved Contractor, as described in the Darwin Port Handbook (11/2023), page 17 "Waste Disposal". Waste is not permitted to be transferred to a launch at the anchorage, under Biosecurity restrictions. The disposal of garbage is not available when alongside Ichthys Terminal berths.

Masters are to consult their Shipping Agent for further information.

4.18 Stores and CTM

Vessel storing is permitted outside port limits.

This service is not available when alongside.

In exceptional cases, requests to hand carry stores onto or off a vessel may be permitted on a case-by-case basis. In such instances, total weight of hand carried goods shall not exceed 15kgs.

Requests must be made to the Terminal Coordinator via the Shipping Agent. Agents are required to submit the necessary documentation, as listed below, along with their request at least 2 business days prior to the vessel's arrival. Requests made outside this timeframe may be declined.

Request to Load Goods onto the Ship:

- Terminal MGP
- ABF Form 43

Request to Remove Goods from the Ship:

- Terminal MGP
- ABF Form 44

Cash to Master requests may be approved on a case-by-case basis. All requests must be submitted to the Shipping Agent, accompanied by the required documentation, including the Terminal Material Gate Pass and ABF Form 43. Requests from Shipping Agents must be submitted to the Terminal Coordinator at least two (2) business days prior to the vessel's arrival. Late submissions may be denied.

The Shipping Agent is responsible for transporting items/ CTM to and from the vessel. ILNG employees are not permitted to transfer items on behalf of the Shipping Agent. The Agent can seek approval from ABF if requesting a crew member to take items through the Terminal. Prohibited items must not be transported through the Terminal (refer to section 5.32 for Prohibited Items).

Masters are to consult their Shipping Agent for further information.

4.19 Overboard Discharges

Vessel overboard suction/discharge valves connected to the cargo system are to be closed and locked prior to the commencement of loading at the Terminal. Independent surveyors attending the vessel may seal these valves prior loading as part of their ongoing duties. A record of the seal serial numbers will be kept by the Surveyor.

This does not include suction/discharges for water ballast or machinery cooling systems.

4.20 Pollution

The Protection of the Sea (Prevention of Pollution from ships) Act 1983 No 41 (Cth) and the Navigation Act 2012 No. 128 (Cth) and related regulations ratify the International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL) within the EEZ and Marine Pollution Act 1999 No. 43 (NT) implements MARPOL within NT Waters. These acts apply to all vessels including Foreign Flagged vessels within respective waters and visiting Carriers and Tankers shall comply fully with these provisions.

Any pollution caused by a visiting vessel must be reported immediately to the Terminal Representative, Darwin Port and AMSA.

A copy of the current Darwin Port Oil Spill Contingency Plan can be found on the Darwin Port website – Emergency and Cyclone Plans

<https://www.darwinport.com.au/facilities-services/emergency-cyclone-plans>

AMSA reporting is mandatory and MARPOL (POLREP) Reports must be submitted in the prescribed reporting format available on the AMSA website.

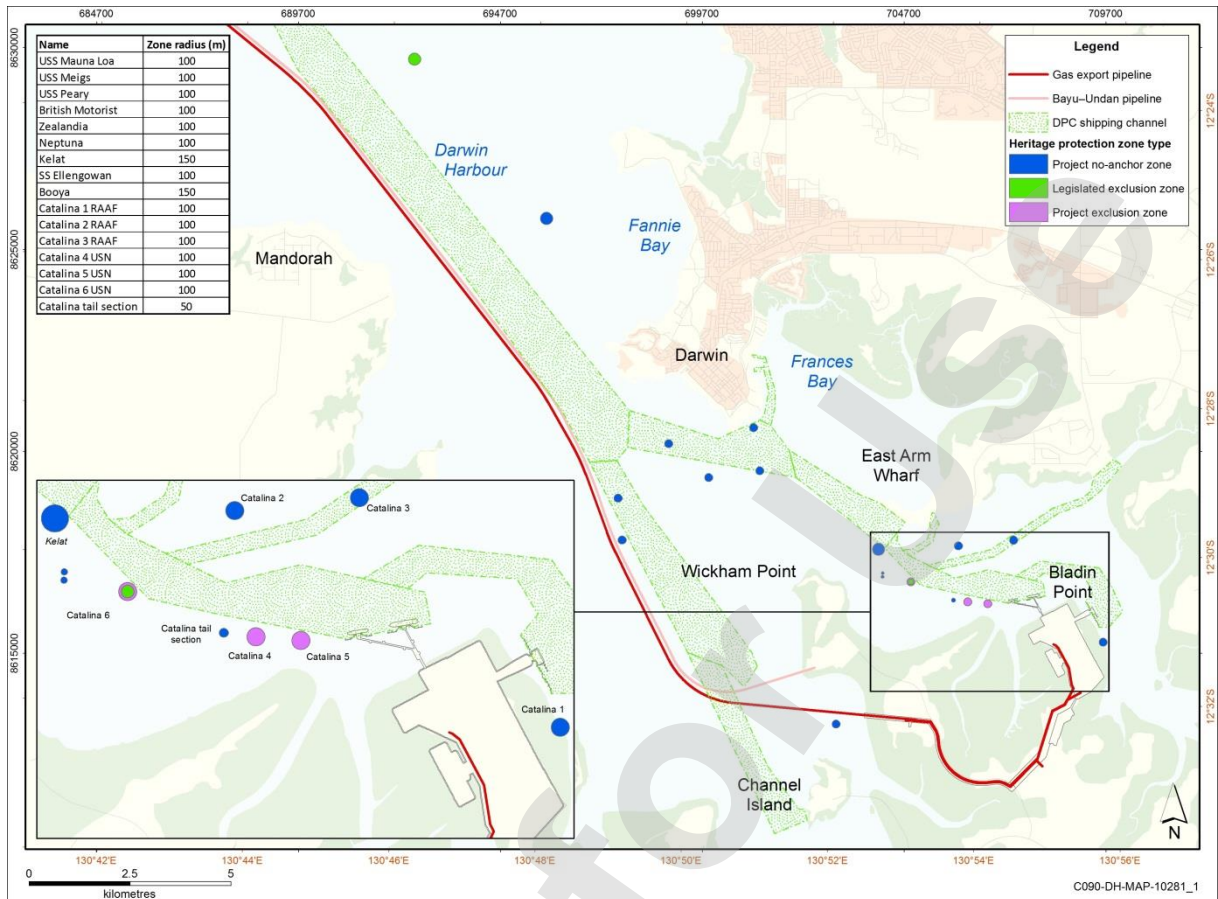
<https://www.amsa.gov.au/marine-environment/marine-pollution/mandatory-marpol-pollution-reporting>

4.21 Fauna Interaction

Environment Protection and Biodiversity Conservation Act 1999 No. 91 (Cth) and related regulations govern cetacean interaction. These laws apply to all vessels including Foreign Flagged vessels within the EEZ of Australia. All vessels shall comply fully with these provisions.

4.22 Heritage Areas

WWII heritage areas have been declared within the Port of Darwin including a number of Catalina Flying Boat wrecks surrounding the Bladin Point Channel and Berthing Pockets. Some of these sites are protected under the NT Heritage Act 2011 and all are subject to Company or legislated exclusion zones, or Company no anchoring zones. Further guidance for Pilots and Tug Masters can be found in the INPEX Operations Non-Aboriginal Heritage Management Plan: Nearshore Operational Area (L060-AH-PLN-60007). Masters and Pilots shall comply fully with these provisions and avoid these zones. Heritage protection zone data files will be provided by Company to Tug Masters for inclusion in tug navigation systems.



4.23 Aboriginal Sacred Sites

Certain islands and shoals within Darwin Harbour contain registered sites protected by the Northern Territory Aboriginal Sacred Sites Act. INPEX activities in vicinity of these sites are governed by an Aboriginal Areas Protection Authority Certificates. Copies of relevant Aboriginal Areas Protection Authority Certificates and data files for navigation equipment will be provided to all INPEX vessels which shall comply fully with certificated provisions and avoiding trespass on these sites.

5 Safety & Security Information

5.1 Incident Reporting

The vessel Master must immediately report to the Terminal Representative all health, safety and environment incidents involving:

- the vessel
- the jetty and Terminal
- Vessel or shore personnel.

The Master must also report any near misses occurring on board the vessel while alongside the Terminal.

Marine incidents MUST be reported to AMSA in the prescribed format. Guidance on making an AMSA Incident Report is available on the AMSA website.

<https://www.amsa.gov.au/vessels-operators/incident-reporting>

5.2 Permit Activities

Vessels are advised that all activities that requires a permit, including diving, confined space entry, working at heights and hot work are not to take place at the Terminal without the approval of the Terminal Representative.

The vessel is to advise the Terminal prior to commencing over the side work.

5.3 Pilot Boarding Arrangements

Owners and Masters are required by Marine Order 21 to ensure that pilot transfer arrangements are in place and carried out in accordance with SOLAS V/23 and IMO Resolution A.1045 (27) "Pilot transfer arrangements"

APPENDIX B: Pilot Boarding Arrangements and IMO Circular MSC.1/Circ.1428 which illustrates the pilot ladder arrangements required by SOLAS V/23

Also refer Section 4.4 Pilotage - for Darwin Port requirements for Pilot Boarding.

5.4 Lifeboat Drills

Although there may be a need to conduct lifeboat drills, for reasons of Terminal safety and security, it is not permitted to put lifeboats into the water whilst at the Terminal unless in an emergency situation. Lifeboat Musters are permitted, with prior approval of the Terminal Representative.

5.5 Vessel Lifting Operations

Use of the vessel's cargo crane while the Marine Loading Arms (MLAs) are connected to the vessel's manifolds is not permitted at the Terminal. This includes during the connection and disconnection processes. For urgent lifting operations whilst the MLAs are connected, the vessel Master shall seek approval from the Terminal Representative.

5.6 Repairs and Maintenance

Repairs and maintenance to the vessels machinery and equipment shall be limited to those items, which do not impair the following:

- Safe and efficient operation of the inert gas system and reliquefaction plants
- Safe and efficient operation of pumproom lighting and ventilation (if applicable)
- Propulsive power, rudder or thrusters
- Firefighting or fire detection capability
- Safe and efficient handling of cargo, ballast, bunkers
- Safe operation and integrity of the mooring system
- Safe operation of electrical equipment in hazardous zones
- Safe operation and integrity of communications equipment
- Safe and efficient operation of the lifting equipment
- Safe and efficient operation of main deck lighting.

5.7 Fire Prevention

Sources of ignition, including smoking, must be carefully managed to ensure they remain separate from hydrocarbons and their vapours.

5.8 Hot Work

Hot work is not permitted whilst alongside the Terminal.

This restriction covers all types of hot work and including, but not limited to, welding equipment, power tools like cutting and grinding equipment, blow torches, soldering equipment, naked lights and non-certified or non-hazardous rated electrical and instrument appliances and test equipment.

5.9 Smoking

Smoking including e-cigarettes at the Terminal is strictly prohibited. Smoking onboard vessels is permitted only in those enclosed spaces that are specifically designated for smoking on the Ship Shore Safety Checklist (SSSC). These designated smoking areas will be agreed with the Terminal Representative.

A maximum of two designated smoking locations are allowed onboard the carrier.

5.10 Matches and Lighters

Matches and or lighters at the Terminal including the product loading jetty are strictly prohibited.

5.11 Funnels

Where applicable, spark arrestors are to be fitted to funnels.

5.12 Air Conditioning

All ventilators through which gas can enter shall be closed and mechanical ventilation shall be stopped if gas is being drawn into the system. Window type air conditioning units must not be used. Normal air conditioning or mechanical ventilation must be used in a mode that maintains a positive pressure sufficient to prevent the ingress of any hydrocarbon gas through doors, ports or hatches which are not gas tight or monitored by gas detectors.

5.13 Accommodation Access

Whilst alongside the Terminal, all vessels shall have all watertight doors closed. One accommodation watertight door shall be selected for vessel's personnel to enter and exit the accommodation.

5.14 Cathodic Protection - Impressed Current Systems

Impressed current cathodic protection systems are to be switched off and isolated whilst the vessel is at the Terminal.

5.15 Vessel Gas Venting

Venting from LNG or LPG cargo tanks is prohibited under normal loading operations whilst at the Terminal. Terminal will connect vapour return Marine Loading Arms (MLA's) for this purpose. Condensate tankers will be permitted to vent via the vessel's mast riser or where no mast riser is fitted, through independent tank vents. Venting shall cease whilst thunderstorm and lightning activities are within close proximity of the Terminal.

See also Section 10.18

5.16 Use of Radar, Radio and Satellite Communication equipment

Whilst the vessel is at the Terminal:

- The main radio transmitting aerial(s) should be earthed and not used.
- VHF radio antennas shall be switched to "low" power.
- Radars shall be switched to "Standby" mode.

This does not include GPS, INMARSAT or V-SAT systems.

5.17 Intrinsically Safe Radios

Only intrinsically safe hand-held radios are to be used within the Terminal and onboard vessels.

5.18 Boiler "Soot" Blowing or Release

Vessels shall not blow down boilers causing "soot" release whilst alongside the Terminal.

5.19 Vessel Readiness

The Master should ensure that the vessel is securely moored alongside at all times. All winches are to be on the manual brake.

Whilst alongside the Terminal, the vessel's main engines and related auxiliaries shall be kept in a state of readiness such that the Vessel can leave under her own power in an emergency.

Masters are directed to Darwin Port Notice 017 - Vessel Immobilisation, for further guidance available on the Darwin Port website

<https://www.darwinport.com.au/facilities-services/compliance-regulations/port-notice>.

At all times whilst a vessel is alongside, there must be sufficient officers and crew on board to deal with any emergencies.

At least one member of the crew must be visible on deck at all times.

5.20 Emergency Towing Off Pennants (ETOPs)

The rigging of Emergency Tow-Off Pennant (ETOP) wires (fire wires) is optional and not mandatory at the Terminal. ETOPs if rigged must be tended frequently to ensure the eye is at least two metres above the water at all times whilst alongside.

Whilst LNG vessels are loading alongside, a port tug remains on standby, on call at 30 minutes notice.

5.21 Fire Fighting Equipment

All firefighting equipment must be in good working order. Fixed firefighting monitors and equipment shall be directed at the vessel's port side loading manifold.

Portable equipment must be correctly positioned in the proximity of the loading side manifolds and ready for immediate use.

Fire control plans shall be positioned port and starboard sides of the vessel and in a predominate location for ready access by shore personnel.

The international shore connection must be prominently identified with connecting flange and bolts ready for immediate use on both the vessel and Terminal.

5.22 Emergency Documents

Before commencing operations, the Master or his deputy shall ensure that copies of the following documents are placed ashore at the head of the gangway:

- a. Cargo handling plan
- b. List of characteristics of cargo onboard and to be loaded, together with position of stowage
- c. Crew list
- d. Vessel's general arrangement plan and vessel's fire safety plan.

5.23 Ship Shore Safety Check List

The ship shore safety check list is to be completed jointly by the Terminal Representative and the Chief Officer or their appointed representative on behalf of the vessel. The safety checklist located at APPENDIX H: is to be completed and signed prior to opening the vessel's manifold valves. Repetitive checks are to be carried out as agreed, but at least every 8 hours and shall be initialled with the time of the check to indicate continued compliance.

5.24 ILNG Terminal ESD System

The primary objective of the emergency shutdown system is to ensure the safety of personnel and to provide protection to plant, equipment and the environment in emergency situations.

The Terminal is equipped with two high integrity, fail-safe, fault-tolerant and redundant emergency shutdown systems ESD 1 and ESD2. Activation of ESD1 will shut down loading while activation of ESD2 will shut down loading and disconnect the loading arms from the ships manifold.

5.25 Reciprocal Emergency Evacuation Arrangement

Vessels alongside a berth should have their offshore gangway swung out and rigged in case required in an emergency.

Should an ILNG site muster occur while a tanker is alongside, the Terminal CCR will inform the vessel Master.

All INPEX personnel (including agents) will remain on the vessel and provide names of facility personnel to the vessel Master / Terminal Representative so they can be accounted for and be removed from the facility's e-muster system.

The vessel Master is responsible for the safety of all personnel on the vessel.

In the unlikely event, the vessel Master orders personnel to evacuate the vessel, all ship personnel and INPEX personnel onboard will muster at the closest safe muster point and keep the Terminal's CCR updated via communications located at the Muster point.

Reciprocal emergency arrangements will be discussed at the pre-load meeting held between the vessel Master and the Terminal Representative. The information provided to the Master must include:

- The site muster evacuation process highlighted in the ILNG Facility Emergency Response Plan - L060-AH-PLN-60002
- A map of the nearest ILNG Terminal muster points for vessel personnel to evacuate to if required.

5.26 Emergency Procedures

Darwin Port has control of incidents including vessel initiated pollution incidents occurring on the water within the limits of the Port. Refer to the Emergency and Crisis Management Plan on the Darwin Port website

<https://www.darwinport.com.au/facilities-services/emergency-cyclone-plans>

The Terminal has control of any incident that occurs at/from the product loading jetties and may initiate emergency response actions through the Emergency Response Team (ERT) in accordance with the ILNG Emergency Response Plan L060-AH-PLN-60002.

External emergency services are able to assist the Terminal with the handling of any incident if requested.

5.27 Safety and Security Zones

Security Zones

The ILNG Terminal is a prescribed Port Facility under the Maritime Transport and Offshore Facilities Security Act 2003 No 131 (Cth) (MTOFSA) and has particular security responsibilities, including having an approved Maritime Security Plan (MSP) that designates landside restricted zones.

Darwin Port is the port operator for the security regulated Port of Darwin. Under MTOFSA, operators of prescribed ports have particular security responsibilities including being responsible for all waterside security measures within the port. For the ILNG Terminal this includes promulgating a water-side restricted zone. Active landside and Waterside security Zones are published on the Darwin Port website.

Masters should consult the latest information which can be found in NT Department of Transport Marine Notices - Bladin Point Closed Waters.

<https://nt.gov.au/marine/marine-safety/notice-to-mariners/port-of-darwin-local-notice>

Safety Zones

Under the Ports Management Act 2015 No. 11 (NT) and related regulations a safety zone can be promulgated around a hazardous activity. Safety zones are controlled by the port operator by way of directions published as local Notices to Mariners.

Directions may include restrictions on entry to the safety area or other measures as necessary to reduce the risk associated with the hazardous activity.

Notices to Mariners containing safety zone directions may be published on the port operator's website and by the Regional Harbourmaster, on behalf of the port operator, on the Northern Territory Department of Transport (DoT) website.

<https://nt.gov.au/marine/marine-safety>

<https://www.darwinport.com.au/facilities-services/compliance-regulations/port-notice>.

5.28 Security Alongside

Vessels should follow the guidelines contained in their Ship Security Plan (SSP) to ensure that an appropriate security level is maintained onboard at all times. Where necessary additional security measures may be outlined in the Declaration of Security (APPENDIX F:) prior to the commencement of loading at the Terminal.

Visiting vessels may be required to exchange a Declaration of Security (DOS) with the Terminal if the vessel operates at a different security level to the Terminal. A DOS is not mandatory (but may be requested) when both the vessel and Terminal are operating at Security Level 1. Vessels should seek information on Terminal operating security levels through their agents.

On arrival the Terminal will provide the vessel with a Waterside Zone Warning Banner which is to be installed by the ship's crew on the Offshore (Seaward) side of the vessel preferably near the manifold area. On completion of loading this banner is to be removed and handed over to the terminal operators.

5.29 Security and Control of Visiting Personnel

The berths within the terminal are contained within a regulated waterside and landside restricted zone. All personnel entering or within the designated area, must comply with security requirements as per the Ichthys LNG Port Facility Security Plan, Ichthys LNG Security Management Plan and the Maritime Transport and Offshore Facilities Security Act (MTOFSA) 2003 including:

- Escorted at all times by a person holding a valid Maritime Security Identification Card (MSIC)
- Carry photo identification at all times or ILNG Access Card (ACS)
- Submit to prohibited items screening of person and bags/equipment as required.

Personnel accessing a vessel from waterside by means of waterside transfer shall comply with the same security requirements as if they were accessing the vessel through the terminal.

In the event of an emergency:

- the MISC escort must proceed with their visitors to the nearest muster point
- swipe their ILNG Access Card (ACS), and
- Communicate the names of the visitors via the muster point intercom system to the control centre.

5.30 Terminal PPE Requirements

All personnel within the Terminal must wear PPE consisting of fire-retardant coveralls, gloves, a hard hat, safety glasses and safety boots.

Personnel who do not comply with these requirements may be denied access to the Terminal.

5.31 PPE Requirements for Transiting Personnel

All personnel transiting the Terminal must wear PPE equivalent to the Terminal PPE requirements (Section 5.30). Onshore Operations will not provide PPE. Personnel who do not to comply with these requirements may be denied access to the Terminal.

Personnel accessing a vessel from waterside by means of waterside transfer shall comply with PPE requirements including, Full length high vis coverall, gloves, hard hat, safety boots and Personnel Flotation Device (PFD).

5.32 Prohibited Items

The use or carriage of weapons and or prohibited items is strictly forbidden at the Terminal. The following items are considered Prohibited at the Terminal

- Lighters
- E-Cigarettes
- Matches
- Vehicle Lighters
- Alcohol
- Fire arms & Ammunition (including replica and imitations)
- Personal Knives
- Fireworks
- Illicit drugs and any type of item that creates open flame or is an ignition source or can be used as a weapon.

Approved Knives for INPEX Sites (Onshore and Offshore)			
Fish Safety F200T (SAP# 10061895)	MARtego (SAP# 10061894)	Gerber EZ Rescue (SAP# 10061893)	Victory Green River Diving Knife (SAP# 10052463)
			

**ALL FIREWORKS
ARE PROHIBITED**



**NO FIREARMS
OR WEAPONS**

**NOTICE
NO ALCOHOL
OR DRUGS ALLOWED**



**NO SMOKING
OR ELECTRONIC
CIGARETTE USE**



**NO LIGHTERS OR
MATCHES BEYOND
THIS POINT**

For on and off signing crew transiting through the terminal, permission to transit prohibited items listed above through the terminal, must be obtained prior from the INPEX Terminal Coordinator or Terminal Representative onboard the vessel.

These items are defined by the Maritime Transport Security Regulations 2003 NO. 366 (Cth) and presented in Table 2. In accordance with these regulations a flare or other incendiary safety device is not a weapon if it is carried on board a ship as part of the ship's safety or signalling equipment.

Table 2 - List of Weapons and Prohibited Items

Weapon	Prohibited Item
1. Bombs and grenades	1. An imitation or replica of a firearm
2. Live rockets or missiles	2. An imitation or replica of a bomb, grenade, rocket, missile or mine
3. Things, other than those included in items 1 and 2: (a) that are, or in the nature of, explosives or incendiary devices; or (b) that contain or expel gas or other irritants (such as tear gas canisters and smoke cartridges), whether or not live	
4. Flame throwers that are of military design, or other devices that are capable of projecting ignited incendiary fuel	
5. Crossbows or other similar devices consisting of a bow fitted transversely on a stock that has a groove or barrel designed to direct an arrow or bolt	
6. Electromagnetic weapons, or other devices made or modified to emit electromagnetic radiation so as to injure or disable a person	
7. Acoustic or light emitting anti-personnel devices	
8. Rocket launchers, recoilless rifles, antitank rifles, bazookas or rocket-propelled-grenade-type launchers	

5.33 Drugs and Alcohol

All vessels must comply with the OCIMF Guidelines for the Control of Drugs and Alcohol Onboard Ships, June 1995. Failure to comply with this guideline may result in the stoppage of cargo operations and disconnection from the Terminal.

The possession of illicit drugs and/or alcohol is strictly prohibited at the ILNG Facility.

Visitors must refrain from the consumption of such drugs/alcohol and adhere to the INPEX Fitness for Work Standard.

5.34 Swimming and Fishing

No fishing, diving or swimming is allowed at the Terminal or from vessels.

5.35 Photography or Electronic Recording Equipment

Use of electronic cameras, video equipment, mobile phones or any other portable electronic device is prohibited at the Terminal or on the open tank deck of the vessel.

The use of such equipment is permitted within the accommodation and engine room spaces of the vessel.

Issued for use

6 Communications

6.1 Harbour Control Darwin Port

Darwin Harbour Control maintains a continuous listening watch on channels 16 (Distress, Safety and Calling) and 10 (primary port operations working channel) - 24 hours a day, 7 days a week. All vessels required to report to Darwin harbour control shall always maintain a listening watch on channels 16 and 10

6.2 Emergency Contact

In the event of a vessel emergency whilst at the Terminal, the vessel is to alert the Terminals Central Control Room (CCR) and Darwin port on VHF Ch.10 immediately. The vessel's and Terminal's Emergency procedures may be enacted with external resources coordinated by the Terminal's CCR.

Should the emergency take place whilst transiting through the port, the vessel's emergency procedures are to be enacted. In both cases the Terminal's CCR should be notified on VHF Ch88.

In case of a total failure of communications, the Terminal will suspend cargo operations until communication is restored.

6.3 Jetty Communication System

PLJ1 - LPG/Condensate

For cargo operations, the primary means of communications is on VHF Ch 87.

UHF Hand held radios may additionally be used for routine communication.

The Terminal also has a Portable Electric System and pendant as the Primary ESD link between ship/shore and a secondary system consisting of a portable radio link for manual shutdown.

PLJ2 - LNG,

The primary communications link between the vessel and the Terminal to manage cargo transfer operations is the Fibre Optic Ship Shore Link (FOSSL)

Secondary communications is via electric Pyle National connection

Tertiary communications is via Pneumatic connection.

UHF Hand held radios may additionally be used for routine communication.

6.4 VHF Radio

Ichthys terminal dedicated VHF frequencies for use within Darwin harbour are:

VHF 87: Cargo and Loading Operations at PLJ No.1 berth – LPG and Condensate

VHF 88: Arrival and Departure Operations at PLJ No.1 and PLJ No.2 berths.

The standby tugs will maintain a continuous watch on VHF channels 16 and 88 and the Terminal UHF frequency. The vessel CCR is required to continuously monitor these channels which are dedicated to the Terminal Operation.

6.5 Standby Tug Contact Details (For PLJ2 only)

The primary means of contacting the standby tug in an emergency is VHF88. Alternatively, the standby tug can be contacted on mobile phone as per the table below.

Tug Name	Mobile Telephone Number
Svitzer Stockton	+61 439 096 900
Svitzer Macquarie	+61 439 089 605
Svitzer Palmerston	+61 408 068 510
Svitzer Stokes	+61 408 118 151

The nominated standby tug will be advised by the Terminal Representative during the pre-load meeting.

Issued for Use

7 Terminal Information

7.1 Vessel Acceptance

All vessels nominated to load at the Terminal will be vetted by INPEX Marine Team, using its Ship Vetting, Inspection and Compatibility Standard X930-AW-STD-60001.

LNG carriers may be visually inspected by an INPEX representative when first nominated.

Once approved, it is the responsibility of the vessel's Master to notify the Terminal, in the event of an incident or accident, which may render the vessel unable to safely berth and load at the Terminal. This notification should be via the Shipping Agent.

At the pre-loading Meeting, the Terminal Representative may request to sight Vessel's documentation to confirm compatibility to safely remain alongside and load at the Terminal. During loading, the Terminal Representative may undertake a Vessel inspection, to determine if the vessel remains suitable to load at the Terminal.

In the event of an incident or non-compliance of the vessel whilst alongside the Terminal, the Terminal Representative may seek clarification and assistance from the vessel's Master to determine the ongoing suitability of the vessel.

All vessel compatibility acceptances are valid for a period of 12 months from the date of the approval, however, may be reviewed prior to this date, especially in the event of a shipboard incident. Vessels over twenty (20) years will be subject to reduced acceptance periods.

INPEX reserves the right to withdraw an approval.

7.2 Bladin Point Channel

The Bladin Point channel commences adjacent to Beacon (B03) and is approximately 1.9 nautical miles in length from the start to the turning basin and dredged to a depth of 13.5 metres.

Note: Masters should consult the latest information pertaining to declared depths prior to arrival which can be found in NT Department of Transport Marine Notices- Declared Port Depths.

<https://nt.gov.au/marine/marine-safety/notice-to-mariners/port-of-darwin-local-notice>

7.3 Turning Basin

The manoeuvring area of the turning basin was dredged to 13.5 metres. The width of the turning basin is approximately 700 metres in diameter.

Masters should consult the latest information pertaining to declared depths prior to arrival which can be found in NT Department of Transport Marine Notices- Declared Port Depths.

<https://nt.gov.au/marine/marine-safety/notice-to-mariners/port-of-darwin-local-notice>

7.4 Jetty Pockets

The LNG, LPG and condensate Jetty pockets were dredged to 13.5 metres.

Masters should consult the latest information pertaining to declared depths prior to arrival which can be found in NT Department of Transport Marine Notices- Declared Port Depths.

<https://nt.gov.au/marine/marine-safety/notice-to-mariners/port-of-darwin-local-notice>

7.5 Standby Tug Requirements

One tug will remain on standby for the duration an LNG carrier is alongside. Standby is defined as within 30mins notice of being alongside the LNG carrier. The Standby tug will maintain listening watch on VHF Ch.88 and may be called upon at any time the master deems that additional tug support may be required e.g. in case of approaching squalls. The Standby tug should be called out by the Terminal Representative on board. The on-call Darwin Pilot should also be notified at this time through Darwin Harbour Control. N.B. this is not a requirement for LPG or Condensate vessels.

7.6 Product Loading Jetties

The ILNG Terminal has two loading jetties - Product Loading Jetty 1(PLJ1) for the export of LPG and condensate; and Product Loading Jetty 2 (PLJ2) for the export of LNG. Arrangements of the Product Loading Jetties are presented at – Appendix K

7.7 Weather Restrictions

Refer 4.2 above. Weather restrictions imposed on vessels whilst alongside the Product Loading Jetties is at Appendix L.

7.8 Terminal Services

Bonding Cable

Not Required

Watchman

A deck watch shall be maintained by the vessel's crew

Bunker Fuel

Not available

Liquid Nitrogen

Not available

Ballast

There are no facilities for treating ballast water at the Terminal. Vessels must arrive with clean ballast only, complying with requirements of Department of Agriculture, Water and Environment (DAWE). For the latest DAWE requirements and forms, vessels must contact their Shipping Agent.

Fresh Water

Not available.

Garbage

The disposal of garbage is not available when alongside Ichthys Terminal berths.

Refer also to Section 4.17. Stores and Provisions

Due to vehicle access restriction and PLJ configurations, providing provisions or stores to vessels is not permitted.

7.9 Visitors

Unless site inducted, visitors to the vessel are to be fully escorted. All visitor including buyers, their representatives or agents, and service technicians are to be nominated via the Shipping Agent to the Terminal Co-ordinator at least 24 hrs prior to arrival.

No waterside visitation is permitted whilst the waterside security zone is in force.

7.10 Shore Leave

Shore leave may be permitted on a case-by-case basis. Requests for shore leave must be made through the Shipping Agent in the prescribed format and received by the Terminal at least two business days prior vessels' arrival. Requests submitted outside this time frame may be declined.

At all times the Master shall ensure sufficient personnel are available onboard to manage an emergency and/or security situation. Masters are also reminded that Terminal undertakes-for cause and random Drug and Alcohol testings at the security gate. Any person registering a non-negative, will not be permitted to enter the Terminal.

Each person going ashore will need to carry government approved photo ID namely photocopy of their passport. INPEX security is authorised to search any person before leaving the Terminal and upon returning.

Full PPE (Coveralls, gloves, helmet, safety glasses and Safety boots) must be worn when transiting through the Terminal. This PPE can be left at the security gate when leaving the terminal. Mobile phones, cameras and personal electronic equipment must be turned off when transiting through the Terminal.

The Shipping agent will arrange for the transport required by the crew for Shore Leave.

7.11 Medical and Dental Assistance

Doctors and dentists are available in Darwin. Any visit to these must be arranged through the Shipping Agent.

For planned visits (excluding emergencies) to a doctor, dentist or medical facility, the Master must advise their Shipping Agent, providing the name of the crew member(s) who requires medical or dental attention. The Agent must submit to the Terminal medical leave documentation along with the medical leave request.

7.12 Crew Change

Refer Section 4.14

7.13 Accommodation for Terminal Representative

The Terminal Representative will board the vessel on arrival and may remain onboard until the completion of loading. Vessel is required to provide suitable single berth cabin accommodation for this period.

7.14 Terminal Maximum Vessel Size Acceptable

	LNG (PLJ2)	LPG (PLJ1)	Condensate(PLJ1)
LOA	345.00m	230.00m	250.00m
Draft	12.10m	12.10m	12.10m
Max Displacement	165,000T	165,000T	165,000T
Max Berth Displ.	165,000T	100,000T	100,000T

Issued for Use

8 Terminal Conditions and Declarations

8.1 Terminal Conditions of Use

Terminal conditions of use are presented at Appendix C. These conditions of use only apply in the absence of a ship shore liability agreement.

8.2 Declarations

Acceptance of Terminal Conditions of Use and Terminal Regulations

Only those vessel Masters not operating under a ship shore liability agreement are required to comply with the Terminal Conditions of Use. Vessel Masters are to declare their acceptance of the Terminal Regulations and Terminal Conditions of Use by completing and signing Appendix C and Appendix D respectively. The vessel must accept the Terminal COU unconditionally with no changes made.

Safety Declaration

All vessel Masters are to complete the Safety Declaration at Appendix E prior to the commencement of loading at the Terminal.

Security Declarations

For all vessels that berth at ILNG Terminal, vessel Masters are to complete the Security Declaration at Appendix F prior to the commencement of loading at the Terminal.

Vessels returning to the Terminal with no changes to security arrangements need only complete the Declaration of Security (DOS) once every 12 months.

Approved Smoking Areas

Vessel Masters are to complete the Approved Smoking Area Declaration at Appendix G prior to the commencement of loading at the Terminal.




9 Berthing Operations

9.1 Spotting Line

The Terminal displays a red day glow inverted triangle spotting plate on the LNG & LPG jetty to which the vessel must align. The Terminal will display a yellow day glow inverted triangle spotting plate on the Condensate jetty to which the ship must align.

The Terminal will advise 24 hours prior to arrival the vessels manifold alignment to the Terminal spotting plate.

9.1.1 Product Spotting Positions

Spotting Plate "Product"	Location	Description
LNG – PLJ2	Marine Loading Arm – B (Vapour)	 <p>Inverted Red Day Glow Triangle</p>
Condensate – PLJ1	Midway between the two Condensate Marine Loading Arms – (western end of jetty)	 <p>Inverted Yellow Day Glow Triangle</p>
LPG – PLJ1	Midway between the two liquid Marine Loading Arms – (east of Condensate spotting plate)	 <p>Inverted Red Day Glow Triangle</p>

9.1.2 Berthing Side

All vessels at ILNG PLJ1 and PLJ2 are berthed port side alongside.

9.2 Mooring Arrangements

The number, diameter and configuration of mooring lines are dependent upon a vessel's size, carrying capacity and environmental limits. Optimoor studies have been performed for classes of vessel likely to berth at the Terminal. These studies are based on OCIMF recommendations and procedures and include OCIMF wind and current coefficients for vessel mooring.

APPENDIX M: provides vessel mooring guidance to Masters based on Optimoor studies while APPENDIX N: shows the associated mooring diagrams

Based on Optimoor studies during the wet season months November–April additional aft spring mooring lines may be required.

A vessel's mooring system will be reviewed as part of the Vessel Clearance process, to ensure compatibility to the Terminal.

9.3 Mooring Procedure & Sequence

The mooring configuration and sequence for running mooring lines will be discussed with the master by the berthing pilot during the Pilot/Master information exchange.

Note: Lines boats are not used and mooring lines are to be run one at a time.

The sequence for transferring the vessels mooring lines ashore is working from amidships towards the stern, aft and towards the bow, forward, that is:

- Forward and aft spring lines first, then
- Breast lines, then
- Head and Stern lines.

The Darwin pilot may change the order for running mooring lines dependent upon environmental conditions at the time.

When within 20 meters of the fenders, the vessel crew will send heaving lines ashore forward and aft. Once received, Terminal personnel attach these heaving lines to the terminal's messenger lines (32 mm diameter polypropylene messenger lines, 125 metres in length).

The vessel's crew heaves these messenger lines on board and attach it to the eye of the jockey stop that is spliced on to the ship's mooring line tail.

The vessel should also attach its own messenger to the same jockey stop, thereby making a continuous connection between the jetty and the offtake tanker.

Once these connections have been made, the crew station on the vessel crew should clearly signal the Terminal mooring team to commence heaving in the mooring line.

The Terminal personnel will then commence heaving the mooring line ashore using the electric pedestal mooring capstan. The vessel's crew must provide sufficient slack both on the mooring line as well as its messenger.

Once the mooring line tail is secured to the jetty mooring hook, Terminal personnel will disconnect the messenger from the jockey stop of the mooring line tail and then connect the ship and shore messengers together. Terminal personnel will then signal the mooring tanker on the offtake tanker to commence heaving in.

The vessel crew will then heave the messengers on board and connect them to the jockey stop of the mooring tail of the next line as described above. This same process is repeated for each of the remaining mooring lines.

During this operation the mooring lines must remain slack until the terminal personnel are clear of the mooring dolphins and give the all-clear to commence tensioning the lines. The vessel officers must ensure this practice is always adhered to.

9.4 Mooring Lines

All vessel mooring lines are to be in good condition and able to be deployed and tensioned directly from dedicated winch drums. The terminal does not allow mooring lines to be made fast on mooring bits or bollards. HMPE mooring lines of similar breaking loads to steel wire rope will be acceptable at the Terminal.

The vessel Master is to ensure that regular checks are made on the mooring lines to ensure they are secure and have an even tension. Once the vessel is all fast, particular attention must be paid to the manifold area to ensure the loading arms do not move beyond the allowed limits due to unplanned vessel movement.

Mixed mooring lines are not permitted at the Terminal.

To assist the vessel crew in continuously monitoring the mooring lines, the Terminal will provide a mooring hook tension monitoring computer to vessels soon after berthing. It is the responsibility of the vessel officers and crew to continuously monitor the tensions and alarms.

The Terminal Representative shall be immediately contacted in the event of excessive mooring line tensions and or the activation of the tension monitoring alarm.

9.5 Mooring Load Monitoring System

A mooring load monitoring system (MLMS), installed at each jetty, provides local display and warns of mooring line tensions for each quick release hook.

Mooring line tension information also displays in the Terminal CCR and on a laptop repeater, which is placed onboard in the vessel's Cargo Control Room. If the vessel is fitted with a Load monitoring computer and permits, the terminal representative will provide the ship with a thumb drive which allows the vessel to monitor this information via their own computer.

9.6 Messenger Lines

The Terminal will provide 32 mm diameter polypropylene messenger lines, 125 metres in length, with an eye spliced at the vessel end.

9.7 Heaving Lines

Provided by the vessel and shall be made of natural fibre rope. Monkey fists are not permitted at the Terminal.

9.8 Ship Shore Access Arrangements

PLJ1 and PLJ2 are each fitted with dedicated telescopic gangways, which automatically adjust to vessel freeboard and tide.

PLJ1 requires a free deck area on a vessel of 3000mm X 2000mm to safely land the Terminal gangway.

PLJ2 requires a free deck area on a vessel of 3200mm X 2500mm to safely land the Terminal gangway.

The LNG Gangway Tower has seven (7) floors with the main control cabin for the LNG loading arm panel located on the 6th floor.

The LPG/Condensate Gangway Tower has six (6) floors and a basement level with the LPG/Condensate loading arm control panel located on the 4th floor.

The height of the lifter, angle and length of the telescopic gangway can be adjusted to accommodate the movement of the vessel.

The nominal horizontal working range of the gangway from the perpendicular on either side On PLJ1 for LPG/Condensate vessels is 13.5 degrees, and on PLJ 2 for LNG vessels is 18 degrees. If the ladder moves beyond the working range, a warning system will be activated and the gangway will auto lift off. In the vertical plane, the operating range of the gangway is 10 degrees up and 20 degrees down from the horizontal. When the gangway reaches these limits, the gangway turntable will change floor levels at the tower.

A turntable is situated on the bottom of the lifter which hydraulically controls the position and angle of the telescopic gangway.

The telescopic ladder is designed with an adjustable length and automatic self-levelling steps.

The bulwark ladder is designed to provide the final access from telescopic ladder to the vessel. The bulwark ladder can rest directly on the vessel's deck or use the strong point on the vessels rail (PLJ2 only). When the bulwark ladder rests on the vessel's deck, the wheels rotate and match the camber of the deck.

The bulwark ladder is fitted with a flashing light, which provides warning that the gangway will soon change tower level or disconnect. Personnel should not transit the gangway whilst the light is activated.

On PLJ2 for LNG vessels, the Gangway structure is fitted with a saddle and outrigger and designed such that in normal operating mode, the saddle rests on the vessels strongback rail.

9.9 Gangway Location

Prior to arrival at the Terminal, Masters shall confirm their vessel has adequate clear deck area as per 9.8 above and is capable to safely receive the Terminal gangway and bulwark ladder, once positioned alongside. The agreed site shall be clear of all deck obstructions, including vents, light towers, wire guides, tank cleaning and ullaging units.

The information below is to provide guidance to vessel Masters, to determine that the bulwark ladder can be safely landed on the vessel's upper deck.

9.10 Product Loading Jetty No.1 (LPG & Condensate)

The centre of the gangway is located at the forward end of the MLAs and will be landed on the tank deck forward of the vessel's portside manifolds. The centre of the gangway is 29.75 meters forward of the LPG Spotting Plate (located midway between LPG liquid loading manifolds) and 17.75 meters forward of the Condensate spotting plate (located midway between Condensate liquid loading manifolds).

9.11 Product Loading Jetty No.2 (LNG)

The centre of the gangway is located at the after end of the MLAs and will be landed on the tank deck aft of the vessel's portside manifolds. The centre of the gangway is located 21.771 metres aft of the LNG spotting line.

9.12 Docking Aid System (Smart Dock)

Both jetties have a docking aid system that receives information from 2 laser sensors installed on each jetty. The System displays information on the jetty mounted display board that can be viewed by the Pilot and Master on an approaching vessel. It displays distance from the berth in metres and approach speed in cm/s.

Maximum berthing speed is 15 cm/s at an approach angle of 10 degrees to the fenders.

9.13 Harbour Pilot Berthing Aid - Trelleborg Pilot Positioning Unit (PPU)

The PPU is a portable explosion proof rated laptop computer with DGPS receivers that provides Pilots with multiple independent information streams.

The Terminal provides Darwin Pilots with a PPU which is linked to the docking aid and mooring and meteorological and oceanographic systems and provides Pilots with real time positioning, docking, mooring load monitoring and environmental information.

Masters are advised that this system is an aid only and should not be the sole source for safe navigation whilst under pilotage with the port limits of Darwin Harbour.

9.14 Mooring Load Monitoring System

A mooring load monitoring system (MLMS), installed at each jetty, provides local display and warns of mooring line tensions for each quick release hook. Mooring line tension information also displays in the Terminal's CCR and on a laptop repeater, which is placed onboard the vessel's CCR.

9.15 Waterside Transfers

There may be occasions that Waterside Transfers are implemented due to various reasons. This will be communicated to the vessel via the Shipping Agent. The vessel will prepare the starboard side gangway for personnel to board.

Personnel transiting to the vessel via waterside transfer are to comply with section 5.29 for security and section 5.31 for PPE requirements as if they were transiting through the terminal.

10 Loading Operations

10.1 Pre and Post Loading Briefings

Pre and post loading meetings will occur between the vessel Master, Chief Officer and the Terminal Representative in order to ensure all relevant information for safe operations is conveyed and agreed. The Pre-Loading meeting agenda is presented in Appendix I. The Post-Loading meeting agenda is presented in Appendix J.

10.2 Loading Plan

At the pre-loading meeting, the Chief Officer must provide the ILNG Terminal Representative with the vessel's cargo loading and ballasting plan for the intended loading operation. This should also include information related to the positive stability and anticipated draughts for the entire operation and include the departure condition of the vessel. Any deviations from the agreed plan during the loading will be brought to the attention of the Terminal Representative.

10.3 Deviations from Agreed Operations

Any deviations to the loading plan must be immediately communicated to the Terminal Representative and mutually agreed before being implemented.

Vessel Masters are reminded they are responsible for the safety of their vessel and Crew, whilst alongside the Terminal.

10.4 Cargo Control Room and Deck Watch Requirements

Throughout loading operations, the vessel's CCR shall be manned by a certificated deck officer, who will be responsible for the safe loading of cargo, communications with the Terminal and monitoring of mooring line tensions.

At least one (1) Crew member shall be stationed on the tank deck, in close proximity of the port side manifolds and shore gangway. Due to the large tidal range at the Port of Darwin, additional Crew members will be required to tend the vessel's mooring lines.

10.5 Inspections Prior to Loading

The Terminal Representative will undertake a Safety Inspection of the vessel on arrival at the berth. In cases where the vessel is found to be sub-standard to terminal and regulatory requirements, the INPEX Terminal Coordinator and INPEX Marine are to be advised immediately prior proceeding.

The Terminal Representative and Vessel's Officer are to complete the Ship Shore Safety Checklist

at Appendix H prior to commencing cargo operations.

The joint declaration must not be signed until all applicable questions result in an affirmative mark in the boxes provided. If a difference of opinion arises on the adequacy of any arrangements made or conditions found, the operation must not commence. These checks should also be repeated at regular intervals, particularly whenever there is a change in normal operations. As far as practicable, Dual checklists should not be used.

10.6 Deck Scupper Plugs

All vessels will ensure that all deck scupper plugs are in place prior to the commencement of loading. During periods of high or torrential rainfall, aft main deck scupper plugs may be removed to prevent overflow, provided a deck watch is in attendance whilst the plug/s are removed and the drained water surface is free from any oil sheen.

10.7 Testing the ESD Systems

All ESD systems with the exception of ESD 2 (disconnect arms) relating to the loading are to be tested prior to commencement of loading operations.

Prior to any ESD function test, the Terminal Representative must ensure that both the vessel and Terminal personnel are fully prepared and an agreement from both parties has been obtained. An ESD Logic test is carried out once the FOSSL / Electrical is connected and powered "on". This is a test signal sent from the Offtake tanker to the Terminal. Warm ESD testing is initiated by the Terminal and is done after the initial Custody Transfer Measurement (CTM) has been carried out by the Offtake Tanker and witnessed by the Terminal Representative and Surveyor.

When the Terminal and Offtake Tanker are ready, ESD valves on the Offtake tanker and the ESD Valves on Terminal's loading headers are opened. The Terminal gives the Offtake Tanker a count down and activates ESD1 shutdown from the shore. The total closure time of the Offtake Tanker's ESD valves must be witnessed and timed for correct operation. This must be greater than 25 seconds but not more than 30 seconds. Terminal ESD valves take between 12-15 seconds to close. As per IGC code, Offtake Tanker ESD valves must close after the Terminal's Shutdown loading valves have closed. This is to avoid any liquid trapped and avoid pressurising the line in case of emergency shutdown.

Once the cool down of the loading arms and the Offtake Tanker's cargo loading lines has been completed and flow in the arms has stopped the Ship will carry out Cold Stroking of its ESD valves.

All personnel in the vicinity of the manifold must move to a safe location.

In case of an ESD 2 activation on LNGC or LPGC, recovery and reconnection of Style 80 will be undertaken whilst vessel is alongside the berth.

A radio ESD transmitter is used on LPG and Condensate vessels. For vessels without a cargo control room, the ESD transmitter is to be situated in a convenient and safe position within the accommodation.

Both ESD systems are 'fail safe' systems, designed to activate shore loading pump shutdown and shore ESD valve closure.

10.8 Testing of Tank High-High Level Alarms

All vessels shall provide evidence of testing of all cargo tank HIGH-HIGH Level Alarms. This shall be validated by the Terminal Representative, prior to the commencement of loading.

10.9 Testing of Tank Venting Systems

As applicable, all vessels shall provide evidence of testing of all cargo tank pressure and vacuum valves. This shall be validated by the Terminal Representative, prior to the commencement of loading.

10.10 Water Curtain/Water Spray System (LNG Carriers)

Prior to opening the vessel's manifold valves the vessels side water curtain shall be brought in to operation by the vessel's personnel.

All other required protection systems in way of tank domes, flanges, valves and superstructure as required shall be operable.

10.11 LNG Manifold Save Alls

ILNG observes the SIGTTO guidelines that recommends the vessel's manifold Save Alls for LNG loading operations to be kept as dry as reasonably practical. Water should not be introduced deliberately or allowed to accumulate during rain to avoid rapid phase transition.

10.12 Spools and Strainers to Vessel's Loading and Vapour Lines (LNG Carriers)

The vessel shall present at ILNG with its short distance pieces (SDP) fitted to its liquid loading and vapour return manifolds as nominated by the Terminal. SDP's are to be compatible with a DN400 (16") ANSI 150 lb presentation flange for connection to the Terminal's QCDC.

A 60 mesh cargo manifold loading strainer (or dual flow strainer) is to be installed within each of the vessels' nominated loading lines. This applies every time the vessel connects to carry out either a gas up, cool down or loading operation at the Terminal.

Where an SDP or strainer is found to be damaged prior to arm connection, the loading is to be delayed until the item is replaced.

On occasions Terminal may require 200 mesh cargo loading strainers to be installed within each of the nominated loading lines. The Terminal will supply these 200 mesh strainers if the vessel is not in possession of them which can then be lifted onto the carrier using their crane. The fitting of the strainers is to be carried out by the ship's crew.

10.13 Connection of Loading Arms

The loading arms will be manoeuvred and connected by Terminal operators. The vapour return will be connected first followed by the liquid arms. The vessel will be responsible for arriving with the "short distance spool pieces" (if so equipped) and loading strainers in place and removing the vessel's manifold blank flanges. Following connection, the loading arms will be pressure/leak tested with nitrogen (N₂) supplied by the Terminal to 500 kPa and the Vapour arm to 200 kPa and inerted. Additionally, a 10 minute nitrogen sweep is performed in each loading arm to remove any possible moisture.

The Terminal Representative must be satisfied that these tests have been satisfactorily completed before cargo operations can commence.

The Terminal will provide the manifold gasket, which is situated between the vessel's manifold and the Terminal's MLA QC/DC.

10.14 Tank Gauging

Gauging will be performed as described at 10.15, 10.16 and 10.17 as applicable, subject to witness and verification by an independent third-party quantity surveyor. Opening CTM for LNG vessels

The sequence for gauging is as follows:

- After vapour arm connected and purged or all MLAs connected and purged
- Stop gas burning and low duty compressor OFF
- Open CTM
- Open vapour ESD valve.

10.15 LPG Vessels

Tank gauging will be by the tank level gauge on the tank dome.

10.16 Condensate Vessels

Manual gauging will be done of each cargo tank via the vapour lock, using an Ullage & Temperature Instrument (UTI).

10.17 Cargo Handling

The Terminal operates under strict environmental emission conditions. Close co-operation between the loading vessel and the Terminal is necessary in order to comply with these conditions.

10.18 Normal Loading

On completion of the loading arms purge and pressure tests, the vessel Chief Officer and Terminal Representative must agree all systems are correctly lined up and ready.

The vessel's vapour return manifold can then be opened, and tank pressure returned ashore via free flow or high duty compressor if required.

During loading operations, vapour pressures will be managed on board. If vapour pressures on the vessel cannot be adequately managed, at the discretion and instruction of the Terminal Representative, the vessel Master MUST immediately reduce cargo loading rates and/or commence vapour return to Terminal.

Note: Vapour return lines will not be connected for condensate loadings.

10.19 Inerted Condition

All Vessels

Vessels shall arrive at the Terminal with all cargo tanks at a positive pressure and inerted with less than 8 percent oxygen by volume.

On Condensate vessels, independent third party surveyors and/or the Terminal Representative will randomly test the oxygen content in vessels cargo tank.

LNG Carriers

The vapour return line is lined up to the tankage flare until the gassing up of the vessel's tanks and pipeline systems has been completed.

10.20 Gassing Up Operations (LNG Carriers)

Gassing up of the vessel's tanks will be by displacement. LNG liquid is taken through the cool down lines and the LNG vaporiser to the vessel's tanks through the vapour lines into the top of the tanks. The inerted vapours is displaced through the LNG liquid and vapour return lines.

The vessel specifies to the Terminal the liquid flow required and the entire gassing up plan should be discussed at the Pre-Start meeting with the Terminal Representative.

Gassing up will require only one loading arm to be used and cooled at this stage.

For vessels arriving in CO₂ condition:

- Target: CO₂ content measured on terminal's vapour line is less than 150 ppm; and

For vessels arriving in 100% nitrogen condition:

- Cooldown can commence whilst vapour flowing through to the Tankage Flare System.
- Target: More than 95% methane by volume i.e. less than 5% nitrogen.

Towards the end of the gassing up operation there may be short periods where the makeup of the vapour return will rapidly change from inert gas to LNG vapour and back to inert gas as the vessel displaces inert gas in the pipeline system. Consistent LNG vapour return may not occur until the end of the operation.

The vessel will keep the Terminal informed with regard to the status of the gassing up operation utilising on-board sampling (hydrocarbon content).

10.21 Cooling of Loading Arms and Vessel's Pipeline System (LNG Carriers)

Under normal loading operations, the vessel will arrive at the Terminal with its tanks cold, ready for loading and with its loading lines and manifold at ambient temperature.

The vessel and Terminal CCR shall confirm:

1. The vessel is ready to accept liquid and return vapour through the loading arms.
2. The Terminal is ready to commence cool down of the loading arms.

When both parties have confirmed readiness, the vessel will request the Terminal to commence cool down. Liquid loading arms will be cooled down simultaneously by means of the cool down controller valves. Cool down flow rate is regulated to approximately 15-20m³/hr on each arm until the LNG has reached the apex of the loading arms. The terminal will then inform the ship that it will flood the loading arms at approximately 100 m³/hr on each loading arm. Once the Offtake vessel is satisfied that its lines have cooled down, the terminal will be requested to stop the flow to the ship and carry out Cold Stroke test of manifold ESD valves prior to commencing loading.

10.22 Cool Down of Vessel's Cargo Tanks (LNG Carriers)

After gassing up the vessel's tanks and pipeline system, cool down of the vessel's spray piping system may commence. Once this is completed, the vessel may request adjustments of the liquid flow rate to cool down the cargo tanks.

At the end of cool down of the vessel's tanks, liquid flow will be stopped and Cold Stroke test of manifold ESD valves is conducted prior to commencing loading.

The Terminal may require an adjustment in cool down rate to meet environmental flaring requirements.

10.23 Gassing Up/Cooling Down Service Fee

Vessels should arrive at the Terminal with their tanks cold (i.e. no warmer than -110°C) and be ready for loading. If a vessel requires gassing up or cooling down before loading, then the Terminal's written approval is required prior to arrival. Buyers shall use reasonable endeavours to minimise requests for gassing up and cooling down requests (including cool down only).

The Terminal reserves the right to reject gassing up / cool down requests that are not expressly provided for in the relevant Buyer's SPA or confirmation notice.

If Terminal approval is granted and the gassing up and/or cooling down operation is beyond a Buyer's free Gassing Up and Cooling Down Rights under its SPA or confirmation notice (as relevant) then a nominal charge (the "GU/CD Service Fee") is payable for any gassing up and cooling down services supplied to a vessel.

For the avoidance of doubt the GU/CD Service Fee is payable if a gassing up and/or cooling down operation is supplied to a vessel in connection with spot/excess cargo.

The GU/CD Service Fee is not payable if the gassing up or cooling down operation is in connection with a free Gassing Up and Cooling Down right as per the relevant Buyer's SPA.

The GU/CD Service Fee is:

1. two hundred thousand dollars 200,000 USD (plus GST)
2. the same for a combined gassing up/cooling down operation or a cooling down operation only
3. shall be invoiced to the vessel or its Shipping Agent and payment is due within 30 days from the date of issue of the invoice; and
4. payable in addition to the LNG supplied to the vessel for the gassing up and/or cooling down operation days from the date of issue of the invoice.

The GU/CD Service fee is subject to periodic review and may be adjusted without prior notification.

10.24 Loading

All loading activities will be at the discretion of the vessel. The Terminal CCR may require stopping loading at any time due to Terminal operational requirements.

The Terminal is responsible for measuring the pressure differentials across the strainers fitted in the shore system. Any abnormal change in the differential pressure indicating a blockage or failure of any strainer is a potentially serious matter and loading is to be reduced through the marine loading arms until the cause is ascertained and rectified. Pressure comparisons commence at the start of ramp up, every rate change and continue hourly when loading at full rate.

Every hour during the loading, the vessel shall inform the Terminal of the quantity received, loading rate, manifold pressure and expected ramp down time.

In the event of a trip of the loading pumps, the Terminal shall not resume loading until the vessel has confirmed loading can resume.

In the initial stages of loading, the vessel and Terminal will monitor the loading rate, to ensure the need to flare excess return gas is minimised.

Throughout the loading operation, the vessel shall provide a minimum of 60 minutes' notice to the Terminal for any changes or requirements which affect the loading operation. This is especially critical during topping off of cargo tanks.

The Terminal shall keep the vessel informed when loading pumps are stopped, started or when a loading line up or rate is changed.

The vessel will keep the Terminal informed of any changes in the vessel's cargo line up.

During loading the vessel must pay particular attention to:

- a. Any signs of leaks of the loading arms at the manifold and on the ship's cargo deck.
- b. Vessel's drift and tension of the mooring lines.
- c. Gangway position
- d. Differential pressure at the manifold.
- e. Any craft approaching the vessel within 500m zone.
- f. Vessel shall not be trimmed by the head or have excessive stern trim i.e. $0.015 \times \text{LOAm}$) during Deballasting operations.

10.25 Prevention of Free Flow of Liquid

To prevent free flow of liquid to the vessel at either the start or end of loading, the Terminal may close the main loading control valves. These valves may be opened at the commencement of forward flow and closed when vessel requests loading to stop.

10.26 Prevention of Roll-over

Vessel Masters are reminded of the potential of cargo roll-over when the density of the on-board heel is significantly different to the density of cargo loaded at the Terminal.

Requests for any special operation, particularly for vessels arriving with a large heel of largely varying composition as compared to the one to be loaded, need to be communicated with the Terminal on departure from vessels' last port prior arrival at Ichthys Terminal. Information provided is to include heel quantity on board and GHV. The Master is required to submit a risk assessment for such operation, addressing mitigations in place for the risks involved.

Any concerns regarding the potential of Roll-over shall be discussed with the Terminal Representative at the Pre-load meeting.

10.27 Cargo Start -Up and Topping Off

It will be the responsibility of the vessel to communicate start-up and topping off loading rates. The Terminal may be able to accommodate loading rate increments of $1,000\text{m}^3/\text{hr}$.

The Terminal will require a minimum of 60 minutes' notice for cargo loading rate changes and ramping down.

10.28 Draining of the Marine Loading Arms

On completion of loading, the ship shore link should be switched to "Inhibited" mode and the Terminal liquid loading valves and vessel's liquid loading double shut valves are to be closed.

Vessel valves should not be shut until the Terminal has confirmation that shore valves are shut and jetty operator has confirmed a pressure relief path has been created on the jetty.

The liquid MLA will be drained and purged sequentially in the following manner.

The Terminal may admit nitrogen and pressurise the loading arms to approximately 500 kPa. The Terminal may then drain back the shore side section of the loading arm together with associated systems to ashore. The MLA will then be de-pressurised.

The MLA is to be re-pressurised with nitrogen and the vessel will open their manifold valves allowing the nitrogen to displace the liquid in the shipside section of the MLA to the vessel's cargo tanks. This "piston purge" is carried out at least 3 times before a check to ascertain whether the MLA is liquid free is done by opening the drain valve on the bottom of the manifold.

Upon completion of the draining of the MLAs, the arms should be purged with nitrogen until a hydrocarbon content of <2% by volume or less than 40% lower explosive limit (LEL) is achieved.

The vapour return line must remain open to shore throughout the liquid arm draining. Once the liquid arms have been drained and purged and with the mutual agreement of both the Vessel and the Terminal, the vapour return valves may be closed and the vapour return arm purged with nitrogen to achieve a hydrocarbon content of <2% by volume.

10.29 Disconnection of Loading Arms

On completion of draining and purging of the liquid and vapour loading arms, the arms shall be disconnected by the Terminal operator.

The Terminal is responsible for fitting the blanks to the liquid loading and vapour return arm flanges.

The vessel is responsible for fitting blanks to the vessel's manifold(s). If Terminal supplied spool pieces and strainers have been used, these may be disconnected by the vessel and landed onto the jetty using the ships crane with permission from the Terminal Representative

The strainers shall be inspected by a Terminal Representative and confirmed clear of debris or damage. Any debris should be collected and both parties given a sample for analysis.

The inspection shall be recorded in either event.

10.30 Measurement, Sampling and Testing

Unless otherwise agreed in writing, all LNG loaded (inclusive of the energy delivered and the combustion and volumetric reference conditions) shall be measured in accordance with Appendix O.

10.31 Final Measurement of Cargo

The final quantity of cargo on board shall not be measured until after all of the vessel's manifold valves have been closed and manifold and loading lines have been drained to the vessel's cargo tanks. An independent surveyor will verify cargo quantity and quality.

11 Product Loading Jetty Information

11.1 Product Loading Jetty No.1 - LPG

Shore Tank Capacity

Propane 1 x 85,000 m³ (Nett working capacity)

Butane 1 x 60,000 m³ (Nett working capacity)

Loading Rates

Maximum is 2,500m³/hr each loading arm.

Marine Loading Arms

The PLJ1 is fitted with two 300mm (12") LPG loading arms and two 300mm (12") vapour return lines. Each arm is dedicated to one product.

Propane (P) is delivered through No.2 MLA and Butane (B) through No.3 MLA.

The loading arms configuration from forward to aft is:

Vapour (P) - Liquid (P) - Liquid (B) - Vapour (B) (VLLV)

Note: Only VLLV manifold configuration carriers will be acceptable, and LPG Carriers shall be capable of loading Propane and Butane concurrently. Terminal's Loading arm configuration is not interchangeable.

Loading arms are equipped with hydraulic QCDC couplings designed to fit the ANSI 150lb Liquid 300mm and Vapour 300mm presentation flanges. Dry break couplings are also fitted to both liquid and vapour lines in case of ESD2 activation.

In the event of ESD2 activation valves on the MLA's close and a hydraulic clamp between the valves opens allowing both sides of the manifold to seal and the MLA to swing clear of the manifold area.

On hearing an ESD2 Activation Alarm (a horn and bell with a visual beacon), all personnel should immediately vacate the manifold area. Some product may be released to atmosphere as the MLAs separate from the vessel's manifold.

ESD activation can be initiated either manually from the shore or automatically by the vessel moving out of the loading arm envelope.

The LPG loading arms working envelopes are asymmetric.

The loading arms are designed to be manoeuvred in wind speeds of up to 38.8 knots (Operating). Loading should be stopped and arms disconnected, parked and locked in if sustained wind speeds of over 35 knots (10 minute average) are anticipated.

Connection of Loading Arms

The loading arms will be manoeuvred and connected by the Terminal Operator and once connected they will advise the Terminal Representative that the arms are connected and will pressure test the connections with nitrogen. The Liquid arms will be pressure / leak tested to 500 kPa and the vapour arms pressure / leak tested to 200 kPa, When the connections have been satisfactorily tested, the loading and vapour arms will be de-pressurised to the atmosphere.

Cargo Measurement

The LPG jetty design basis does not assume the handling of vessels with inerted or contaminated cargo tanks, or with tanks containing warm LPG vapour.

As the custody transfer for all LPG loadings is based on vessel figures, it is essential that the vessel's arrival heel is ascertained before any cargo operations commence.

Sampling of Propane and Butane is done at the Terminal, using a grab system to sample the streams in conformance with ASTM D1265 (Standard Practice for Sampling Liquid Petroleum Gases – Manual Method).

Vessel's tanks will be gauged on arrival and the Terminal Representative must be satisfied that all survey requirements have been met before any manifold valves are opened.

Measurement and Sampling shall be witnessed and verified by an independent surveyor, agreed upon by Seller and the relevant Buyer.

11.2 Product Loading Jetty No.1 - Condensate

Loading Rates

2,500m³/hr each loading arm

Maximum 4,500m³/hr – two arms

Shore Tank Capacity

Tank 1 1 x 60,000m³ (Net Working Capacity)

Tank 2 1 x 60,000m³ (Net Working Capacity)

Tanks 3 (Buffer Tank) 1 x 6,500m³ (Net Working Capacity)

Marine Loading Arms

There are two 300mm (12") condensate loading arms for loading condensate on the PLJ1 Jetty.

Vessels should present with two 300mm manifold connections, they should be clean free of corrosion and have flat faces ready for connection to a QCDC coupling.

The Condensate loading arms working envelopes are asymmetric.

The loading arms are designed to be manoeuvred in wind speeds of up to 38.9 knots (Operating). Loading should be stopped and arms disconnected, parked and locked in if sustained wind speeds of over 35 knots (10 minute average) are anticipated.

Connection of Loading Arms

The connection at the tanker manifold is by QCDC which have been designed to adapt to tanker flanges of 300 mm (12") and 400 mm (16") Class ANSI 150 lb.

The loading arms will be manoeuvred and connected by the Terminal operator and once connected they will advise the Terminal Representative that the loading arms have been connected and will pressure test the connections with nitrogen. The liquid arms will be pressure / leak tested to 500 kPa, When the connections have been satisfactorily tested, the loading arms will be de-pressurised.

Cargo Measurement

The onshore tank measurement system is the primary measurement. An independent surveyor will verify cargo quantity and quality and custody of the product will take place at vessel's manifold.

11.3 Product Loading Jetty No.2 - LNG

Shore Tank Capacity

Tank 1 = 165,000m³ (working volume)

Tank 2 = 165,000m³ (working volume)

Loading Rates

Maximum flow rates (m³/hr) for the loading arms:

1 Liquid Arm 5,000 m³/hr

2 Liquid Arms 9,500 m³/hr (331 kPa at manifold pressure)

3 Liquid Arms 12,000 m³/hr (331 kPa at manifold pressure)*

*Likely pressure will be marginally greater than 331 kPa at this loading rate.

The Terminal's normal mode of operation is to load through two MLAs.

Vapour Return Capacity

The terminal can handle around 30,000 m³/hr vapour return from the vessel.

Marine Loading Arms

Loading arms configuration from forward to aft is:

Liquid - Vapour - Liquid or Vapour - Liquid

Loading Arm Limits

The Condensate loading arms working envelopes are asymmetric. Vessel is spotted on the berth within optimal connectivity within the LNG MLA operating envelopes.

Connection of Loading Arms

The loading arms will be manoeuvred and connected by the Terminal operator and once connected they will advise the Terminal Representative that the arms are connected and will pressure / leak test the connections with nitrogen. The Liquid arms will be pressure / leak tested to 500 kPa and the vapour arms pressure / leak tested to 200 kPa, When the connections have been satisfactorily tested, the loading and vapour arms will be de-pressurised to the atmosphere.

Cargo Measurement

As the custody transfer for all LNG loadings is based on vessel figures, it is essential that the vessel's arrival heel is ascertained before any cargo operations commence. LNG cargo in the vessel's cargo tanks will be gauged on arrival and the Terminal Representative must be satisfied that all survey requirements have been met before any manifold valves are opened.

Volumes of LNG loaded will be determined by gauging the LNG in the cargo tanks before and after cargo loading using the vessel's Custody Transfer Measurement System (CTMS). The result of cargo volume measurement and calculation shall be verified by an independent surveyor.

See also 10.2.5 Measurement, Sampling and Testing.

12 Departure Operations

12.1 Main Engine Preparation and Readiness

Preparation for departure can commence approximately one hour (90 minutes for steam turbine ships) prior to the agreed sailing time. It is permitted to test the main engine on air/steam, prior to the removal of the MLAs and gangway, however any main engine test with fuel, will not be allowed until MLAs and gangway have been disconnected/removed.

Vessel radars should remain on "standby" until the vessel is ready to depart the Terminal.

12.2 Shipboard Documents

The vessel Master at post-loading meeting provides:

- the CTM reports before OBQ and after loading,
- the port timesheet, and
- the original signed NOR
- Letters of Protest (if any) and/or Statement of facts (if any)

The Terminal Representative signs and receives these documents on behalf of the Terminal.

12.3 Terminal Documents

The Terminal shipping documents are normally generated after the vessel is ready to sail from the Terminal. To avoid delay the Terminal implements Early Departure Procedure (EDP), where once completed, these documents are signed by the vessels authorised representative (usually the Shipping Agent) on the Master's behalf and forwarded electronically to the vessel's Master by the vessels authorised representative. To enable EDP to occur, the vessel's authorised representative shall obtain written consent from the Master of their acceptance of EDP at the Terminal prior to the commencement of loading.

12.4 Removal of Gangway

The gangway may be removed on confirmation of all Terminal personnel are ashore and that the FOSSL is disconnected. A responsible vessel crew member should be standing by to assist if any problems during lifting of the gangway emerge which may require action from the vessel.

12.5 Pilot Arrangements

The Darwin Port pilot may embark the vessel from the water side via the outboard accommodation ladder.

12.6 Unmooring and Departure

Tugs may be made fast to the vessel prior to the commencement of unmooring operations. The sequence of mooring line let go is to be agreed between the Master and Pilot and transmitted to the Terminal mooring Crew prior to commencement of unmooring.

APPENDIX A: INFORMATION IN ETA NOTICE AND NOTICE OF READINESS

No.	Items to be displayed in ETA Notice and NOR Content Signer	LNG *								LPG								Condensate							
		Departure of Last Port	96 Hrs	48 Hrs	24 Hrs	12 Hrs	Final (5)	NOR		Departure of Last Port	72 Hrs	48 Hrs	24 Hrs	Final (12)	NOR		Departure of Last Port	72 Hrs	48 Hrs	24 Hrs	Final (12)	NOR			
								Tendered	Accepted						Tendered	Accepted						Tendered	Accepted		
Master	Master	Master	Master	Master	Master	Master	Master	Seller's Rep	Master	Master	Master	Master	Master	Master	Seller's Rep	Master	Master	Master	Master	Master	Master	Seller's Rep			
1.	Vessel's name and IMO number	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓			
2.	Cargo Number	✓	✓	✓	✓	✓	✓	✓																	
3.	Date / time of departure Last Port (UTC +9.5hrs)	✓								✓							✓								
4.	ETA Loading Port (UTC +9.5hrs)	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓			
5.	Estimated arrival draught at Loading Port (Fore & Aft)	✓								✓							✓								
6.	Estimated departure draught at Loading Port (Fore & Aft)	✓								✓							✓								
7.	Discharge port (or place)	✓								✓							✓								
8.	Remaining LNG heel quantity at discharge port (m3)	✓																							
9.	Estimate LNG heel quantity at NOR tender (M3)	✓																							
10.	Requirement for gassing up/cooling down (hours)	✓																							
11.	Remaining Propane and Butane heel quantities at discharge port (m3)									✓															
12.	Remaining Propane and Butane heel quantities at NOR tender (m3)									✓															
13.	Estimated Crude / Condensate ROB at NOR tender (M3)																			✓					
14.	Estimated cargo volume to be loaded (m3)	✓								✓							✓								
15.	Ship maximum loading rate (m3/hr)	✓								✓							✓								
16.	RoB & type of fuel oil at arrival Loading Port	✓								✓							✓								
17.	Any vessel deficiencies affecting vessel performance	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓			
18.	Any vessel security level	✓								✓							✓								
19.	Spare part provisions or repairs required, if any	✓								✓							✓								
20.	Crew change, if any	✓								✓							✓								
21.	Darwin shipping agent's contact	✓								✓							✓								
22.	Confirm vessel manifolds sized and ready to accept Terminal Loading Arms	✓								✓							✓								
23.	Advise any other vessel operations whilst at the Terminal	✓																							
24.	Master's Full Name	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		
25.	Vessel position (Lat / Long)		✓	✓	✓	✓	✓				✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓		

No.	Items to be displayed in ETA Notice and NOR Content Signer	LNG *								LPG						Condensate							
		Departure of Last Port	96 Hrs	48 Hrs	24 Hrs	12 Hrs	Final (5)	NOR		Departure of Last Port	72 Hrs	48 Hrs	24 Hrs	Final (12)	NOR		Departure of Last Port	72 Hrs	48 Hrs	24 Hrs	Final (12)	NOR	
								Tendered	Accepted						Tendered	Accepted						Tendered	Accepted
Master	Master	Master	Master	Master	Master	Master	Master	Seller's Rep	Master	Master	Master	Master	Master	Master	Seller's Rep	Master	Master	Master	Master	Master	Master	Seller's Rep	
26.	Total distance run (from discharge port)		✓	✓	✓						✓	✓	✓					✓	✓	✓			
27.	Distance in last 24 hours		✓	✓	✓						✓	✓	✓					✓	✓	✓			
28.	Average speed in last 24 hours		✓	✓	✓	✓	✓				✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	
29.	Distance to go to Loading Port		✓	✓	✓						✓	✓	✓					✓	✓	✓			
30.	Last Port of Call		✓								✓							✓					
31.	Tank Conditions (Cold, Gass Free, etc.)		✓								✓							✓					
32.	Confirm ballast water exchange has been carried out				✓							✓								✓			
33.	Unobstructed area for landing shore gangway				✓			✓				✓		✓						✓		✓	
34.	Confirm free pratique received (Y/N)				✓							✓								✓			
35.	Estimate cargo tanks (equator ring or vapour) temperature on arrival				✓							✓								✓			
36.	Confirm the following are fully operational and available:				✓							✓								✓			
	A) Navigation, mooring, anchoring, communications, safety and engine system (Y/N)				✓							✓								✓			
	B) Bow Thruster, if fitted (Y/N)				✓							✓								✓			
	C) Cargo system and boil off control system (Y/N)				✓							✓								✓			
	D) Nitrogen or Inert Gas Generation System (Y/N)				✓							✓								✓			
	E) Gas detection system (Y/N)				✓							✓								✓			
	F) ESD system, alarms and interlocks (Y/N)				✓							✓								✓			
	G) Cargo tank high level alarms and interlocks (Y/N)				✓							✓								✓			
	H) High and low-pressure alarms (Y/N)				✓							✓								✓			
	I) Remotely operated cargo valves (Y/N)				✓							✓								✓			
	J) Time closure of manifold ESD valves (seconds)				✓							✓								✓			
	K) Manifolds are in good condition and ready to accept loading arms (Y/N)				✓							✓								✓			
	L) Terminal compatible, short distance pieces fitted at portside manifolds (Y/N)				✓							✓								✓			
37.	Date and Time (UTC + 9.5 hours)							✓														✓	
38.	Average of (equator ring or vapour) temperature for cargo tanks on arrival							✓														✓	
39.	Average tank pressure (kPa) (12kPa)					✓	✓	✓															

* LNG carriers must send 12-hour and 5-hour pre-arrival notices based on the expected Pilot Onboard (POB) time.

APPENDIX B: PILOT BOARDING ARRANGEMENTS

REQUIRED BOARDING ARRANGEMENTS FOR PILOT

In accordance with SOLAS Regulation V/23 & IMO Resolution A.1045(27)

INTERNATIONAL MARITIME PILOTS' ASSOCIATION

H.Q.S. "Wellington" Temple Stairs, Victoria Embankment, London WC2R 2PN Tel: +44 (0)20 7240 3973 Fax: +44 (0)20 7210 3518 Email: office@impahq.org

This document and all IMO Pilot-related documents are available for download at: <http://www.impahq.org>

RIGGING FOR FREEBOARDS OF 9 METRES OR LESS

HANDHOLD STANCHIONS
Min. Diam. 32mm
Min. 120cm
Above Bulwark

Handholds Min. 70cm
Max. 80cm

HAN-ROPEs (without knots)
Min. Diam. 28mm
Max. Diam. 32mm
IF REQUIRED BY THE PILOT

SIDE ROPES
Min. Diam. 18mm

ALL STEPS
Must rest firmly against ship's side

SPREADER
Min. 180cm Long

MAXIMUM 9 STEPS
Between spreaders

Min. 40cm

31-35cm

5th STEP
From bottom must be a spreader

6 METRES unobstructed ship's side

Height Required by Pilot

COMBINATION ARRANGEMENT FOR SHIPS WITH A FREEBOARD OF MORE THAN 9 METRES WHEN NO SIDE DOOR AVAILABLE

PILOT LADDER
Must extend at least 2 metres above lower platform

Ladder must be firmly attached to ship's side 1.5 metres above accommodation platform

ACCOMMODATION LADDER
Secured to ship's side

Maximum 45° slope

Should lead aft

Lower platform horizontal

The lower platform shall be a minimum of 5 metres above the sea

A pilot ladder requires a climb of not less than 1.5 metres and no more than 9 metres

Recommended 2 metres horizontal mark

0.5m

2m

2m

STERN BOW

Accommodation ladder should be secured to ship's side

(Using eyespind, magnetic or pneumatic system)

NO!
No shackles, knots or splices

NO!
The steps must be evenly spaced

NO!
The steps must be horizontal and checks under the steps must be tightly secured

NO!
Spreaders must not be lashed between steps

NO!
Side ropes must be evenly spaced

NO!
The steps should not be painted, dirty or slippery

NO!
Loops and tripping lines present a tripping hazard and foul the Pilot Ladder

Handhold stanchions rigidly secured to deck

Responsible Officer in contact with bridge

Lifeline with self-lighting light

Bulwark & Pilot ladder secured to deck strong points

PILOT LADDER WINCH REEL

A

Handholds Min. 70cm
Max. 80cm

Minimum Clearance 220cm

Pad eye

NO OBSTRUCTIONS
Min. 91.5cm

B

All pilot ladder winch reels should have a means of prevention from being accidentally operated.

The brake and lock must be operative on manually operated winches.

Power winches must have an operative safety device to lock the winch in position.

Minimum Clearance 220cm

Handholds Min. 70cm
Max. 80cm

Minimum 91.5cm

C

Side opening

Minimum Clearance 220cm

Handholds Min. 70cm
Max. 80cm

75cm

75cm

Minimum 91.5cm

Ship's side doors used for transfer should not open outward

APPENDIX C: TERMINAL CONDITIONS OF USE

THIS DEED POLL IS DATED

.....

GIVEN BY:

(A) **THE VESSEL INTERESTS** (AS DEFINED BELOW); and

IN FAVOUR OF:

(B) **PROJECT INTERESTS** (AS DEFINED BELOW)

IN RELATION TO THE FOLLOWING VESSEL:

MV (the "**Vessel**")

IT IS AGREED AS FOLLOWS:

Terminal Conditions of Use

1. DEFINITIONS AND INTERPRETATION

1.1 Definitions

In this Deed, unless the context otherwise requires:

'Affiliate' means in respect of any Person (the '**Relevant Person**'), a person that directly or indirectly controls or is controlled by the Relevant Person or is, together with the Relevant Person, under the common direct or indirect control of another Person, for which purpose **'control'** shall mean beneficial ownership of fifty percent (50%) or more of the voting shares of a company or other entity or of the equivalent rights to determine the decisions of such a company or other entity;

'Day' means a period of twenty-four (24) consecutive hours starting at 00:00 hours:

- (a) in the case of obligations related to the Loading Port or the Loading Facilities, Darwin time; and
- (b) in any other case where the context so requires, the time zone relevant to the particular location

'Deed' means this document.

'Delegated Operator' means INPEX Operations Australia Pty Ltd (ACN 150 217 262) in its capacity as delegated operator and agent of the Seller

'Fault' means a breach of duty in negligence or any other tort, in contract, under statute or otherwise

'Governmental Authority' means in respect of any country, any national, regional, state, municipal, local or other government, any subdivision, agency, commission or authority, including any port authority, of it or any quasi-governmental organisation within it

'Incident' means any occurrence, or series of occurrences having the same origin, arising out of or relating to the performance of the SPA by or behalf of any party thereto, in which there is any one or more of:

- (a) loss of or damage to the Ports or the Vessel
- (b) loss or damage, other than to the Ports, caused or contributed to by the Vessel
- (c) loss or damage, other than to the Vessel, caused or contributed to by the Ports
- (d) an escape or discharge of oil, oily mixture or other pollutant:
 - (i) from the Vessel
 - (ii) within the Loading Port; or
 - (iii) which interferes with the normal operation of the Ports; and
- (e) an obstruction or danger affecting or interfering with the normal operation of the Ports or the Vessel

'LNG' means natural gas in a liquid state at or below its point of boiling and at or near atmospheric pressure.

'Loading Facilities' means the facilities at the Loading Port which are constructed, operated and maintained by Seller, relating to loading, vapour return, mooring, unmooring, crew handling, Vessel communication, Vessel boarding and disembarking, sampling, analysis and testing, emergencies, berthing, and production and storage, inventory of LNG, LPG, condensates or other products or supplies, and also includes all berths, buoys, gear, equipment, plant, facilities and property of any kind, whether afloat or ashore, located in or adjacent to those facilities and in the ownership, possession or control of Project Interests at the time of an Incident.

'Loading Port' means the Port of Darwin, Northern Territory, including but not limited to its anchorages, berths, facilities, channels, turning basins and approaches.

'Master' means the master of the Vessel or any other Person for the time being in charge of the Vessel.

'Person' means any individual, corporation, partnership, trust, unincorporated organisation or other legal entity, including any Governmental Authority

'Ports' means either or both of the Loading Port and the Loading Facilities, as the context suggests

'Project Interests' means any one or more of:

- (a) Seller
- (b) Delegated Operator of the Loading Facilities
- (c) all other Persons employed or providing services at the Loading Port in connection with the production, storage or loading of LNG, LPG, condensates or other products or supplies at the Loading Port, including agents, except Vessel Interests
- (d) each Affiliate, including the parent company, of Seller or of Delegated Operator of the Loading Facilities or of any Person referred to in paragraph (c) which is in any way connected with the production, storage or loading of LNG, LPG, condensates or other products or supplies at the Loading Port; and
- (e) the directors, officers, employees and agents of any Person included as Project Interests pursuant to paragraph (a), (b), (c) or (d).

'Seller' means Ichthys LNG Pty Ltd (ACN 150 217 299).

'SPA' means the relevant sale and purchase agreement of LNG, LPG, condensates or other products and supplies, as amended from time to time.

'Third Party' means any Person other than Vessel Interests and Project Interests and any other Person included in the definition of Project Interests or Vessel Interests.

'Towage Services Contractor' means the third-party towage services provider arranged by the Seller and made available to each Vessel at the Loading Port, and where the towage services provider does not own the vessel involved in providing the towage services, the Towage Services Contractor includes any direct, indirect and part owner of that vessel and any disponent owner of any tier of such a vessel.

'Vessel' means an LNG or LPG or condensate ship as defined in the respective sales purchase agreement and includes that vessel's cargo, fuel, stores, equipment, appurtenances and all other things on board from time to time.

'Vessel Interests' means any one or more of:

- (a) Vessel owner
- (b) Vessel charterer
- (c) all other Persons, except Project Interests, when employed in connection with or providing services in connection with the ownership or operation of the Vessel
- (d) each Affiliate, including the parent company, of the Vessel owner or Vessel charterer or of any Person referred to in paragraph (c) which is in any way connected with the ownership or operation of the Vessel, including the Master; and
- (e) the directors, officers, employees and agents of any Person included as Vessel Interests pursuant to paragraph (a), (b), (c) or (d).

The Towage Services Contractor, the Vessels involved in the course of providing towage services or rendering assistance to the Vessel, and the tug masters, ship pilots and the crews of tugboats, pilot boats and helicopters used to convey ship pilots to or from the Vessel and other Vessels rendering assistance to the Vessel are considered as Vessel Interests while providing towage services or ship pilotage services or rendering assistance to the Vessel.

'Wilful Misconduct' means any act or omission which is done or omitted to be done wilfully having regard to, or with reckless disregard for or wanton indifference to, its foreseeable and harmful consequences.

1.2 Interpretation

In this Deed unless otherwise specified, reference to:

- (a) 'includes' and 'including' shall mean including without limitation
- (b) words denoting the singular shall include the plural and vice versa, and words denoting any gender shall include all genders
- (c) a reference to a Person who is included in Project Interests shall include the successors and permitted assigns of that Person
- (d) clauses are to recitals, clauses or schedules of this Deed
- (e) wherever in this Deed any of the Project Interests consent, approval or agreement is required to be not unreasonably withheld, such obligation shall include but not be limited to the obligation of such Project Interest to not unreasonably delay giving the relevant consent, approval or agreement.

- (f) wherever in this Deed any Person is required to exercise its endeavours to do something or refrain from doing something, without prejudice to the general meaning of such expressions or undertakings, such Person shall not be in breach of its obligations to the extent its actions are limited by its need to comply with its contractual and legal obligations, provided that it has (where reasonable to do so) used its reasonable endeavours to obtain any necessary waiver of such obligations.
- (g) an agreement (other than this Deed) includes that agreement as amended, supplemented, novated or replaced from time to time.
- (h) a statute (including any subordinate legislation), code or guideline include that statute, code or guideline as from time to time modified or re-enacted or consolidated whether before or after the execution date of this Deed.
- (i) any authority, association or body whether statutory or otherwise shall, if any such authority, association or body ceases to exist or is reconstituted, renamed or replaced or its powers or functions are transferred to any other authority, association or body, be deemed to refer respectively to the authority, association or body established or constituted in lieu thereof or as nearly as may be succeeding to the powers or functions thereof.
- (j) Project Interests includes any one or more of them as the context may permit or require, and a reference to Vessel Interests includes any one or more of them as the context may permit or require; and
- (k) any Person also imports his, her or its legal personal representatives, administrators, successors and permitted assigns.

1.3 Headings and conflicts

The headings in this Deed are inserted for convenience only and shall not affect the construction of this Deed.

1.4 Periods of time

- (a) In the computation of periods of time from a specified day or Day to a later specified day or Day, the word **'from'** means **'from but excluding'** and the words **'until'** and **'to'** mean **'to and including'**.
- (b) Any provision of stipulation that an action may or shall be taken within a specified number of days or Days shall mean that such action may or shall be taken within the number so specified starting at 0:00 hours on the day or Day on which the right or obligation to take such action arose.
- (c) All dates and periods of time shall be determined by reference to the Gregorian calendar.

2. APPLICATION

- 2.1 Notwithstanding any other agreement, and notwithstanding any rights that any Project Interest may have under the applicable law or any other law that may govern the determination of liability among the Vessel Interests and Project Interests in respect of an Incident, the liability of the Vessel Interests in respect of any Incident is determined and limited exclusively in accordance with the terms and conditions set out in this Deed. In the event of any inconsistency between this Deed and any other agreement or applicable law, this Deed shall prevail.
- 2.2 Vessel owner and Vessel charterer shall procure that Vessel Interests that are not party to this Deed shall comply with the terms of this Deed. Vessel owner and Vessel charterer shall defend, indemnify and hold harmless Seller and Delegated

Operator for failure to procure Vessel Interests not party to this Deed to comply with the terms of this Deed.

- 2.3 This Deed commences on the date of its execution and continues in full force and effect until it is earlier terminated by consent by the Delegated Operator (acting on behalf of the Project Interests). This Deed applies to any Incident which occurs during that period. After that period, this Deed remains in force until the discharge of all obligations hereunder which arise during that period. Termination of this Deed shall be without prejudice to the rights and liabilities of the Parties accrued prior to or as a result of such termination. Any provisions of this Deed which are necessary for the exercise of such accrued rights shall survive expiry of this Deed to the extent so required.

3. DAMAGE TO THE VESSEL AND CARGO

- 3.1 Vessel Interests acknowledge that in all circumstances the Master remains responsible on behalf of Vessel Interests for the proper navigation and safety of the Vessel.

- 3.2 Subject to clause 3.1, Vessel Interests shall procure the Master, from time to time, to place the Vessel or transport it to or remove it from any berth or anchorage or position within the Loading Port as reasonably requested by Project Interests' marine supervisor or any other authorised employee or agent of Project Interests.

- 3.3 Subject to any provision of this Deed that provides otherwise, liability for:

- (a) any damage to or loss of the Vessel
- (b) any interference with the Vessel
- (c) any other occurrence adversely affecting the normal operation of the Vessel; or
- (d) any claim, demand or action made or brought against the Vessel or a Vessel Interest by a Third Party (other than those covered by clauses 5.1 and 5.2),

in each case arising from an Incident, shall, as between Project Interests and Vessel Interests, be borne by Project Interests and Vessel Interests in proportion to their respective degrees of Fault as a result of which the Incident occurred.

- 3.4 An amount is not recoverable by Vessel Interests from Project Interests pursuant to clause 3.3 to the extent that it can be reasonably shown that the Incident:

resulted from an act of war, hostilities, civil war, rebellion, insurrection, terrorism or act of God, including but not limited to earthquakes, volcanic eruption, tidal wave, lightning or cyclone, if in any such case Project Interests took all action reasonably open to them in the circumstances to protect the property of Project Interests and Vessel Interests from the damage or loss; or

- (b) was caused by the Wilful Misconduct of a Third Party.

4. DAMAGE TO THE PORTS

- 4.1 The Delegated Operator of the Loading Facilities remains responsible on behalf of Project Interests for the proper operation and safety of the Loading Facilities and of any other part of the Loading Port in the ownership, possession or control of Project Interests.

- 4.2 Subject to any provision of this Deed that provides otherwise, liability for:

- (a) any damage to or loss of the Ports

- (b) any discharge of oil, oily mixture or pollutant within or which adversely affects or interferes with the normal operation of the Ports
- (c) any interference with the Ports
- (d) any other occurrence adversely affecting the normal operation of the Ports; or
- (e) any claim, demand or action made or brought against Project Interest by a Third Party (other than those covered by clauses 5.1 and 5.2),

in each case arising from an Incident, including but not limited to the costs of:

- (i) cleaning up any escape or discharge of oil, oily mixture or pollutant from the Vessel; and
- (ii) removing any danger or obstruction, which may interfere with the normal operation of the Ports,

shall, as between Vessel Interests and Project Interests, be borne by Vessel Interests and Project Interests in proportion to their respective degrees of Fault as a result of which the Incident occurred.

4.3 An amount is not recoverable by Project Interests from Vessel Interests pursuant to clause 4.2 to the extent that it can be reasonably shown that the Incident:

- (a) resulted from an act of war, hostilities, civil war, rebellion, insurrection, terrorism or act of God, including but not limited to earthquakes, volcanic eruption, tidal wave, lightning or cyclone, if in any such case Vessel Interests took all action reasonably open to them in the circumstances to protect the property of Vessel Interests and Project Interests from the damage or loss; or
- (b) was caused by the Wilful Misconduct of a Third Party.

4.4 Notwithstanding that the Towage Services Contractor, tug masters, ship pilots and the crews of tugboats, pilot boats and helicopters and other Vessels rendering assistance to the Vessel may be Affiliates, employees or agents of Project Interests or of Third Parties, as between Vessel Interests and Project Interests:

- (a) any act or omission of such Persons, or any failure of a tugboat, pilot boat or other vessel or helicopter occurring in the course of providing towage or ship pilotage services or rendering assistance to the Vessel is the responsibility of Vessel Interests (except to the extent caused by the Wilful Misconduct of Project Interests);
- (b) any act or omission of such Persons, or any failure of a tugboat, pilot boat or other vessel or helicopter occurring other than in the course of providing towage or ship pilotage services or rendering assistance to the Vessel is not the responsibility of Vessel Interests (except to the extent caused by the Wilful Misconduct of Vessel Interest); and
- (c) the consequences of any such act or omission or failure that causes or contributes to an Incident shall be determined in accordance with this Deed to the exclusion of and without reference to any other contract which may at any time be agreed to between, any of Vessel Interests, any of Project Interests, any Towage Services Contractor and any tug master or ship pilot or provider of tugboats, pilot boats or other Vessels or helicopters used to convey ship pilots to or from the Vessel or render assistance to the Vessel.

5. PERSONNEL CLAIM

- 5.1 Vessel Interests shall not be responsible for claims brought by any employee of Project Interests or any member of the family or dependant of any Project Interests' employee arising out of or consequent upon the personal injury, loss of or damage to property of, or death of, a Project Interests' employee, family member or dependant, irrespective of whether such personal injury, loss or damage to property of, or death of, a Project Interest' employee, family member or dependant, was wholly or partially caused by or due to the Fault of Vessel Interests.
- 5.2 Vessel Interests are solely responsible for claims brought by any employee of Vessel Interests or any member of the family or dependant of any Vessel Interests' employee arising out of or consequent upon the personal injury, loss of or damage to property of, or death of, a Vessel Interests' employee, family member or dependant, irrespective of whether such personal injury, loss or damage to property of, or death of, a Vessel Interest' employee, family member or dependant, was wholly or partially caused by or due to the Fault of Project Interests, and Vessel Interests shall indemnify and hold Project Interests harmless if any of Vessel Interests' employees, or any family member or dependant thereof, or the executor, administrator or personal representative of any of them, brings such a claim against Project Interests.
- 5.3 Vessel Interests and, where appropriate, their respective insurers, shall consult together and cooperate with Project Interests to the extent practicable before any Vessel Interest makes any payment for which an indemnity would be due or might reasonably be expected to be due from the other pursuant to this clause 5.

6. POLLUTION

- 6.1 If an escape or discharge of oil, oily mixture or pollutant occurs from the Vessel either within the Loading Port or which interferes with or may interfere with the normal daily operation of the Loading Port, or if such an escape or discharge is threatened, Project Interests may take all reasonably necessary actions and Vessel Interests shall cooperate with Project Interests to prevent, reduce or clean up the anticipated or resulting pollution.
- 6.2 The cost of actions taken by Project Interests to prevent, reduce or clean up that pollution is recoverable from Vessel Interests pursuant to clause 4.2, subject to the exceptions provided for in clause 4.3.

7. WAIVER

- 7.1 Regardless of any Person's Fault, Vessel Interests waive in favour of Project Interests any rights, claims and entitlement to limit their liability under this Deed with respect to an Incident from which they might otherwise benefit under any applicable law, including any statute, the Convention on Limitation of Liability for Maritime Claims 1976, the Limitation of Liability for Maritime Claims Act 1989 (Cth) or any other convention now or hereafter enacted or adopted.

8. LIMITS OF PROJECT INTERESTS' LIABILITY

The Vessel Interests acknowledge and agree that:

- 8.1 the liability of Project Interests to Vessel Interests is joint and several
- 8.2 the aggregate liability of Project Interests to Vessel Interests in respect of any one incident or occurrence, howsoever arising, is limited to one hundred and fifty million United States Dollars (US\$150,000,000) or such greater amount as the Parties may mutually agree upon in the future
- 8.3 payment of the amount specified in clause 8.2 or the amount of any greater limit,

as provided for in that clause, to any one or more of Vessel Interests in respect of any one incident or occurrence is a complete defence to any claim, suit or demand relating to that incident or occurrence made by Vessel Interests against Project Interests; and

- 8.4 for the purposes of this Deed, but not for any other purpose, the property of any one or more of Vessel Interests is deemed to be the property of all of them.

9. LIMITS OF VESSEL INTERESTS' LIABILITY

- 9.1 The liability of Vessel Interests to Project Interests hereunder is joint and several.
- 9.2 The aggregate liability of Vessel Interests to Project Interests under this Deed in respect of any one incident or occurrence, howsoever arising, is limited to one hundred and fifty million United States Dollars (US\$150,000,000) or such greater amount as mutually agreed between the Parties, not in excess of the amount of coverage which in normal practice is available from P&I Clubs that are members of the International Group of P&I Clubs for liabilities arising under this Deed.
- 9.3 Payment of the amount specified in clause 9.2 or the amount of any greater limit, as provided for in that clause, to any one or more of Project Interests in respect of any one incident or occurrence is a complete defence to any claim, suit or demand relating to that incident or occurrence made by Project Interests against Vessel Interests.
- 9.4 For the purposes of this Deed, but not for any other purpose, the property of any one or more of Project Interests is deemed to be the property of all of them.

10. INSURANCE

- 10.1 Vessel Interests shall keep the Vessel entered with a P&I Club which is a member of the International Group of P&I Clubs. Vessel Interests shall pay all premiums, fees, dues and other charges of that P&I Club and comply with all of its rules, terms and warranties in accordance with normal industry practice. Vessel Interests shall keep Project Interests informed of the identity and business address of the P&I Club with which the Vessel is entered as protected, the amount, including the amount of any greater limit, as provided for in clause 9.2, of that protection and such information as is available and appropriate on the terms of that protection.
- 10.2 It is understood by Vessel Interests that Project Interests shall either keep its interest in the Loading Facilities insured, including coverage for liability of the kind covered by this Document, or self-insure, in accordance with its normal corporate practice, and shall, if insuring, pay all premiums, fees, dues and other charges of the applicable insurer and comply with all of the rules, terms and warranties of the applicable insurance policy.

11. THIRD PARTY CLAIMS

- 11.1 No Person, other than a Person who is included in Project Interests, has any rights under any applicable law to enforce any term of this Deed, but this does not affect any right or remedy of a third party which exists or is available apart from this Deed.
- 11.2 Vessel Interests shall not be liable in contract or tort (including without limitation negligence) or otherwise howsoever, as a result of any act or omission in the course of or in connection with this Deed, for or in respect of:
- (a) any indirect, incidental or consequential or exemplary loss or damage

- (b) any loss of revenue or profits; or
- (c) any loss of production, loss of bargain, loss of goodwill or loss of contract.

12 GOVERNING LAW

This Deed and any non-contractual obligations arising out of or in connection with it are governed by the laws of Western Australia. The Vessel Interests hereby submit to the jurisdiction of the courts of Western Australia and of any court that may hear appeals from any of those courts, from any proceedings in connection with this Deed.

THIS DEED POLL IS EXECUTED AND DELIVERED ON THE DATE SET OUT ABOVE.

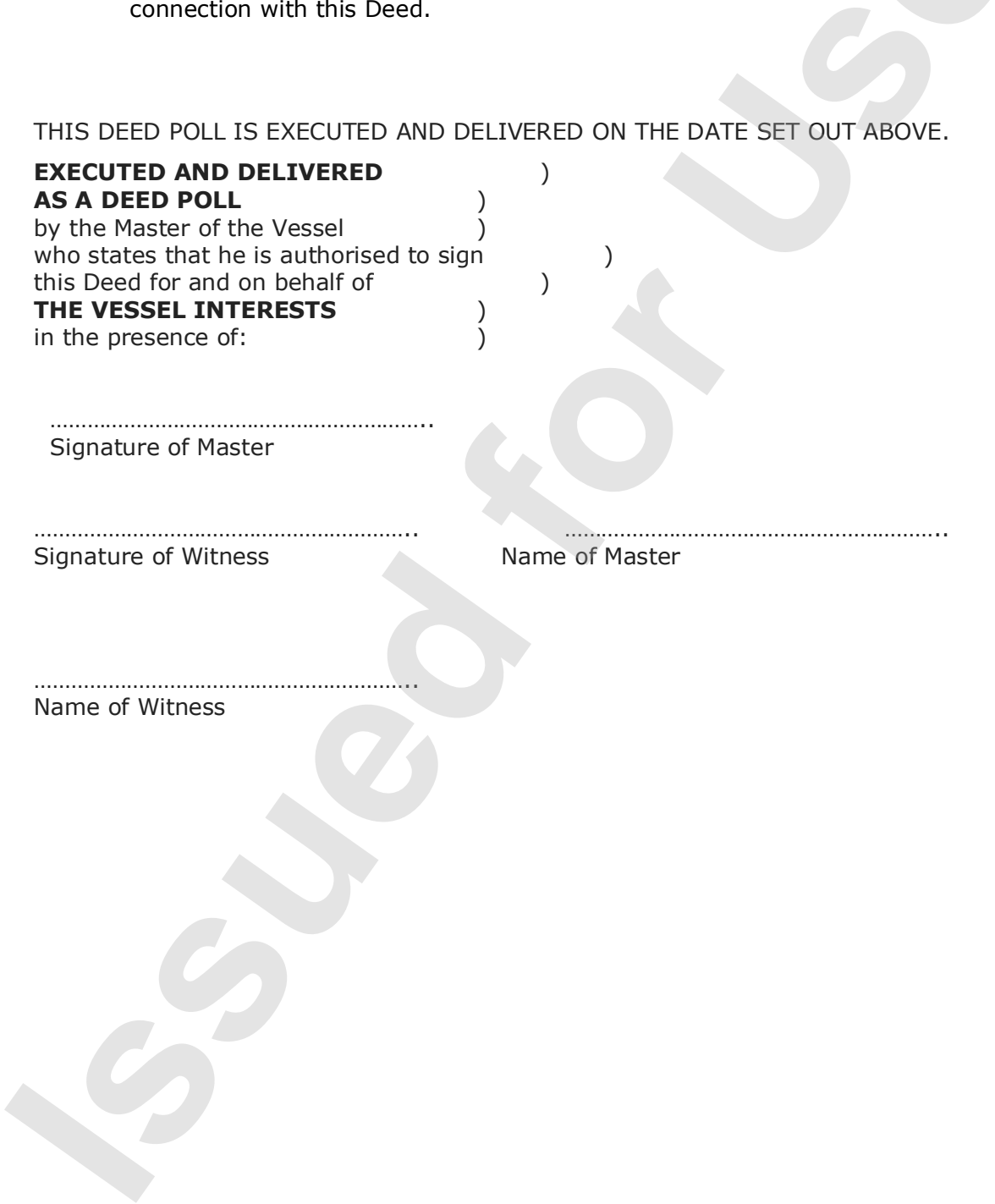
EXECUTED AND DELIVERED)
AS A DEED POLL)
 by the Master of the Vessel)
 who states that he is authorised to sign)
 this Deed for and on behalf of)
THE VESSEL INTERESTS)
 in the presence of:)

.....
Signature of Master

.....
Signature of Witness

.....
Name of Master

.....
Name of Witness



APPENDIX D: ACCEPTANCE OF TERMINAL REGULATIONS

The Master

MT.....

Dear Captain,

The Terminal Conditions are presented at APPENDIX C: of the INPEX Onshore Terminal Regulations. You represent and warrant that you have the authority to bind the owner and charterer of your vessel and your crew.

By signing this Deed Poll, you:

1. Confirm having read and understood the INPEX Onshore Terminal Regulations (including but not limited to the Terminal Conditions of Use in Appendix C) prior to entry to the Terminal; and
2. Agree that you, your crew, and the owner and charterer of your vessel will comply with and are bound by the terms of the INPEX Onshore Terminal Regulations (including but not limited to the Terminal Conditions of Use in Appendix C).

This Deed Poll is given in favour of and for the benefit of Project Interests.

The contents of this Deed Poll and the Terminal Regulations are confidential, and with the exception of disclosure to other Project Interests or vessel Interests and/or their respective insurers, shall not be disclosed to any other party without the written consent of INPEX Operations Australia Pty Ltd.

This Deed Poll and any non-contractual obligations arising out of or in connection with it are governed by the laws of Western Australia.

You submit to the jurisdiction of the courts of Western Australia, and of any court that may hear appeals from any of those courts, for any proceedings in connection with this Deed Poll.

EXECUTED AS A DEED POLL

Signed sealed and delivered)
 by individual in the presence of:)
)

.....
Signature of Master of the vessel

.....
Name of Master of the vessel (print)

.....
Witness

.....
Name of Witness (print)

.....
Date and Time

APPENDIX E: Safety Declaration



APPENDIX - E

Safety Letter
Ichthys LNG Terminal

Date: _____

The Master

Cargo#: _____

Dear Capt. _____

Responsibility for the safe conduct of operations onboard your vessel whilst your vessel is at this Terminal rests with you, as Master of the vessel.

Before operations commence, your full cooperation and understanding is sought of the Terminal safety requirements, which are based on safe practices widely accepted by the global communities.

It is expected that you and your crew will strictly comply with the Terminal safety requirements whilst your vessel is visiting the Terminal. This same expectation applies to all Terminal personnel together with the expectation of full cooperation between all parties in the interest of safe and efficient operations.

Prior to the commencement of operations, and periodically thereafter, the Terminal Representative and, where appropriate, a Responsible Officer, may conduct a routine inspection of your vessel to ensure that the questions in the Terminal safety checklist can be answered in the affirmative.

Where appropriate corrective action is required to answer the questions in the Terminal safety checklist in the affirmative, operations will not be commenced, nor should they have commenced, be stopped immediately, until the situation has been satisfactorily rectified.

It is expected that if you and or your crew consider safety is compromised by any Terminal personnel action or equipment, you will communicate this to the Terminal Representative and all operations will cease until the situation has been satisfactorily rectified.

Signed.....
Capt.
Master

Signed.....

Terminal Representative

Date:
Time.....

APPENDIX F: SECURITY DECLARATION



APPENDIX F: SECURITY DECLARATION

Vessel Name			
Port of Registry		IMO Number	
Last Port Visited			
Terminal Name	Ichthys LNG – Darwin, Australia		

This Declaration of Security is valid From:		To:	
--	--	------------	--

This Declaration of Security is valid for the purposes of loading of liquid hydrocarbons onto this vessel from the Terminal

Vessel Security Level:		Terminal Security Level:	
-------------------------------	--	---------------------------------	--

The Terminal and Vessel agree to the following security measures and responsibilities to ensure compliance with the requirements of the International Ships and Ports Security (ISPS) Code.

Activity	The Terminal:	The Vessel:
Ensuring the Performance of all security duties		
Monitoring restricted areas to ensure that only authorized personnel have access		
Controlling access to the Terminal		N/A
Controlling access to the Vessel		
Monitoring of the Terminal, including areas surrounding the vessel (waterside restricted zone)		
Monitoring of the Terminal, including areas surrounding the vessel (landside restricted zone)		N/A
Handling of Cargo		
Delivery of Vessels stores		
Handling unaccompanied baggage		
Controlling the embarkation of persons and their effects		
All Waterside Restrictions Zones (WRZ) breaches are to be reported to Darwin Port. Darwin Port is responsible to report to the Regulator all WRZ breaches		
All Landside Restrictions Zones (LRZ) breaches are the responsibility of INPEX. INPEX is responsible to report to the Regulator all LRZ breaches.		N/A

Document No: L770-AH-FRM-70024
 Security Classification: Restricted
 Revision: 1
 Last Modified: 23/11/2023



APPENDIX F: SECURITY DECLARATION

Comments

The signatories to this agreement certify that security measures and arrangements for both the Terminal and the Vessel during the specified activities meet the provisions of the ISPS Code and will be implemented in accordance with the provisions already stipulated in their approved plan(s) or the specific arrangements agreed to and set out in the attached annex.

Dated at Darwin Ichthys LNG on the:	
Signed for and on behalf of:	
The Terminal:	The Vessel:
(Signature of Port Facility Security Officer)	(Signature of Vessel Security Officer)
Name and title of person who signed	
Name:	Name:
Title:	Title:
Contact details	

Document No: L770-AH-FRM-70024
 Security Classification: Restricted
 Revision: 1
 Last Modified: 23/11/2023

APPENDIX G: APPROVED SMOKING AREAS



APPENDIX - G

APPROVED SMOKING AREAS

For the duration the Vessel remains at the Terminal only those smoking areas listed below are to be used onboard

For the purpose of this notice 'SMOKING' includes the use of 'VAPES' and 'E-CIGARETTES'

Vessel Name: _____

Date: _____

Onboard Smoking Locations

1. _____

2. _____

Signed: _____

Signed: _____

Vessel Master

Terminal Representative

APPENDIX H: Ship Shore Safety Checklist

This checklist complies with ISGOTT Sixth Edition and provides the necessary information for a ship/shore safety checklist. The document is to be completed and maintained in electronic format.

This procedure does not relieve responsibility for compliance with any other procedure that may be required.

This Appendix comprises appropriate parts of the international Ship/Shore Safety Check List, Guidelines relating to the Check List and a specimen letter for issue by the Terminal Representative to Masters of vessels at the Terminal.

Instructions for Completion:

This document is intended to be completed and maintained in electronic format and is available at: https://www.ocimf.org/media/164404/ISGOTT-6_Ship-Shore-Checklists-updated_interactive.pdf

Pre arrival:

Section 2 has been completed by Terminal.

Vessel Master to complete sections 1A and 1B – making remarks as applicable, *and return at earliest.*

Master is to retain working copy in electronic format.

After Mooring:

Parts 3, 4, 5, 6, 7A and declaration to be completed by Terminal Representative and carrier at the pre-loading meeting.

Parts 7B and 7C are not applicable.

During Loading:

Parts 8 and 9 are to be completed by Terminal Representative and carrier during loading.

At the completion of loading, carrier to provide copy of completed checklist to Terminal Representative before departure.

ISGOTT Sixth Edition

ISGOTT Checks pre-arrival Ship/Shore Safety Checklist

Date and time: _____

Port and berth: _____

Tanker: _____

Terminal: _____

Product to be transferred: _____

Part 1A. Tanker: checks pre-arrival			
Item	Check	Status	Remarks
1	Pre-arrival information is exchanged (6.5, 21.2)	<input type="checkbox"/> Yes	
2	International shore fire connection is available (5.5, 19.4.3.1)	<input type="checkbox"/> Yes	
3	Transfer hoses are of suitable construction (18.2)	<input type="checkbox"/> Yes	
4	Terminal information booklet reviewed (15.2.2)	<input type="checkbox"/> Yes	
5	Pre-berthing information is exchanged (21.3, 22.3)	<input type="checkbox"/> Yes	
6	Pressure/vacuum valves and/or high velocity vents are operational (11.1.8)	<input type="checkbox"/> Yes	
7	Fixed and portable oxygen analysers are operational (2.4)	<input type="checkbox"/> Yes	

Part 1B. Tanker: checks pre-arrival if using an inert gas system			
Item	Check	Status	Remarks
8	Inert gas system pressure and oxygen recorders are operational (11.1.5.2, 11.1.11)	<input type="checkbox"/> Yes	
9	Inert gas system and associated equipment are operational (11.1.5.2, 11.1.11)	<input type="checkbox"/> Yes	
10	Cargo tank atmospheres' oxygen content is less than 8% (11.1.3)	<input type="checkbox"/> Yes	
11	Cargo tank atmospheres are at positive pressure (11.1.3)	<input type="checkbox"/> Yes	

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Part 2. Terminal: checks pre-arrival			
Item	Check	Status	Remarks
12	Pre-arrival information is exchanged (6.5, 21.2)	<input type="checkbox"/> Yes	
13	International shore fire connection is available (5.5, 19.4.31, 19.4.35)	<input type="checkbox"/> Yes	
14	Transfer equipment is of suitable construction (18.1, 18.2)	<input type="checkbox"/> Yes	
15	Terminal information booklet transmitted to tanker (15.2.2)	<input type="checkbox"/> Yes	
16	Pre-berthing information is exchanged (21.3, 22.3)	<input type="checkbox"/> Yes	

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ISGOTT Checks after mooring Ship/Shore Safety Checklist

Part 3. Tanker: checks after mooring			
Item	Check	Status	Remarks
17	Fendering is effective (22.4.1)	<input type="checkbox"/> Yes	
18	Mooring arrangement is effective (22.2, 22.4.3)	<input type="checkbox"/> Yes	
19	Access to and from the tanker is safe (16.4)	<input type="checkbox"/> Yes	
20	Scuppers and savealls are plugged (23.7.4, 23.7.5)	<input type="checkbox"/> Yes	
21	Cargo system sea connections and overboard discharges are secured (23.7.3)	<input type="checkbox"/> Yes	
22	Very high frequency and ultra high frequency transceivers are set to low power mode (4.11.6, 4.13.2.2)	<input type="checkbox"/> Yes	
23	External openings in superstructures are controlled (23.1)	<input type="checkbox"/> Yes	
24	Pumproom ventilation is effective (10.12.2)	<input type="checkbox"/> Yes	
25	Medium frequency/high frequency radio antennae are isolated (4.11.4, 4.13.2.1)	<input type="checkbox"/> Yes	
26	Accommodation spaces are at positive pressure (23.2)	<input type="checkbox"/> Yes	
27	Fire control plans are readily available (9.11.2.5)	<input type="checkbox"/> Yes	

Part 4. Terminal: checks after mooring			
Item	Check	Status	Remarks
28	Fendering is effective (22.4.1)	<input type="checkbox"/> Yes	
29	Tanker is moored according to the terminal mooring plan (22.2, 22.4.3)	<input type="checkbox"/> Yes	
30	Access to and from the terminal is safe (16.4)	<input type="checkbox"/> Yes	
31	Spill containment and sumps are secure (18.4.2, 18.4.3, 23.7.4, 23.7.5)	<input type="checkbox"/> Yes	

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ISGOTT Checks pre-transfer Ship/Shore Safety Checklist

Date and time: _____

Port and berth: _____

Tanker: _____

Terminal: _____

Product to be transferred: _____

Part 5A. Tanker and terminal: pre-transfer conference				
Item	Check	Tanker status	Terminal status	Remarks
32	Tanker is ready to move at agreed notice period (9.11, 21.7.1.1, 22.5.4)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
33	Effective tanker and terminal communications are established (21.1.1, 21.1.2)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
34	Transfer equipment is in safe condition (isolated, drained and de-pressurised) (18.4.1)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
35	Operation supervision and watchkeeping is adequate (7.9, 23.11)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
36	There are sufficient personnel to deal with an emergency (9.11.2.2, 23.11)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
37	Smoking restrictions and designated smoking areas are established (4.10, 23.10)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
38	Naked light restrictions are established (4.10.1)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
39	Control of electrical and electronic devices is agreed (4.11, 4.12)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
40	Means of emergency escape from both tanker and terminal are established (20.5)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
41	Firefighting equipment is ready for use (5, 19.4, 23.8)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
42	Oil spill clean-up material is available (20.4)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
43	Manifolds are properly connected (23.6.1)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
44	Sampling and gauging protocols are agreed (23.5.3.2, 23.7.7.5)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
45	Procedures for cargo, bunkers and ballast handling operations are agreed (21.4, 21.5, 21.6)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
46	Cargo transfer management controls are agreed (12.1)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
47	Cargo tank cleaning requirements, including crude oil washing, are agreed (12.3, 12.5, 21.4.1)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	See also parts TB/TC as applicable

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Part 5A. Tanker and terminal: pre-transfer conference (cont.)				
Item	Check	Tanker status	Terminal status	Remarks
48	Cargo tank gas freeing arrangements agreed (12.4)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	See also part 7C
49	Cargo and bunker slop handling requirements agreed (12.1, 21.2, 21.4)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	See also part 7C
50	Routine for regular checks on cargo transferred are agreed (23.7.2)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
51	Emergency signals and shutdown procedures are agreed (12.1.6.3, 18.5, 21.1.2)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
52	Safety data sheets are available (1.4.4, 20.1, 21.4)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
53	Hazardous properties of the products to be transferred are discussed (1.2, 1.4)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
54	Electrical insulation of the tanker/terminal interface is effective (12.9.5, 17.4, 18.2.14)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
55	Tank venting system and closed operation procedures are agreed (11.3.3.1, 21.4, 21.5, 23.3.3)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
56	Vapour return line operational parameters are agreed (11.5, 18.3, 23.7.7)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
57	Measures to avoid back-filling are agreed (12.1.13.7)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
58	Status of unused cargo and bunker connections is satisfactory (23.7.1, 23.7.6)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
59	Portable very high frequency and ultra high frequency radios are intrinsically safe (4.12.4, 21.1.1)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
60	Procedures for receiving nitrogen from terminal to cargo tank are agreed (12.1.14.8)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	

Additional for chemical tankers Checks pre-transfer

Part 5B. Tanker and terminal: bulk liquid chemicals. Checks pre-transfer				
Item	Check	Tanker status	Terminal status	Remarks
61	Inhibition certificate received (if required) from manufacturer	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
62	Appropriate personal protective equipment identified and available (4.8.1)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
63	Countermeasures against personal contact with cargo are agreed (1.4)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
64	Cargo handling rate and relationship with valve closure times and automatic shutdown systems is agreed (16.8, 21.4, 21.5, 21.6)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
65	Cargo system gauge operation and alarm set points are confirmed (12.1.6.6.1)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	

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Part 5B. Tanker and terminal: bulk liquid chemicals. Checks pre-transfer (cont.)				
Item	Check	Tanker status	Terminal status	Remarks
66	Adequate portable vapour detection instruments are in use (2.4)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
67	Information on firefighting media and procedures is exchanged (5, 19)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
68	Transfer hoses confirmed suitable for the product being handled (18.2)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
69	Confirm cargo handling is only by a permanent installed pipeline system	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
70	Procedures are in place to receive nitrogen from the terminal for inerting or purging (12.114.8)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	

Additional for gas tankers Checks pre-transfer

Part 5C. Tanker and terminal: liquefied gas. Checks pre-transfer				
Item	Check	Tanker status	Terminal status	Remarks
71	Inhibition certificate received (if required) from manufacturer	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
72	Water spray system is operational (5.3.1, 19.4.3)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
73	Appropriate personal protective equipment is identified and available (4.8.1)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
74	Remote control valves are operational	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
75	Cargo pumps and compressors are operational	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
76	Maximum working pressures are agreed between tanker and terminal (21.4, 21.5, 21.6)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
77	Reliquefaction or boil-off control equipment is operational	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
78	Gas detection equipment is appropriately set for the cargo (2.4)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
79	Cargo system gauge operation and alarm set points are confirmed (12.1.6.6.1)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
80	Emergency shutdown systems are tested and operational (18.5)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
81	Cargo handling rate and relationship with valve closure times and automatic shutdown systems is agreed (16.8, 21.4, 21.5, 21.6)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
82	Maximum/minimum temperatures/pressures of the cargo to be transferred are agreed (21.4, 21.5, 21.6)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
83	Cargo tank relief valve settings are confirmed (12.11, 21.2, 21.4)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	

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Part 6. Tanker and terminal: agreements pre-transfer				
Part 5 item	Agreement	Details	Tanker initials	Terminal initials
32	Tanker manoeuvring readiness	Notice period (maximum) for full readiness to manoeuvre: _____ Period of disablement (if permitted): _____		
33	Security protocols	Security level: _____ Local requirements: _____		
33	Effective tanker/terminal communications	Primary system: _____ Backup system: _____		
35	Operational supervision and watchkeeping	Tanker: _____ Terminal: _____		
37 38	Dedicated smoking areas and naked lights restrictions	Tanker: _____ Terminal: _____		
45	Maximum wind, current and sea/swell criteria or other environmental factors	Stop cargo transfer: _____ Disconnect: _____ Unberth: _____		
45 46	Limits for cargo, bunkers and ballast handling	Maximum transfer rates: _____ Topping-off rates: _____ Maximum manifold pressure: _____ Cargo temperature: _____ Other limitations: _____		

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Part 6. Tanker and terminal: agreements pre-transfer (cont.)				
Part 5 item	Agreement	Details	Tanker initials	Terminal initials
45 46	Pressure surge control	Minimum number of cargo tanks open: _____ Tank switching protocols: _____ Minimum number of cargo tanks open: _____ Tank switching protocols: _____ Full load rate: _____ Topping-off rate: _____ Closing time of automatic valves: _____		
46	Cargo transfer management procedures	Action notice periods: _____ Transfer stop protocols: _____		
50	Routine for regular checks on cargo transferred are agreed	Routine transferred quantity checks: _____		
51	Emergency signals	Tanker: _____ Terminal: _____		
55	Tank venting system	Procedure: _____		
55	Closed operations	Requirements: _____		
56	Vapour return line	Operational parameters: _____ Maximum flow rate: _____		
60	Nitrogen supply from terminal	Procedures to receive: _____ Maximum pressure: _____ Flow rate: _____		

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Part 6. Tanker and terminal: agreements pre-transfer (cont.)				
Part 5 item ref	Agreement	Details	Tanker initials	Terminal initials
83	For gas tanker only: cargo tank relief valve settings	Tank 1: _____ Tank 2: _____ Tank 3: _____ Tank 4: _____ Tank 5: _____ Tank 6: _____ Tank 7: _____ Tank 8: _____ Tank 9: _____ Tank 10: _____		
XX	Exceptions and additions	Special issues that both parties should be aware of: _____ _____		

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Date and time: _____
 Port and berth: _____
 Tanker: _____
 Terminal: _____
 Product to be transferred: _____

Part 7A. General tanker: checks pre-transfer			
Item	Check	Status	Remarks
84	Portable drip trays are correctly positioned and empty (23.7.5)	<input type="checkbox"/> Yes	
85	Individual cargo tank inert gas supply valves are secured for cargo plan (12.1.13.4)	<input type="checkbox"/> Yes	
86	Inert gas system delivering inert gas with oxygen content not more than 5% (11.1.3)	<input type="checkbox"/> Yes	
87	Cargo tank high level alarms are operational (12.1.6.6.1)	<input type="checkbox"/> Yes	
88	All cargo, ballast and bunker tanks openings are secured (23.3)	<input type="checkbox"/> Yes	

Part 7B. Tanker: checks pre-transfer if crude oil washing is planned			
Item	Check	Status	Remarks
89	The completed pre-arrival crude oil washing checklist, as contained in the approved crude oil washing manual, is copied to terminal (12.5.2, 21.2.3)	<input checked="" type="checkbox"/> Yes	
90	Crude oil washing checklists for use before, during and after crude oil washing are in place ready to complete, as contained in the approved crude oil washing manual (12.5.2, 21.6)	<input type="checkbox"/> Yes	

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ISGOTT Checks after pre-transfer conference Ship/Shore Safety Checklist

For tankers that will perform tank cleaning alongside and/or gas freeing alongside

Part 7C. Tanker: checks prior to tank cleaning and/or gas freeing			
Item	Check	Status	Remarks
91	Permission for tank cleaning operations is confirmed (21.2.3, 21.4, 25.4.3)	<input type="checkbox"/> Yes	
92	Permission for gas freeing operations is confirmed (12.4.3)	<input type="checkbox"/> Yes	
93	Tank cleaning procedures are agreed (12.3.2, 21.4, 21.6)	<input type="checkbox"/> Yes	
94	If cargo tank entry is required, procedures for entry have been agreed with the terminal (10.5)	<input type="checkbox"/> Yes	
95	Slop reception facilities and requirements are confirmed (12.1, 21.2, 21.4)	<input type="checkbox"/> Yes	

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Declaration

We the undersigned have checked the items in the applicable parts 1 to 7 as marked and signed below:

	Tanker	Terminal
Part 1A. Tanker: checks pre-arrival	<input type="checkbox"/>	<input type="checkbox"/>
Part 1B. Tanker: checks pre-arrival if using an inert gas system	<input type="checkbox"/>	<input type="checkbox"/>
Part 2. Terminal: checks pre-arrival	<input type="checkbox"/>	<input type="checkbox"/>
Part 3. Tanker: checks after mooring	<input type="checkbox"/>	<input type="checkbox"/>
Part 4. Terminal: checks after mooring	<input type="checkbox"/>	<input type="checkbox"/>
Part 5A. Tanker and terminal: pre-transfer conference	<input type="checkbox"/>	<input type="checkbox"/>
Part 5B. Tanker and terminal: bulk liquid chemicals. Checks pre-transfer	<input type="checkbox"/>	<input type="checkbox"/>
Part 5C. Tanker and terminal: liquefied gas. Checks pre-transfer	<input type="checkbox"/>	<input type="checkbox"/>
Part 6. Tanker and terminal: agreements pre-transfer	<input type="checkbox"/>	<input type="checkbox"/>
Part 7A. General tanker: checks pre-transfer	<input type="checkbox"/>	<input type="checkbox"/>
Part 7B. Tanker: checks pre-transfer if crude oil washing is planned	<input type="checkbox"/>	<input type="checkbox"/>
Part 7C. Tanker: checks prior to tank cleaning and/or gas freeing	<input type="checkbox"/>	<input type="checkbox"/>

In accordance with the guidance in chapter 25 of *ISGOTT*, we have satisfied ourselves that the entries we have made are correct to the best of our knowledge and that the tanker and terminal are in agreement to undertake the transfer operation.

We have also agreed to carry out the repetitive checks noted in parts 8 and 9 of the *ISGOTT* SSSCL, which should occur at intervals of not more than hours for the tanker and not more than hours for the terminal.

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

Tanker	Terminal
Name <input type="text"/>	Name <input type="text"/>
Rank <input type="text"/>	Position <input type="text"/>
Signature <input type="text"/>	Signature <input type="text"/>
Date <input type="text"/>	Date <input type="text"/>
Time <input type="text"/>	Time <input type="text"/>

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ISGOTT Checks during transfer Ship/Shore Safety Checklist

Repetitive checks

Part 8. Tanker: repetitive checks during and after transfer								
Item ref	Check	Time	Time	Time	Time	Time	Time	Remarks
Interval time:..... hrs								
8	Inert gas system pressure and oxygen recording operational	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
9	Inert gas system and all associated equipment are operational	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
11	Cargo tank atmospheres are at positive pressure	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
18	Mooring arrangement is effective	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
19	Access to and from the tanker is safe	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
20	Scuppers and savealls are plugged	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
23	External openings in superstructures are controlled	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
24	Pumproom ventilation is effective	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
28	Tanker is ready to move at agreed notice period	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
29	Fendering is effective	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
33	Communications are effective	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
35	Supervision and watchkeeping is adequate	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
36	Sufficient personnel are available to deal with an emergency	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
37	Smoking restrictions and designated smoking areas are complied with	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
38	Naked light restrictions are complied with	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	

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Part 8. Tanker: repetitive checks during and after transfer (cont.)								
39	Control of electrical devices and equipment in hazardous zones is complied with	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
40 41 42 51	Emergency response preparedness is satisfactory	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
54	Electrical insulation of the tanker/terminal interface is effective	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
55	Tank venting system and closed operation procedures are as agreed	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
85	Individual cargo tank inert gas valves settings are as agreed	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
86	Inert gas delivery maintained at not more than 5% oxygen	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
87	Cargo tank high level alarms are operational	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
Initials								

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Part 9. Terminal: repetitive checks during and after transfer								
Item ref	Check	Time	Time	Time	Time	Time	Time	Remarks
Interval time:..... hrs								
18	Mooring arrangement is effective	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	
19	Access to and from the terminal is safe	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	
29	Fendering is effective	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	
32	Spill containment and sumps are secure	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	
33	Communications are effective	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	
35	Supervision and watchkeeping is adequate	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	
36	Sufficient personnel are available to deal with an emergency	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	
37	Smoking restrictions and designated smoking areas are complied with	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	
38	Naked light restrictions are complied with	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	
39	Control of electrical devices and equipment in hazardous zones is complied with	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	
40 41 47 51	Emergency response preparedness is satisfactory	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	
54	Electrical insulation of the tanker/terminal interface is effective	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	
55	Tank venting system and closed operation procedures are as agreed	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	
Initials								

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APPENDIX I: PRE-LOADING MEETING AGENDA



APPENDIX - I

PRE-LOADING MEETING AGENDA

This checklist provides the necessary information for a Pre-Loading Meeting Agenda. The meeting takes place onboard the Vessel after arrival at the terminal and prior to commencement of loading.

Vessel: _____
 Master's Name: _____
 Cargo Number: _____
 Arrival Date: _____

Items to be confirmed:

Meeting Commenced: _____

Meeting Completed: _____

Vessel Tank Plan

For LNG and LPG carriers

Vessel's tanks (or equator) temperature on arrival				
1	2	3	4	
- _____ °C	- _____ °C	- _____ °C	- _____ °C	

Pre-Loading Meeting Agenda	
Agreed loading quantity (m3)	
Quantity on board at arrival (m3)	
Full loaded cargo tank capacity (m3) _____ %	
Estimated loading time (hours)	_____ hrs
Loading / de-ballasting plan and stability information provided to Terminal	
Early Departure Procedure (EDP) agreed	
Manifold connections Ship and Terminal	
Confirm ship representative is at loading manifold for arm connection and disconnection	
Shore tanks	
Confirm deck and CCR watch is in place	CCR - _____ Deck - _____
Agree an Initial CTM	
Initial rate required after cold ESD?	_____ m3/hr
Maximum loading rate (m3/hr)	_____ m3/hr
Topping off loading rate (m3/hr)	_____ m3/hr
Notice to reduce loading rate.	_____ minutes
Vessel or Shore stop of loading?	
Emergency stop procedure agreed	
MLA / Manifold leak response discussed and agreed.	
Expected range of vapour return temperature?	_____ °C

Pre-Loading Meeting Agenda	
Maximum flow of vapour return.	
Manifold connections (a) soundness of manifold flange	
Discuss use of HD compressor – in MANUAL mode until full loading rate is achieved.	
Are the Vessel’s lines full of LNG or empty (circle). Temperatures of the liquid crossover and Forward and Aft temperatures of liquid header.	Crossover: Cold/Ambient Header Aft: Cold/Ambient Header Forward: Cold/Ambient
Warm ESD carried out by Vessel or Shore? (a) FOSSL ✓ [REDACTED] [REDACTED]	
Cool down will take approximately.	
Cold function test of ships ESD valves will be carried out by vessel.	
Lifting activities at manifold and cargo handling area. (Lifting operations are not to occur during MLA connection, loading and disconnection.)	
Discuss that lifting operations require supervision by responsible officer around manifold area.	
Telephone or radio communications tested.	
VHF Radio on Channel 88 for contact with INPEX Control and standby tug. Standby tug also monitors VHF10	
UHF Radio provided by ILNG to Vessel on Channel ‘LOADING LNG’ during loading	
Vessel’s Manifold ESD valves closing time?	
PERC system health?	
Maximum available Loading Arm envelope?	
Discuss Terminal gangway operation, alarms and auto-levelling and lift functions	

Pre-Loading Meeting Agenda	
Mooring lines tension alarm is set at 40 tonnes . Vessel to inform shore if moorings need adjustment.	
Terminal to provide weather reports to Vessel at pre- and post- load meetings as minimum and when required.	
Smart-dock system set-up, operational and explained to Vessel.	
Any incident or protest to be reported to Terminal Representative immediately.	
Warn Vessel of falling ice from shore loading arms at the manifold. Discuss precautions to be taken.	
Discuss visual and hand inspection with proper PPE of drained and purged Vessel manifold's lines.	
Maintenance activities on loading or mooring facilities within 200 meters from Vessel's side?	
Any Vessel planned maintenance whilst at the Terminal?	
Services marked and set up in such a way that hoses and fittings are not interchangeable. Operations Utility Services requirements to be communicated and to be checked that all necessary services are clearly marked for easy identification.	
Nitrogen requirements	
Discuss the LNG Sampling Procedure	
Any crew members proceeding ashore? Confirm name and timing of departure. Is Fire Retardant Clothing required? Security procedure	
Any unplanned crew movements need to be discussed with the Loading Master prior to occurring.	
Vessel to verify calculated departure draft visually after completion and provide a copy of Departure stability summary from approved Loadicator . (Explain to Ship staff)	

Pre-Loading Meeting Agenda	
Status of Vessel's engines. (Emergency Readiness)	
Vessel requires ____ minutes after disconnection for turbine warming?	
Requirement for testing main engine after gangway is removed	

Master or Deputy: _____

Terminal Representative: _____

Date: _____

Original: ILNG / **Copy:** Vessel

Issued for Use

APPENDIX J: POST LOADING MEETING AGENDA



APPENDIX - J

POST LOADING MEETING AGENDA

Vessel: _____

Cargo Number: _____

Date of Departure: _____

Meeting duration: _____ ~ _____

Items to be confirmed:

EDP authorisation issued to Shipping Agent	Yes
Port Timesheets complete with agreed times	
Notes of Protest issued and signed for receipt (Terminal/Vessel)	
Remarks on cargo berthing and/or loading operations, if any.	
Cargo loaded figures agreed	
Observations from the safety inspections discussed	
Shipping Documents completed (if not EDP)	EDP
Pilot on board time for departure _____	
Departure time agreed and Terminal personnel available _____	
Procedure of disconnection of gangway and cables agreed	
Time disconnection of gangway and cables agreed	
Towage services notified	
Completed Terminal vessel inspection report provided to Vessel	
UHF Radio returned / Trelleborg USB Collected / Laptop Collected	
Updated weather information by the Terminal (Send detailed BoM forecast)	
Safety Banner Removed	
Confirm discharge port and ETA _____	
Incident/accidents discussed and noted	
Departure draft verified visually by ship <u>staff?</u>	
Copy of Departure stability summary from approved <u>Loadicator</u> provided?	
Terminal can be contacted on VHF88 if assistance is required after the Loading Master departs the vessel. Darwin Port VHF10.	

Master or Deputy: _____

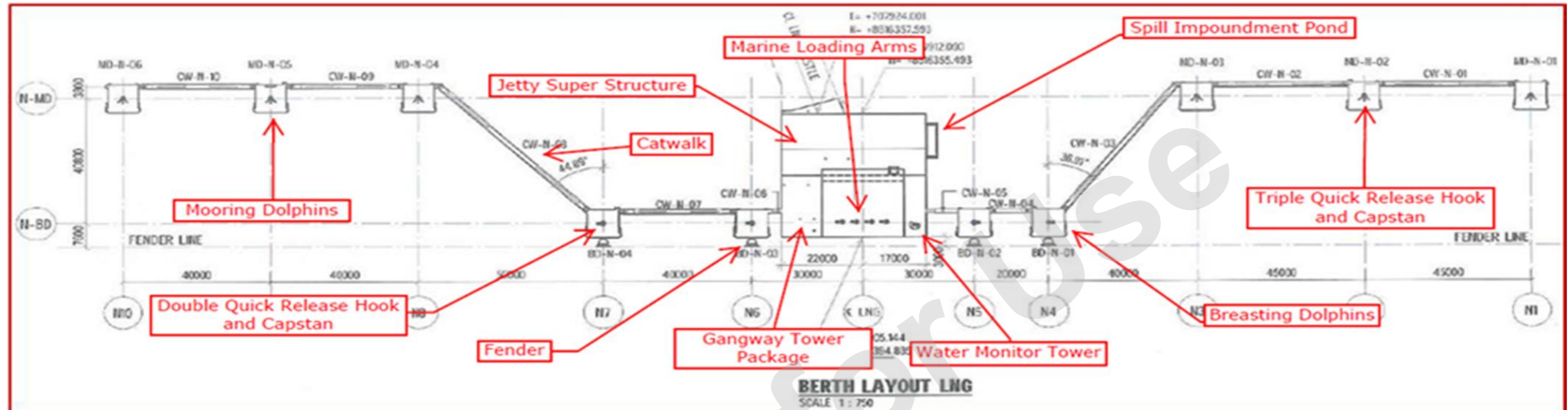
Terminal Representative: _____

Date: _____

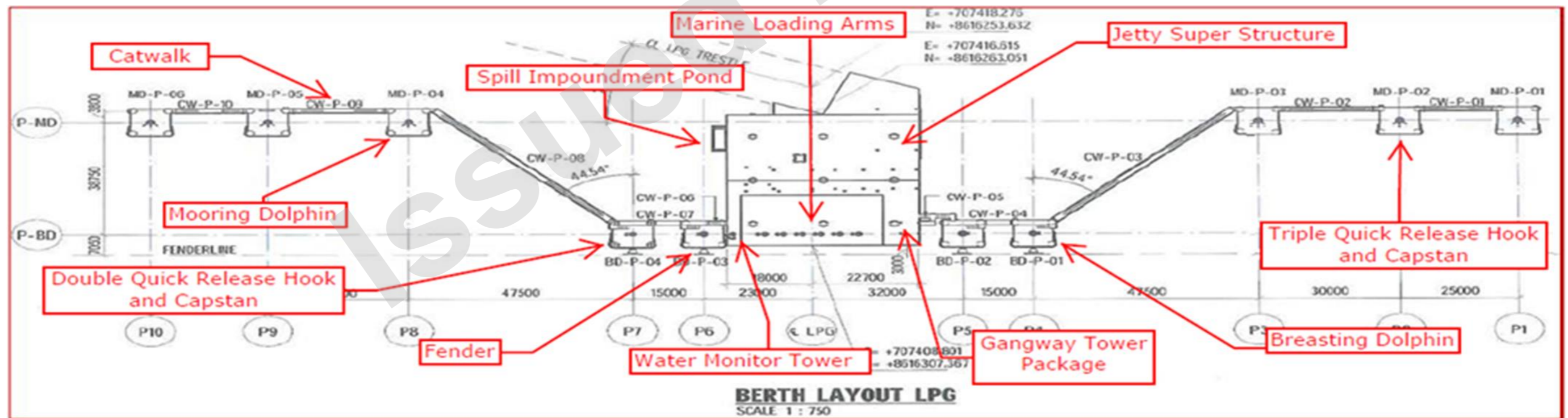
Original: ILNG / **Copy:** Ship

APPENDIX K: PRODUCT LOADING JETTY OVERVIEW

BERTH LAYOUT LNG



BERTH LAYOUT LPG/CONDENSATE



APPENDIX L: WEATHER PARAMETERS

Description	Limit
Consider suspension of berthing	
Wind velocity	> 20 knots, except if wind is from the SE where berthing is allowed up to 25 knots.
Significant Wave height	> 1.0m at the berth
Visibility	< 1 nm
Considerations for suspending cargo operations	
Sustained Wind velocity	30 knots and forecast to increase
Thunderstorm or lightning activity	At the discretion of the Terminal.
Considerations for disconnection of arms and removal of gangway	
Sustained Wind velocity	35 knots and forecasted to increase
Consideration for unberthing	
Sustained Wind velocity	Above 40 knots and forecasted to increase
Significant Wave height	> 2.0m at the berth

The decision to depart the berth due to a forecasted deterioration in weather conditions must be made in sufficient time to allow for safe departure from the Terminal.

APPENDIX M: Mooring Arrangement Number, Diameter and Configuration

The following mooring line configurations are for guidance to Ship Masters only. The final configuration of mooring lines will be subject to Darwin Port and Terminal approval. For LNG vessels mooring arrangements will be determined by vessels OPTIMOOR Mooring Analysis Report. For LPG and Condensate vessels, mooring arrangements have been determined by generic OPTIMOOR Mooring Analysis undertaken for generic size vessels calling the berth.

Table 3 - LNG Vessel Mooring Arrangements

		Vessel Size (m3)	Vessel Type	Line Type	Headlines	Forward Breastlines	Forward Springs	Aft Springs	Aft Breastlines	Sternlines	Total Lines Required
LNG Vessel	LNG 1	140,000 - 155,000	Moss & Membrane	44mm steel wire ropes (MBL 132t) with nylon tails 95mm in diameter and 11 metres long	4	3	2	2	3	4	18
	LNG 2	140,000 - 155,000	Moss & Membrane		3	4	2	2	4	3	18
	LNG 3	175,000	Moss & Membrane		3	4	2	2	4	3	18
	LNG 4	210,000 - 216,000	Membrane (Q-Flex)		3	3	2	2	3	3	16

Table 4 - LPG Vessel Mooring Arrangements

		Vessel Size (DWT)	Line Type	Headlines	Forward Breastlines	Forward Springs	Aft Springs	Aft Breastlines	Sternlines	Total Lines Required
LPG Vessel	LPG 1	48,000 - 55,133	32mm steel wire ropes (MBL 65t) with nylon tails 95mm in diameter and 11 metres long	3	3	2	2	3	3	16
	LPG 2	48,000 - 55,133	35mm steel wire ropes (MBL 86t) with nylon tails 95mm in diameter and 11 metres long	3	2	2	2	2	3	14

Table 5 - Condensate Vessel Mooring Arrangements

		Vessel Size (DWT)	Vessel Type	Line Type	Headlines	Forward Breastlines	Forward Springs	Aft Springs	Aft Breastlines	Sternlines	Total lines Required
Condensate Tanker	Cond 1	48,000 – 55,000	Medium	28mm Polyester (60t MBL) Lines	2	2	2	2	2	2	12
	Cond 2	48,000 – 55,000	Medium	24mm Amsteel Blue SK78 Dyneema (49t MBL) or UHMWPE (67t MBL) line with Polyester/Nylon tails 11 meters long.	2	2	2	2	2	2	12
	Cond 3	>100,000	Large	32/34mm steel wire ropes (MBL 77/84t) with Nylon tails 11 meters long.	3	2	2	2	2	3	14

Note: Ships of less than 45,000 DWT shall be assessed on a case by case basis to confirm that their parallel middle body contacts at least two berthing dolphins and can deploy an adequate number of mooring lines.

APPENDIX N: Vessel Mooring Diagrams - Consider Wet Season Mooring Diagram

Figure 4 - LNG Vessel Mooring Diagram

Mooring configurations for LNG carriers are dictated by vessel specific OPTIMOOR mooring analysis undertaken by vessel operators for each carrier and reviewed by the Terminal at the time of vessel Ship- Shore Compatibility assessment checks. Below mooring configurations are indicative only.

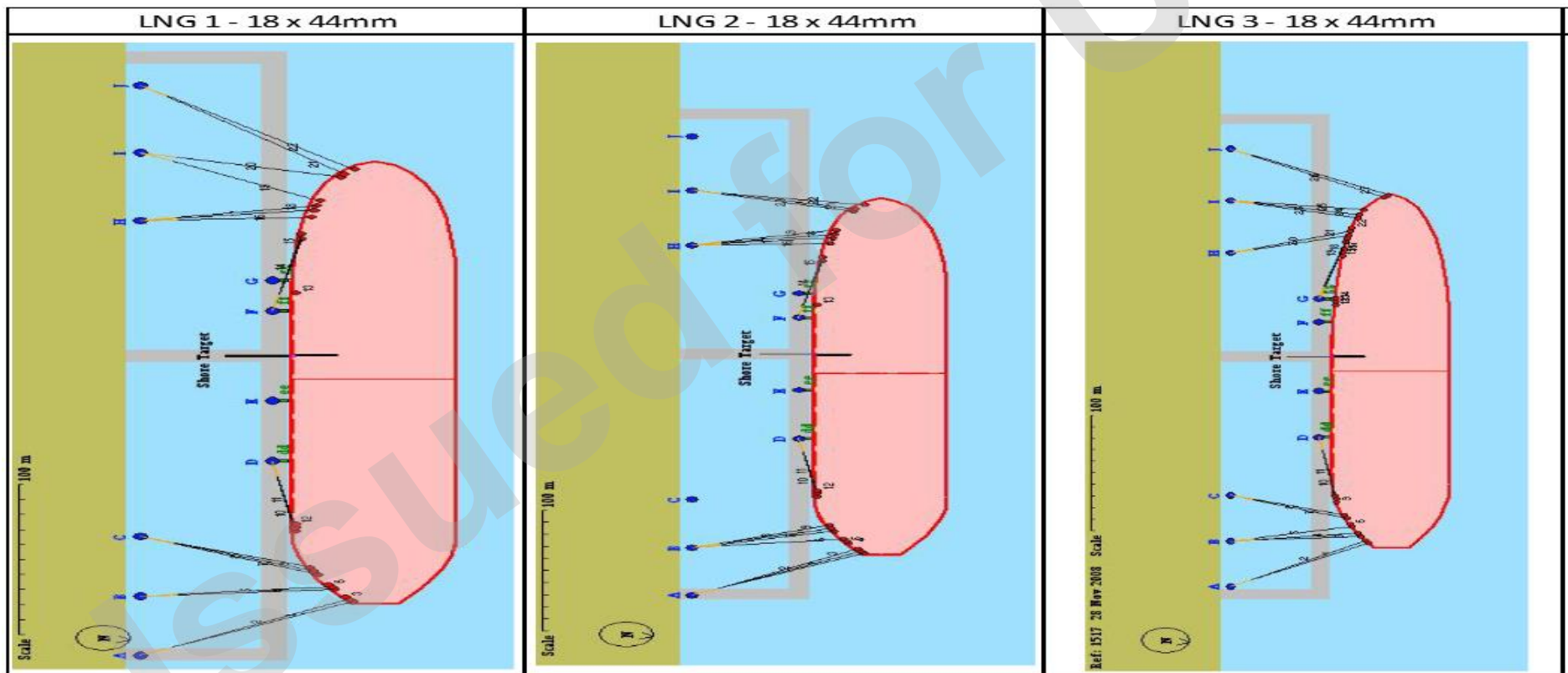
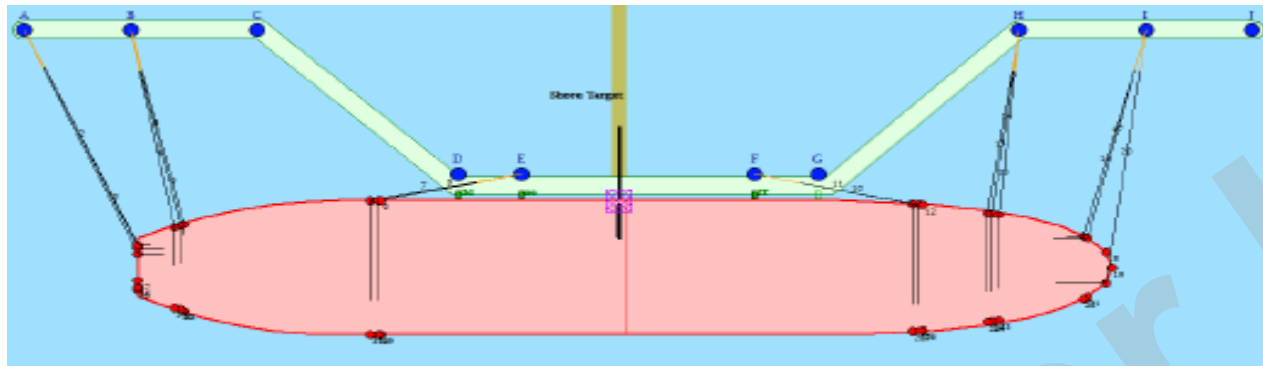


Figure 5 - LPG Vessel Mooring Diagram



Mooring arrangement for LPG C with 16 lines

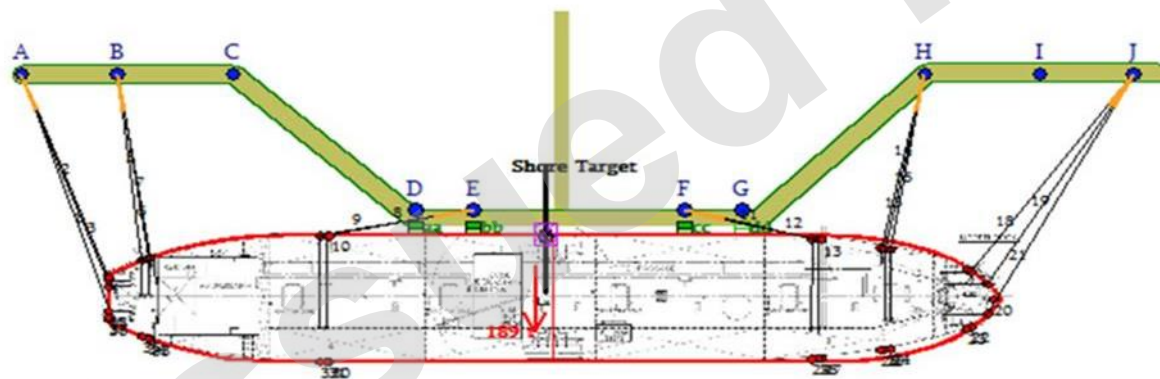
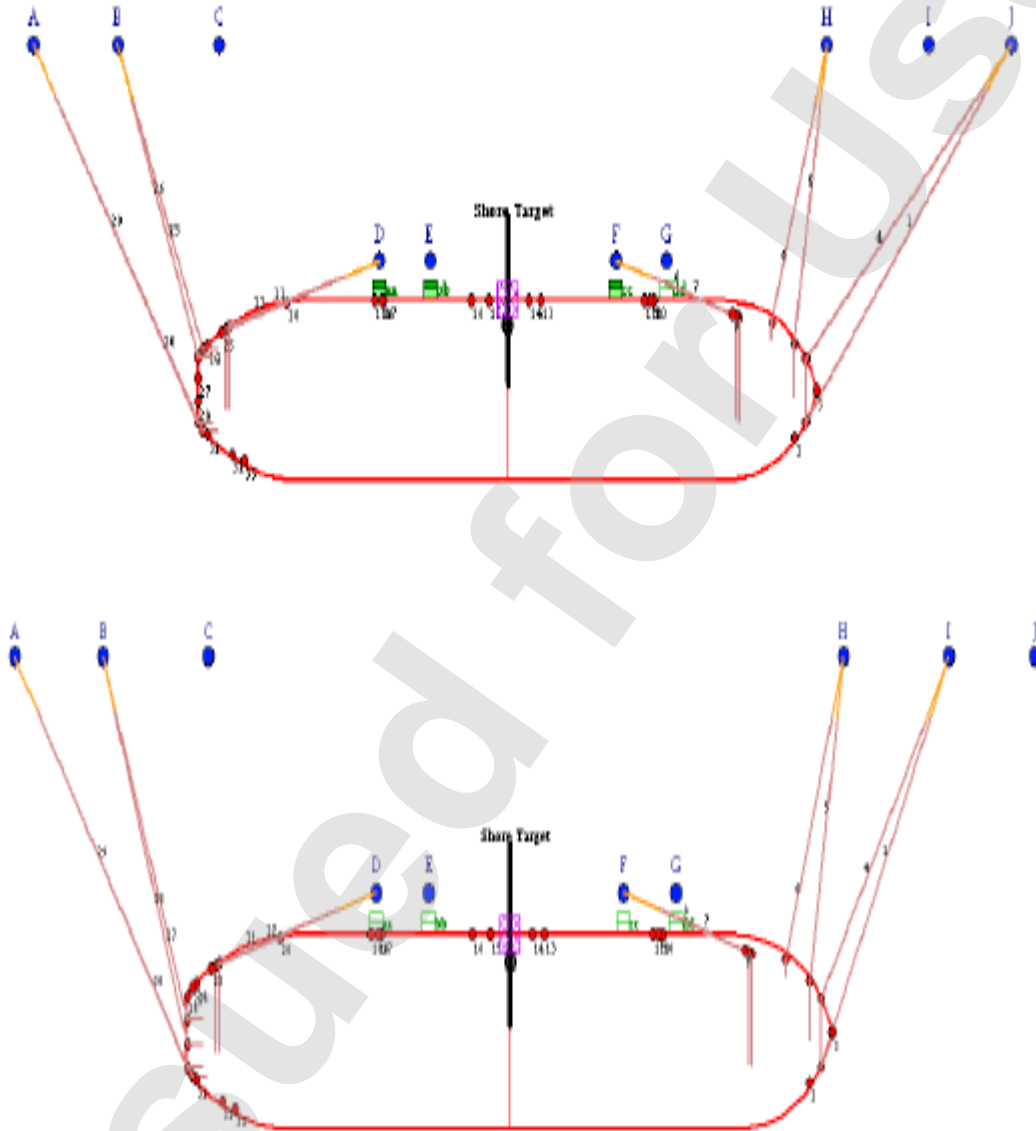
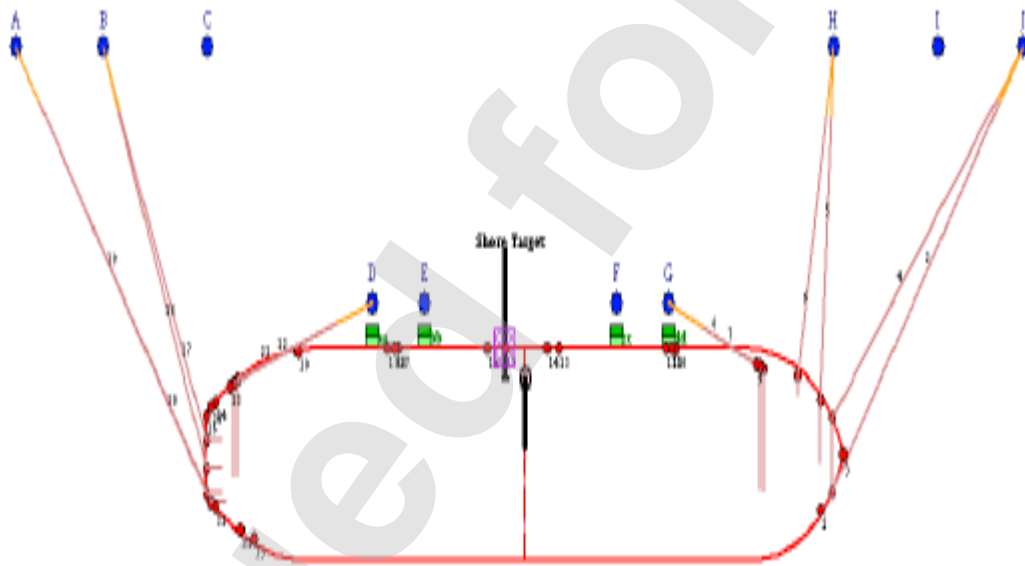
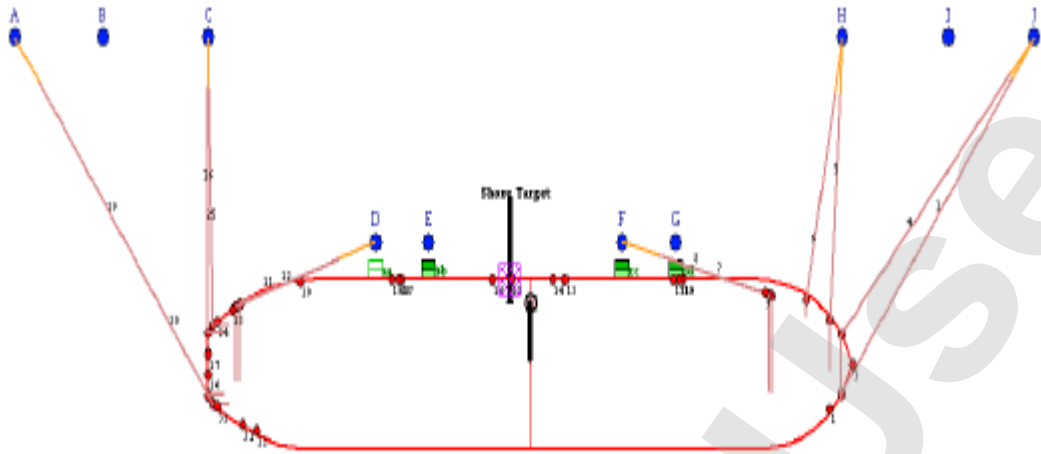


Figure 6 - Condensate Vessel Mooring Diagram





APPENDIX O: Schedule 1 - Measurement Analysis and Calculation

SCHEDULE 1

Measurement, Analysis and Calculation

1. REFERENCES FOR SCHEDULE 1

1.1 This Schedule 1 is intended to give minimum requirements that are in general compliance with LNG industry standards and practice. Primary references are:

- (a) ISO 13398:1997 – Refrigerated light hydrocarbon fluids – Liquefied natural gas – Procedure for custody transfer on board ship;
- (b) ISO 8311:1989 – Refrigerated light hydrocarbon fluids – Calibration of membrane tanks and independent prismatic tanks in ships – Physical measurement;
- (c) ISO 6578:1991 – Refrigerated hydrocarbon liquids – Static measurement – Calculation procedure;
- (d) ISO 6976:1995 – Natural gas – Calculation of calorific values, density, relative density and Wobbe index from composition;
- (e) ISO 8943:2007 – Refrigerated light hydrocarbon fluids – Sampling of liquefied natural gas – Continuous and intermittent methods;
- (f) EN 12838:2000 – Installations and equipment for liquefied natural gas – Suitability testing of LNG sampling systems;
- (g) ISO 6974:2000 – Natural Gas – Determination of composition with defined uncertainty by gas chromatography;
- (h) ISO 19739:2004 – Natural Gas – Determination of sulphur compounds using gas chromatography;
- (i) ASTM D5453 – Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Oxidation Decomposition and Ultraviolet Fluorescence Method; and
- (j) GPA Publication 2145-09 (SI) – Table of Physical Properties for Hydrocarbons and Other Compounds of Interest to the Natural Gas Industry.

1.2 The above references shall be considered as the minimum criterion for any item not specifically addressed in this Schedule 1.

1.3 The basis for all calculations is based on ideal reaction at fifteen degrees Celsius (15°C) and one thousand and thirteen decimal two five millibars absolute (1013.25 mbar). Conversion to reference conditions of sixty degrees Fahrenheit (60°F) and fourteen decimal six nine six pounds per square inch absolute (14.696 psia) is defined in this Schedule 1.

2. TANK GAUGE TABLES

2.1 Calibration of LNG Tanks and Preparation of Tank Gauge Tables

- (a) each LNG shall have been calibrated for volume against level. Such calibrations shall be or have been approved and certified by a reputable independent surveyor; and
- (b) the tank gauge tables shall be prepared which shall be certified by a reputable independent surveyor. Such tank gauge tables shall include sounding tables, correction tables for list and trim, volume corrections to tank service temperature, and other corrections if necessary.

2.2 Accuracy of Tank Gauge Tables

Tank gauge tables prepared pursuant to paragraph 2.1(b) of this Schedule 1 shall indicate volumes in cubic metres expressed to the nearest thousandth (0.001), with LNG tank depths expressed in metres to the nearest hundredth (0.01).

3. SELECTION OF GAUGING DEVICES

3.1 Liquid Level Gauging Devices

- (a) Each LNG tank of an LNG Ship shall be equipped with main and auxiliary liquid level gauging devices that utilise different technologies.
- (b) The measurement accuracy of the main gauging devices shall be plus or minus seven decimal five (± 7.5) millimetre or better and of the auxiliary liquid level gauging devices shall be plus or minus ten (± 10) millimetre or better. Indications from the two systems shall be routinely compared to ensure they are performing normally.
- (c) The liquid level in each LNG tank shall be logged or printed.

3.2 Temperature Gauging Devices

- (a) Each LNG tank of any LNG Ship shall be equipped with a minimum of five (5) pairs of temperature gauging devices located on or near the vertical axis of such LNG tank.
- (b) Primary and redundant temperature gauges are required. Such temperature gauging devices shall be installed to provide temperature indication at various levels in each tank. Specifically, one (1) device shall be located near the bottom and one (1) shall be located in the vapour space at the top of each LNG tank. The temperature of the LNG and of the vapour space in each LNG tank shall be measured by means of a number of properly located temperature measuring devices sufficient to permit the determination of average temperature.
- (c) In the temperature range of minus one hundred and sixty-five degrees Celsius (-165°C) to minus one hundred and forty-five degrees Celsius (-145°C), the accuracy shall be plus or minus zero decimal two degrees Celsius ($\pm 0.2^{\circ}\text{C}$) or better and in the temperature range of minus one hundred and forty-five degrees Celsius (-145°C) to plus forty degrees Celsius ($+40^{\circ}\text{C}$), the accuracy shall be plus or minus one decimal five degrees Celsius ($\pm 1.5^{\circ}\text{C}$) or better.
- (d) The temperature in each LNG tank shall be logged or printed.

3.3 Pressure Gauging Devices

- (a) Each LNG tank of an LNG Ship shall have at least one (1) absolute vapour pressure gauging device.

- (b) The measurement accuracy of the vapour pressure gauging device shall be plus or minus one percent ($\pm 1\%$) of the full scale.
- (c) The pressure in each LNG tank shall be logged or printed.

3.4 List and Trim Gauging Devices

- (a) A list gauging device and a trim gauging device shall be installed on each LNG Ship.
- (b) The measurement accuracy of the list and the trim gauging devices shall be in accordance with generally accepted practices in the LNG industry.

4. MEASUREMENT PROCEDURES

4.1 LNG Ship Condition

Condition of the LNG Ships at the time of custody transfer, with respect to cargo pipelines, cargo facilities, trim and list, shall be as described in clause 5.6 of ISO 13398.

4.2 Liquid Level

- (a) Each time LNG is loaded onto an LNG Ship the liquid level of each LNG tank in each LNG Ship shall be determined immediately before any of the LNG Ship liquid manifold valves has been opened and loading commences and immediately after loading is completed and the LNG Ship manifold valves have been closed and shall be determined in accordance with paragraph 4 of this Schedule 1.
- (b) Measurement of the liquid level in each LNG tank of an LNG Ship shall be made to the nearest millimetre by using the main liquid level gauging devices referred to in paragraph 3.1 of this Schedule 1. Should a main device fail, the auxiliary device shall be used.
- (c) Five (5) readings shall be made following the manufacturer's recommendations on reading interval. The arithmetic average of the readings rounded to the nearest one (1) millimetre shall be deemed the liquid level. When readings are being taken of any LNG tank, such LNG tank shall remain closed.
- (d) If there is doubt as to the correctness of the readings a new series of five (5) readings shall be taken.

4.3 Temperature

- (a) At the same time as the liquid level is measured, the temperature of the LNG and vapour in an LNG Ship shall be determined by means of the temperature measuring devices specified in paragraph 4 of this Schedule 1.
- (b) The temperature of the vapour in an LNG Ship ("TV") shall be determined immediately before loading by means of such temperature measuring devices which are known by reference to the liquid gauging devices to be then fully surrounded by vapour. Such determination shall be made by taking one (1) reading of each temperature measuring device in each LNG tank fully surrounded by vapour to the nearest zero point zero one (0.01) degree Celsius.
- (c) The temperature of the liquid cargo in an LNG Ship ("TL") shall be determined immediately after loading by means of such temperature measuring devices which are known by reference to the liquid gauging devices to be then fully immersed in liquid. Such determination shall be made by taking one (1) reading of each temperature measuring device fully immersed in liquid in each LNG tank to the nearest zero point zero one (0.01) degree Celsius.

- (d) An arithmetic average of all such readings with respect to vapour and liquid in all LNG tanks shall be deemed the final temperature of vapour and liquid. To calculate such arithmetic average temperature, all readings of the temperature measuring devices shall be added together and then divided by the total number of readings which are used in this calculation and then rounded to the nearest tenth degree Celsius (0.1°C).

4.4 Pressure

- (a) At the same time as the liquid level is measured, absolute pressure in each LNG tank shall be measured to the nearest zero decimal one (0.1) kilopascal or to the nearest one (1) millibar by using the pressure gauging device referred to in paragraph 3.3 of this Schedule 1.
- (b) The determination of the absolute pressure (P_v) in the LNG tanks of an LNG Ship shall be made by taking one (1) reading of the pressure gauging device in each LNG tank, and then by taking an arithmetic average of all such readings.
- (c) In the case where readings are made in millibars, such arithmetic average shall be calculated to one (1) decimal place and shall be rounded to the nearest whole millibar. In the case where readings are made in kilopascals, such arithmetic average shall be calculated to two (2) decimal places and shall be rounded to the nearest one (1) decimal place in kilopascal.

4.5 List and Trim

- (a) At the same time as the liquid level is measured, the measurement of the list and of the trim shall be conducted to the nearest zero decimal zero one degree (0.01°) for list and zero decimal zero one metre (0.01m) for trim.
- (b) The determination of the list and of the trim shall be made by taking one (1) reading of the list and trim gauging devices.

4.6 Procedure in case of Gauging Device Failure

If the measurements referred to in paragraphs 4.2, 4.3, 4.4 and 4.5 of this Schedule 1 cannot be performed due to a failure of a primary/main gauging device, the volume of LNG delivered shall be determined by gauging the liquid level using the redundant/auxiliary gauging and measurement devices. Should the secondary gauging devices fail as well, alternative gauging procedures shall be determined by mutual agreement between the Parties.

4.7 Determination of Volume of LNG Loaded

- (a) The volume of LNG stated in cubic metres to the nearest zero decimal zero zero one (0.001) cubic metres, shall be determined by using the tank gauge tables referred to in paragraph 2 of this Schedule 1 and by applying the volume corrections set forth in such paragraph.
- (b) The volume of LNG loaded (V_L) shall be determined by deducting the total volume of LNG in all LNG tanks immediately before loading commences (V_h) from the total volume in all LNG tanks immediately after loading is completed (V_b). This volume of LNG loaded is then rounded to the nearest cubic metre.

5. DETERMINATION OF COMPOSITION OF LNG AND VAPOUR

5.1 Sampling and Analysis Procedures

- (a) A sampling system based on constant pressure floating piston with electrical vaporiser, designed, installed and operated in accordance with ISO 8943:2007, shall be provided, maintained and operated to provide representative samples of LNG. The same LNG sample shall also be continuously analysed using an "on line" gas chromatograph as a primary measurement. Such gas chromatograph shall continuously operate during the period when normal and stable loading flow-rate is occurring. In addition, and as a back-up (secondary) system, three (3) representative LNG samples will be obtained continuously and at a proportional rate (ratio between LNG loading line A and B) during the period starting immediately after continuous loading at the normal flow rate (after ramp up) has commenced and ending immediately prior to the suspension of continuous loading at normal flow rate (before ramp down). A properly designed and maintained sample delivery and conditioning system shall be utilised.
- (b) The LNG loaded shall be analysed using "on-line" gas chromatograph for invoicing purposes. The average of the analysis results while loading flow-rate is normal and stable shall be used as the composition of the loaded LNG cargo (Energy Components shall be used to collate this data). The said "on-line" gas chromatograph shall be validated and/or calibrated within 48 hours prior to the commencement of the LNG loading.
- (c) Should the on-line gas chromatograph fail, Parties (seller and buyer) shall consider using the back-up system, analysing one of the three representative LNG sample in the seller's Onshore laboratory, using an off-line (lab) gas chromatograph, for invoicing purposes. One (1) sample cylinder shall be delivered to the LNG Ship if so required. In addition, one (1) sample cylinder shall be retained for at least sixty (60) Days. In case of any dispute as to the accuracy of any analysis, the sample shall be further retained until the Parties agree to retain it no longer.
- (d) If both the primary measurement (on-line gas chromatograph) and back-up system (grabbed representative LNG sample) fails for any reason, or in the case the primary measurement fails and the Parties agree not to use the back-up system as per 5.1(c), the normalised arithmetic average of analysis results of the five (5) immediately preceding LNG Cargoes, from the Loading Port, as verified by the independent surveyor appointed in connection with delivery of such Cargoes, shall be deemed to be the composition of the LNG. However, in case the sampling and analysis result of one or more Cargo(es) is not representative of the normalised arithmetic average because of instability of the LNG composition during production ramp-up or for any other reason, the sampling and analysis results for such Cargo(es) shall be excluded in calculating the normalised arithmetic average.

Analysis Procedure

- (a) On-line gas chromatograph shall be the primary measurement for LNG cargo; using the average result while loading flow-rate is normal and stable shall be used as the composition of the loaded LNG cargo (Energy Components shall be used to collate this data). In case the on-line Gas Chromatograph fail, for any reason, the representative LNG sample (one of the three samples) shall be analysed immediately at the seller's onshore laboratory to determine, by gas chromatography, the molar fractions of hydrocarbons, Nitrogen, Carbon Dioxide and Oxygen in the sample. The method used shall be the method described in the latest version of ISO 6974:2000. Care should be taken to ensure that the molar fraction of methane is adjusted (normalised) so as to make the sum of component fractions equal to one decimal zero zero zero zero (1.0000).
- (b) Gas chromatography which is used to determine molar fractions of each gas component in the sample cylinder, shall detect Methane, Ethane, Propane, Iso-Butane, N-Butane, Iso-Pentane, N-Pentane, Nitrogen, Carbon Dioxide and Oxygen. If Hexane and/or heavier components are detected, molar fractions of Hexane and/or heavier components shall be added to molar fraction of N-pentane for calculation stipulated in paragraph 5 of this Schedule 1.
- (c) The ISO 19739 procedure shall be used to determine the Total Sulphur content of the LNG loaded. If the total sulphur content is less than five (5) mg/Sm³ it is not necessary to analyse the sample for hydrogen sulphide. The ISO 19739 procedure shall be used to determine the Hydrogen Sulphide content of the LNG loaded.

6. CALCULATION OF QUANTITY LOADED

6.1 General

The calculation procedures contained in this paragraph are in accordance with ISO 6578 – 1991 Refrigerated hydrocarbon liquids – Static Measurement, using Klosek – McKinley method for density calculation.

For the purpose of converting gauge to absolute pressure measurements, the atmospheric pressure shall be deemed to be one thousand and thirteen decimal two five millibars (1013.25 mbar = 101.325 kPa). Unless otherwise specified, reference conditions shall have the meaning:

- (a) Reference pressure – one thousand and thirteen decimal two five millibars (1013.25 mbar = 101.325 kPa); and
- (b) Reference temperature – fifteen degrees Celsius (15°C).

6.2 In this paragraph 6 each of the following notations shall have the following meaning:

- D = Density of the LNG loaded, in kg/m³, at the prevailing composition and temperature T_L, rounded to two (2) decimal places, calculated according to the method specified in paragraph 6.5 of this Schedule 1.
- HV_i = Gross Heating Value (Mass Based) of component "i" in MJ/kg of dry ideal gas. For data see paragraph 7.1 of this Schedule 1 at two hundred and eighty eight point one five (288.15) degrees Kelvin (fifteen (15) degrees Celsius) and one thousand and thirteen point two five (1013.25) millibars.
- HV_m = Gross Heating Value (Mass Based) of the LNG loaded in MJ/kg of dry ideal gas, calculated according to the method specified in paragraph 6.3 of this Schedule 1 at two hundred and eighty-eight point one five (288.15) degrees Kelvin (fifteen (15) degrees Celsius) and one thousand and thirteen point two five (1013.25) millibars, rounded to four (4) decimal places.
- HV = Gross Heating Value (Volume Based) of the LNG loaded in Btu/SCF, at sixty (60) degrees Fahrenheit and fourteen point six nine six (14.696) pounds per square inch absolute, calculated in accordance to the method specified in paragraph 6.3 of this Schedule 1, rounded to one (1) decimal place.
- 37.706 = Gross Heating Value (Volume Based) of the vapour displaced by the volume of the LNG loaded in MJ/m³ at two hundred and eighty eight point one five (288.15) degrees Kelvin (fifteen (15) degrees Celsius) and one thousand and thirteen point two five (1013.25) millibars.
- K_T = Volume correction in m³/kmol at temperature T_L obtained by linear interpolation from paragraph 7.4 of this Schedule 1, rounded to six (6) decimal places.

K_2	=	Volume correction in $m^3/kmol$ at temperature T_L obtained by linear interpolation from paragraph 7.5 of this Schedule 1, rounded to six (6) decimal places.
M_i	=	Molecular mass of component "i" in $kg/kmol$ according to paragraph 7.2 of this Schedule 1.
P_v	=	The average absolute pressure of the vapour phase of the ship's LNG tank in millibars measured according to paragraph 4.4 of this Schedule 1 immediately before loading. Where the readings have been made in kilopascals, the data shall be converted to millibars.
Q	=	MMBtu contained in the LNG delivered, rounded to the nearest ten (10) MMBtu, at sixty (60) degrees Fahrenheit and fourteen point six nine six (14.696) pounds per square inch absolute.
Q_{vd}	=	MJ contained in the vapour displaced, rounded to the nearest one (1) MJ at two hundred and eighty-eight point one five (288.15) degrees Kelvin (fifteen (15) degrees Celsius) and one thousand and thirteen point two five (1013.25) millibars.
$Q_{fuelgas}$	=	MJ Consumed by the LNG Ship as fuel during the loading operations, calculated according to the method specified in Section 6.7 of this Schedule 1, and rounded to the nearest one (1) MJ.
T_L	=	Average temperature of the LNG in the LNG tanks in an LNG Ship immediately after loading in degrees Celsius, rounded to one (1) decimal place, as specified in paragraph 4.3 of this Schedule 1.
T_v	=	Average temperature of the vapour in the LNG tanks in an LNG Ship immediately before loading begins, in degrees Celsius, rounded to one (1) decimal place, as specified in paragraph 4.3 of this Schedule 1.
V_b	=	Volume of the LNG in an LNG Ship immediately after loading in m^3 rounded to three (3) decimal places as specified in paragraph 4.7(b) of this Schedule 1.
V_h	=	Volume of the LNG in an LNG Ship immediately before loading in m^3 rounded to three (3) decimal places as specified in paragraph 4.7(b) of this Schedule 1.
V_L	=	Volume of the LNG loaded in m^3 rounded to the nearest cubic metre as specified in paragraph 4.7(b) of this Schedule 1.
V_{gd}	=	Volume, in m^3 , of vapour displaced from the LNG Ship during loading which is equal to the volume of LNG loaded as defined in V_L .
v_i	=	Molar volume of component "i" in $m^3/kmol$ at T_L obtained by linear interpolation from paragraph 7.3 of this Schedule 1, rounded to six (6) decimal places.
X_i	=	Molar fraction of component "i" of the samples taken, rounded to four (4) decimal places, determined by gas chromatographic analysis as specified in paragraph 5.2 of this Schedule 1.
X_m	=	Value of X_i for methane.
X_n	=	Value of X_i for nitrogen.

6.3 MMBtu calculation of the LNG Loaded

The number of MMBtu contained in the LNG loaded, Q, shall be calculated using the following formula:

$$Q = \frac{((V_L * D * HV_m) - Q_{vd} + Q_{fuelgas})}{1055.12}$$

at sixty (60) degrees Fahrenheit and fourteen point six nine six (14.696) pounds per square inch absolute

in which:

$$V_L = V_b - V_h$$

$$HV_m = \frac{\sum (X_i * M_i * HV_i)}{\sum (X_i * M_i)}$$

$$Q_{vd} = V_{gd} * 288.15 / (273.15 + T_v) * (P_w / 1013.25) * 37.706$$

6.4 The derivation of the conversion factor $\frac{1}{1055.12}$ in the formula in paragraph 6.3 of this Schedule 1 for the conversion of MJ into MMBtu is obtained as follows:

(a) $q\left(\begin{smallmatrix} T \\ P \end{smallmatrix}\right)$ means the gross heating value, measured at temperature T and pressure P, contained in a specified quantity of gas;

$$(b) \ q\left(\begin{smallmatrix} 60^\circ F \\ 14.696 \text{psia} \end{smallmatrix}\right) \text{ in MJ} = \frac{1}{1.00006} q\left(\begin{smallmatrix} 15^\circ C \\ 1013.25 \text{millibar} \end{smallmatrix}\right) \text{ in MJ};$$

(c) one (1) MMBtu corresponds to one thousand and fifty-five point zero six (1055.06) MJ;

$$(d) \ q\left(\begin{smallmatrix} 60^\circ F \\ 14.696 \text{psia} \end{smallmatrix}\right) \text{ in MMBtu} = \frac{1}{1055.06} q\left(\begin{smallmatrix} 60^\circ F \\ 14.696 \text{psia} \end{smallmatrix}\right) \text{ in MJ};$$

(e) combining (b) and (d) above yields:

$$(f) \ q\left(\begin{smallmatrix} 60^\circ F \\ 14.696 \text{psia} \end{smallmatrix}\right) \text{ in MMBtu} = \frac{1}{1055.12} q\left(\begin{smallmatrix} 15^\circ C \\ 1013.25 \text{millibar} \end{smallmatrix}\right) \text{ in MJ}.$$

6.5 Density Calculation Formula

The density of the LNG loaded, in kg/m³, which is used in the MMBtu calculations in paragraph 6.3 of this Schedule 1 shall be calculated from the following formula derived from the revised Klosek-McKinley method (ISO 6578:1991):

$$D = \frac{\sum (X_i * M_i)}{\sum (X_i * v_i) - ((K_1 + (K_2 - K_1) * X_n / 0.0425) * X_m)}$$

6.6 Gross Heating Value (Volume Based) specification

The calculation of the Gross Heating Value (Volume Based) of LNG loaded in Btu/SCF, for the purpose of determining the quality of such LNG for comparison with the specifications set out in schedule 1, shall be derived from the same compositional analysis as is used for the purposes of calculating the Gross Heating Value (Mass Based). GHV shall be calculated using ISO 6976-1995 in Btu/SCF assuming an ideal gas and using a reference combustion and metering temperature of sixty degrees Fahrenheit (60°F) and a reference pressure of fourteen decimal six nine six pounds per square inch absolute (14.696 psia) the calculation formula as follows:

$$HV = 1.13285 \times \Sigma(X_i \times M_i \times HV_i)$$

The above formula follows from:

(a) molar gross heating value = $\Sigma(X_i \times M_i \times HV_i)$ MJ/kmol

(b) 1 kmol = 2.20462 lbmol

(c) 1 lbmol = 379.482 SCF

and hence:

$$(d) HV = 1,000,000 / (1,055.12 \times 2.20462 \times 379.482) \times \Sigma (X_i \times M_i \times HV_i)$$

$$= 1.13285 \times \Sigma (X_i \times M_i \times HV_i)$$

In the application of the above formula, no intermediate rounding shall be made if the value of HV is thereby affected.

- 6.7 In case the LNG Ship is permitted to burn gas to engines during the bulk loading, the quantity of Natural Gas consumed by the LNG Ship as fuel $Q_{fuelgas}$ shall be calculated according to the following formula:

$$Q_{fuelgas} = HV_m \times E_{fuelgas}$$

Where $E_{fuelgas}$ is the quantity of Natural Gas (in kilogram) measured by the gas flow meter equipped on the LNG Ship, $E_{fuelgas}$ shall be the difference between the first and second reading of the gas flow meter, which will take place respectively just before loading commences and just after loading is completed. $E_{fuelgas}$ is rounded to the nearest one (1) kilogram.

In the case that the LNG Ship has not got the functionality described for the gas flow meter, for simplicity the Parties may make a mutual decision to a fixed quantity consumed during the period of loading.

The value of $E_{fuelgas}$ shall be zero (0) where the Natural Gas is not burnt by the LNG Ship at the Loading Facilities during bulk loading operations

7. DATA

7.1 Values of HV_i

Component	HV_i (MJ/kg)
Methane	55.575
Ethane	51.951
Propane	50.369

Issued for Use

Component	HV _i (MJ/kg)
Iso-Butane	49.388
N-Butane	49.546
Iso-Pentane	48.950
N-Pentane	49.045
Nitrogen	0
Carbon Dioxide	0
Oxygen	0

Source: GPA Publication 2145-09 (SI): "Table of Physical Properties for Hydrocarbons and Other Compounds of Interest to the Natural Gas Industry".

7.2 Values of M_i

Component	M_i (kg/kmol)
Methane	16.0425
Ethane	30.0690
Propane	44.0956
Iso-Butane	58.1222
N-Butane	58.1222
Iso-Pentane	72.1488
N-Pentane	72.1488
Nitrogen	28.0134
Carbon Dioxide	44.0095
Oxygen	31.9988

Source: GPA Publication 2145-09 (SI): "Table of Physical Properties for Hydrocarbons and Other Compounds of Interest to the Natural Gas Industry".

7.3 Values of v_i (m³/kmol)

Temperature	-150°C	-155°C	-160°C	-165°C	-170°C	-175°C	-180°C
Methane ¹⁾	0.039580	0.038839	0.038149	0.037500	0.036891	0.036315	0.035771
Ethane ¹⁾	0.048806	0.048369	0.047942	0.047524	0.047116	0.046716	0.046324

Temperature	-150°C	-155°C	-160°C	-165°C	-170°C	-175°C	-180°C
Propane ¹⁾	0.063417	0.062953	0.062497	0.062046	0.061602	0.061164	0.060731
Iso-Butane ¹⁾	0.079374	0.078859	0.078352	0.077851	0.077356	0.076868	0.076384
N-Butane ¹⁾	0.077847	0.077359	0.076875	0.076398	0.075926	0.075459	0.074997
Iso-Pentane ¹⁾	0.092817	0.092267	0.091721	0.091179	0.090642	0.090107	0.089576
N-Pentane ¹⁾	0.092642	0.092111	0.091583	0.091058	0.090536	0.090016	0.089498
Nitrogen ¹⁾	0.055897	0.051022	0.047019	0.044043	0.041788	0.039949	0.038408
Carbon Dioxide ²⁾	0.027950	0.027563	0.027200	0.026775	0.026400	-	-
Oxygen ²⁾	0.033670	0.032520	0.031510	0.030610	0.029800	-	-

Source: 1) ISO 6578:1991, Annex B, Orthobaric molar volumes of individual components of LNG Table B. 1

2) Institute of Petroleum publication IP 251/76

Note: For intermediate values of temperature and molecular mass a linear interpolation shall be applied.

7.4 Values of Volume Correction Factor, K_f (m³/kmol)

Molecular Mass of Mixture	-150°C	-155°C	-160°C	-165°C	-170°C	-175°C	-180°C
16.0	-0.00001	-0.00001	-0.00001	-0.00001	-0.00001	-0.00001	-0.00001
17.0	0.00028	0.00024	0.00021	0.00018	0.00016	0.00015	0.00013
18.0	0.00056	0.00047	0.00041	0.00037	0.00033	0.00029	0.00025
19.0	0.00076	0.00067	0.00058	0.00051	0.00045	0.00041	0.00037
20.0	0.00098	0.00086	0.00076	0.00067	0.00059	0.00052	0.00047
21.0	0.00113	0.00100	0.00089	0.00079	0.00070	0.00062	0.00055
22.0	0.00132	0.00117	0.00101	0.00090	0.00081	0.00072	0.00064

Source: ISO 6578:1991, Annex C, Correction factors for volume reduction of LNG mixtures Table C. 1

Note 1: Molecular mass of mixture equals $\Sigma(X_i \times M_i)$.

Note 2: For intermediate values of temperature and molecular mass a linear interpolation shall be applied.

APPENDIX P: Onshore Cargo Safety Data Sheets

P1. LNG



SAFETY DATA SHEET

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name LIQUEFIED NATURAL GAS (LNG)
Synonyms LNG • NATURAL GAS

1.2 Uses and uses advised against

Uses INDUSTRIAL APPLICATIONS

1.3 Details of the supplier of the product

Supplier name INPEX OPERATIONS AUSTRALIA PTY LTD
Address Level 22, 100 St. Georges Terr, Perth, WA, 6000, AUSTRALIA
Telephone (08) 6213 6000

1.4 Emergency telephone numbers

Emergency 13 11 26 (PIC)
Emergency (08) 8983 8888
Emergency 1300 761 085

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

Physical Hazards

Flammable Gases: Category 1A
 Gases Under Pressure: Refrigerated liquefied gas

Health Hazards

Not classified as a Health Hazard

Environmental Hazards

Not classified as an Environmental Hazard

2.2 GHS Label elements

Signal word DANGER

Pictograms



Hazard statements

H220 Extremely flammable gas.
 H281 Contains refrigerated gas; may cause cryogenic burns or injury.

Prevention statements

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P282 Wear cold insulating gloves and either face shield or eye protection.

Response statements

P336 + P315 Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.
 P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
 P381 In case of leakage, eliminate all ignition sources.

PRODUCT NAME LIQUEFIED NATURAL GAS (LNG)**Storage statements**

P403 Store in a well-ventilated place.

Disposal statements

None allocated.

2.3 Other hazards

In high concentrations may cause asphyxiation. Contact with liquid may cause cold burns/frostbite.

3. COMPOSITION/ INFORMATION ON INGREDIENTS**3.1 Substances / Mixtures**

Ingredient	CAS Number	EC Number	Content (v/v)
METHANE	74-82-8	200-812-7	>80%
ETHANE	74-84-0	200-814-8	<10%
PROPANE	74-98-6	200-827-9	<10%
BUTANE	106-97-8	203-448-7	<1%
ISOBUTANE	75-28-5	200-857-2	<1%

4. FIRST AID MEASURES**4.1 Description of first aid measures**

Eye	Cold burns: Immediately flush with tepid water or with sterile saline solution. Hold eyelids apart and irrigate for 15 minutes. Seek medical attention.
Inhalation	If inhaled, remove from contaminated area. To protect rescuer, use an Air-line respirator or Self Contained Breathing Apparatus (SCBA). Be aware of possible explosive atmospheres. Apply artificial respiration if not breathing. Give oxygen if available.
Skin	Cold burns: Remove contaminated clothing and gently flush affected areas with warm water (30°C) for 15 minutes. It is recommended that warm water is applied to clothing before removing it so as to prevent further skin damage. Apply sterile dressing and treat as for a thermal burn. For large burns, immerse in warm water for 15 minutes. DO NOT apply any form of direct heat. Seek immediate medical attention.
Ingestion	Ingestion is not considered a potential route of exposure.
First aid facilities	Eye wash facilities and safety shower should be available.

4.2 Most important symptoms and effects, both acute and delayed

In high concentrations may cause asphyxiation. Direct contact with the liquefied material or escaping compressed gas may cause frostbite injury.

4.3 Immediate medical attention and special treatment needed

Treat symptomatically.

5. FIRE FIGHTING MEASURES**5.1 Extinguishing media**

Stop flow of gas if safe to do so. If the gas source cannot be isolated, do not extinguish the flame, since re-ignition and explosion could occur. Evacuate area and await arrival of emergency services.

5.2 Special hazards arising from the substance or mixture

Extremely flammable. Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, heaters, naked lights, pilot lights, mobile phones etc. when handling.

5.3 Advice for firefighters

Temperatures in a fire may cause containers to rupture and internal pressure relief devices to be activated. Cool containers exposed to fire by applying water from a protected location. Do not approach containers suspected of being hot. This material is capable of forming explosive mixtures in air.

5.4 Hazchem code

2YE	
2	Fine Water Spray.
Y	Risk of violent reaction or explosion. Wear full fire kit and breathing apparatus. Contain spill and run-off.
E	Evacuation of people in and around the immediate vicinity of the incident should be considered.

PRODUCT NAME LIQUEFIED NATURAL GAS (LNG)

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

If discharge occurs, evacuate area of personnel immediately. Ventilate area where possible and eliminate ignition sources. Use Personal Protective Equipment (PPE) as detailed in Section 8 of the SDS.

6.2 Environmental precautions

Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.3 Methods of cleaning up

Evacuate area immediately, assess risks, isolate pipe work upstream of discharge point, ventilate area and contact emergency services where appropriate. Only stop flow of gas if safe to do so. Keep area evacuated and free from ignition sources until any leaked or spilled liquid has evaporated. Repairs must only be undertaken by authorised personnel.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas.

7.2 Conditions for safe storage, including any incompatibilities

Do not store near incompatible substances and sources of ignition. Tanks should be located to minimise risk to personnel and property and should be protected from damage (from vehicles or work processes). Tanks are best located outdoors with protection from the elements. Storage conditions should comply with AS 3981: The storage and handling of liquefied natural gas.

Ensure any pipework used for distribution is labelled and colour coded for ready identification of contents. See AS 1897 (Gas transmission and distribution systems) and AS 2885 (Pipeline - Gas and liquid petroleum) for additional details.

7.3 Specific end uses

No information provided.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Exposure standards

Ingredient	Reference	TWA		STEL	
		ppm	mg/m ³	ppm	mg/m ³
Butane	SWA [AUS]	800	1900	--	--
Butane	SWA [Proposed]	--	--	1000	2370
Ethane	SWA [AUS]	Asphyxiant			
Isobutane	SWA [AUS]	1000	--	--	--
Methane	SWA [AUS]	Asphyxiant			
Propane	SWA [AUS]	Asphyxiant			

Biological limits

No biological limit values have been entered for this product.

8.2 Exposure controls

Engineering controls Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical explosion proof extraction ventilation is recommended. Maintain vapour levels below the recommended exposure standard.

PRODUCT NAME LIQUEFIED NATURAL GAS (LNG)

PPE

Eye / Face	Wear safety glasses.
Hands	Wear leather or insulated gloves.
Body	Wear coveralls.
Respiratory	Where an inhalation risk exists, wear Self Contained Breathing Apparatus (SCBA) or an Air-line respirator.



9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	COLOURLESS GAS (LIQUEFIED UNDER PRESSURE)
Odour	SLIGHT ODOUR
Flammability	EXTREMELY FLAMMABLE
Flash point	-188°C (Approximately)
Boiling point	-162°C
Melting point	-182°C
Evaporation rate	NOT AVAILABLE
pH	NOT RELEVANT
Vapour density	0.6 (Air = 1)
Relative density	0.4
Solubility (water)	NOT AVAILABLE
Vapour pressure	101.325 kPa @ 20°C
Upper explosion limit	14 %
Lower explosion limit	5.3 %
Partition coefficient	NOT AVAILABLE
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Explosive properties	NOT AVAILABLE
Oxidising properties	NOT AVAILABLE
Odour threshold	NOT AVAILABLE

9.2 Other information

% Volatiles	100 %
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10. STABILITY AND REACTIVITY

10.1 Reactivity

Carefully review all information provided in sections 10.2 to 10.6.

10.2 Chemical stability

Stable under recommended conditions of storage.

10.3 Possibility of hazardous reactions

Polymerization will not occur.

10.4 Conditions to avoid

Avoid heat, sparks, open flames and other ignition sources.

10.5 Incompatible materials

Incompatible with oxidising agents (e.g. hypochlorites), acids (e.g. nitric acid), heat and ignition sources. Do not use natural rubber flexible hoses. Also incompatible (potentially violently) with oxygen, halogens and metal halides.

10.6 Hazardous decomposition products

May evolve toxic gases if heated to decomposition.

PRODUCT NAME LIQUEFIED NATURAL GAS (LNG)

11. TOXICOLOGICAL INFORMATION**11.1 Information on toxicological effects**

Acute toxicity No known toxicological effects from this product. Based on available data, the classification criteria are not met.

Information available for the ingredients:

Ingredient	Oral LD50	Dermal LD50	Inhalation LC50
METHANE	--	--	326 gm/m ³ /2h (mouse)
ETHANE	--	--	658 mg/L/4hrs (rat)
PROPANE	Study not feasible	Study not feasible	> 800000 ppm/15M (rat)
BUTANE	Study not feasible	Study not feasible	658000 mg/m ³ /4H (rat)

Skin Not classified as a skin irritant. Contact with the liquefied material or escaping compressed gas may cause frostbite injury.

Eye Not classified as an eye irritant. Contact with the liquefied material or escaping compressed gas may cause frostbite injury.

Sensitisation Not classified as causing skin or respiratory sensitisation.

Mutagenicity Not classified as a mutagen.

Carcinogenicity Not classified as a carcinogen.

Reproductive Not classified as a reproductive toxin.

STOT - single exposure Asphyxiant. Effects are proportional to oxygen displacement. Over exposure may result in dizziness, drowsiness, weakness, fatigue, breathing difficulties and unconsciousness.

STOT - repeated exposure Not classified as causing organ damage from repeated exposure.

Aspiration Not classified as causing aspiration.

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

No information provided.

12.2 Persistence and degradability

No information provided.

12.3 Bioaccumulative potential

No information provided.

12.4 Mobility in soil

No information provided.

12.5 Other adverse effects

When discharged into the atmosphere, methane may contribute to the greenhouse effect. Methane has a global warming potential of 28 (CO₂ = 1).

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods**

Waste disposal Cylinders should be returned to the manufacturer or supplier for disposal of contents.

Legislation Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

PRODUCT NAME LIQUEFIED NATURAL GAS (LNG)



	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
14.1 UN Number	1972	1972	1972
14.2 Proper Shipping Name	METHANE, REFRIGERATED LIQUID or NATURAL GAS, REFRIGERATED LIQUID with high methane content	METHANE, REFRIGERATED LIQUID or NATURAL GAS, REFRIGERATED LIQUID with high methane content	METHANE, REFRIGERATED LIQUID or NATURAL GAS, REFRIGERATED LIQUID with high methane content
14.3 Transport hazard class	2.1	2.1	2.1
14.4 Packing Group	None allocated.	None allocated.	None allocated.

14.5 Environmental hazards

No information provided.

14.6 Special precautions for user

Hazchem code 2YE
 GTEPG 2A2
 EmS F-D, S-U

Other information Ensure cylinder is separated from driver and that outlet of relief device is not obstructed.

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Poison schedule A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).

Classifications Safe Work Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals (GHS Revision 7).

Inventory listings **AUSTRALIA: AIIC (Australian Inventory of Industrial Chemicals)**
 All components are listed on AIIC, or are exempt.

16. OTHER INFORMATION

Additional information ASPHYXIANTS (1): When present in the atmospheres in high concentrations, asphyxiants reduce the oxygen concentration by displacement. Atmospheres deficient in oxygen do not provide adequate sensory warning of danger and most simple asphyxiants are odourless. Therefore it is not appropriate to recommend an exposure standard for each asphyxiant, but to maintain oxygen concentrations. However, some asphyxiants may be given an exposure standard due to the potential for narcotic effects at high concentrations or an explosion hazard.

ASPHYXIANTS (2): There is a significant hazard associated with workers entering poorly ventilated areas (e.g. tanks) where oxygen may be deficient. An air supplied breathing apparatus may be required if adequate ventilation is not ensured.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:
 The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as form of product, method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

PRODUCT NAME LIQUEFIED NATURAL GAS (LNG)**HEALTH EFFECTS FROM EXPOSURE:**

It should be noted that the effects from exposure to this product will depend on several factors including: form of product; frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
GHS	Globally Harmonized System
GTEPG	Group Text Emergency Procedure Guide
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m ³	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

Report status

This document has been compiled by RMT on behalf of the manufacturer, importer or supplier of the product and serves as their Safety Data Sheet ('SDS').

It is based on information concerning the product which has been provided to RMT by the manufacturer, importer or supplier or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer, importer or supplier.

While RMT has taken all due care to include accurate and up-to-date information in this SDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this SDS.

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[End of SDS]

P2. PROPANE BULK



SAFETY DATA SHEET

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name **PROPANE BULK**
 Synonyms **PROPANE**

1.2 Uses and uses advised against

Uses **INDUSTRIAL USE**

1.3 Details of the supplier of the product

Supplier name **INPEX OPERATIONS AUSTRALIA PTY LTD**
 Address **Level 22, 100 St. Georges Terr, Perth, WA, 6000, AUSTRALIA**
 Telephone **(08) 6213 6000**

1.4 Emergency telephone numbers

Emergency **13 11 26 (PIC)**
 Emergency **(08) 8983 8888**
 Emergency **1300 761 085**

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

Physical Hazards

Flammable Gases: Category 1A
 Gases Under Pressure: Liquefied gas

Health Hazards

Not classified as a Health Hazard

Environmental Hazards

Not classified as an Environmental Hazard

2.2 GHS Label elements

Signal word **DANGER**

Pictograms



Hazard statements

H220 **Extremely flammable gas.**
 H280 **Contains gas under pressure; may explode if heated.**

Prevention statements

P210 **Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.**

Response statements

P377 **Leaking gas fire: Do not extinguish, unless leak can be stopped safely.**
 P381 **In case of leakage, eliminate all ignition sources.**

Storage statements

P410 + P403 **Protect from sunlight. Store in a well-ventilated place.**

PRODUCT NAME PROPANE BULK

Disposal statements

None allocated.

2.3 Other hazards

In high concentrations may cause asphyxiation. Contact with liquid may cause cold burns/frostbite.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS Number	EC Number	Content (v/v)
PROPANE	74-98-6	200-827-9	>90%
BUTANE	106-97-8	203-448-7	<2%
ETHANE	74-84-0	200-814-8	<2%
METHANE	74-82-8	200-812-7	<0.5%

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye	Cold burns: Immediately flush with tepid water or with sterile saline solution. Hold eyelids apart and irrigate for 15 minutes. Seek medical attention.
Inhalation	If inhaled, remove from contaminated area. To protect rescuer, use an Air-line respirator or Self Contained Breathing Apparatus (SCBA). Be aware of possible explosive atmospheres. Apply artificial respiration if not breathing. Give oxygen if available.
Skin	Cold burns: Remove contaminated clothing and gently flush affected areas with warm water (30°C) for 15 minutes. It is recommended that warm water is applied to clothing before removing it so as to prevent further skin damage. Apply sterile dressing and treat as for a thermal burn. For large burns, immerse in warm water for 15 minutes. DO NOT apply any form of direct heat. Seek immediate medical attention.
Ingestion	Ingestion is not considered a potential route of exposure.
First aid facilities	Eye wash facilities and safety shower should be available.

4.2 Most important symptoms and effects, both acute and delayed

In high concentrations may cause asphyxiation. Direct contact with the liquefied material or escaping compressed gas may cause frostbite injury.

4.3 Immediate medical attention and special treatment needed

Treat symptomatically.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Stop flow of gas if safe to do so, such as by slowly closing the cylinder valve.

5.2 Special hazards arising from the substance or mixture

Extremely flammable. Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, heaters, naked lights, pilot lights, mobile phones etc. when handling.

5.3 Advice for firefighters

Temperatures in a fire may cause cylinders to rupture and internal pressure relief devices to be activated. Cool cylinders or containers exposed to fire by applying water from a protected location. Do not approach cylinders or containers suspected of being hot. This material is capable of forming explosive mixtures in air.

5.4 Hazchem code

2YE	
2	Fine Water Spray.
Y	Risk of violent reaction or explosion. Wear full fire kit and breathing apparatus. Contain spill and run-off.
E	Evacuation of people in and around the immediate vicinity of the incident should be considered.

6. ACCIDENTAL RELEASE MEASURES

PRODUCT NAME PROPANE BULK

6.1 Personal precautions, protective equipment and emergency procedures

If the cylinder is leaking, evacuate area of personnel. Inform manufacturer/supplier of leak. Use Personal Protective Equipment (PPE) as detailed in Section 8 of the SDS. Ventilate area where possible and eliminate ignition sources.

6.2 Environmental precautions

Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.3 Methods of cleaning up

Stop the flow of material, if this is without risk. If the leak is irreparable, move the cylinder to a safe and well ventilated area, and allow to discharge. Keep area evacuated and free from ignition sources until any leaked or spilled liquid has evaporated.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas.

7.2 Conditions for safe storage, including any incompatibilities

Do not store near incompatible substances and sources of ignition. Cylinders should be stored: upright, prevented from falling, in a secure area; below 65°C, in a dry, well ventilated area constructed of non-combustible material with firm level floor (preferably concrete), away from areas of heavy traffic and emergency exits.

7.3 Specific end uses

No information provided.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Exposure standards

Ingredient	Reference	TWA		STEL	
		ppm	mg/m ³	ppm	mg/m ³
Butane	SWA [AUS]	800	1900	--	--
Butane	SWA [Proposed]	--	--	1000	2370
Ethane	SWA [AUS]	Asphyxiant			
Methane	SWA [AUS]	Asphyxiant			
Propane	SWA [AUS]	Asphyxiant			

Biological limits

No biological limit values have been entered for this product.

8.2 Exposure controls

Engineering controls Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical explosion proof extraction ventilation is recommended.

PPE

- Eye / Face** Wear safety glasses.
- Hands** Wear leather or insulated gloves.
- Body** Wear coveralls.
- Respiratory** Where an inhalation risk exists, wear Self Contained Breathing Apparatus (SCBA) or an Air-line respirator.



9. PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT NAME PROPANE BULK

9.1 Information on basic physical and chemical properties

Appearance	COLOURLESS GAS
Odour	SLIGHT ODOUR
Flammability	EXTREMELY FLAMMABLE
Flash point	> -156°C
Boiling point	> -45°C
Melting point	NOT AVAILABLE
Evaporation rate	NOT AVAILABLE
pH	NOT AVAILABLE
Vapour density	1.9 (Air = 1)
Relative density	NOT AVAILABLE
Solubility (water)	INSOLUBLE
Vapour pressure	NOT AVAILABLE
Upper explosion limit	9.5 % (Propane)
Lower explosion limit	2.0 % (Propane)
Partition coefficient	NOT AVAILABLE
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	450°C
Viscosity	NOT AVAILABLE
Explosive properties	NOT AVAILABLE
Oxidising properties	NOT AVAILABLE
Odour threshold	NOT AVAILABLE

9.2 Other information

Freezing point	< -180°C
Density	0.5 kg/L @ 15°C

10. STABILITY AND REACTIVITY

10.1 Reactivity

Carefully review all information provided in sections 10.2 to 10.6.

10.2 Chemical stability

Stable under recommended conditions of storage.

10.3 Possibility of hazardous reactions

Polymerization will not occur.

10.4 Conditions to avoid

Avoid heat, sparks, open flames and other ignition sources.

10.5 Incompatible materials

Incompatible with oxidising agents (e.g. hypochlorites), acids (e.g. nitric acid), heat and ignition sources. Do not use natural rubber flexible hoses. Also incompatible (potentially violently) with oxygen, halogens and metal halides.

10.6 Hazardous decomposition products

May evolve toxic gases if heated to decomposition.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity No known toxicological effects from this product. Based on available data, the classification criteria are not met.

Information available for the ingredients:

Ingredient	Oral LD50	Dermal LD50	Inhalation LC50
PROPANE	Study not feasible	Study not feasible	> 800000 ppm/15M (rat)
BUTANE	Study not feasible	Study not feasible	658000 mg/m3/4H (rat)
ETHANE	--	--	658 mg/L/4hrs (rat)
METHANE	--	--	326 gm/m3/2h (mouse)

Skin Not classified as a skin irritant. Contact with the liquefied material or escaping compressed gas may cause frostbite injury.

PRODUCT NAME PROPANE BULK

Eye	Not classified as an eye irritant. Contact with the liquefied material or escaping compressed gas may cause frostbite injury.
Sensitisation	Not classified as causing skin or respiratory sensitisation.
Mutagenicity	Not classified as a mutagen.
Carcinogenicity	Not classified as a carcinogen.
Reproductive	Not classified as a reproductive toxin.
STOT - single exposure	Asphyxiant. Effects are proportional to oxygen displacement. Over exposure may result in dizziness, drowsiness, weakness, fatigue, breathing difficulties and unconsciousness.
STOT - repeated exposure	Not classified as causing organ damage from repeated exposure.
Aspiration	Not classified as causing aspiration.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No information provided.

12.2 Persistence and degradability

No information provided.

12.3 Bioaccumulative potential

No information provided.

12.4 Mobility in soil

No information provided.

12.5 Other adverse effects

Gas at standard temperature and pressure and is expected to partition primarily to air.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Legislation Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE



	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
14.1 UN Number	1075	1075	1075
14.2 Proper Shipping Name	PETROLEUM GASES, LIQUEFIED	PETROLEUM GASES, LIQUEFIED	PETROLEUM GASES, LIQUEFIED
14.3 Transport hazard class	2.1	2.1	2.1
14.4 Packing Group	None allocated.	None allocated.	None allocated.

14.5 Environmental hazards

No information provided.

PRODUCT NAME PROPANE BULK

14.6 Special precautions for user

Hazchem code	2YE
GTEPG	2A2
EmS	F-D, S-U
Other information	Ensure cylinder is separated from driver and that outlet of relief device is not obstructed.

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Poison schedule	A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).
Classifications	Safe Work Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals (GHS Revision 7).
Inventory listings	AUSTRALIA: AIIC (Australian Inventory of Industrial Chemicals) All components are listed on AIIC, or are exempt.

16. OTHER INFORMATION

Additional information ASPHYXIANTS (1): When present in the atmospheres in high concentrations, asphyxiants reduce the oxygen concentration by displacement. Atmospheres deficient in oxygen do not provide adequate sensory warning of danger and most simple asphyxiants are odourless. Therefore it is not appropriate to recommend an exposure standard for each asphyxiant, but to maintain oxygen concentrations. However, some asphyxiants may be given an exposure standard due to the potential for narcotic effects at high concentrations or an explosion hazard.

ASPHYXIANTS (2): There is a significant hazard associated with workers entering poorly ventilated areas (e.g. tanks) where oxygen may be deficient. An air supplied breathing apparatus may be required if adequate ventilation is not ensured.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:

The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as form of product, method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

HEALTH EFFECTS FROM EXPOSURE:

It should be noted that the effects from exposure to this product will depend on several factors including: form of product; frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

PRODUCT NAME PROPANE BULK

Abbreviations	ACGIH	American Conference of Governmental Industrial Hygienists
	CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
	CNS	Central Nervous System
	EC No.	EC No - European Community Number
	EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
	GHS	Globally Harmonized System
	GTEPG	Group Text Emergency Procedure Guide
	IARC	International Agency for Research on Cancer
	LC50	Lethal Concentration, 50% / Median Lethal Concentration
	LD50	Lethal Dose, 50% / Median Lethal Dose
	mg/m ³	Milligrams per Cubic Metre
	OEL	Occupational Exposure Limit
	pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
	ppm	Parts Per Million
	STEL	Short-Term Exposure Limit
	STOT-RE	Specific target organ toxicity (repeated exposure)
	STOT-SE	Specific target organ toxicity (single exposure)
	SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
	SWA	Safe Work Australia
	TLV	Threshold Limit Value
	TWA	Time Weighted Average

Report status

This document has been compiled by RMT on behalf of the manufacturer, importer or supplier of the product and serves as their Safety Data Sheet ('SDS').

It is based on information concerning the product which has been provided to RMT by the manufacturer, importer or supplier or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer, importer or supplier.

While RMT has taken all due care to include accurate and up-to-date information in this SDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this SDS.

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[End of SDS]

P3. BUTANE BULK



SAFETY DATA SHEET

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name BUTANE BULK
Synonyms BUTANE

1.2 Uses and uses advised against

Uses INDUSTRIAL USE

1.3 Details of the supplier of the product

Supplier name INPEX OPERATIONS AUSTRALIA PTY LTD
Address Level 22, 100 St. Georges Terr, Perth, WA, 6000, AUSTRALIA
Telephone (08) 6213 6000

1.4 Emergency telephone numbers

Emergency 13 11 26 (PIC)
Emergency (08) 8983 8888
Emergency 1300 761 085

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

Physical Hazards

Flammable Gases: Category 1A
 Gases Under Pressure: Compressed gas

Health Hazards

Not classified as a Health Hazard

Environmental Hazards

Not classified as an Environmental Hazard

2.2 GHS Label elements

Signal word DANGER

Pictograms



Hazard statements

H220 Extremely flammable gas.
 H280 Contains gas under pressure; may explode if heated.

Prevention statements

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Response statements

P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
 P381 In case of leakage, eliminate all ignition sources.

Storage statements

P410 + P403 Protect from sunlight. Store in a well-ventilated place.

PRODUCT NAME BUTANE BULK

Disposal statements
None allocated.

2.3 Other hazards
No information provided.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS Number	EC Number	Content (v/v)
BUTANE	106-97-8	203-448-7	<70%
ISOBUTANE	75-28-5	200-857-2	<45%
PROPANE	74-98-6	200-827-9	<3%
ISOPENTANE (2-METHYLBUTANE)	78-78-4	201-142-8	<1%
PENTANE	109-66-0	203-692-4	<1%

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye	Cold burns: Immediately flush with tepid water or with sterile saline solution. Hold eyelids apart and irrigate for 15 minutes. Seek medical attention.
Inhalation	If inhaled, remove from contaminated area. To protect rescuer, use an Air-line respirator or Self Contained Breathing Apparatus (SCBA). Be aware of possible explosive atmospheres. Apply artificial respiration if not breathing. Give oxygen if available.
Skin	Cold burns: Remove contaminated clothing and gently flush affected areas with warm water (30°C) for 15 minutes. It is recommended that warm water is applied to clothing before removing it so as to prevent further skin damage. Apply sterile dressing and treat as for a thermal burn. For large burns, immerse in warm water for 15 minutes. DO NOT apply any form of direct heat. Seek immediate medical attention.
Ingestion	Ingestion is not considered a potential route of exposure.
First aid facilities	Eye wash facilities and safety shower are recommended.

4.2 Most important symptoms and effects, both acute and delayed

In high concentrations may cause asphyxiation. Symptoms may include loss of mobility / consciousness. Victim may not be aware of asphyxiation. In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination.

4.3 Immediate medical attention and special treatment needed

Treat for asphyxia and cold burns.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Stop flow of gas if safe to do so, such as by slowly closing the cylinder valve. If the gas source cannot be isolated, do not extinguish the flame, since re-ignition and explosion could occur. Await arrival of emergency services or manufacturer's advisor. Drench and cool cylinders with water spray from protected area at a safe distance. If it is absolutely necessary to extinguish the flame, use only a dry chemical powder extinguisher. Do not move cylinders for at least 24 hours. Avoid shock and bumps to cylinders.

5.2 Special hazards arising from the substance or mixture

Highly flammable. Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, heaters, naked lights, pilot lights, mobile phones etc. when handling.

5.3 Advice for firefighters

Temperatures in a fire may cause cylinders to rupture and internal pressure relief devices to be activated. Cool cylinders or containers exposed to fire by applying water from a protected location. Do not approach cylinders or containers suspected of being hot. This material is capable of forming explosive mixtures in air.

5.4 Hazchem code

2YE	
2	Fine Water Spray.
Y	Risk of violent reaction or explosion. Wear full fire kit and breathing apparatus. Contain spill and run-off.
E	Evacuation of people in and around the immediate vicinity of the incident should be considered.

PRODUCT NAME BUTANE BULK

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

If the cylinder is leaking, evacuate area of personnel. Inform manufacturer/supplier of leak. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation. Eliminate all sources of ignition. Consider the risk of potentially explosive atmospheres.

6.2 Environmental precautions

Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.3 Methods of cleaning up

Carefully move material to a well ventilated remote area, then allow to discharge if safe to do so. Do not attempt to repair leaking valve or cylinder safety devices.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Do not drag, drop, slide or roll cylinders. The uncontrolled release of a gas under pressure may cause physical harm. Use a suitable hand truck for cylinder movement.

7.2 Conditions for safe storage, including any incompatibilities

Do not store near sources of ignition or incompatible materials. Cylinders should be stored below 65°C in a secure area, upright and restrained to prevent cylinders from falling. Cylinders should also be stored in a dry, well ventilated area constructed of non-combustible material with firm level floor (preferably concrete), away from areas of heavy traffic and emergency exits.

7.3 Specific end uses

No information provided.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Exposure standards

Ingredient	Reference	TWA		STEL	
		ppm	mg/m ³	ppm	mg/m ³
Butane	SWA [AUS]	800	1900	--	--
Butane	SWA [Proposed]	--	--	1000	2370
Isobutane	SWA [AUS]	1000	--	--	--
Pentane	SWA [AUS]	600	1770	750	2210
Pentane (all isomers)	SWA [Proposed]	1000	3000	--	--
Propane	SWA [AUS]	Asphyxiant			

Biological limits

No biological limit values have been entered for this product.

8.2 Exposure controls

Engineering controls Provide suitable ventilation to minimise or eliminate exposure. Confined areas (e.g. tanks) should be adequately ventilated or gas tested. Maintain vapour levels below the recommended exposure standard.

PRODUCT NAME BUTANE BULK

PPE

Eye / Face	Wear safety glasses.
Hands	Wear leather or insulated gloves.
Body	Wear safety boots.
Respiratory	Where an inhalation risk exists, wear Self Contained Breathing Apparatus (SCBA) or an Air-line respirator.



9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	COLOURLESS GAS
Odour	SLIGHT ODOUR
Flammability	EXTREMELY FLAMMABLE
Flash point	< 23°C
Boiling point	-1°C
Melting point	-138°C
Evaporation rate	NOT AVAILABLE
pH	NOT AVAILABLE
Vapour density	NOT AVAILABLE
Relative density	NOT AVAILABLE
Solubility (water)	INSOLUBLE
Vapour pressure	NOT AVAILABLE
Upper explosion limit	8.4 %
Lower explosion limit	1.8 %
Partition coefficient	NOT AVAILABLE
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Explosive properties	NOT AVAILABLE
Oxidising properties	NOT AVAILABLE
Odour threshold	NOT AVAILABLE

10. STABILITY AND REACTIVITY

10.1 Reactivity

Carefully review all information provided in sections 10.2 to 10.6.

10.2 Chemical stability

Stable under recommended conditions of storage.

10.3 Possibility of hazardous reactions

Polymerization will not occur.

10.4 Conditions to avoid

Avoid shock, friction, heavy impact, heat, sparks, open flames and other ignition sources.

10.5 Incompatible materials

Incompatible with oxidising agents (e.g. hypochlorites), acids (e.g. nitric acid), heat and ignition sources. Do not use natural rubber flexible hoses. Also incompatible (potentially violently) with oxygen, halogens and metal halides.

10.6 Hazardous decomposition products

May evolve toxic gases if heated to decomposition.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

PRODUCT NAME BUTANE BULK

Acute toxicity Based on available data, the classification criteria are not met.

Information available for the ingredients:

Ingredient	Oral LD50	Dermal LD50	Inhalation LC50
BUTANE	Study not feasible	Study not feasible	658000 mg/m ³ /4H (rat)
PROPANE	Study not feasible	Study not feasible	> 800000 ppm/15M (rat)
ISOPENTANE (2-METHYLBUTANE)	> 2000 mg/kg (rat)	--	> 20 mg/L (rat)
PENTANE	> 2,000 mg/kg (rat)	--	> 25.3 mg/l/4hrs (rat)

Skin	Direct contact with the liquefied material or escaping compressed gas may cause cold burns similar to frostbite injury.
Eye	Direct contact with evaporating liquid may result in cold burns, similar to frostbite injury, with possible permanent damage.
Sensitisation	Not classified as causing skin or respiratory sensitisation.
Mutagenicity	Not classified as a mutagen.
Carcinogenicity	Not classified as a carcinogen.
Reproductive	Not classified as a reproductive toxin.
STOT - single exposure	Asphyxiant. Effects are proportional to oxygen displacement. Single exposure may cause drowsiness or dizziness. Over exposure may result in weakness, fatigue, breathing difficulties and unconsciousness.
STOT - repeated exposure	Not classified as causing organ damage from repeated exposure.
Aspiration	Not relevant.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No information provided.

12.2 Persistence and degradability

No information provided.

12.3 Bioaccumulative potential

No information provided.

12.4 Mobility in soil

No information provided.

12.5 Other adverse effects

No information provided.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Legislation Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE



PRODUCT NAME BUTANE BULK

	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
14.1 UN Number	1075	1075	1075
14.2 Proper Shipping Name	PETROLEUM GASES, LIQUEFIED	PETROLEUM GASES, LIQUEFIED	PETROLEUM GASES, LIQUEFIED
14.3 Transport hazard class	2.1	2.1	2.1
14.4 Packing Group	None allocated.	None allocated.	None allocated.

14.5 Environmental hazards

No information provided.

14.6 Special precautions for user

Hazchem code	2YE
EmS	F-D, S-U
Other information	Ensure cylinder is separated from driver and that outlet of relief device is not obstructed.

15. REGULATORY INFORMATION**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

Poison schedule	A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).
Classifications	Safe Work Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals (GHS Revision 7).
Inventory listings	AUSTRALIA: AIIIC (Australian Inventory of Industrial Chemicals) All components are listed on AIIIC, or are exempt.

16. OTHER INFORMATION

Additional information APPLICATION METHOD: Gas regulator of suitable pressure and flow rating fitted to cylinder or manifold with low pressure gas distribution to equipment.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:

The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as form of product, method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

HEALTH EFFECTS FROM EXPOSURE:

It should be noted that the effects from exposure to this product will depend on several factors including: form of product; frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

PRODUCT NAME BUTANE BULK

Abbreviations	ACGIH	American Conference of Governmental Industrial Hygienists
	CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
	CNS	Central Nervous System
	EC No.	EC No - European Community Number
	EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
	GHS	Globally Harmonized System
	GTEPG	Group Text Emergency Procedure Guide
	IARC	International Agency for Research on Cancer
	LC50	Lethal Concentration, 50% / Median Lethal Concentration
	LD50	Lethal Dose, 50% / Median Lethal Dose
	mg/m ³	Milligrams per Cubic Metre
	OEL	Occupational Exposure Limit
	pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
	ppm	Parts Per Million
	STEL	Short-Term Exposure Limit
	STOT-RE	Specific target organ toxicity (repeated exposure)
	STOT-SE	Specific target organ toxicity (single exposure)
	SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
	SWA	Safe Work Australia
	TLV	Threshold Limit Value
	TWA	Time Weighted Average

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[End of SDS]

P4. ONSHORE CONDENSATE



SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifier

Product Name Plant Condensate (NAPHTHA)
Synonym(s) INPEX Onshore Condensate

1.2 Product identifier

Use(s) PETROLEUM REFINING

1.3 Details of the supplier of the product

Supplier name INPEX OPERATIONS AUSTRALIA PTY LTD
Address Level 22, 100 St. Georges Terrace, Perth, WA, 6000, AUSTRALIA
Telephone 08 6213 6000

1.4 Emergency telephone number(s)

Emergency 08 8983 8888

SECTION 2 HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

GHS classification(s) Flammable Liquids: Category 2

Physical Hazards

Flammable Liquids: Category 2

Health Hazards

Aspiration Hazard:	Category 1
Skin Corrosion/Irritation:	Category 2
Specific Target Organ Toxicity (Single Exposure):	Category 3
Germ Cell Mutagenicity:	Category 1B
Carcinogenicity:	Category 1A
Toxic to Reproduction:	Category 1A
Specific Target Organ Toxicity (Repeated Exposure):	Category 2

Environmental Hazards

Not classified as an Environmental Hazard

2.2 GHS Label elements

Signal word DANGER

**Pictogram(s)****Hazard statements(s)**

H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.

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H340	May cause genetic defects.
H350	May cause cancer.
H360	May damage fertility or the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.

Prevention statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ventilating/lighting equipment.
P243	Take precautionary measures against static discharge.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P264	Wash thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Response statement(s)

P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340	IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P321	Specific treatment is advised - see first aid instructions.
P331	Do NOT induce vomiting.
P362	Take off contaminated clothing and wash before re-use.
P370 + P378	In case of fire: Use appropriate media for extinction.

Storage statement(s)

P403 + P233 + P235	Store in a well-ventilated place. Keep cool. Keep container tightly closed.
P405	Store locked up.

Disposal statement(s)

P501	Dispose of contents/container in accordance with relevant regulations.
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2.3 Other Hazards

In high concentrations may cause asphyxiation. Contact with liquid may cause cold burns/frostbite.

SECTION 3 COMPOSITION/INFORMATION ON INGREDIENTS**3.1 Substances/Mixtures**

Ingredient	CAS No.	EC number	Content (Vol. %)
NATURAL GAS CONDENSATES (PETROLEUM)	64741-47-5	265-047-3	>90%
Containing			
HEXANE, Mixture of Isomers	92112-89-1	-	25 to 50%
ISOPENTANE	78-78-4	201-142-8	10 to 30 %
PENTANE(S)	109-66-0	203-892-4	25 to 50%
TOLUENE	108-88-3	203-625-9	1 to 5%
XYLENE	1330-20-7	215-535-7	1 to 5%
BENZENE	71-43-2	200-753-7	1 to 2%

SECTION 4 FIRST AID MEASURES**4.1 Description of first aid measures**

Eye	If in eyes, hold eyelids apart and flush continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre, a doctor, or for at least 15 minutes.
Inhalation	If inhaled, remove from contaminated area. To protect rescuer, use a Type A (Organic vapour) respirator or an Air-line respirator (in poorly ventilated areas). Apply artificial respiration if not breathing.
Skin	If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water. Continue flushing with water until advised to stop by a Poisons Information Centre or a doctor.
Ingestion	For advice, contact a Poisons Information Centre on 13 11 26 (Australia Wide) or a doctor (at once). If swallowed, do not induce vomiting.
First aid facilities	Eye wash facilities and safety shower should be available.

4.2 Most important symptoms and effects, both acute and delayed

See Section 11 for more detailed information on health effects and symptoms.

4.3 Immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 FIRE FIGHTING MEASURES**5.1 Extinguishing media**

Dry agent, carbon dioxide or foam. Prevent contamination of drains and waterways.

5.2 Special hazards arising from the substance or mixture

Highly flammable. May evolve carbon oxides and hydrocarbons when heated to decomposition. Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, pilot lights, heaters, naked lights, mobile phones, etc when handling. Earth containers when dispensing fluids.



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5.3 Advice for firefighters

Evacuate area and contact emergency services. Toxic gases may be evolved in a fire situation. Remain upwind and notify those downwind of hazard. Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) when combating fire. Use waterfog to cool intact containers and nearby storage areas.

5.4 Hazchem code.

3YE

3 Normal Foam (protein based foam that is not alcohol resistant).

Y Risk of violent reaction or explosion. Wear full fire kit and breathing apparatus. Contain spill and run-off.

E Evacuation of people in and around the immediate vicinity of the incident should be considered.

SECTION 6 ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear Personal Protective Equipment (PPE) as detailed in section 8 of the SDS. Clear area of all unprotected personnel. Ventilate area where possible. Contact emergency services where appropriate.

6.2 Environmental precautions

Prevent product from entering drains and waterways.

6.3 Methods of cleaning up

Contain spillage, then cover / absorb spill with non-combustible absorbent material (vermiculite, sand, or similar), collect and place in suitable containers for disposal. Eliminate all sources of ignition.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

SECTION 7 HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit smoking in areas of use.

Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures.

7.2 Conditions for safe storage, including any incompatibilities

Store in a cool, dry, well ventilated area, removed from oxidising agents, acids, alkalis, heat or ignition sources, foodstuffs, out of direct sunlight and out of the reach of children. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use. Check regularly for leaks or spills. Large storage areas should have appropriate fire protection.

7.3 Specific end uses No information provided.

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SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters**Exposure standards**

Ingredient	Reference	TWA		STEL	
		ppm	mg/m ³	ppm	mg/m ³
Benzene	SWA [AUS]	1	3.2	--	--
Hexane, other isomers	SWA [AUS]	500	1760	1000	3500
Pentane	SWA [AUS]	600	1770	750	2210
Toluene	SWA [AUS]	50	191	150	574
Xylene	SWA [AUS]	80	--	150	--
n-Hexane	SWA [AUS]	20	72	--	--

Biological limits

No biological limit values have been entered for this product.

Ingredient	Determinant	Sampling Time	BEI
BENZENE	S-Phenylmercapturic acid in urine	End of shift	25 µg/g creatinine
	t,t-Muconic acid in urine	End of shift	500 µg/g creatinine
N-HEXANE	2,5-Hexanedione in urine (without hydrolysis)	End of shift at end of	0.4 mg/L
TOLUENE	o-Cresol in urine	End of shift	0.02 mg/L
	Toluene in urine	End of shift	0.03 mg/L
	Toluene in blood	Prior to last shift of	0.02 mg/L
XYLENE	Methylhippuric acids in urine	End of shift	1.5 g/g creatinine

8.2 Exposure controls

Engineering controls Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical explosion proof extraction ventilation is recommended. Flammable/explosive vapours may accumulate in poorly ventilated areas. Vapours are heavier than air and may travel some distance to an ignition source and flash back. Maintain vapour levels below the recommended exposure standard.

PPE

Eye/ Face Wear protective equipment to prevent eye contact. Selection of protective equipment may include safety glasses, chemical goggles, face shields, or a combination depending on the work and operations conducted.

Hands Wear Polyvinyl Alcohol (PVA) or Viton gloves.

Body Wear coveralls or long sleeved clothing and boots.

Respiratory Determine if airborne concentrations are below the recommended occupational exposure limits. If airborne concentrations are above the acceptable limits, wear an approved respirator that provides adequate



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protection from this material, such as: Air-Purifying Respirator for Organic Vapours (Type A).

Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.



SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	COLOURLESS LIQUID
Odour	HYDROCARBON ODOUR
Flammability	HIGHLY FLAMMABLE
Boiling point	< 30°C
Melting point	NOT AVAILABLE
Evaporation rate	NOT AVAILABLE
pH	NOT AVAILABLE
Vapour density	NOT AVAILABLE
Specific gravity	0.65 to 0.75
Solubility (water)	INSOLUBLE
Vapour pressure	NOT AVAILABLE
Upper explosion limit	NOT AVAILABLE
Lower explosion limit	NOT AVAILABLE
Partition coefficient	NOT AVAILABLE
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Explosive properties	NOT AVAILABLE
Oxidising properties	NOT AVAILABLE
Odour threshold	NOT AVAILABLE

9.2 Other Information

% Volatiles 95 vol % over Boiling Range

SECTION 10 STABILITY AND REACTIVITY

10.1 Reactivity

Highly flammable liquid and vapour

10.2 Chemical stability

Stable under normal ambient and anticipated storage, and handling conditions of temperature and pressure.

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10.3 Possibility of hazardous reactions

Polymerization is not expected to occur.

10.4 Conditions to avoid

Avoid heat, sparks, open flames and other ignition sources.

10.5 Incompatible materials

Incompatible with oxidising agents (e.g., chlorates, hypochlorites, nitrates, peroxides), strong acids(e.g., nitric acid), alkalis (e.g., hydroxides), heat and ignition sources.

10.6 Hazardous decomposition products

May evolve carbon oxides and hydrocarbons when heated to decomposition and emit acrid smoke and irritating fumes.

SECTION 11 TOXICOLOGICAL INFORMATION**11.1 Information on toxicological effects**

Acute toxicity Harmful if swallowed, in contact with skin or if inhaled.

Information available for the ingredients:

Ingredient	Oral LD50	Dermal LD50	Inhalation LC50
NATURAL GAS	--	--	800 mg/m ³ (rat)
N-HEXANE	25 g/kg (rat)	3000 mg/kg (rabbit)	48000 ppm/4 hours (rat)
ISOPENTANE	> 2000 mg/kg (rat)	--	> 20 mg/L (rat)
PENTANE	--	--	364 g/m ³ /4 hours (rat)
TOLUENE	5580 mg/kg (rat)	5000 mg/kg (rabbit)	25.7 - 30 mg/L/4hrs (rat)
XYLENE	> 2000 mg/kg (rat) (NICNAS)	> 1700 mg/kg (rabbit)	5000 ppm (rat)
BENZENE	930 mg/kg (rat)	48 mg/kg (mouse)	9980 ppm (mouse)

Skin	Irritating to the skin. Contact may result in drying and defatting of the skin, rash and dermatitis.
Eye	Causes serious eye irritation. Contact may result in irritation, lacrimation, pain and redness.
Sensitisation	Not classified as causing skin or respiratory sensitisation.
Mutagenicity	May cause genetic defects. Several studies have demonstrated induction of both numerical and structural chromosomal aberrations, sister chromatid exchanges and micronuclei in experimental animals and humans after in vivo benzene exposure.
Carcinogenicity	May cause cancer. Benzene is classified as carcinogenic to humans (IARC Group 1). Ethylbenzene which has been classified as a Group 2B carcinogen (possibly carcinogenic to humans)
Reproductive	Over exposure to toluene may damage fertility or the unborn child
STOT - single exposure	Over exposure may result in irritation of the nose and throat, coughing, nausea and headache. High level exposure may result in dizziness, drowsiness, breathing difficulties and unconsciousness.

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STOT – repeated exposure	Repeated exposure to toluene may result in central nervous system (CNS), liver and kidney damage
Aspiration	Aspiration into the lungs may result in chemical pneumonitis and pulmonary oedema.

SECTION 12 ECOLOGICAL INFORMATION

12.1 Toxicity

This material is expected to be toxic to aquatic organisms. However, this has not been fully tested.

12.2 Persistence and degradability

Rapid volatilisation is expected in soil and water, with volatilisation being an important fate process of the condensate. Vapour-phase condensate will be degraded in the atmosphere via photo-oxidation.

The non-vapour-phase material is not expected to be readily biodegradable. It may cause long-term adverse effects in the aquatic environment. However, the product has not been fully tested.

12.3 Bioaccumulative potential

No information provided.

12.4 Mobility in soil

Limited information was available at the time of this review.

12.5 Other adverse effects

Benzene is listed on the National Inventory of Pollutants - Threshold Category 1, use of 10 tonnes/year. If released to the atmosphere it will exist in the vapour phase and subject to photo-oxidation. In soil, it is subject to rapid volatilisation. Benzene is also highly mobile and may leach to groundwater. Subject to rapid volatilisation from water. Biodegradable. Toxic to aquatic organisms.



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SECTION 13 DISPOSAL INFORMATION

13.1 Waste treatment methods

Waste Disposal This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers

Legislation Dispose of in accordance with relevant local legislation.

SECTION 14 TRANSPORT INFORMATION

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE



	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG/IMO)	AIR TRANSPORT (IATA/ICAO)
14.1 Number	3295	3295	3295
14.2 Proper Shipping name	HYDROCARBONS, LIQUID, N.O.S.	HYDROCARBONS, LIQUID, N.O.S.	HYDROCARBONS, LIQUID, N.O.S.
14.3 Transport hazard class	3	3	3
14.4 Packing Group	I	I	I

14.5 Environmental hazards

Not a Marine Pollutant

14.6 Special precautions for user

Hazchem Code 3YE
 GTEPG 3A1
 EMS F-E, S-D

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SECTION 15 REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Poison schedule	Classified as a Schedule 7 (S7) Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).
Classifications	Safework Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.
Inventory listing(s)	AUSTRALIA: AICS (Australian Inventory of Chemical Substances) All components are listed on AICS or are exempt.

SECTION 16 OTHER INFORMATION

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Additional information**PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:**

The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as form of product, method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

HEALTH EFFECTS FROM EXPOSURE:

It should be noted that the effects from exposure to this product will depend on several factors including: form of product; frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAS#	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
GHS	Globally Harmonized System
GTEPG	Group Text Emergency Procedure Guide
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m ³	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	Relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).

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ppm	Parts Per Million
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

Disclaimer

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. Neither this company, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described here we cannot guarantee that these are the only hazards that exist.

[End of SDS]

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Dave Dann	Dave Dann	22/01/25 16:18	Approver

Name	Title
Dave Dann	General Manager Onshore
Dave Dann	General Manager Onshore

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