Port Bonython Terminal Handbook

2500-200-ORM-0013

Technical Information and Safety Regulations

Santos Limited
Santos Centre, Ground Floor
60 Flinders Street
ADELAIDE SA 5000

DISCLAIMER AND IMPORTANT NOTICE

This Terminal Handbook is intended to put owners, charterers, and Masters of Vessels on notice as to the general conditions, facilities, company regulations and services available at the Port Bonython Liquids Terminal, operated by Santos Limited on behalf of the Terminal Owners. Any owners, charterers or masters of Vessels using the Terminal must comply with this Handbook.

While believing the information contained in this Handbook to be accurate and complete, Santos does not make any warranty in respect of nor accepts any responsibility for accuracy or completeness (regardless of its purpose of use) of this document and reserves the right to amend the information contained in this Handbook as and when required. All documents and forms used in this Handbook and in the appendices are samples only, which may not be the most up-to-date current revisions.

In particular, the information contained in this document does not replace official publications relating to the Terminal contained in hydrographic charts, sailing directions and other publications which the Masters of Vessels should ensure are the most up-to-date available.

This Terminal Handbook is prepared by the Terminal Owners in accordance with the obligations of the Terminal Owners pursuant to clause 71 of the Stony Point (Liquids Project) Indenture, as ratified by the *Stony Point (Liquids Project) Ratification Act 1981*.

Rev	Owner	Reviewer/s *Managerial/Technical/Site*	Approver
	Marine Manager	Marine Superintendent	OIM
1	Jeff Knight	Neel Sud, Naveen Sigroha (Load Master)	Jade Riley
2	Jeff Knight	Neel Sud, Naveen Sigroha	Lee Rodgers
3	Jeff Knight	Neel Sud, Naveen Sigroha	Lee Rodgers

Rev	Description	Author	Approved	Date
1	Initial Issue	Neel Sud, Naveen Sigroha	Yes	01-07-2023
2	Updates: • Updated Branding • OIM Contact (Pg. 11 Sec 2.2) • Added vessel responsibility to book services (Page 17-18 Section 5.4) • Standby Tug location (Pg 28 Section 7.6) • Master's authority to call standby tug (Pg 28 Section 7.6) • 100T bollard added (Pg. 33, Sec 8.13.1) • Loading rate restriction for non-inerted Crude/ Naphtha vessels (Pg 40-41 Section 9.12) • Changes to EDP Notice. (Page 44 Section 9.28) • Changes to ETA Notification (Pg 48) • Added Pre-Loading Meeting Agenda (Pg 56-58 Appendix D) • Added Post Loading Meeting Agenda (Pg 59-60 Appendix D) • Updated Ship/Shore Safety Checklist (Pg 61-70) • Pilotage passage plan (Pg 79 Appendix H)	Neel Sud, Naveen Sigroha	Lee Rodgers	29 Feb 2024
2	ETA Notice updated to align with GTC, minor edits	N. Sud, N.Sigroha	Lee Rodgers	20 Nov 2024

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1. Glossary

Term	Definition
ABF	Australian Border Force
Adverse Weather	a cyclone, tropical low, line squall or other adverse weather conditions and/or sea or tide conditions preventing or hindering the loading or operation of an Offtake Tanker at the Terminal
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
AHD	Australian Height Datum
AIS	Automatic Identification System
AMSA	Australian Maritime Safety Authority
bbl	API barrel, equalling 42 US gallons
BD	Breasting Dolphin
Beaufort Scale	A scale of wind force ranging from O (calm) to 12 (hurricane), corresponding with the velocity of wind at a set distance above ground or sea level
Berth	Port Bonython Marine Terminal berth
Berthing/Terminal Terms	terms and conditions contained in definitions of this Handbook (the Handbook) which govern the provision or performance of services at the Port Bonython Marine Terminal for the benefit of the Offtake Tanker
BWTP	Ballast Water Treatment Plant
CCR (Terminal)	Central Control Room
CCR (Vessel)	Cargo Control Room
CoQQ	Certificate of Quality and Quantity
Customs	Department of Customs and Excise of the Commonwealth of Australia
DAWE	Department of Agriculture, Water and Environment
DGPS	Differential Global Positioning System
DUKC	Dynamic Under Keel Clearance
DWT	Deadweight Tonnage
EDP	Early Departure Procedure
ERT	Emergency Response Team
ESD-1	Emergency Shutdown of loading
ESD-2	Emergency Shutdown of Loading and Arms disconnection
ETA	Estimated Time of Arrival
Facility	Port Bonython Marine Terminal
Facility Services	all and any services (with or without goods or property) of any description (whether compulsory, voluntary or otherwise) provided or performed (whether for consideration or otherwise) by or on behalf of the Servants or contractors at or on or about the Port Bonython marine terminal directly or indirectly in connection with the offtake of crude, Naphtha or LPG from port Bonython marine terminal, including without limit to the foregoing, pilotage, navigation, berthing, mooring, off taking, communications, watch or other services assistance direction advice instruction or conduct whatsoever.
GPS	Global Positioning System
Handbook	this Handbook
HAT	Highest Astronomical Tide
HF	High Frequency
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
Injury	death, personal injury, or illness

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
ITF	International Transport Federation
km	kilometres
Knot	nautical miles per hour
LAT	Lowest Astronomical Tide
LOA	Length Overall
Loading Date Range	the 2-day or 5-day time period identified in an Agreed Offtake Lifting Program during which a Vessel is required to arrive at the Pilot Embarkation Area and tender NOR (Notice of Readiness)
Loading Master	A person contracted for and qualified to Santos Ltd requirements to act as the terminal representative and coordinate loading operations on the Offtake Tanker.
LPG	Liquefied Petroleum Gas
LSA	Life Saving Appliance
m	metres
M&SS	Marine and Safety Supervisor
MARSEC	Maritime Security Level
Master	master of any vessel and who is the master thereof (whether or not their name appears on Certificate of Registry or Articles of that vessel)
MBL	Minimum Breaking Load
MD	Mooring Dolphin
MHWN	Mean High Water Neaps
MHWS	Mean High Water Springs
MLA	Marine Loading Arm
MLWN	Mean Low Water Neaps
MLWS	Mean Low Water Springs
Moorings	the facilities for mooring Offtake Tankers at Port Bonython Marine Terminal
MSIC	Maritime Security Identification Card
MSL	Mean Seal level
MT	Motor Tanker
nm	nautical miles
NOR	Notice of Readiness
OCIMF	Oil Companies International Marine Forum
Offtake Tanker	Crude, Naphtha and LPG tanker requiring Facility Services to be provided or performed
Offtake Tanker Owners	jointly and severally the Offtake Tanker, her owners, Charterers (demise or otherwise), owners of cargo and/or bunkers aboard the Offtake Tanker and their respective directors, officers, employees, (including Master and crew), contractors and servants and agents;
OIM	Onshore Installation Manager, the Person in Charge (PIC) of all Port Bonython Terminal operations and emergency response whilst the Terminal structurally moored at the berth.
Operating Procedures	Port Bonython Marine Terminal Operating Procedures;
Operator	Santos Ltd as Operator of Port Bonython Marine Terminal
Owner	In relation to Offtake Tanker, jointly and severally, the Offtake Tanker, its owners, operators, managers, charterers (demise or otherwise), owners of cargo and/or bunkers aboard the Offtake Tanker, and their respective directors, office employees (including Master and crew), agents and contractors
PERC	Powered Emergency Release Coupling
PFSO	Port Facility Security Officer

Pilot	A person provided to coordinate manoeuvring of the Offtake Tanker whilst berthing and un-berthing operations
PoB	Pilot on Board
PPE	Personal Protective Equipment
QCDC	Quick Connect Disconnect Coupling
QRH	Quick Release Hooks
Servants or Contractors	Operator, and their respective affiliate companies, directors, officers, employees, (including but not limited to the Port Bonython Marine terminal owners and the staff of Port Bonython Marine Terminal), contractors and agents of Operator '
Shall	Mandatory instruction
Should	Recommended instruction
SIGTTO	Society of International Gas Tanker and Terminal Operators
SIRE	Ship Inspection Report
SOP	Short Distance Piece
SSP	Ship Security Plan
SSSC	Ship Shore Safety Checklist (ISGOTT Rev 6)
STCW	the International Convention on Standards of Training, Certification and Watch keeping for Seafarers
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
UTC	Universal time coordinated
VHF	Very High Frequency

2. Key contacts

2.1 In Case of Emergency

Immediate Emergency Actions

- Make the area safe if able.
- Alert others in the immediate area
- For EMERGENCY assistance alert the CCR:

refrain contacting “000” from the facility as onsite resources will be delayed.

• Phone, dial “222” from an internal phone or
• Radio UHF Ch 3 Jetty Head Operator or
UHF Ch 1 Control
UHF Ch 4 Security
• Mobile phone, “0429 770 137”
•Provide the operator:
− your name
− your location
− your company
− return contact information
− details of the emergency
− what assistance is required

Muster if siren sounds or unsafe to remain at the location

2.2 Terminal Address and Phone Number

Port Authority and Port Manager:

Department for infrastructure and Transport

Minister for Infrastructure and Transport

Minister's Commercial Delegate:
Manager, Commercial Marine and State Waters
77 Grenfell Street
Adelaide SA 5000 SA 5942
Phone +61 8 8343 3240
Mobile: +61 437 682 775
Email: grant.sommers@sa.gov.au

Minister's Infrastructure Delegate:
Manager, Marine Assets
77 Grenfell Street,
Adelaide SA 5000
Phone +61 8 8343 2702
Mobile: +61 402 894 129
Email: spiros.dimas@sa.gov.au

Terminal Address

Santos Port Bonython
Fifth St, Port Bonython SA 5601
Phone +61 8 8649 0100
Fax +61 8 8649 0200
PFSO: +61 428 727 433

Post:
PO Box 344
Whyalla
South Australia 5600

Contact email:

Primary (Marine supt.): Naveen.sigroha@contractor.santos.com
Secondary (OIM, PFSO): Lee.Rodgers@santos.com
Secondary (Marine Supt. Ports and Terminals) Neel.Sud@santos.com

Pilotage

Flinders Port Holdings Group
296 St Vincent Street

South Australia 5015
Australia
P +61 (0)8 8447 0611
F +61 (0)8 8447 0606
E fpholdings@flindersports.com.au

Adelaide VTS

Primary: VHF Ch12
Secondary: VHF Ch16Port Adelaide
Telephone: +61 8 8447 0902
E: portops-adl@flindersports.com.au
E:fpvtsmoc@flindersports.com.au

Radio Contacts:

VHF marine channel frequencies for shipping operations in the Harbor:

- Listening Station: Channel 16
- Initial Call: Channel 16
- Ship/Shore/Ship Operations: Channel 8
- Tug Operations: Channel 8

Terminal Provided Radio:

- Primary: UHF Ch3 (Marine)- Santos Jetty head
- Secondary: UHF Ch1 (Process)- Santos Control
- Secondary: UHF Ch4 (Security)- Santos Security

Santos Control is manned and monitors VHF Ch16 During Shipping Operations

3. Introduction

3.1 Port Bonython

Port Bonython is situated on the western shore of Spencer Gulf, South Australia, about 160 nautical miles from the entrance to the Gulf. The port includes the Liquids Terminal (Lat 33°01' S, 137°47' E) which is located about nine nautical miles from the port of Whyalla.

Port Bonython was established to facilitate the export of products from the Cooper Basin oil fields. Major commodities handled include crude oil, liquid Propane, liquid Butane and Naphtha from Liquids Berth.

Port Bonython is administered by Department for Infrastructure and Transport (https://www.dit.sa.gov.au/)

Refer to Port Bonython Port Rules issued by the Department of Transportation and Infrastructure. A Copy of DIT Port Regulations can be requested through the local agent.

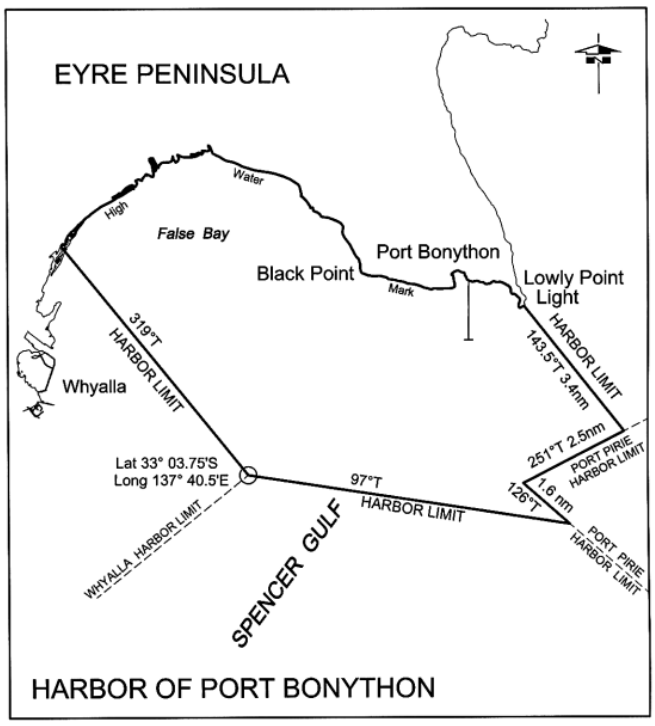
The liquids terminal is operated by Santos Pty Ltd. The Jetty facilities are also utilized by IOR Terminals Australia and Port Bonython Fuels for Diesel Import to Port Bonython.

UNLO CODE: AUPBY

Load line Zone: Summer

3.2 Harbor Limit

The subjacent land underlying, and the adjacent land extending from, the waters, rivers, creeks and inlets to high water mark of that portion of the western coast of Spencer Gulf bounded by commencing at the eastern extremity of the harbor of Whyalla, Latitude 33°03.75'S, Longitude 137°40.5'E, then along the north-east boundary of that harbor bearing 319°T to high water mark, then generally easterly along high water mark to its intersection with a straight line bearing 143.5°T from Lowly Point Light, then along the latter line for a distance of approximately 3.4 nautical miles to the north boundary of the harbor of Port Pirie, then along the latter line bearing 251°T for a distance of approximately 2.5 nautical miles to the west extremity of that harbor, then along the south-west boundary of that harbor bearing 126°T for a distance of approximately 1.6 nautical miles to its intersection with a straight-line bearing 97°T from the point of commencement, then along the latter line to the point of commencement.



3.3 Products Handled

- Crude Oil
- Naphtha Light
- Naphtha Heavy
- Propane
- Butane

Safety Data sheets for Products handed at Port Bonython are provided in Appendix J.

4. Reporting

4.1 Time zone

Santos Port Bonython operates on ACST time zone UTC +9.5hrs

Daylight Saving Time begins at 2am on the first Sunday in October when clocks are put forward one hour (UTC+10.5hrs). Daylight Saving Time ends at 2am (3am Daylight Saving Time) on the first Sunday in April when clocks are put back one hour.

4.2 Pre-Arrival Reporting

In addition to agreed ETA Notification in Sales Purchase agreement, following additional Pre-arrival Reporting is Mandatory for all vessels calling Port Bonython:

The master of the vessel must notify the terminal of the estimated time of arrival (ETA) at the Pilot Boarding Ground (PBG) at least 96 hours prior to the first day of the two-day delivery range (2ADR/2DDR), as applicable.

The master of the vessel must report updated ETAs to the Pilot Boarding Ground at intervals of 96, 72, 48, 36, 24, 12, and 6 hours prior to arrival, aligned with the first day of the two-day delivery range, in accordance with APPENDIX A: Information in ETA Notice and Notice of Readiness (NOR).
Vessel arriving after first day of 2ADR/ 2DDR must continue to report ETA every 6 hours after 12 hour notice is given to terminal.

4.3 Deviation Notification

If the ETA changes by more than 6 hours or 48 hours' notice is given or more than 2 hours after 24 hours' notice is given, the master of vessel must immediately notify Shipping Coordinator or Local agent of the revised ETA.

4.4 Notice of Readiness

The Master of the Vessel shall tender NOR upon Vessel's safe arrival at anchorage position or passing the Pilot Boarding Ground or as per Sales Purchase Agreement/ Charterer's instructions having all necessary Port Clearances and being able to receive cargo for loading. Master of the vessel is recommended to follow Buyer's suggested times to Tender NOR.

The acceptance of NOR by terminal will be when the vessel is all fast or when vessel is ready to load in all aspect.

4.5 Port Communications and Procedures

For documentations, pre-arrival messages and communication required by vessels arriving at Port Bonython, the master of the vessel should contact their Shipping Agent for latest procedures, documentations and any other information required by Regulatory Bodies at Port Bonython.

4.6 Notification to Port Authority

Not less than 48 hours prior to the arrival of the vessel at the applicable Pilot Boarding Station, the vessel's master or ship's agent shall convey details to the Port Authority of:

- the vessel's expected time of arrival at that Station.
- vessel draft fore and aft,
- the vessel's last port of call; and
- whether the water-ballast is clean or otherwise treated.

Not less than 48 hours prior to the arrival of the vessel at the applicable Pilot Boarding Station the master shall advise the Port Authority whether the vessel's hull is, to the best of his knowledge, in sound condition and free of leaks and marine pests.

If the vessel is scheduled to proceed direct to the Berth on its arrival, the master shall confirm to the Port Authority the expected time of arrival at least four hours prior to arrival at the applicable Pilot Boarding Station or, if that vessel is exempt from requiring a pilot, at the Berth.

4.7 Incident Reporting

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

- Vessel
- Jetty and Terminal
- Vessel or Shore Personnel

Any near misses occurring onboard the Vessel whilst alongside must be reported by Vessel Master to the Terminal Representative, PFSO, Adelaide VTS and Security.

Any security incident must be reported to Terminal Representative (PFSO or PFSO Representative).

All marine accidents involving any vessels under way or at anchor within the Harbor, or engaged in, waiting to commence, or having completed loading or unloading operations, shall be reported to the Port Authority, Terminal Representative and any other authority required by statute at the earliest possible time by the master of the vessel. Such report shall be confirmed in writing to the Port Authority within 48 hours of the event stating full details of the nature of the accident.

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. Port Bonython General Information

5.1 Climate and Meteorological Conditions

With maritime climatic influences drawn inland by Spencer Gulf and Gulf St. Vincent, the southern coastal zone of the state has been characterized as having a "Mediterranean" climate, with mild to cool wet winters and hot dry summers. The two dominant weather influences derive from the Southern Ocean to the south and from the continental interior to the north. These can produce sharp temperature contrasts at any time of the year, most markedly in summer, when scorching northerly winds can give way within hours to cool southerlies off the ocean.

The Spencer Gulf is relatively free of damaging weather events, however between the months of April through until October, Southern Ocean cold fronts will generate strong winds in excess of 25 knots and in more severe events more than 30 knots sustained or gusts to gale force in squalls. The cold fronts are the leading edge of the deep Southern Ocean low pressure systems that generally track from the west to the east.

Masters shall also refer to FPH Master Port Rules, section 16.2 Strong Wind or Gale Warning

5.2 Terminal Weather Conditions

Current

Strong tidal currents occur in the berth area and approaches with maximum ebb streams running about 30% faster than maximum floods. At spring tides, every two weeks, the current may reach a maximum of 1.7 knots (88 cm/sec) on the ebb and 1.3 knots (67 cm/sec) on the flood. At "King" tides, twice per year, peak current speeds will be about 10% higher. The current speeds given are for an average depth of about 10 meters. Near-surface currents, which will affect small vessels, run about 10% faster than the 10 meters average.

Both flood and ebb currents generally set slightly across the berth, towards the shore. The peak flood stream averages 12° onto the berth. The peak ebb stream averages 7° onto the berth but varies between 16° 'on' and 2° 'off' the berth.

Tides

For tidal predictions for the area, the Whyalla tide tables should be used. Electronic versions can be found at the following link, then select the relevant year and the Port of Whyalla:

http://www.bom.gov.au/oceanography/projects/ntc/sa_tide_tables.shtml

Port Bonython will supply tidal information once the vessel is alongside by the Terminal Representative.

Weather Forecast

Gale warnings and strong wind warnings are broadcast over the marine VHF 16. Ships at the berth will be promptly advised of any warnings received by the terminal radio.

Because of the known and predicable environmental climatic conditions weather forecasting is considered quite accurate and should be readily available through online services or subscriptions from the Bureau of Meteorology.

Please refer to the following online services for reference (Web address subject to change. Contact agent for latest links):

- http://www.bom.gov.au/sa/forecasts/spencer-gulf.shtml
- http://www.baywind.com.au/sa/index.php?L=spencergulf
- https://www.windy.com/?-33.308,138.468,7
- https://dashboard.weatherzone.com.au/

Flinders Port provides an online, real time Wind and Tide sensor data service called Hydrotel. The Sensors are located at Jetty route. The log in information can be found below:

Website	http://hydrotel.flindersports.com.au
General Log-in	santos
Password	hydro

5.3 Legislation

Vessel Master to seek their own independent legal advice as to the laws that apply to his/ her circumstances. The laws that might apply could include following legislations and regulations:

- Department of Infrastructure and Transportation – Port Bonython Port Rules 2023
- Stony Point (Liquids Project) Ratification Act Port Rules 1983
- South Australian Ports (Disposal of Maritime Assets) Act 2000
- Work Health and Safety Act 2012
- Protection of Marine Waters (Prevention of Pollution from Ships) Act 1987 (SA)
- Protection of Marine Waters (Prevention of Pollution from Ships) Regulations 2013
- Maritime Transport and Offshore Facilities Security Act 2003 (Australia)
- Environment Protection and Biodiversity Conservation Act 1999
- Harbors and Navigation Act 1993 (SA)
- Navigation Act 2012
- Occupational Health and Safety (Maritime Industry) Act 1993
- Biosecurity Act 2015
- AMSA Marine Orders
- DIT(SA) Notices to Mariners https://dit.sa.gov.au/latest_news/notice_to_mariners

The laws mentioned in the list are not exhaustive and without warranty or representation by Santos and its operated sites/ personnel/ contractors. The vessel master should seek his or her own legal advice and representation.

5.4 Pilotage

Pilotage is compulsory within Port Limits and provided by Flinders Ports Holdings and arranged through a shipping agent. Daylight berthing restrictions apply on vessel berthing. There are no daylight restrictions for vessel departure.

Pilot Boarding Ground Position:

- Port Bonython 33 Deg 10.00Min South 137 Deg 39.11Min East
- Port Pirie 33 Deg 04.45Min South 137 Deg 45.58Min East
- Whyalla 33 Deg 03.44Min South 137 Deg 39.01Min East

Pilotage for vessels with a draft of more than 14m is at the Port Bonython pilot boarding ground. Pilotage for vessels with a draft of less than 14m is at the Whyalla or Port Pirie pilot boarding ground. Deep draught ships (Draught more than 11m) will use the buoyed channel to the east of Fairway Bank. Outward bound, ships will disembark the pilot at the Entrance Buoy (165° (T) dist. 6.7 nautical miles from No. 1 Bn. Vessels with draft greater than 16m will require the Pilot to remain onboard and be disembarked at the Wallaroo pilot boarding place. Pilot ladders must be rigged, and the embarkation and disembarkation of pilots thereby must be supervised by a responsible deck officer. Adequate lighting must be provided at night. All pilot ladders and accommodation ladders must be clean, in good condition and must comply with the IMO SOLAS regulations and must be rigged with 2 manropes.
Whenever a pilot or other person embarks or disembarks from a ship by ladder, they entrust their safety to the pilot transfer arrangements provided by the ship. 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”. Pilot Boarding Arrangements and IMO Circular MSC.1/Circ.1428 illustrate the pilot ladder arrangements required by SOLAS V/23.Refer Appendix C 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 Flinders Ports Website - Pilotage.
Adelaide VTS Shipping Schedule:
https://portmis.flindersports.com.au/

Port Bonython Pilotage Passage Plan (Appendix H):
https://www.flindersportholdings.com.au/wp-content/uploads/2023/01/FP4826_Bonython_-PILOT_PASSAGE.pdf

Pilot Ladder & Pilot Boarding Arrangements:
https://www.flindersportholdings.com.au/wp-content/uploads/2021/11/MOFP-002-Pilot-Ladder-amp-Boarding.pdf

Pilot Ladder Checklist:
https://www.flindersportholdings.com.au/wp-content/uploads/2023/02/PILOT-LADDER-CHECKLIST.pdf

Berthing/ Unberthing Services

Berthing and unberthing services, including pilotage, mooring crew launch, mooring crew, lines handling boat, and mooring tugs, are facilitated by external service provider(s). The vessel master is required to secure these services for the safe berthing and unberthing of the vessel via Shipping Agent appointed by the Vessel/Operator. Responsibility for any delays or damages resulting from inadequate notification provided to service providers or unavailability of services for berthing services shall rest solely with the vessel. Vessel

masters must adhere to the established notification timeframe to mitigate the risk of incurring such delays or damages.

5.5 Anchorage

Inward-bound vessels awaiting pilot or customs should anchor in the vicinity of the pilot boarding ground. The water depth is about 16 meters with good holding in sand. Vessel masters are recommended to contact Adelaide VTS for Anchorage Position.

5.6 Declared Depth

Declared Depth at berth is 20.0 meters.

Declared Depth of Channels:

- West of Fairway Bank: 11.2 meters
- East of Fairway Bank: 18.4 meters

Port and adjacent areas are hydro surveyed every 2 years. Last Survey Conducted: 01 February 2021.

Master should consult the latest information pertaining to declared depth prior to arrival through local agent or Adelaide-VTS.

5.7 Under Keel Clearance

The Port Manager's direction for under keel clearance (UKC) requirements for Port Bonython applies to vessels operating in port limits. The below UKC requirements presents the currently prescribed minimum static UKC which is set to account for dynamic and accuracy factors:

- Vessels with a draft more than 16 meters on arrival or departure will be assessed on a case-by-case basis by the Port Manager due to the strong tidal streams at Berth.
- The master of a vessel shall ensure that when proceeding under way into, out of, or within the Harbor, a vessel under keel clearance shall be not less than 20 per cent of the vessel's maximum draft. When calculating the draft of a vessel in advance of arrival into the Harbor, it is recommended that the master deduct at least 0.2 meters from the tide predictions to allow for possible adverse effects on the height of the tide influenced by the weather.
- When secured alongside the Berth the master of a vessel shall ensure that the vessel is maintained in an upright condition, does not assume excessive trim and that the under-keel clearance is not less than 0.6 meter.
- An under-keel clearance of less than 20 per cent of the vessel's draft may be permitted in special circumstances when the vessel is proceeding under way within the Harbor, subject to the sole discretion and prior approval of the Port Manager.

5.8 Towage

Harbor towage is compulsory within the Port limits and provided by Svitzer Terminals Australia Pty Ltd.

Towage services can be arranged through Shipping Agents.

Towage services are provided by Tugs Stationed at Port Pirie. Vessel masters and Operators are recommended to coordinate well in advance to book towage.

5.9 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 Master is to consult their Shipping Agent for the latest documentation and information requirements to obtain a Biosecurity clearance.

5.10 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.

5.11 Crew Change

Crew changes are permitted at Port Bonython jetty. Vessel Master and Operator must seek approval from Terminal. Vessel is to submit Crew Change list at least 5 days prior arrival at Port Bonython. The vessel's appointed agent is to arrange transportation and PPE for the crew to and from Security Gate and Jetty Head.

Full/ major crew change is strictly prohibited at Port Bonython. If crew change is permitted, Vessel Senior Management officers should remain onboard until completion of cargo.

Masters are to consult their Shipping Agent for further information.

5.12 Bunkering

Bunkering services are not permitted when the vessel is alongside.

5.13 Ballast Water

Ballasting/Deballasting operations without prior approval from Authorized officer (Department of Agriculture, Fisheries and Forestry) is strictly prohibited. Vessel will require a Bio Security Status Document (BSD), which gives permission to berth and discharge water ballast.

Visiting Vessels are to ensure compliance with the Biosecurity Act 2015 and related regulations. There are no facilities for treating ballast water at the Terminal. Vessels must arrive with clean ballast water only, complying with requirements of the Department of Agriculture, Fisheries and Forestry.

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

5.14 Garbage

Garbage reception facilities are not available at Port Bonython. Vessel Masters are recommended to consult Local Agent. Masters are cautioned that garbage reception facilities are very expensive.

5.15 Stores

Loading of stores from the jetty, unless carried by hand, is not permitted during cargo loading or unloading operations unless agreed between the master and Terminal Representative. In the event of an agreement being reached:

- all tank hatches and ullage plug within 16 meters (50 feet) of the stores-handling area must be battened down prior to the commencement of loading.
- any cargo operation which may allow vapor to escape on to the deck must be stopped whilst stores are being handled (e.g., pumping of stripping into an after tank)
- any metal drums or heavy metal parts likely to cause a spark must be landed on rubber matting and not allowed to contact the vessel's deck. If no matting is available, loading and unloading operations must be suspended and all tank lids/openings battened down whilst metal items of stores are landed on deck. Additionally, the above items must not be dragged or rolled along the vessel's deck; and
- gas cylinders must be carried by hand or transported on a rubber-tired trolley (and must not be rolled along the deck of a vessel or the Jetty).

5.16 Pollution

Protection of the Sea (Prevention of Pollution from ships) Act 1983 and the Navigation Act 2012 and related regulations apply to all vessels, including Foreign Flagged vessels. All vessels operating withing harbor limits must comply with these provisions.

The VTS shall be notified as soon as practicable of any spillage of a pollutant into the waters of the Harbor. The VTS will report the incident to the State Marine Pollution Controller.

The spillage of pollutants into the sea from any cause must be reported forthwith to the Security Manager and the Terminal Representative by the master of a vessel if the spillage is from the vessel at the Berth of which he is the master.

In the event of any spillage and pollution incident which has caused, or have the potential to cause, pollution of the sea, the following action must be taken without delay by the master of the vessel and the responsible Jetty Head Officer:

- all loading and unloading operations shall immediately cease.
- The source of the spillage shall be located, and immediate action taken to stop the escape of the pollutants.
- if the spillage is from a vessel, the master of the vessel shall:
- take prompt action to contain the pollutants and prevent the occurrence of further pollution from the vessel; and
- co-operate with whatever means are reasonably available to contain, recover and cleanup the pollution subject to the authority of the State Marine Pollution Controller.
- If the spillage is from the berth or the jetty, the responsible Jetty Head Officer in conjunction with the responsible Marine Supervisor shall take immediate action to stop the escape of pollutants from the Jetty and contain the spillage on the Jetty.
- the Security Manager must activate the relevant Emergency Response Plan and the South Australian Marine Spill Contingency Action Plan, as appropriate; and
- (Cargo loading or unloading operations shall not resume after a spillage of pollutants has occurred until the cause has been satisfactorily determined and eliminated and there is no likelihood that a further spillage of pollutants will occur from the same source. This decision shall be taken by the State Marine Pollution Controller in consultation with the Security Manager.

AMSA reporting is mandatory for vessels, 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

5.17 Emissions and Discharges

Vessel Master must ensure as far as is reasonably practical that vessels do not emit smoke or vapour whilst in the Harbor to the extent that it causes danger to any other person.

Vessel Master must ensure as far as is reasonably practical that no offensive material is to be discharged from vessels directly or indirectly into the waters or onto land within the Harbor limits.

6. Safety and Security Information

6.1 Terminal Muster Location

Refer Terminal Life Saving and Fire Fighting Demographic plan in Appendix G.

The secondary route for muster and evacuation from jetty head is through Berthing and Mooring dolphin.

Evacuation from Vessel and Lifeboat Readiness

Primary: Terminal provides fixed gangway for all vessels visiting Port Bonython.

Secondary: Jetty: Mooring Dolphins

Vessel: Outboard side Pilot Ladder

Vessels are required to keep outboard lifeboat(s) lowered to embarkation deck and free of any obstruction during their stay at Port Bonython. Due to fire resistance, although limited, the terminal recognizes lifeboats as the most suitable means of evacuation from vessel.

6.2 Activities that require Permit

Vessels are advised that all activities that require 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.

6.3 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. Lifeboat Musters are permitted, with prior approval of the Terminal Representative.

6.4 Vessel Lifting Operations

Lifting operations using ship's cargo crane are strictly prohibited due to proximity to MLA. Use of Cargo crane on outboard side is permitted after approval from Terminal Representative.

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.

6.5 Bending moments and shearing forces

Vessel master must ensure vessels in excess of 10,000 deadweight tonnage has an efficient means of readily calculating the bending moments and shearing forces at various positions in the vessel's hull at all stages of loading, unloading and/or Deballasting which is available to the master of the vessel.

6.6 Fire Prevention

Sources of ignition, including smoking, must be carefully managed to ensure they remain separate from hydrocarbons and their vapour. No ignition source is permitted to be taken into the Jetty Terminal without the approval of the Terminal Manager.

- Ignition sources include, but are not limited to:
- Welding or grinding equipment.
- Spray painting equipment.
- Electrical power tools.
- Internal combustion engines.
- Nylon clothing that makes static electricity.
- Lighters and matches.
- Mobile phones.
- Cameras.
- Smoking.

Camera and Mobile phone use may be allowed if the personnel are operating with Santos approved Portable Multi-gas detector.

6.7 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.

6.8 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.
Matches and or lighters at the terminal including the Jetty are strictly prohibited.

6.9 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.

6.10 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.

6.11 Vessel Gas Venting

Venting from 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 Vapour recovery. Vapour recovery is subject to Vapour Space analysis.

Naphtha and Crude oil 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 proximity of the Terminal. Gas detectors are installed at the jetty and in the jetty operator room. Upon activation of a gas detector, vessel will be required to change venting tanks.

6.12 Use of Radar and GMDSS Equipment

Whilst the vessel is at Terminal, the Main transmitting aerial(s) should be earthed and should not be used. VHF radio transmitters shall be switched to “Low” power mode or 1W. Use of Radar is strictly prohibited whilst the vessel is alongside. The vessel is to keep its AIS 'on' at all times.

6.13 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.
At all times while 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 always be visible on the deck.

6.14 Maintenance and Repairs

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

- Safe and efficient operation of the inert gas system and reliquefication 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.

6.15 Emergency Towing Off Pennants

The rigging of emergency tow-off pennant wires (fire wires) is optional and not mandatory at the Terminal. ETOP, if rigged, must be tended frequently to ensure the eye is always at least two meters above the water whilst alongside.

6.16 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 on the port and starboard sides of the vessel and in a predominate location for ready access by shore personnel.
A fire hose connection from shore mains to ship’s mains will be provided by the Terminal.

6.17 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:

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

6.18 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 D 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 initialed with the time of the check to indicate continued compliance.

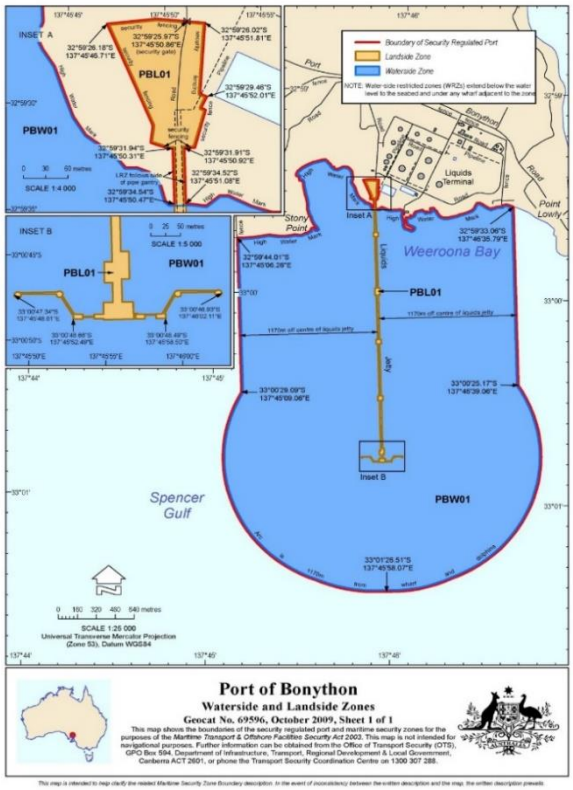
6.19 ESD System

The primary objective of the emergency shutdown system is to ensure the safety of personnel and to provide protection to plants, equipment, and the environment in emergency situations.
The Terminal is equipped with high integrity and fail-safe emergency shutdown systems ESD and PERC systems. Activation of ESD 1 will shut-down loading. Activation of PERCS will shut down loading and disconnect the loading arms from the ships manifold. Activation time of ESD-1 is 30seconds. The PERCS System will activate after ESD Activation.

6.20 Safety and Security Zones

Security Zones

Santos Port Bonython is a security regulated Port Facility as well as a Security Regulated Port. Terminal Maintains Maritime Security Plan in accordance with the requirements of the Maritime Transport and Offshore Facilities Security Act and Regulations 2003. The waterside area delineated in Figure 1 below is classified as the "Waterside Restricted Zone" for the purposes of these Jetty Terminal Rules. The Waterside Restricted Zone comes into effect as soon as a vessel intending to berth (Subject Vessel) is within 1,170 meters of the Jetty and ceases once the Subject Vessel has left the Berth and is outside the 1,170-metre zone. While the Subject Vessel is within that zone, all other vessels seeking to enter the Waterside Restricted Zone must have the prior approval of the Port Facility Security Officer (PFSO) to do so; and personnel entering the Waterside Restricted Zone, other than those on the Subject Vessel, must have a current Maritime Security Identification Card (MSIC) or be directly supervised by an MSIC holder.



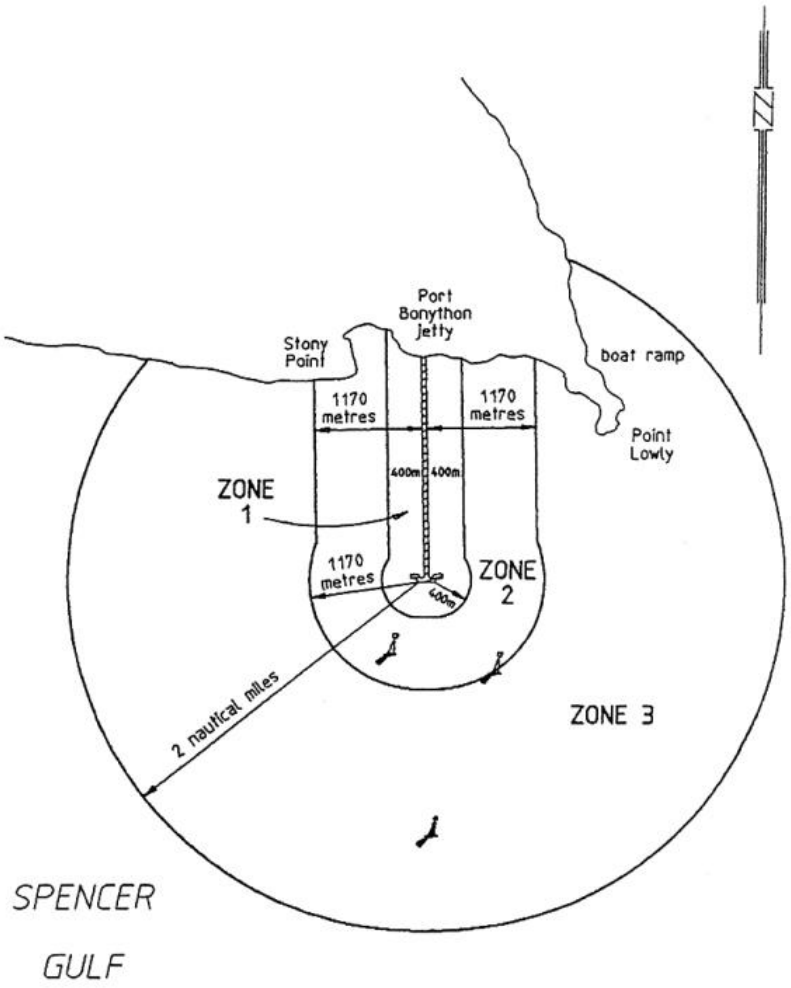
Safety Zones

Vessel is required to comply with Zone Controls mandated by SA Harbor and Navigation Regulations (2009): Refer ECDIS Restricted area.

Zone	Controls applicable
Zone 1	Control 1 and 4
Zone 2	Control 1 and 4 but only if a vessel is moored at jetty or, the berth operations signal at the sea-ward end of the jetty are signaling a single red light flashing at an approximate rate of 1 flash every 2 seconds.
Zone 3	Control 1 and 4 but only if an audible signal is sounding or the berth operations signals at the seaward end of the jetty are signaling a single red light flashing at an approximate rate of 2 flashes per Second.

Control 1: a person must not take a vessel into the specified waters or cause or permit a vessel to enter or remain in the specified waters.

Control 4: a person must not ski, aquaplane or be towed in any other manner by a vessel in the specified waters.



6.21 Terminal PPE Requirements

All personnel within the Terminal must wear PPE consisting of fire-retardant coveralls, a hard hat, safety glasses and safety boots. Personnel who do not comply with these requirements may be denied access to the Terminal. Refer Appendix E. Vessel Staff are allowed to check draft and perform regular duties with Cotton overalls. Vessel must comply with rest of PPE requirements as detailed in Appendix E.

6.22 PPE Requirements for Transiting Personnel

All personnel transiting the Terminal must wear PPE equivalent to the Terminal PPE requirements. (Section 6.21). Onshore Operations will not provide PPE. Personnel who do not 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)

6.23 Weapons and Prohibited items

The use or carriage of weapons and or prohibited items is strictly forbidden at the Terminal. Weapons and prohibited items include, but are not limited to:

- firearms.
- bombs and grenades.
- rockets or missiles.
- things that are, or in the nature of, explosives or incendiary devices or that contain or expel gas or other irritants.
- flame throwers.
- crossbows.
- electromagnetic weapons.
- acoustic or light emitting anti personal devices.
- rocket launchers.
- an imitation or replica firearm.
- an imitation or replica bomb, grenade, rocket, missile, or mine.

For personnel transiting through terminal, including sign on and signoff crew, possession and carriage of Prohibited items is not allowed.

6.24 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 these guidelines may result in the stoppage of cargo operations and disconnection from the Terminal.

Visitors must refrain from the consumption of drugs/alcohol during their stay at Port Bonython.

6.25 Swimming and Fishing

Diving, swimming, and fishing are strictly prohibited withing harbor limits.

7. Communications

7.1 Official Language

English is Official Working Language.

7.2 VTS

Adelaide VTS maintains a continuous listening watch on channels 16 (Distress, Safety and Calling) and 12 (primary port operations working channel) - 24 hours a day, 7 days a week. All vessels required to report to Adelaide VTS shall always maintain a listening watch on channels 16 and 12.

7.3 Emergency Contact

In the event of a Vessel emergency whilst at the Terminal the vessel is to alert the Terminal Representative, Control room on VHF CH 16 and Adelaide VTS on Ch16 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 Central Control Room should be notified on VHF Ch16.

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

7.4 Jetty Communication System

For cargo operations, the primary means of communication is Terminal provided UHF Radio Ch3

Secondary Means of Communication is VHF Ch16- Santos Control

Terminal Representative staying onboard can be contacted if Vessel/ Control Room are unable to communicate Properly.

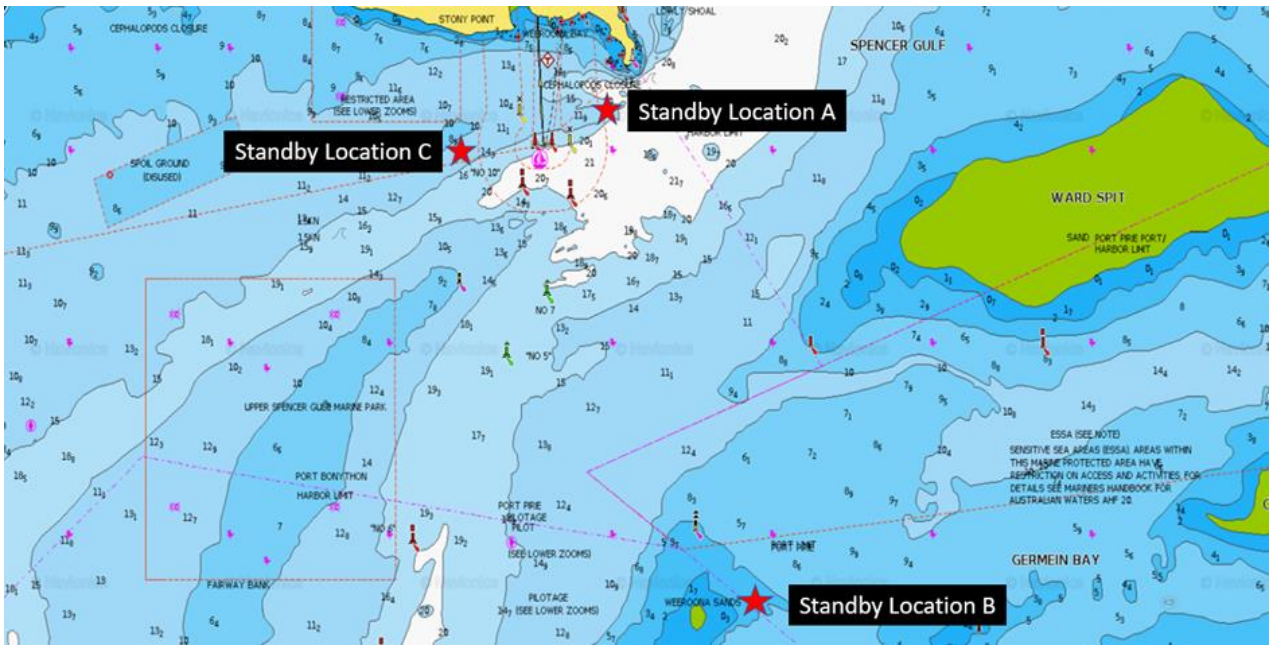
No Telephone Facility is available on Jetty. Jetty is manned by Operator during shipping operations. Jetty operator can be contacted, if required.

7.5 Jetty Head

Ships at the berth must remain in communication with the Jetty control room at all times, using a portable two-way radio provided by the terminal.

7.6 Standby Tugs

The primary means of Contacting standby tugs in an emergency is VHF Ch08 and VHF Ch16. The standby tug details will be advised by the Terminal Representative during the pre- load meeting. Vessel master must ensure communication is maintained with Standby tug. Vessel Master are authorized to contact standby tug directly, if and when required, to assist throughout vessel stay at Port Bonython liquids berth.



8. Terminal Information

8.1 Vessel Acceptance

All vessels nominated to load at the terminal will be vetted by Santos, using its Marine assurance standards.
All vessels visiting Port Bonython may be visually inspected by Terminal Representative when nominated and at Port Bonython before loading.
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.

8.2 Vessel Certification

All vessels must be in possession of a completed and valid set of safety, security and trading certificates. All officers to be properly qualified and in possession of recognized certificates of competency as required for that vessel as per STCW 95 / 2010 as amended. All LPG vessels are to be in possession of a certificate of fitness under the terms of the IMO code for construction and equipment of ships carrying liquefied gas in bulk, also of an appropriate Classification Society certificate. Complies with International Transport Federation (ITF) Rules and Regulations as are applicable and in operation from time to time. The owner of the Vessel or bare boat charterers shall have in place (and provide documentary evidence upon request) the maximum pollution liability insurance available from and through a P & I Club in the International Group of P & I Clubs.

8.3 Approach Clearances

A 400-metre exclusion area applies around the Jetty and the Berth at all times. The master of a vessel shall not allow the vessel to approach within this 400metre exclusion area at any time unless authorized by the Port Manager.
The master of a vessel shall not allow the vessel to approach within 1,170 meters of the Berth or the Jetty at any time whilst a gas carrier is secured to the Berth and/or the applicable signal light is displayed unless authorized by the Port Manager.
Where there is an emergency at the Berth and the Berth's emergency operations light signal is exhibited and/or the audible warning alarm as required by these Rules is sounding, the master of any vessel, other than a vessel authorized by the Port Manager, shall ensure that the vessel maintains a clearance from the Berth of at least 2 nautical miles.

8.4 Berth Operations Signals

Berth Operations and Warning Lights are mounted above the outer mooring dolphins accessway. When such light signals are exhibited, or an audible alarm sounded, the requirements shall be strictly observed by the masters of all vessels in the vicinity.
The berth operation signals are:

- All-round Fixed Red Light - active only at night – to show the position of the Jetty. This fixed red light will switch off when the lights in paragraphs (b) and (c) below are activated.

- an all-round red light flashing 30 times per minute to indicate '**DO NOT APPROACH WITHIN 1,170METRES."**
- an all-round red light flashing 120 times per minute and / or an audible alarm sounded to indicate an emergency – '**ALL NONESSENTIALVESSELS SHALL KEEP AT LEAST TWO NAUTICAL MILES CLEAR OF JETTY BERTH'**.
- Terminal Emergency has Fixed siren indicating emergency on terminal. The vessel must initiate emergency procedures on hearing the sirens.
- **Fixed Sirens are tested for approximately 10seconds daily at 1200LT.**

8.5 Sound Signals by Vessel

The master of a vessel within the limits of the Harbor shall not use the whistle on the vessel for any purpose other than to indicate navigation manoeuvres pursuant to the Prevention of Collisions at Sea Regulations or to attract attention in an emergency.

8.6 Standby Tug Requirements

As part of Terminal safety requirements, at least one (1) tug (FiFi1 with EPA approved Foam) will be in Standby mode in the vicinity of the berth. Ship's Master to ensure lines and crew are ready in case of emergency to attend to the tug. The tug remains on standby for as long as the Offtake Tanker is alongside the Jetty for cargo and ship loading.
From time to time the standby tug may be required to assist with other movements within the Port. The decision to release the standby tug will be at the discretion of the following resources:
If directed of a Port Management Officer
At the discretion of the Terminal OIM
At the discretion of the Offtake Tanker's Master

If a Port Management Officer, Pilot, Offtake Tanker Master or Terminal OIM deem necessary, the tug and any additional tugs needed to move the Offtake Tanker may be requested to move to a standby position alongside the Offtake Tanker. Such instances may include, but not limited to:

+ adverse weather
+ safety
+ and security

8.7 Environmental Limitations and Hull Exposure

Design criteria for extreme off-berth mooring loads on the largest ships:

+ Maximum wind speed (30 sec gust) - 60 kts/ 110 kph
+ Simultaneous current, @ 5° "off" wharf - 2 kts
+ Windage or lateral exposed area - 4,459 sq m

It should be borne in mind that a 60 knot, 30 second gust could occur with an average wind speed of about 45 knots or Beaufort Force 9, therefore the windage of a vessel at the berth must not be allowed to exceed 4,459 sq m in Force 9 conditions.
Equivalent maximum windage areas for various wind speeds are:

Beaufort Force	Wind Speed Average	30 sec gusts	Maximum Windage
8	37 kts	49 kts	6,689 sq m
9	45 kts	60 kts	4,459 sq m
10	52 kts	69 kts	3,344 sq m

8.8 Accommodation for Terminal Representative

Terminal Representative(s) will board the vessel on arrival and may remain onboard until the completion of loading. Vessel is required to provide two suitable single berth cabin accommodation and meals for this period as per Australian Standards. Representative Cabin, including meeting room, CCR must be clean and compliant with Australian Standards of Hygiene. Allocated cabin must be located on CCR deck and above, preferable closer to bridge for emergency phone reception.

8.9 Third-Party Audits and Inspections Onboard

To ensure safety and compliance, the terminal permits visits and audits conducted by third-party auditors. However, these must be pre-approved by the Terminal Manager, Marine Superintendent, Security, and the designated Terminal Representative at least 5 days prior to vessel berthing. It is essential that these inspections do not disrupt safe operations, including loading, or create any unsafe situations within the terminal.

8.10 Independent Third-Party Cargo Surveyors

The role of appointed Independent Third-Party Cargo Surveyors is crucial for quality assurance at Port Bonython. The vessel must provide support to the visiting cargo surveyor to ensure smooth operations. Regardless of the Principals for contracted survey works, Cargo Surveyors are required to follow all safety protocols outlined in the documents. This includes, but is not limited to, Santos Lifesaving rules, Terminal PPE Requirements, Closed sampling, and gauging procedures. Cargo surveyors must be trained and certified for the work undertaken while operating at the Santos Terminal, Jetty, and Vessel. Unless specifically required in the Loading instructions, Cargo surveyors are required to check the random-tank atmosphere to be utilized for loading operations and report the checks to Terminal Representative.

8.11 Terminal Allowed Vessel Size

Maximum LOA:	265.0 meters
Minimum LOA:	138.0 meters
Draft:	16.0 meters
Maximum Displacement:	150,000T

All vessels exceeding 265 meters LOA and, or, 150,000T Displacement are considered Oversize vessels. Oversize vessels can be accommodated at berth after Permission from Port Manager. Services to oversize vessel will be provided after the Master/ Operator/ Principles agrees to undertake oversize voyage with signed oversize letter from Service Provider (Flinders Ports Holding). Refer Appendix I.

8.12 Navigation

8.12.1 Master Obligations

International Rules for the Prevention of Collisions at Sea Regulations have been adopted by the Navigation Act and apply to all vessels in all State waters, including those waters within the Harbor, unless indicated otherwise by the Act.

The master of a vessel shall ensure that the vessel under his/her control does not:

- pass another vessel in any channel within the Harbor.
- anchor the vessel in any channel within the Harbor, except in an emergency.
- except with the approval of an Authorized Person, cause or permit a cable, chain, hawser or rope to be placed across any channel within the Harbor.
- Where a vessel is anchored in a channel of the Harbor in an emergency, the master of the vessel must advise the Port Authority/ Port Manager, VTS and Terminal as soon as practicable and, once the emergency is resolved, move the vessel to
- the side of the channel without delay and notify the Port Authority/ Port Manager, VTS and Terminal immediately upon that move being made.

8.12.2 Recommended Navigation Charts:

Chart Number	Description
AUS 343	Whidbey Isles to Cape Du Couedic
AUS 485	Spencer Gulf and Gulf St Vincent
BA 2389	St Vincent and Spencer Gulfs
BA 407	Spencer Gulf
AUS 136	Approaches to Whyalla & Port Pirie
AUS 778	Pt Lowly to Port Augusta
AUS 777	Winceby Island to Point Riley
AUS 776	Williams Island to Winceby Island

8.12.3 Recommended ENC

AU5PBY01	Spencer Gulf - Port Bonython
AU434137	Whyalla to Wallaroo Bay
AU5WYA01	Spencer Gulf - Whyalla
AU433137	Port Bonython to Port Augusta
AU5PPI01	Spencer Gulf - Port Pirie Wharves and approaches
AU240130	Head of Great Australian Bight to Cape Jaffa

For description of coastline, anchorages, weather notes, etc., refer to the NP13 Australia Pilot, Volume 1 – South Coast of Australia.

8.12.4 Approaches and Entrance to Spencer Gulf

From the East:

Vessels approaching from the east should set a course to pass no closer than 10 nautical miles clear of Cape Borda lighthouse from where a course may be set to enter the Gulf between Wedge and Althorpe Island. Tracks can be subject to strong cross sets due to the tides. On entering the Gulf, a safe course should be set to pass to the west of Tiparra Reef beacon, (30°04’ S, 137°231/2’ E).

Vessels with local knowledge sometimes pass to the north of Kangaroo Island, using Backstairs Passage and Investigator Strait.

From the West:

Vessels approaching from the west should set a course to pass 10 nautical miles south of S. Neptune Island lighthouse, and thence into the Gulf by the previously mentioned track. The Mariners are cautioned against passing within 5 nautical miles of S. Neptune Island.

8.12.5 Approaches and Entrance to Spencer Gulf

Although good depths are available in the northern part of the Gulf, accurate navigation is essential because the navigable widths are not great for deep draught ships, and the coastlines are low lying and featureless. The deep-water channel off Tiparra Reef is only 4 nautical miles wide. From there, set course to pass westward of Middle Bank. A buoy marks the southern end of Middle Bank and the navigable width for a deep draught ship at that point is less than 3 nautical miles.

From Middle Bank beacon steer to pass west of Yarraville Shoal beacon keeping clear of Planck Shoal (8.8 m) and a 10 m patch northward of Middle Bank, both of which are marked by buoys.

After passing Yarraville Shoal beacon, a course should be set to the Pilot Boarding Ground.

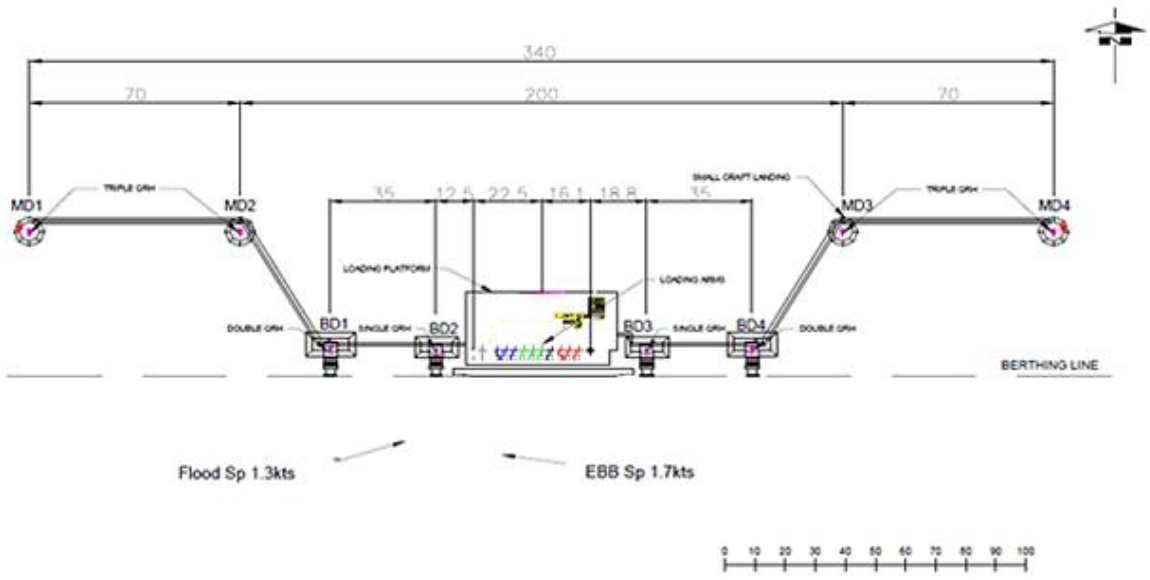
8.12.6 Departure

The outward passage down the Spencer Gulf is the exact reverse of the inward passage, with the same need for very exact navigation until past Tiparra Reef.

8.13 Berthing

8.13.1 Berth Layout

The berth consists of a concrete loading platform erected on steel piles in 20.19 meters of water. No dredging has been carried out and no siltation is anticipated in the berth area. The berth is orientated 088°-268° (T), approximately in line with the tidal currents.



Four breasting dolphins (BD1 to BD4) equipped with rubber fenders hold large vessels clear of the loading platform. A row of fender-piles immediately in front of the platform is capped with a rubber-fender steel berthing beam against which ships can lie. Four mooring dolphins (designated MD1-4), consisting of raked steel piles with concrete caps, lie to the east and west of the breasting dolphins. Both mooring and breasting dolphins carry quick release hooks for the ship's mooring lines. A 100T bollard is located at center of continuous fender.

Deck heights above mean high water springs (MHWS):

- Loading Platform + 10.74 m
- Breasting Dolphins + 3.5 m
- Mooring Dolphins + 5.5 m
- Continuous Fender + 1.0 m

Distances from center to center, between fenders:

- BD1 - BD2: 35 m
- BD2 - BD3: 70 m
- BD3 - BD4: 35 m

8.13.2 Berthing Velocity

Design Berthing Velocity for 150,000T Displacement at approach angle of 15 Degree is 11cm/sec.

8.13.3 Accidental berthing energy for fenders

- Outer dolphins 250 t-m
- Inner dolphins 125 t-m
- Continuous fender 50 t-m

8.13.4 Tug Requirements

Vessel Length Overall	Tug(s)
Vessels in excess of 138m LOA (Berthing/ Unberthing) (Whether turning or not)	2
Vessels in excess of 180m LOA (Berthing/ Unberthing) (Whether turning or not)	1 Z Peller + 1Tug
Vessels in excess of 240m in length (Berthing)	2 Z Peller or,1 Z Peller plus 2 Tugs
Vessels in excess of 240m in length (Unberthing)	2 Z Peller or, 1Z Peller plus 2/1 tug

A bow thruster will be considered in lieu of a tug provided its power is sufficient for the vessels size and wind speed is less than 15 knots. Bow thruster power will be calculated by the following:

- 1 HP = 0.746 KW
- 100 HP = 1 Ton Bollard Pull

If a vessel has a bow thruster and visits the Harbor for the first time the Licensed Pilot will use appropriate tugs and assess the strength of the bow thruster.

As at Date of Publication, following Tugs are located at Port Pirie for Operations at Port Bonython:

Tug Name	LOA (meters)	M/E Power	Bollard Pull	Propellers/ Type	Remarks
Svitzer Ginga	30	2X1685 kW	55t ahead	2X Z-Peller	Fi-Fi
Svitzer Larrakia	30	2X 1685kW	55mt ahead	2X Z-Peller	Fi-Fi

Latest Information on Tug availability can be found on link:
https://www.flindersports.com.au/pilot-information/#towage-vessels

8.13.5 Berthing Restrictions:

Berthing Operations are strictly restricted to daylight berthing only.
Sailing/ Departure can be planned after daylight basis Pilot availability and prior notification to Port Authority and Service Providers

- Berthing vessels in excess of 240 meters will only berth if the rise or fall in tide is less than 40 centimeters in the hour.
- Unberthing vessels (Not swinging) more than 240 meters will be with 2 tugs (Z Peller plus 1) only if the rise or fall in tide is less than 40 centimeters in the hour. If the rise/fall exceeds 40 centimeters in the hour a third tug will be required.
- Berthing of fully laden vessels that can only berth "Port Side Alongside" can only occur where the rise/fall in tides is less than 30cms in the hour.

If wind speed exceeds 25 knots from Southeast to Southwest Directions (135°T-225°T), all berthing and unberthing operations must be suspended. If wind exceeds 25kts from direction other than those mentioned in this section , Vessel berthing and Unberthing will be subject to Santos Discretion in consultation with pilot.

8.13.6 Manifold Alignment

Vessel must align to terminal advised MLA and Manifold. Terminal Representative and Mooring Team member will guide the vessel staff with alignment. The Terminal will advise 24 hours prior to arrival of the Vessels manifold alignment to MLAs to be used for operations.

8.13.7 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.
Terminal representative will conduct Mooring analysis for vessel prior to berthing and a copy of mooring configuration is provided to Vessel via Local agent or visiting Pilot.
The Licensed Pilot will advise the master of a vessel on mooring requirements. Any known defect or limitation in the vessel's mooring system must also be reported to the Licensed Pilot before arrival.
Refer Appendix B: Mooring Configurations

8.13.8 Terminal Mooring Equipment

Dolphin	Single Hook	Combined
MD1, MD2, MD3, MD4	Triple 125t QRH	375t (3679kN) total SWL
BD1 & BD4	Double 125t QRH	250t (2453kN) total SWL
BD2 & BD3	Double 125t QRH	250t (2453kN) total SWL

All QR hooks are fitted with remote-control trips which can be operated from the control room in an emergency. Capstans are located at each set of quick release hooks to assist in handling mooring lines or messengers. Only one line at a time will be accepted by the capstan winch. Capstan line-haul speed is 25 m/minute and SWL is 125kN.

8.13.9 Design Mooring Loads:

Mooring Dolphins Normal Load = 1500kN Accidental Load = 2500kN
Breasting Dolphins: Mooring Load = 800kN
(Note: no breakdown into a Breasting Dolphin Normal Load & Accidental Load provided in design specifications.)

8.13.10 Mooring Procedures:

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.
Lines boat is provided for running lines to the dolphins.

The sequence for transferring the Vessels mooring lines ashore is working from amidships towards the bow breast lines and then Aft breast ropes followed by Stern ropes.

8.13.11 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 recommend 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 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.

8.13.12 Gangway

A hydraulically powered gangway is sited at the eastern end of the jetty head to provide access to ships at the berth.

The gangway does not have Telescopic movement restricting the gangway placement within swing area. Vessel must ensure the Gangway landing area is clear of obstructions.

8.13.13 Waterside Transfer

There may be occasions when 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.

9. Loading Operations

9.1 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 agenda and Ship Shore Safety Checklist is presented in Appendix D.

9.2 Loading Plan

At the pre-loading meeting, the Chief Officer must provide the 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.

9.3 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.

9.4 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. During weather events, additional Crew members will be required to tend the Vessel's mooring lines. A total of three (03) Crew members shall be available on deck at all times during vessel stay at Port Bonython berth.

9.5 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 Terminal Operations Coordinator and Marine Manager are to be advised immediately prior to proceeding.

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

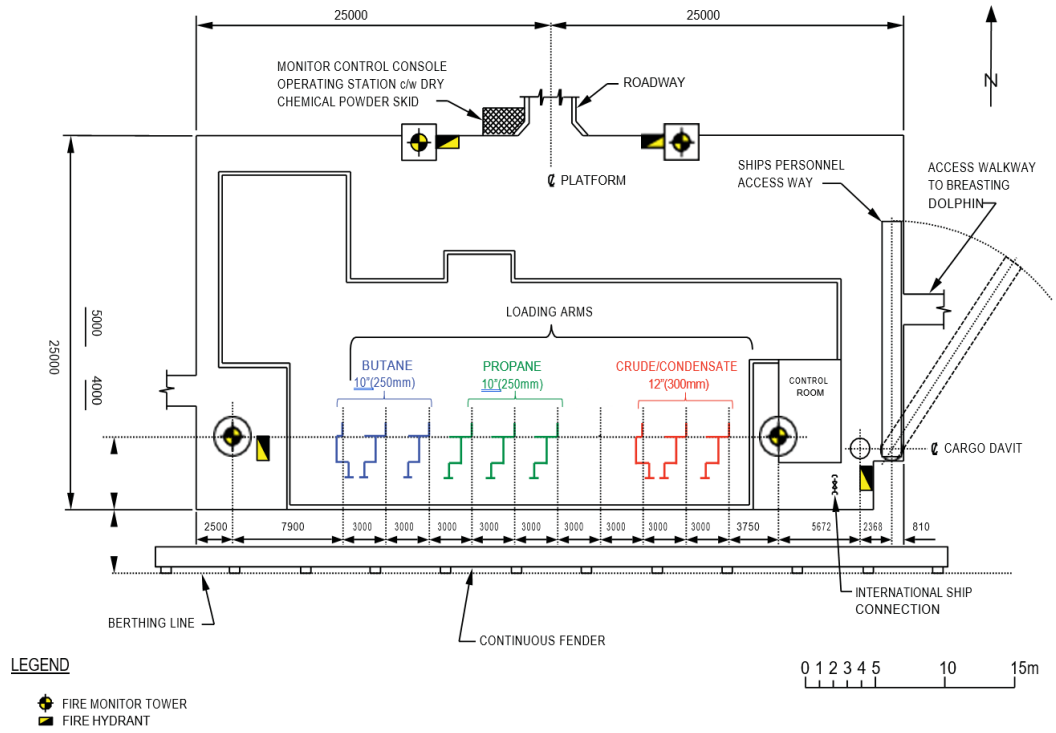
9.6 Deck Scupper Plugs

During operations, the scuppers of all shall be effectively plugged and no leakage or spillage on board shall be swept or allowed to leak overboard. ANY LEAKAGE OR SPILLAGE must be reported immediately to the terminal operator, who will initiate the terminal oil spill contingency plan.

9.7 Loading Arms

Details of the loading arms and ships manifold requirements are given in the Table below. The arms are numbered 1 to 9, reading in order from the eastern end of the jetty head.

The Arms have operations tolerance for winds up to 27m/sec(54.9kts). Operation, connection, and disconnection of MLAs beyond 27m/sec winds is not permitted. Vessel Master and Terminal Representative must consider stoppage and disconnection before crossing critical wind limit.



LOADING ARMS				SHIPS MANIFOLD REQUIREMENTS					
No	Service	Size		Height above Waterline		Height above deck or other obstruction		Set back to face of ships manifold or reducer if required.		Minimum distance between ships manifolds
		Arm (All 150 ANSI)	Coupling (All 150 ANSI)	Max	Min	Max	Min below lower edge of manifold flange	From ships side Max	From ships side Min	
1 2 3	Crude, Naphtha	12" 300mm	12" 300mm	20.24m	4.14m	Unrestricted, except for safe access.	0.56m	4m	1.65m	2 m
4 5 6	Propane Liquid or Propane Vapour	10" 250mm	10" or 12" 250mm or 300mm	20.24m	4.14m		0.53m	4m	1.5m	2 m
7 8 9	Butane Liquid or Butane Vapour	10" 250mm	10" or 12" 250mm or 300mm	20.24m	4.14m		0.53m	4m	1.5m	2 m

Note: Bonding Wire is not required on terminal. MLA are fitted with ISGOTT compliant Insulation flange.

9.8 Ship's Manifold

Vessel's presentation flanges must be free of rust, paint, pitting, deterioration and damage.
Vessel must have ANSI 150 reducers for ship shore interface. Although mirror face presentation flange are preferred, raised face presentation flange will only be accepted after review by Terminal Representative.

9.9 Loading Arm Safe Envelope

Surge

The maximum allowable movement of any arm in surge (parallel with the wharf) is ± 3 meters from the centerline.

Outreach

The maximum outreach, perpendicular to the wharf, measured from the fender face is:

- 300 mm (12") crude arms at minimum operating height of +4.14 m above LWS: 4.8 m.
- 300 mm (12") crude arm at height above + 5.6 m: 7.6 m.
- 250 mm (10") LPG arms: 7.6 m.

Height

Maximum of 10.5 m above platform deck for 300 mm (12") arms, less for smaller arms. Maximum allowable heights of ship's manifold above waterline allowing for tidal range etc., is given in Section 9.7.

Note: If any arm moves beyond the given limits, the ESD system will automatically be activated.

9.10 ESD and Emergency Disconnection sequence

When one of any arms connected to a ship approaches the limit identified in Section 9.9, a first stage ESD will occur shutting down the pump and ESD valve. First stage ESD or First threshold limit will cause the sounding of sonorous alarm and flashing light on Jetty.

Loading can only resume after repositioning vessel within safe envelope.
If the vessel crossed the second threshold, stage 2 ESD with PERCS activation would occur.
PERCS activation cannot be bypassed without repositioning in MLA in safe envelope.

9.11 Hydraulically Operated Coupler

MLAs are provided with hydraulic operated coupler (QC/DC). The coupling consists of a flange that mates with ship's manifold and a set of claws that clamp onto back of the ship's flange. The interface is provided with "O" ring which must be checked before each use. Vessel must ensure the ship's presentation flange is free of any dents, damage, and paint.

QC/DC coupling for Propane and butane arm is adjustable to accommodate both 300mm and 250mm manifold. It is strongly recommended that the vessel arrive with 250mm Manifold for LPG loading operations.

9.12 Loading Rate

Maximum Loading rates for each MLA are approximately:

- Crude oil: 2,500 m3/hour
- Naphtha: 1,400 m3/hour
- Butane: 1,800 m3/hour
- Propane: 1,800 m3/hour

Maximum loading rates at the berth are approximately:

- Crude oil: 7,500 m3/hour
- Naphtha: 4,200 m3/hour
- Butane: 1,800 m3/hour
- Propane: 1,800 m3/hour

Loading Rates restriction for Non-inerted Vessels

The start of loading is a critical time, and it is essential to maintain a flow rate not exceeding 1 m/sec in any of the vessel's pipework during the loading of crude and naphtha cargoes at Port Bonython. This limitation is imposed to mitigate the risks associated with static electricity. The ship's Chief Officer is responsible for determining the flow rate that ensures compliance with the aforementioned limit. The information must be communicated to Terminal Representative during pre-loading meeting. Furthermore, the established flow rate limit must be maintained until the tank inlet pipe is covered approximately 300 mm in the tank being loaded.

9.13 Jetty Emergency Shutdown and Surge Relief System

The emergency shutdown (ESD) system to stop loading can be activated from the shore or the Jetty Control room or from the shore gangway. It is also activated automatically in the event of the following occurring:

- electrical power failure.
- excessive pipeline pressure.
- surge in loading pump supply current.
- loading arm extending outside of safe envelope.
- low level in shore tank.

The ESD valves are power operated, backed up by emergency power and Nitrogen motors. Activating the ESD system stops the loading pumps and closes the following ESD valves: tank suctions, valves at shore end of jetty, valves at loading arms. All valves in the shore ESD system have a closure time of 30 seconds.

9.14 Prevention of Surge Damage

Serious damage to piping and equipment could result from pressure surge if ships automatic valves are slammed shut while loading at maximum rates. For this reason, records of tests or manufacturer’s data on the ship’s valves will be required by the terminal. If suitable test data is not available, the master may be asked to operate the system to allow timing of the valves.

Separate surge drums are provided on the loading platform for butane and propane. The crude oil/naphtha header relieves into the jetty sump. The capacity of these systems is very limited.
If the Marine Coordinator considers the ship’s valve closure times to be too short, he may ask for them to be locked off or he may order loading at a reduced rate. If loading time is unduly prolonged through this cause, the extra time may be charged against the ship.

9.15 Connection of Loading Arms

The loading arms will be moved 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.
The presentation Flange will be inspected by Terminal Representative before connection. After connection, Terminal Operators will conduct ESD and PERCS test.
Following connection, the loading arms will be pressure/leak tested with nitrogen (N2) supplied by the

Terminal to 300KPa and the Vapour arm to 200 Kpa and inerted.
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.

9.16 Vapour Space inspection on arrival

Independent third-party surveyors and/or the Terminal Representative will randomly test the oxygen content in Vessel's cargo tank.

9.17 Tank and Associated fittings on arrival

Vessels will not be accepted for loading unless the tanks to be loaded and the ship's piping are free of any liquid or vapour which would knowingly contaminate or degrade the product. The Terminal assumes no responsibility for cleanliness of ship's tanks for loading.
Tank washing, gas freeing, inerting or cooling down are not permitted at the berth unless prior consent is received.
Crude and Naphtha vessels must have her tanks inerted to less than 8% oxygen prior arrival. This will be checked by the surveyor on arrival.
H2S in Cargo Tanks to be less than 5PPM.

9.18 Testing of Vapour Space for Propane and Butane Loading

Gas carriers must be properly cooled down and gassed up. Reliquefication equipment must be in good working order. Terminal complies with stringent environmental emission conditions. Flaring and Vapour release for Propane and Butane loading is strictly prohibited. Vapour recovered from vessel is used to fill Shore tank vapour space. If vessel is inerted, terminal requires the vessel to conduct atmosphere change before arriving at Port Bonython. Vessel failure to comply with gasup requirement would require terminal to conduct flaring. Vessel intention to arrive in inerted condition must be advised 10 days prior berthing.

Vapour return will only be accepted after Vapour Space analysis to satisfaction of Terminal Representative and Operations Team. Vapour Sample will be drawn by third party independent surveyor and tested by Santos laboratory. Such testing must be witnessed and endorsed by Third Party independent surveyor.
Generally, vessel must arrive with at least 85% vapour composition on product to be loaded in nominated tanks. Loading rates at terminal are strictly dependent on Vapour composition on vessel's arrival. Vessel's failure to arrive with acceptable and on-spec vapour composition will result in slow loading rates and Vessel will be held responsible for any delays or damage occurring due to such condition.

9.19 Cargo Measurement

Cargo quantity and quality will be determined by an independent surveyor. Custody of all products will take place at the ship's manifold.
Shore measurement and sampling will determine quantity and quality as follows:

9.19.1 Crude Oil and Naphtha

- Quantity will be determined by shore tank dips.
- Quality will be determined by sampling the shore tanks and blended proportional from each tank loaded from during loading.
- Ship's Tank Measurements will only be used when shore measurements are not possible.

9.19.2 Propane and Butane

- Quantity will be determined on Ship's tanks gauging and allowance made for the decreased vapour space.
- Quality will be determined by proportional sampling.

9.20 Cargo Handling Coordination

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.

9.21 Loading Readiness

On Completion of Arms connection and leak test the Vessel Chief Officer and Terminal Representative must agree all systems are correctly lined up and ready.
The Vessel's vapour return manifold can only be opened after clearance from Terminal Representative.

Note: Vapour return lines will not be connected for Crude and Naphtha loadings.

9.22 General precautions during loading

Loading or unloading operations shall not commence until the following actions have been taken to the satisfaction of both the vessel's master and the Terminal Representative:

- Notices have been displayed on the vessel, in appropriate languages, bearing the words: "SMOKING AND OPEN LIGHTS STRICTLY PROHIBITED" have been displayed in prominent positions on board the vessel and near all access points to the vessel; and
- The vessel's master and the Terminal Representative have completed and signed the "Ship/Shore Safety Check list" certifying that all conditions on that safety checklist have been complied with.

9.23 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.
Every two hours during the loading, the Vessel shall inform the Terminal of the quantity received (GOV).
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 minimized.
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 cargo tanks topping off.

- 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:
- Any signs of leaks of the loading arms at the manifold and on the ship's cargo deck.
- Vessel's drift and tension of the mooring lines.
- Gangway position.
- Differential pressure at the manifold.
- Vessel shall not be trimmed by the head or have excessive trim.
- Vessel must always ensure compliance with Section 5.7 of handbook.

9.24 Crude and Naphtha Loading

- The master of the vessel shall ensure that his vessel is securely moored alongside the Jetty at all times when at the Berth. All tension winches must be on manual brake.
- There must be sufficient crew members, with responsible officer supervision, on board at all times to deal with any emergency. At least one member of the duty watch shall be visible on deck at all times.
- During loading or unloading operations all doors, portholes and openings from the outer deck to accommodation or machinery spaces (other than the pumproom) shall be kept closed except for entry/exit purposes. 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 may be used on full recirculation mode only.
- All cargo tank lids must be closed and secured and venting of vessel's tanks must take place only through the venting system.
- Should an accumulation of gas become apparent, loading or unloading must be stopped or loading/unloading rate reduced at the discretion of the responsible Terminal Representative or the vessel's responsible deck officer.
- Vessels in excess of 10,000 deadweight tons shall have an efficient means of readily calculating bending moments and shear stresses in the vessel's hull at all stages of loading, unloading and deballasting.

9.25 Propane and Butane Loading

In addition to 9.24, vessel must comply with following:

- The vessel's master must advise the responsible Terminal Representative of the maximum loading rate, the maximum working temperature and pressure of the vessel's tanks and details of the previous three cargoes carried.
- The vessel's tanks must be purged of air to the satisfaction of the responsible Terminal Representative, prior to loading. The oxygen content of tanks must be less than 2% by volume.
- The loading arms must be drained and cleared of liquid and all pressure removed prior to connection / disconnection. Nitrogen is connected to the arms for purging.
- The vessel's tanks and pipelines must be gradually and evenly cooled down before loading to avoid any excessive thermal stresses.
- The vessel's emergency shutdown system must be fully functional.
- Due account must be taken of the high co-efficient of volumetric expansion when determining closing ullages, and IMO filling ratio to be strictly adhered to. At least two independent methods of determining ullage space must be provided.
- All vapour must be returned ashore or recycled and not permitted to be released into the atmosphere.
- The vessel's scuppers in the cargo area must be kept closed while loading LPG. During an emergency scuppers close to break of accommodation can be opened after obtaining permission from Load Master.

9.26 Weather Criteria

Vessels accepted for berth occupancy and loading operations at Port Bonython are assessed for wind up to 50kts and current up to 2 kts. If the Loading Master, in consultation with the Master of the vessel, considers that either a squall or lightning may affect the terminal and the Offtake Tanker, loading operations may be suspended. All ship and terminal personnel must standby to closely monitor the situation. Terminal representative, Marine Superintendent and Terminal Managers may at times impose stringent stoppage, disconnection and unberthing criteria. Such criteria will be communicated to vessel either prior berthing or during safety meeting. In absence of restrictions, following limits apply to all vessels:

Stoppage (Notify Standby Tugs)

- 30 Kts Northerly wind
- 35 Kts Southerly wind

Arms Disconnection (Standy tugs Alongside and Ready for assistance)

- 35 Kts Northerly Winds
- 40 Kts Southerly Winds

Unberthing will be subject to discussion between Master and Terminal representative.

9.27 Arms Disconnection and Draining

On completion of loading, the Terminal liquid loading valves and Vessels 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 pressurize the loading arms to approximately 350 kPa. The Terminal may then drain back the shore side section of the loading arm together with associated systems to ashore.

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. The Vessel is responsible for fitting blanks to the Vessel's manifold(s).

9.28 Bill of Lading and Early Departure Procedures

The Terminal shipping documents are normally generated after arms disconnection. Vessel shall allow 4 hours for documentation after completion of loading. Bill of lading dates is based on Custody transfer date i.e., Arms Disconnection. To avoid delay, the Terminal may implement Early Departure Procedure (EDP), where once completed, these documents are signed by the Vessels authorized representative (usually the Shipping Agent) on the Master's behalf and forwarded electronically to the Vessel Master by the Vessels authorized representative. Terminal Representative will transmit EDP Notice to vessel and Agent. On completion of loading Terminal Representative will provide **Letter of Authority** to vessel master which must be signed by master before any documents are signed by agent.

9.29 Main Engine Preparation and Readiness

Preparation for departure can commence approximately one hour 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 after receiving confirmation from Terminal Representative, 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.

Vessel Master Must make all necessary arrangements to depart after custody transfer and documentation. In absence of reasonably acceptable and genuine cause for delayed departure, Vessel/ Owners/ Principle may be liable for charges/ penalties as determined by Santos. Such penalties will be decided on case-by-case basis which will be communicated through local Shipping agents.

10. Emergency Equipment

Refer Appendix G for location of Firefighting and Lifesaving equipment.

10.1 Jetty Firefighting Equipment

Terminal provides fire hose with Ship Shore coupling to visiting vessel. The hose must be connected to vessel's fire mains during vessel's berth occupancy.

Fire Pumps

3 electric and 3 diesel pumps, located at pumping station midway along approach jetty, capacity 113,750 liters/min @ 1,240 kPa. Plant fire pumps also start automatically if fire water demand causes drop in pressure, giving 5,005 liters/min @ 1,240 kPa.

Foam Equipment

Foam ring-main fed by separate pumps. Storage tank capacity 9,100 liters 3% foam.

Live Hose Reels

4, each with: 30.5 m x 38 mm hose.
Fire Boxes
4, each with: 3 x 40 m lengths of 38 mm hose.
2 x 40 m lengths of 63.5 mm hose.

Water and foam nozzles Extinguishers

6 x 9 kg chemical extinguishers in fire boxes.
2 x 50 kg mobile dry chemical units.

Breathing Apparatus

1 MSA self-contained breathing apparatus at car park area in first aid box; and
1 MSA resuscitation apparatus are stored at jetty control room.

10.2 Lifesaving and First Aid

Lifebuoys:

1 lifebuoy each is located at Berthing and Mooring dolphins.
1 lifebuoy is located in car park area.

Personal Floatation Devices

2 PFD each East and West side of dolphin access area are provided at Jetty. Area requiring PFD are marked on Jetty.

First Aid Kit

First Aid kits are located at the Visitor waiting area in the Car Park and outside Foam installation in car park.

Emergency Telephone

Emergency telephone is located inside Jetty head control room.

10.3 Oil Spill Equipment

The area between the seaward face of the loading platform and the rear of the loading arms is fully bunded and any accumulation of liquid is drained to a sump and pumped into the dirty ballast system.

Terminal maintains Tier-1 Oil spill equipment. Oil spill is located on site at Terminal in Marina. Vessel master must coordinate with Terminal Representative for deployment of Oil spill equipment.

Following Equipment is available on terminal:

Item	Qty	Location	Comment
Rapid Assessment Team Kit Carry Bag. Checklists. PPE. Personal Detector (as required).	3	RAT 1 Kit is located with Flinders Ports Load Master on berthed ship. RAT 2 Kit is located with Svitzer Stand-by Tug Master. RAT 3 Kit is located in Port Bonython Equipment Shed.	This kit is used to assist the conduct of rapid assessments.
Nearshore Booming Team Kit Trolley / Trailer 150m Solid Floatation Boom. 2 x Towing Bridals. 2 x Ship Side Anchors. Site Control / Decontamination Kit.	1	Located in Port Bonython Equipment Shed.	This kit is used to deploy a rapid containment boom and secure it to a vessel using ship side magnets. The deployment of the boom requires the assistance of a Nearshore Support Vessel.
Shoreline Clean-up Team Kit (Light) Trailer Site Control Stores.	1	Located in Port Bonython Equipment Shed.	This kit is used to deploy to assigned shoreline sectors to establish site control. This kit does not contain equipment or stores to conduct actual shoreline clean-up operations.
Tracking Buoys Fastwave	2	Located in the Port Bonython Equipment Shed.	Monitored by Fastwave.
Rapid Oil Spill Sampling Kit	1	Located in Port Bonython Equipment Shed	This kit is used to collect samples as requested by the IMT as part of the ongoing response
Wildlife Sampling Kit	1	Located in the Port Bonython Equipment Shed	This kit is used to collect samples as requested by the IMT as part of the ongoing response.

10.4 Emergency Response Plan

A copy of Terminal Emergency Response Plan and Oil Spill contingency plan is available with attending Terminal Representative. If the master requires the mentioned documents, it can be requested from Terminal Representative.

Appendix
(Replaceable Schedule)

A. Information in ETA Notice and Notice of Readiness (NOR).

All ETA Notification must be sent to:

1. Naveen Sigroha (Marine Superintendent) Naveen.sigroha@contractor.santos.com
2. Neel Sud (Marine Superintendent Ports and Terminals) Neel.Sud@santos.com
3. Port Bonython Process Coordinator port.bonython.process.coordinator@santos.com
4. Port Bonython Shipping Coordinator Port.Bonython.Shipping.Coordinator@santos.com

ETA Notice:

A. Departure Last Port and Daily Noon Report (at least 96,72, 48,36,24,12,6 hours prior first day of 2DDR):

1. Vessel Name and IMO Number
2. Master Name (First, Middle, Last)
3. Vessel Arrival and departure Draft
4. Vessel arrival and Departure Displacement
5. GM(Fluid) Arrival and Departure
6. Vessel's Position
7. ETA Port Bonython (ACST)
8. Run and Distance to Go
9. Arrival and Departure Stowage Plan
10. Weather
11. Expected Delays and issues that (if Any)

Additional for Naphtha and Crude Vessels:

1. Vessel's Tank Atmosphere H2s and O2 content
2. Vessel's Slops ROB on arrival

Note: Vessel Slops ROB on arrival must be less than 50% of Slops tanks Capacity

Additional for LPG Vessel

1. Propane- Nominate Tank Atmosphere, Temperature (Top, Middle, Bottom) and Heel Onboard
2. Butane- Nominated Tank Atmosphere, Temperature (Top, Middle, Bottom) and Heel Onboard
3. Atmosphere Changes during voyage (if any)

B. At least 5 Days Prior Arrival and not less than 3 days Prior arrival

ETA Notice as Per Appendix (A.a) and:

1. Vessel's Arrival Crew List
2. Planned Crew Change, if any (Refer Section 5.11)
3. Planned Visitors, Inspection
4. Planned Stores Delivery
5. Receipt and acknowledgement of Terminal Handbook (Appendix A.e)

Crew list, Visitor list, Crew change list, Inspection and Stores delivery information must also be provided to port.bonython.security@santos.com at least 5 days prior vessel planned berthing. 3 days exemption only applies to vessel arriving from Australian Ports where voyage is short than 3 days.

C. 96 Hours' Notice

ETA Notice as Per Appendix A.(a) and:

1. Vessel's Mooring Inventory

2. Vessel's Winch Brake Test Record

3. Signed Stamped Copy of Terminal's Safety Letter

D. 24 Hours' Notice

ETA Notice as Per Appendix A.a. and Appendix D. Ship Shore Safety Checklist Part 1A and 1B

e. Vessel Master Shall send E-mail acknowledgement to:

Port.Bonython.Shipping.Coordinator@santos.com

Dear Sir/Madam

PORT BONYTHON MARINE TERMINAL

TERMINAL HANDBOOK

I,_____, Master of the Offtake Tanker _____, on behalf of the owner, operator, manager and/or charterer of the Offtake Tanker, acknowledge the receipt of a copy of the above-mentioned document and confirm acceptance of and undertake to comply in all material respects with all applicable provisions and requirements contained in the Handbook and the Berthing/Terminal Terms therein and the Terminal Operating Procedures. Furthermore, I confirm that the vessel agrees to comply with all mandatory reporting requirements, including the obligation to report at least 96 hours prior to the first date of the delivery range.

Dated this _____day of_____20__

_____

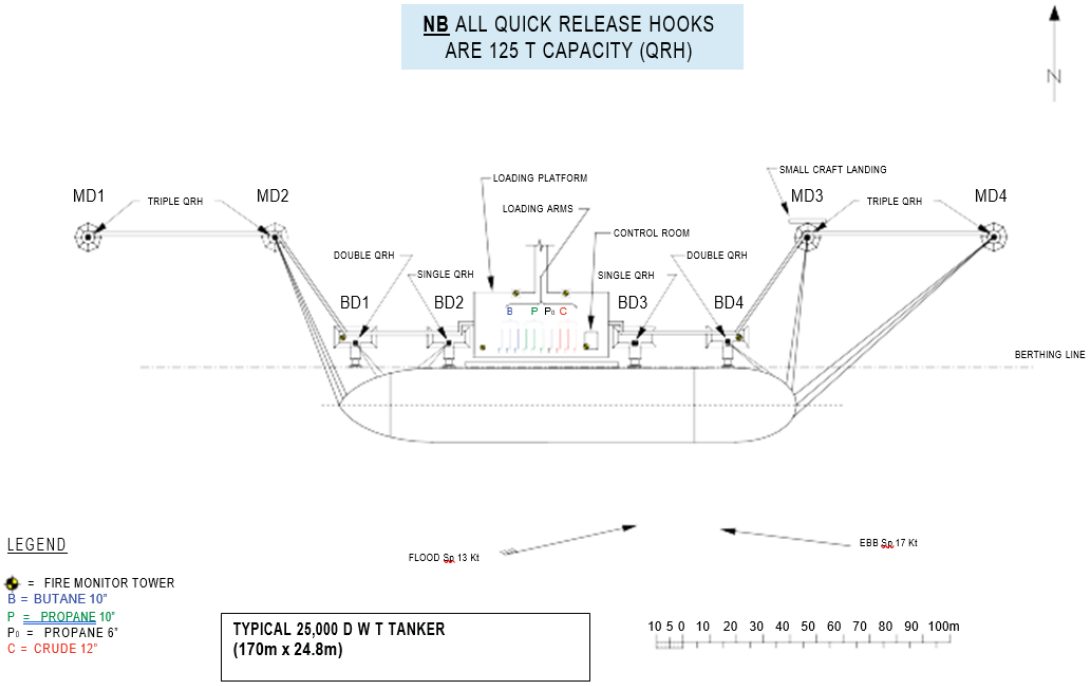
(Signature of Master)

Company / Ship Stamp

B. Mooring Configuration

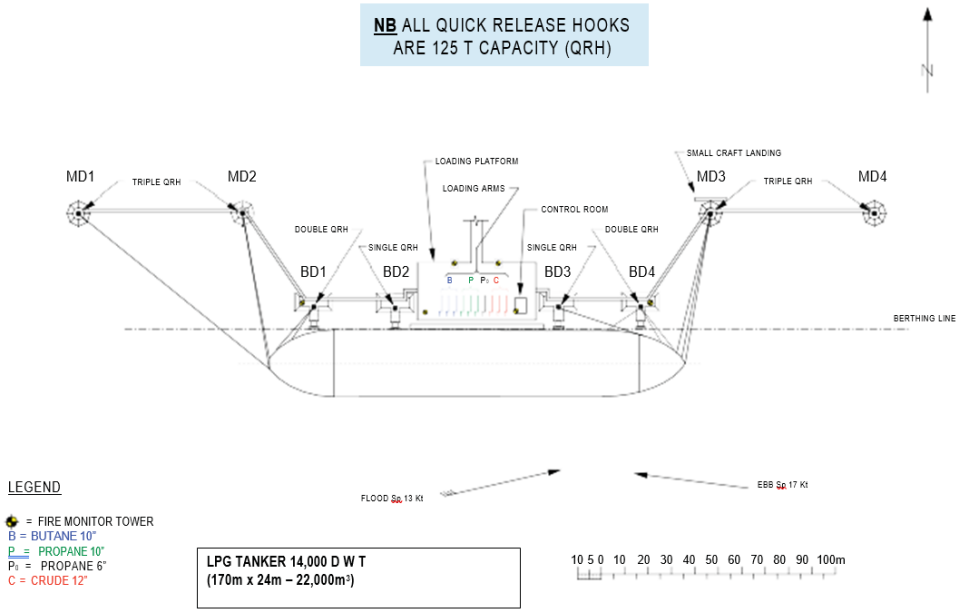
1. Mooring Details – 25,000 dwt Tanker

Head/stern lines are run to the mooring dolphins. Two breast lines are required at each end, either to the inner mooring dolphins or to the breasting dolphins. Springs (2 each end) must be of adequate length.



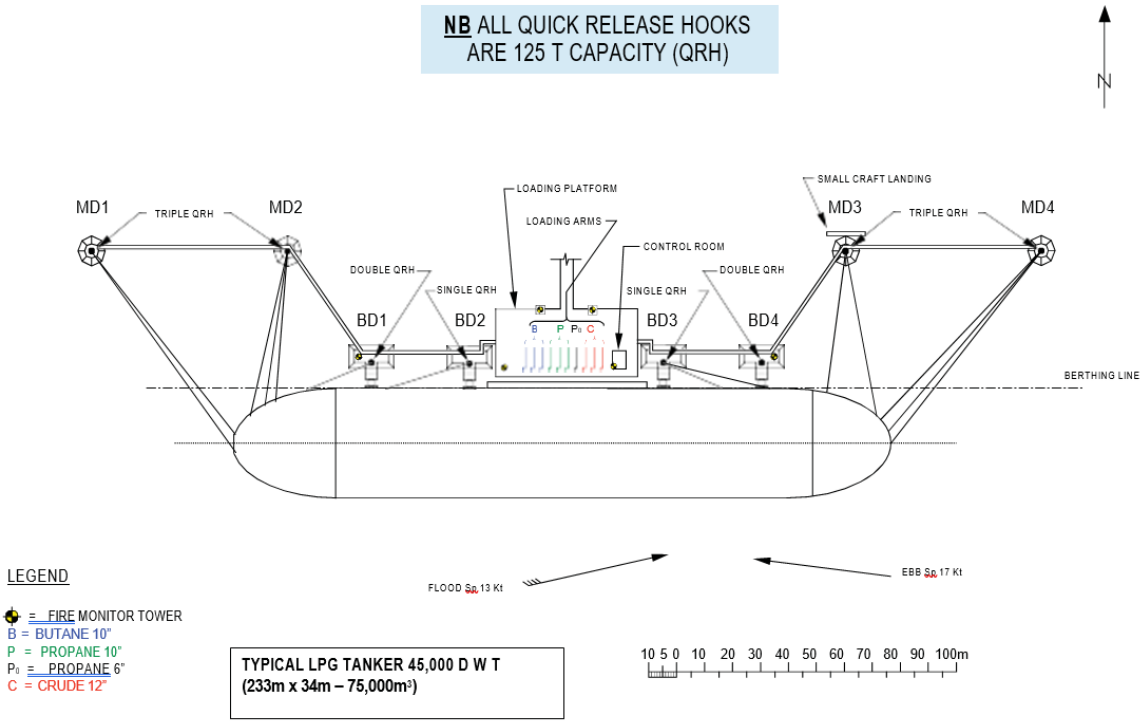
2. Mooring Details – 14,000 (22,000 m3) LPG

Two breast lines and two springs are required fore and aft. In the example shown the aft breast lines lead forward but adequate transverse restraint is provided by the stern lines to MD2.



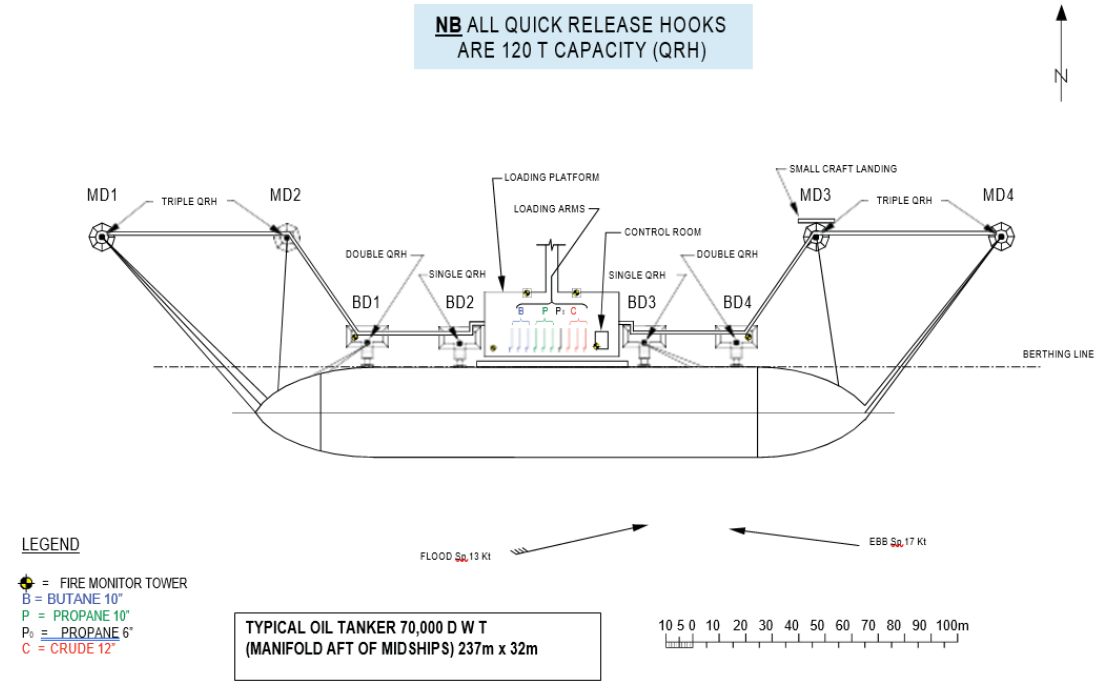
3. Mooring Details – 50,000 dwt (85,000 m3) LPG

If practicable, five lines should be run to the mooring dolphins at either end (e.g. 3 headlines and 2 forward breast lines or 2 headlines and 3 forward breast lines). Two fore springs and 2 backsprings are also required.



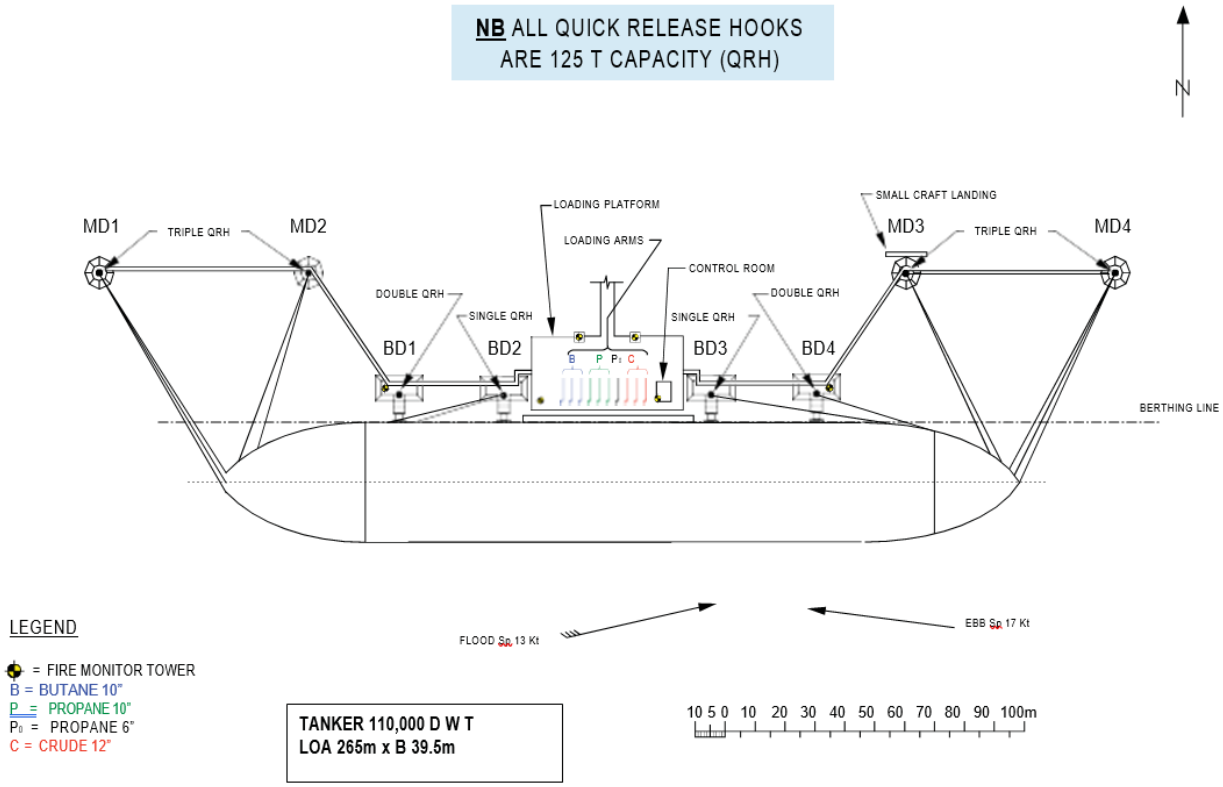
4. Mooring Details – 70,000 dwt Tanker

At least four lines are to be run at each end, i.e., 2 head/stern lines and 2 breasts or 3 head/stern lines and 1 breast line. Two fore springs and two backsprings should be run if practicable.

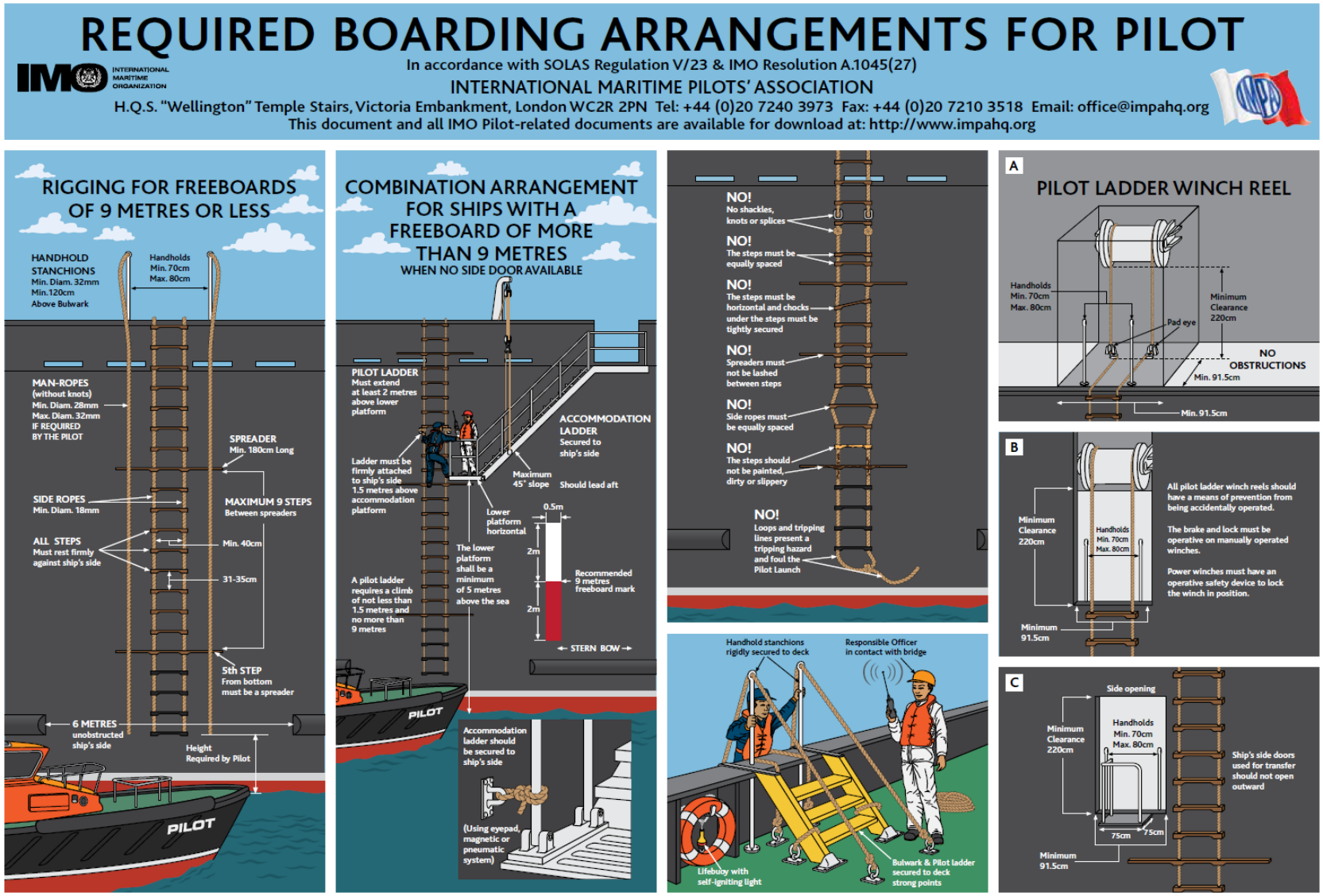


5. Mooring Details – 120,000 dwt Tanker

Three head/stern lines and two breast lines must be run from either end of the ship. Two fore springs and two backsprings are required, ensuring that the drift of these lines is as long as possible.



C. Pilot Boarding Arrangement



D. Safety Letter, Meeting Agenda and Ship Shore Checklist

Port Bonython Shipping Safety Requirements

Santos Ltd
ABN 80 007 550 923
Port Bonython
PO Box 344
Whyalla South Australia 5600
Telephone: 61 8 8649 0100
Facsimilie: 61 8 8649 0200
www.santos.com

Santos
We have the energy.

The Master,

Vessel: Our Ref:

Port: *Port Bonython* Date:

Dear Sir,
SAFETY REQUIREMENTS

Requirements for the safe conduct of operations on board your ship while alongside our terminal rests with you as Master. Nevertheless, since our personnel, property and other shipping may suffer serious damage in the event of accident aboard your ship, we wish, before operations start, to seek your full co-operation and understanding on the Safety Requirements set out in the Ship/Shore Safety Check List.

These Safety Requirements have been drawn up by a number of Terminal Operators in conjunction with a representative section of the International Tanker Industry. They are based upon the provisions of the Codes of Safe Practice currently accepted by the Oil and Tanker Industries. We therefore, expect you and all under your command to adhere strictly to them throughout your stay alongside this terminal. We, for our part, will ensure that our personnel do likewise and co-operate fully with you in the mutual interest of safe and efficient operation.

In order to assure ourselves of your compliance with these Safety Requirements, we shall, from time to time, instruct a member of our staff to visit your ship and, after reporting to you or your deputy, join one of your officers in a routine inspection of cargo decks and accommodation spaces.

If we observe infringements on board your ship of any of these Safety Requirements, we shall bring this immediately to the attention of yourself or your deputy for corrective action. If such action is not taken in a reasonable time, we shall adopt such measures as appear to us most appropriate with the situation and shall notify you accordingly.

IN THE EVENT OF CONTINUED DISREGARD OF THESE SAFETY REQUIREMENTS, WE RESERVE THE RIGHT TO STOP ALL OPERATIONS AND ORDER YOUR SHIP OFF THE BERTH.

If you observe any infringement of these requirements by Terminal Staff, whether on the jetty or onboard your ship, please bring this immediately to the notice of our Representative who is nominated as your contact during your stay in Port. Should you consider any immediate threat to the safety of your ship arises from any action on our part, or equipment under out control, you are fully entitled to demand an immediate cessation of operations.

Your Senior Terminal Representative on duty is the Process Supervisor. The telephone number is PLANT CONTROL ROOM: 8649 0107.

Pre-Loading Meeting Agenda

The Checklist must be completed in conjunction with Ship Shore Safety Checklist and provides necessary information for a pre-loading meeting agenda. The meeting takes place onboard vessel after the vessel is securely moored at terminal prior to commencement of loading.

Vessel: _____
Master's Name: _____
Cargo Number: _____
Arrival Date (All Fast):_____

A copy of vessel's stowage plan (Arrival and Departure) must be attached with this document.

Pre-Loading Meeting Agenda	
Agreed loading Quantity	(MT/ bbls)
Quantity onboard at arrival	_____(m3) _____(MT) _____(bbls)
Vessel Full loaded capacity	_____(m3) _____(MT) _____(bbls)
Estimate loading time (hours)	_____(hours)
Loading plan and stability information provided to Terminal (including deballasting)	YES/NO
Early Departure Procedure (EDP) agreed, if applied by Terminal	YES/NO
Ship/ Shore Manifold Connection (Including Vapour)	**Crude/ Naphtha** _____MLA-A _____MLA-B _____MLA-C **Propane** _____Propane-1 _____Propane-2 _____Propane-3 **Butane** _____Butane-1 _____Butane-2 _____Butane-3
Arms connection procedure has been discussed (including PERCS, ESD, Leak Test) **Supervision is required by Responsible vessel officer.** **Load Master is In-charge of Arms connection and testing**	YES/NO Comment (if any):
Terminal and Vessel ESD Discussed **Terminal ESD Button located on Gangway**	YES/NO Vessel ESD timing_____
Maximum Marine Loading Arm Envelope	
Ship/ Shore Communication Tested	UHF Ch 01 (Shipping) YES/NO VHF Ch 16 (Emcy.) YES/NO VHF Ch 08 (Tugs) YES/NO

<table>
<tr><td>Shore Tanks</td><td colspan="4"><table>
<tr><td>Tank</td><td>Product</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
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<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
</table></td></tr>
<tr><td>Approximate loading Temperature</td><td colspan="4">Crude/ Naphtha
_____(Deg. Celsius)
Propane
_____(Deg. Celsius)
Butane
_____(Deg. Celsius)</td></tr>
<tr><td>Propane/ Butane Ship Tank Temperature</td><td colspan="4"><table>
<tr><td>Tank</td><td>Top</td><td>Middle</td><td>Bottom</td></tr>
<tr><td>1P</td><td></td><td></td><td></td></tr>
<tr><td>1S</td><td></td><td></td><td></td></tr>
<tr><td>2P</td><td></td><td></td><td></td></tr>
<tr><td>2S</td><td></td><td></td><td></td></tr>
<tr><td>3P</td><td></td><td></td><td></td></tr>
<tr><td>3S</td><td></td><td></td><td></td></tr>
<tr><td>4P</td><td></td><td></td><td></td></tr>
<tr><td>4S</td><td></td><td></td><td></td></tr>
</table></td></tr>
<tr><td>Vessel Heel on Arrival</td><td colspan="4">Propane Vapour_____
Propane Liquid _____
Butane Vapour_____
Butane Liquid _____</td></tr>
<tr><td>Approximate Product Density</td><td colspan="4">Crude/ Naphtha
_____
_____
Propane
_____
Butane
_____</td></tr>
<tr><td>Estimate loading time (hours)</td><td colspan="4">_____(hours)</td></tr>
<tr><td>Initial loading Rate</td><td colspan="4">_____(m3/hr)</td></tr>
<tr><td>Maximum loading rate</td><td colspan="4">_____(m3/hr)</td></tr>
<tr><td>Topping off rate</td><td colspan="4">_____(m3/hr)</td></tr>
<tr><td>Notice to reduce loading rate</td><td colspan="4">_____(min)</td></tr>
<tr><td>Ship or Shore stop for loading</td><td colspan="4">Ship/ Shore</td></tr>
<tr><td>Emergency Stop Procedure agreed</td><td colspan="4">YES/NO

Comment (if any):</td></tr>
<tr><td>Weather Report provided to vessel</td><td colspan="4">YES/NO</td></tr>
</table>

Any Safety issue noted by terminal during Pre-loading inspection	YES/NO Comments:
Gangway Operations and precautions discussed with vessel	YES/NO
Terminal Exclusion Zone discussed with Vessel	YES/NO
Additional Security Measure Discussed with Vessel	YES/NO
Vessel Readiness for emergency discussed	YES/NO
Departure arrangements discussed	YES/NO
Nitrogen Supply Procedure for Line pressure test and Arms draining agreed.	YES/NO
Discussed standby tug arrangement discussed. **Comms VHF Ch08 and Ch16** **Standby tug location as per THB**	YES/NO
Terminal Mooring Requirements and Mooring monitoring during berth occupancy discussed and agreed.	YES/NO Comments:
Vessel Expectation for safe operations discussed, including authority of Terminal Representative to stop, suspend and direct vessel if any unsafe/ non-compliance is noted.	YES/NO
Additional Comments:	

Master: _____

Terminal Representative: _____

Date: _____

Post Loading Meeting Agenda

This checklist must be completed on conclusion of cargo operations. The meeting takes place onboard vessel after loading operation is complete and before vessel departure.

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

A copy of Completed Ship/Shore safety checklist must be provided to terminal, including Section-9.

Post-Loading Meeting Agenda	
EDP Authorisation provided to vessel master, if applicable	YES/NO
Bill of Lading Provided to vessel (as per SPA)	YES/NO
Quantity Delivered (Bill of Lading Figures)	_____(m3) _____(MT) _____(bbls) _____(LT)
Ship/ Shore Discrepancy	_____% VEF Adjusted _____% Without VEF
Port Timesheet complete and agreed	YES/NO
Remarks on Loading operations, including berthing, if any.	YES/NO Comments:
Safety observation, if any. (Including pre-loading inspection, during loading and post loading)	YES/NO Comments:
Gangway Removal Discussed	YES/NO Comments:
Fire Hose disconnection before departure discussed	YES/NO

Departure time and Terminal manning discussed	YES/NO Comment (if any):
Terminal to Vessel feedback complete	YES/ NO
Terminal UHF radio returned	YES/ NO
Weather update provided to vessel	YES/ NO
Incident/ accidents discussed and noted.	YES/ NO
Additional Comments (if any):	

Master: _____

Terminal Representative: _____

Date: _____

PORT BONYTHON TANKER / TERMINAL SAFETY CHECKLIST - ISGOTT 6TH EDITION

Port Bonython Pre-Arrival Tanker / Terminal Safety Checklist

Date:		**Time:**	
Tanker:		**Master:**	
Port:		**Loading Master:**	
Product:			

Santos

Part 1A and 1B Tanker:
Checks Pre-Arrival (to be confirmed by Master or C/O) Prior to vessel berthing

Item	Check	Status (Y/N)	Remark
1A.1	Pre-arrival information is exchanged (6.5, 21.2)	☐ Yes ☐ No	
1A.2	International shore fire connection is available (5.5, 19.4.3.1)	☐ Yes ☐ No	
1A.3	Transfer hoses are of suitable construction (18.2)	☐ Yes ☐ No	
1A.4	Pre-arrival information is exchanged (6.5, 21.2)	☐ Yes ☐ No	
1A.5	Pre-berthing information is exchanged (21.3, 22.3)	☐ Yes ☐ No	
1A.6	Pressure/vacuum valves and/or high velocity vents are operational (11.1.8)	☐ Yes ☐ No	
1A.7	Fixed and portable oxygen analysers are operational (2.4)	☐ Yes ☐ No	

Part 1A and 1B Tanker:
Checks Pre-Arrival (to be confirmed by Master or C/O) Prior to vessel berthing

Item	Check	Status (Y/N)	Remark
1B.1	Inert gas system pressure and oxygen recorders are operational (11.1.5.2, 11.1.11)	☐ Yes ☐ No	
1B.2	Inert gas system and associated equipment are operational (11.1.5.2, 11.1.11)	☐ Yes ☐ No	
1B.3	Cargo tank atmospheres' oxygen content is less than 8% (11.1.3)	☐ Yes ☐ No	
1B.4	Cargo tank atmospheres' oxygen content is less than 8% (11.1.3)	☐ Yes ☐ No	

Part 2 Terminal:

Pre-Arrival Checks (completed by Terminal Loading Master) prior to vessel berthing

Item	Check	Status (Y/N)	Remark
2.1	Pre-arrival information is exchanged (6.5, 21.2)	☐ Yes ☐ No	
2.2	International shore fire connection is available (5.5, 19.4.3.1, 19.4.3.5)	☐ Yes ☐ No	*Terminal will provide Fire hose with Internation connection to connect to ship's fire mains*
2.3	Transfer equipment is of suitable construction (18.1, 18.2)	☐ Yes ☐ No	
2.4	Terminal Handbook transmitted to tanker (15.2.2)	☐ Yes ☐ No	
2.5	Pre-berthing information is exchanged (21.3, 22.3)	☐ Yes ☐ No	

Part 3 Tanker:

Checks completed after Mooring (to be confirmed by Master or C/O) during Pre-Loading Meeting

Item	Check	Status (Y/N)	Remark
3.1	Fendering is effective (22.4.1)	☐ Yes ☐ No	
3.2	Mooring arrangement is effective (22.2, 22.4.3)	☐ Yes ☐ No	
3.3	Access to and from the tanker is safe (16.4)	☐ Yes ☐ No	
3.4	Scuppers and savealls are plugged (23.7.4, 23.7.5)	☐ Yes ☐ No	
3.5	Cargo system sea connections and overboard discharges are secured (23.7.3)	☐ Yes ☐ No	
3.6	Very high frequency and ultra high frequency transceivers are set to low power mode (4.11.6, 4.13.2.2)	☐ Yes ☐ No	
3.7	External openings in superstructures are controlled (23.1)	☐ Yes ☐ No	
3.8	Pumproom ventilation is effective (10.12.2)	☐ Yes ☐ No	
3.9	Medium frequency/high frequency radio antennae are isolated (4.11.4, 4.13.2.1)	☐ Yes ☐ No	
3.10	Accommodation spaces are at positive pressure (23.2)	☐ Yes ☐ No	
3.11	Fire control plans are readily available (9.11.2.5)	☐ Yes ☐ No	

Part 4 Terminal:

Checks completed after Mooring

Item	Check	Status (Y/N)	Remark
4.1	Fendering is effective (22.4.1)	☐ Yes ☐ No	
4.2	Tanker is moored according to the terminal mooring plan (22.2, 22.4.3)	☐ Yes ☐ No	
4.3	Access to and from the terminal is safe (16.4)	☐ Yes ☐ No	
4.4	Spill containment and sumps are secure (18.4.2, 18.4.3, 23.7.4, 23.7.5)	☐ Yes ☐ No	

Port Bonython Pre-Transfer Tanker / Terminal Safety Checklist

Date:		**Time:**	
Tanker:		**Master:**	
Port:		**Loading Master:**	
Product:			

Part 5A Tanker & Terminal:

Pre-Loading Conference **(all tankers)**

Item	Check	Tanker Status (Y/N)	Terminal Status (Y/N)	Remarks
5A.1	Tanker is ready to move at agreed notice period (9.11, 21.7.1.1, 22.5.4)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.2	Effective tanker and terminal communications are established (21.1.1, 21.1.2)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.3	Transfer equipment is in safe condition (isolated, drained and de-pressurised) (18.4.1)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.4	Operation supervision and watchkeeping is adequate (7.9, 23.11)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.5	There are sufficient personnel to deal with an emergency (9.11.2.2, 23.11)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.6	Smoking restrictions and designated smoking areas are established (4.10, 23.10)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.7	Naked light restrictions are established (4.10.1)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.8	Control of electrical and electronic devices is agreed (4.11, 4.12)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.9	Means of emergency escape from both tanker and terminal are established (20.5)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.10	Firefighting equipment is ready for use (5, 19.4, 23.8)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.11	Oil spill clean-up material is available (20.4)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.12	Manifolds are properly connected (23.6.1)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.13	Sampling and gauging protocols are agreed to (23.5, 3.2, 23.7, 7.5)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.14	Procedures for cargo, bunkers and ballast handling operations are agreed (21.4, 21.5, 21.6)	☐ Yes ☐ No	☐ Yes ☐ No	*Vessel to provide a copy of loading plan to terminal*
5A.15	Cargo transfer management controls are agreed (12.1)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.16	Routine for regular checks on cargo transferred are agreed (23.7.2)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.17	Emergency signals and shutdown procedures are agreed (12.1.6.3, 18.5, 21.1.2)	☐ Yes ☐ No	☐ Yes ☐ No	

Item	Check	Tanker Status (Y/N)	Terminal Status (Y/N)	Remarks
5A.18	Safety data sheets are available (1.4.4, 20.1, 21.4)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.19	Hazardous properties of the products to be transferred are discussed (1.2, 1.4)	☐ Yes ☐ No	☐ Yes ☐ No	*Refer SDS of product supplied*
5A.20	Electrical insulation of the tanker/terminal interface is effective (12.9.5, 17.4, 18.2.14)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.21	Tank venting system and closed operation procedures are agreed (11.3.3.1, 21.4, 21.5, 23.3.3)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.22	Vapour return line operational parameters are agreed (11.5, 18.3, 23.7.7)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.23	Measures to avoid back-filling are agreed (12.1.13.7)	☐ Yes ☐ No	☐ Yes ☐ No	*Not Applicable*
5A.24	Status of unused cargo and bunker connections is satisfactory (23.7.1, 23.7.6)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.25	Portable very high frequency (VHF) and ultra high frequency (UHF) radios are intrinsically safe (4.12.4, 21.1.1)	☐ Yes ☐ No	☐ Yes ☐ No	
5A.26	Procedures for receiving nitrogen from terminal to cargo tank are agreed (12.1.14.8)	☐ Yes ☐ No	☐ Yes ☐ No	*Nitrogen provided by terminal for pressure testing and line clearing*

Part 5B Tanker & Terminal:

Pre-Loading Conference **(Tanker and Terminal handling Bulk Liquid Chemicals)**

5B.1	Inhibition certificate received (if required) from manufacturer	☐ Yes ☐ No	☐ Yes ☐ No	*Not Applicable*
5B.2	Appropriate personal protective equipment identified and available (4.8.1)	☐ Yes ☐ No	☐ Yes ☐ No	*Refer SDS of product supplied*
5B.3	Countermeasures against personal contact with cargo are agreed (1.4)	☐ Yes ☐ No	☐ Yes ☐ No	
5B.4	Cargo handling rate and relationship with valve closure times and automatic shutdown systems is agreed (16.8, 21.4, 21.5, 21.6)	☐ Yes ☐ No	☐ Yes ☐ No	
5B.5	Cargo system gauge operation and alarm set points are confirmed (12.1.6.6.1)	☐ Yes ☐ No	☐ Yes ☐ No	
5B.6	Adequate portable vapour detection instruments are in use (2.4)	☐ Yes ☐ No	☐ Yes ☐ No	
5B.7	Information on firefighting media and procedures is exchanged (5, 19)	☐ Yes ☐ No	☐ Yes ☐ No	
5B.8	Transfer hoses confirmed suitable for the product being handled (18.2)	☐ Yes ☐ No	☐ Yes ☐ No	
5B.9	Confirm cargo handling is only by a permanent installed pipeline system	☐ Yes ☐ No	☐ Yes ☐ No	
5B.10	Procedures are in place to receive nitrogen from the terminal for inerting or purging (12.1.14.8)	☐ Yes ☐ No	☐ Yes ☐ No	

Not Applicable

Item	Check	Tanker Status (Y/N)	Terminal Status (Y/N)	Remarks
5C.1	Inhibition certificate received (if required) from manufacturer	☐ Yes ☐ No	☐ Yes ☐ No	*Not Applicable*
5C.2	Appropriate personal protective equipment identified and available (4.8.1)	☐ Yes ☐ No	☐ Yes ☐ No	*Refer Safety Data Sheet*
5C.3	Water spray system is operational (5.3.1, 19.4.3)	☐ Yes ☐ No	☐ Yes ☐ No	
5C.4	Remote control valves are operational	☐ Yes ☐ No	☐ Yes ☐ No	
5C.5	Reliquefaction compressors and other boil-off control measures are operational	☐ Yes ☐ No	☐ Yes ☐ No	
5C.6	Gas detection equipment is appropriately set for the cargo (2.4)	☐ Yes ☐ No	☐ Yes ☐ No	
5C.7	Cargo system gauge operation and alarm set points are confirmed (12.1.6.6.1)	☐ Yes ☐ No	☐ Yes ☐ No	
5C.8	Emergency shutdown systems are tested and operational (18.5)	☐ Yes ☐ No	☐ Yes ☐ No	*Shore 30 seconds* *ESD button on gangway*
5C.9	Cargo handling rate and relationship with valve closure times and automatic shutdown systems is agreed (16.8, 21.4, 21.5, 21.6)	☐ Yes ☐ No	☐ Yes ☐ No	
5C.10	Maximum/minimum temperatures/pressures of the cargo to be transferred are agreed (21.4, 21.5, 21.6)	☐ Yes ☐ No	☐ Yes ☐ No	
5C.11	Cargo tank relief valve settings are confirmed (12.11, 21.2, 21.4)	☐ Yes ☐ No	☐ Yes ☐ No	*Terminal Requires cargo stoppage at 80% of MARVS Harbour Setting*

Part 6 Tanker & Terminal:
Agreements Pre-Transfer

Item	Agreement	Initials for Tanker	Initials of L/Master	Details
6.1	Tanker manoeuvring readiness			Notice period (maximum) for full readiness to manoeuvre: _____ Period of disablement (if permitted): _____
6.2	Security protocols			Security level: _____ Local requirements: _____
6.3	Effective tanker/terminal communications			Primary system: *Shore Radio Ch 3* Backup system: *VHF Channel 16*
6.4	Operational supervision and watchkeeping			Tanker: _____ Terminal: _____
6.5	Dedicated smoking areas and naked lights restrictions			Tanker: _____ _____ Terminal: _____
6.6	Maximum wind, current and sea/swell criteria or other environmental factors			Stop cargo transfer: *30 kn (Northly)* *35 kn (Southly)* Disconnect: *35 kn (Northly)* *40 kn (Southly)* Unberth: _____kn
6.7	Limits for cargo, bunkers and ballast handling			Maximum transfer rates: - Crude / Naphtha _____ m3/hr - C3 / C4 _____ mt/hr Topping-off rates: - Crude / Naphtha _____ m3/hr - C3 / C4 _____ mt/hr Maximum manifold pressure: - Crude / Naphtha _____ barg - C3 / C4 _____ barg Cargo temperature: - Crude / Naphtha _____ degC - C3 _____degC - C4 _____degC Other Limitations: _____

Item	Agreement	Initials for Tanker	Initials of L/Master	Details
6.8	Pressure surge control			Minimum number of cargo tanks open: - Crude / Naphtha _____ - C3 _____ - C4 _____ Tank switching protocols: - Crude / Naphtha _____ - C3 _____ - C4 _____ Full load rate: _____ Topping-off rate: _____ Closing time of automatic valves: - Crude / Naphtha _____s - C3 _____s - C4 _____s
6.9	Cargo transfer management procedures			Action notice periods: _____mins Transfer stop protocols: _____ mins
6.10	Routine for regular checks on cargo transferred are agreed between tanker and terminal			Routine transferred quantity checks: **Hourly or 2 Hourly** (circle one)
6.11	Emergency signals			Tanker: _____ Terminal: *Shore continuous siren (tested at midday everyday)*
6.12	Tank venting system			Procedure: _____ _____
6.13	Closed operations			Requirements: _____ _____
6.14	Vapour return line			Operational parameters: _____ Maximum flow rate: _____
6.15	Nitrogen supply from terminal			Procedures to receive: Provided for line clearing and pressure testing Maximum pressure: 3.5 barg Flow rate: _____m3/hr
6.16	Exceptions: - Special issues that both parties should be aware of			_____ _____
Part 6B Tanker & Terminal: Agreements Pre-Transfer **(LPG Tankers Only)**				
6B.1	Cargo tank relief valve settings			Tank 1: _____kPa Tank 2: _____kPa Tank 3: _____kPa Tank 4: _____kPa

Part 7A Tanker & Terminal:

Pre-Transfer Checks **(Crude and Naptha Tankers Only)**

Item	Agreement	Status (Y/N)	Remark
7A.1	Individual cargo tank inert gas supply valves are secured for the cargo plan (12.1.13.4)	☐ Yes ☐ No	
7A.2	Inert gas system delivering inert gas with oxygen content not more than 5% (11.1.3)	☐ Yes ☐ No	
7A.3	Cargo tank high level alarms are operational (12.1.6.6.1)	☐ Yes ☐ No	
7A.4	All cargo, ballast and bunker tanks openings are secured (23.3)	☐ Yes ☐ No	

Part 7B Tanker & Terminal:

Pre-Transfer Checks **(if crude oil washing is planned)**

7B.1	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)	☐ Yes ☐ No	
7B.2	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)	☐ Yes ☐ No	

Crude oil Washing and Tank cleaning not allowed at terminal

Part 7C Tanker & Terminal:

Pre-Transfer Checks **(Checks Prior Tank Cleaning or Gas Freeing)**

7.2	Permission for tank cleaning operations is confirmed (21.2.3, 21.4, 25.4.3)	☐ Yes ☐ No	
7.2	Permission for gas freeing operations is	☐ Yes ☐ No	
7.2	Tank cleaning procedures are agreed (12.3.2,	☐ Yes ☐ No	
7.2	If [illegible] tank entry is required, procedures for	☐ Yes ☐ No	
[illegible]	Slop reception facilities and requirements are confirmed (12.1, 21.2, 21.4)	☐ Yes ☐ No	

Part 8 Declarations: Tanker & Terminal

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

Checklist Part Number	Initialled on Behalf of the Tanker	Initialled on Behalf of the port / port facility
Part 1A. Tanker: Checks Pre-Arrival		
Part 1B. Tanker: Checks Pre-Arrival if using Inert Gas Systems (Applicable for Naphtha and Crude Tankers only)		
Part 2A. Terminal: Pre-Arrival Checks		
Part 3A. Tanker: Checks Completed After Mooring		
Part 4A. Terminal: Checks Completed After Mooring		
Part 5A. Tanker & Terminal: Pre-Loading Conference (all tankers)		
Part 5B. Tanker & Terminal: Pre-Loading Conference (Bulk Liquid Chemicals)		
Part 5C. Tanker & Terminal: Pre-Loading Conference (Liquefied Gas Variant)		
Part 6A. Tanker & Terminal: Agreements Pre-Transfer (all Tankers)		
Part 6B. Tanker & Terminal: Agreements Pre-Transfer (LPG Tankers Only)		
Part 7A. Tanker & Terminal: Pre-Transfer Checks (Crude and Naphtha Tankers only)		

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 agree 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:		Name:	
Rank:		Postion:	
Signature:		Signature:	
Date:		Date:	
Time:		Time:	

E. Terminal PPE Requirements

Health Safety & Security Bulletin

New PPE Procedure & Field Clothing

Santos

A new SMS Personal Protective Equipment Procedure has been released (link). Several new requirements, most notable being a new field clothing standard and catalogue which includes flame resistant clothing.

New field clothing standard and catalogue:

+ Flame resistant clothing for people working around live hydrocarbon infrastructure i.e. our hydrocarbon production and processing facilities and well sites.
+ 'Santos Blue' uniforms for all land-based sites/activities (incl. Varanus Island & Devil Creek) and Orange uniforms for offshore sites/activities where there is a risk of falling into the water.
+ High visibility also required if at high risk from moving vehicles/plant/equipment or land based personnel performing tasks with risk of falling into water (e.g. jetty) ⇨ blue garments require supplementary high visibility vest, jacket or life jacket.

Flame Resistant – 'Santos Blue' & Orange
(Land-based hydrocarbon facilities / offshore activities)

Cotton Drill – 'Santos Blue'
(Non-hydrocarbon facilities/sites)

Note – contractors and external visitors not required to meet Santos blue/orange colouring.

Other main changes:

Lace up or zip work boots for ankle protection. Slip-ons only in marine areas with a risk of falling into water.

Carry or wear gloves at all times in production or processing facilities and construction sites.

Wearers of tight fitting respiratory protective equipment to undergo a "facial fit test" and be clean shaven at the sealing surface.

Implementation requirements:

+ Field clothing and boots – **30 April 2022**. Order new clothing and boots as needed over the next 12 months.
+ Carrying gloves – **30 July 2021**.
+ Respirator fit testing - an **implementation plan** is being developed for sites where not already in place (aim for full implementation – **30 November 2021**).

Click here for FAQs on the new PPE requirements

Click here for Coupa clothing ordering instructions

F. Feedback form from Terminal to Vessel

Terminal Feedback on Vessel		
Vessel Name	LR/IMO No.	Flag

☐ Check here if Note of Protest Issued.

Comment below:

☐ Check here if any Safety or Pollution Violation. Attach copy

Inspection Date:		Agent:	

Terminal:		Arrival Date:	Departure Date:
☐ Darwin LNG ☐ Varanus Island ☐ Gladstone LNG ☐ Port Bonython	☐ Ningaloo Vision ☐ Bayu Undan ☐ PNG Kumul		

Cargo		Transfer Operations
☐ Crude Oil ☐ Condensate ☐ LNG	☐ LPG ☐ Naptha	☐ Loading ☐ Discharging

Loading / Discharging Rates: (m3/h)

Average:	Actual:	Planned:
Nationality:	Officers:	
	Crew:	

Ratings:

S = Satisfactory; N = Needs Improvement; U = Unsatisfactory; X = Not Observed.
Please explain "U", and "N" ratings in the comment section.

	Item:	Rating:	Comment:
	Pre-arrival information exchanged and satisfactory?	☐ S ☐ N ☐ U ☐ X	
	Pilotage & berthing satisfactory? Vessel equipment & manoeuvrability?	☐ S ☐ N ☐ U ☐ X	
	Vessel compliant with all terminal regulations?	☐ S ☐ N ☐ U ☐ X	
	Gangway and/ or access to the vessel satisfactory?	☐ S ☐ N ☐ U ☐ X	
	Mooring arrangement per computer-based mooring analysis?	☐ S ☐ N ☐ U ☐ X	
	Pre-cargo Transfer Information Exchange and Safety Check List performed?	☐ S ☐ N ☐ U ☐ X	
	Comprehensive cargo & ballast plans in place and being followed?	☐ S ☐ N ☐ U ☐ X	
	Readiness of safety, firefighting & emergency response equipment?	☐ S ☐ N ☐ U ☐ X	
	Effective cargo watch to monitor ship's movement while alongside. Lines well attended by ships staff. No movement or alarms?	☐ S ☐ N ☐ U ☐ X	
	Operational communications (Alongside) satisfactory? Ships/ Shore link communication link working satisfactory?	☐ S ☐ N ☐ U ☐ X	
	Manifold area suitable with adequate lighting and water curtain system operational? (For LPG and LNG vessels only)	☐ S ☐ N ☐ U ☐ X	
	Effective cooling down of manifold and lines prior to loading or discharging?	☐ S ☐ N ☐ U ☐ X	

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	Item:	Rating:	Comment:
	Condition of cargo containment system? Arrived ready for cargo operations? Condition of ships lines pre/ post loading?	☐ S ☐ N ☐ U ☐ X	
	Nitrogen system performance? (For LPG and LNG vessels only)	☐ S ☐ N ☐ U ☐ X	
	Cold/ Warm ESD testing satisfactory? ESD timing correct?	☐ S ☐ N ☐ U ☐ X	
	Custody Transfer System properly initiated and closed?	☐ S ☐ N ☐ U ☐ X	
	Ballast discharge monitored?	☐ S ☐ N ☐ U ☐ X	
	Deck lighting adequate for safe night-time operations? Ability to reduce light emissions for environmentally sensitive areas?	☐ S ☐ N ☐ U ☐ X	
	Cargo pumps and cargo compressors in good order?	☐ S ☐ N ☐ U ☐ X	
	Ramp up/ Ramp down rates and pressures per agreement with terminal?	☐ S ☐ N ☐ U ☐ X	
	Officers and crew conduct & professional knowledge?	☐ S ☐ N ☐ U ☐ X	
	Safety/ Environmental practices and compliance?	☐ S ☐ N ☐ U ☐ X	
	General vessel appearance, including accommodation?	☐ S ☐ N ☐ U ☐ X	
	Do the officers and crew involved in cargo operations appear adequately rested?	☐ S ☐ N ☐ U ☐ X	

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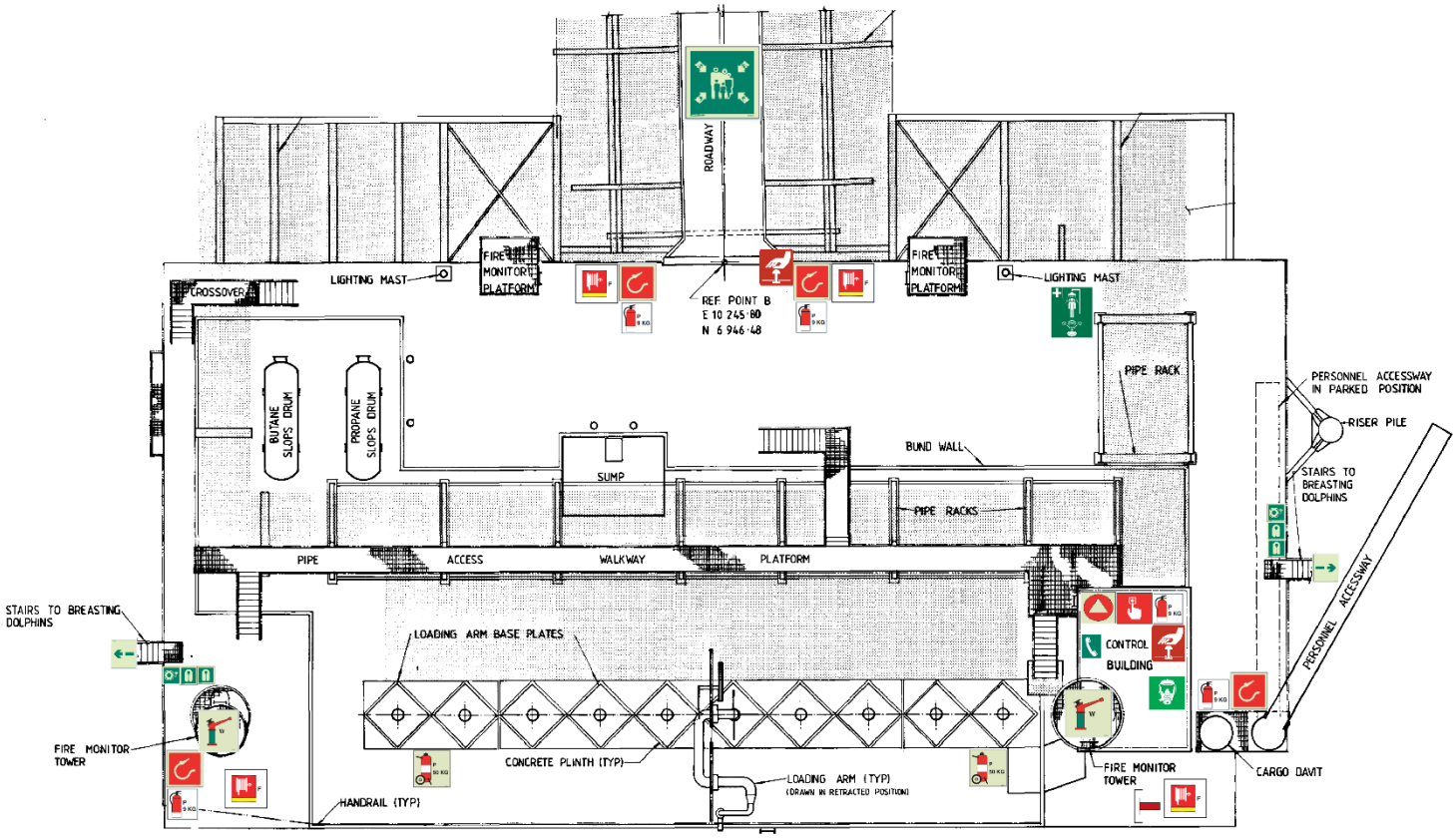
	Item:	Rating:	Comment:
	Strainers used and mesh size? Condition post cargo operations?	☐ S ☐ N ☐ U ☐ X	
	Cas up and/ or cool down. Time to change over & time required each step?	☐ S ☐ N ☐ U ☐ X	
	Vapour management performance?	☐ S ☐ N ☐ U ☐ X	
	Gas detection system satisfactory? Specify any hydrocarbon readings.	☐ S ☐ N ☐ U ☐ X	
	Proper transfer arm & manifold draining, purging & disconnection per SIGTTO January 2012 guidance paper?	☐ S ☐ N ☐ U ☐ X	
	Pilot Boarding Arrangements?	☐ S ☐ N ☐ U ☐ X	
	Vessel acceptable at this terminal?	☐ Yes ☐ No	
	Communication with ship staff satisfactory?	☐ Yes ☐ No	
	Vessel compliant with terminal requirements?	☐ Yes ☐ No	

Additional Comments:

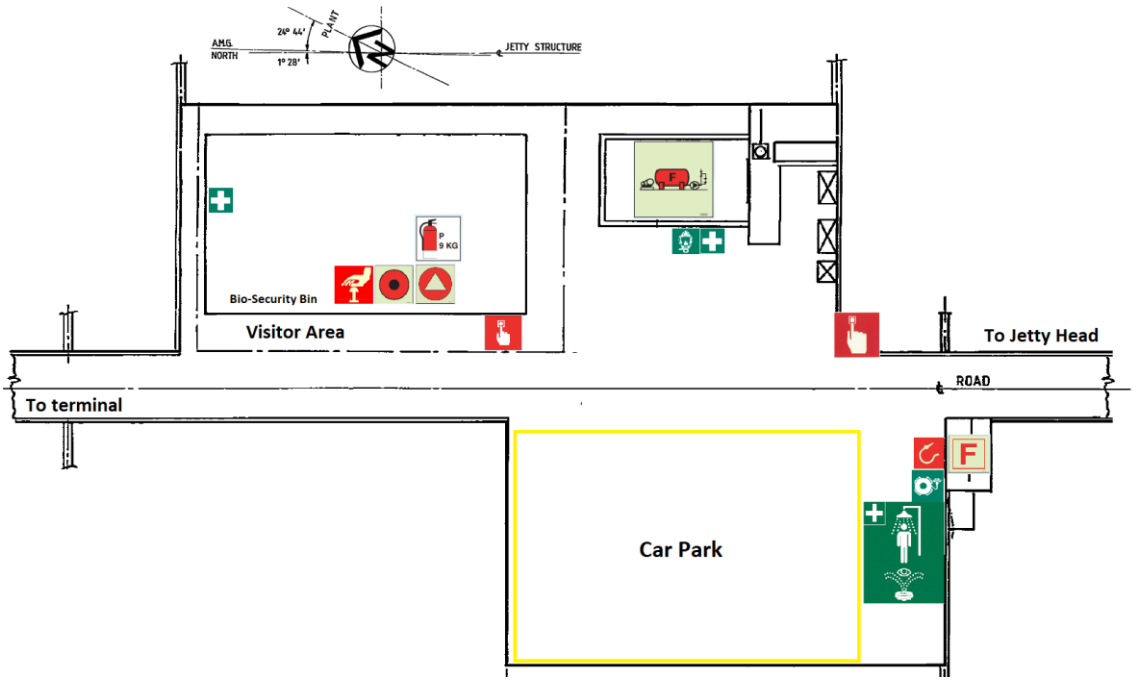
Inspector:	Title:	Signature:

G. Lifesaving and Fire Fighting equipment location and Incident Response Plan

Jetty Head:



Car Park:



Port Bonython Liquids Terminal
South Australia

Santos

Tactical Incident Response Plan

TIRP # 22 **Scenario:** LOC or Fire at Jetty Head

Scenario Information

Application	Loss of containment or fire at Jetty Head
Causation	Flange leak, piping failure, mechanical damage, shipping collision with structure
Detection	Flame detection system, thermal detection systems, personnel notification

Key Substances in Scenario

Substance	Vol. (m^3)	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%/VOL)	AIT (°C)	SG
Crude Oil UN # 1267	652 N/A	Loadout line Return line Loading arm	Flammable Gas 2		3WE	14	01.0 - 10.0 est.	Not Avail.	0.8 (H_2O)
Naphtha (Light) UN # 1268	652 N/A	Loadout line Return line Loading arm	Flammable Gas 2		3YE	14	01.0 - 10.0 est.	Not Avail.	0.68 (H_2O)
Naphtha (Heavy) UN # 1268	652 N/A	Loadout line Return line Loading arm	Flammable Gas 2		3YE	14	01.0 - 10.0 est.	Not Avail.	0.73 (H_2O)
Diesel	550 N/A	Loadout line Loading arm					00.6 - 7.0 est.	Not Avail.	0.82 (H_2O)
Propane (Liquid) UN # 1978	520 N/A 220	Loadout line Loading arm Vapour return V-2221	Flammable Gas 2		2YE	04	02.2 - 09.5	431	1.8 (air)
Butane (Liquid) UN # 1011	551 N/A 242	Loadout line Loading arm Vapour return V-2221	Flammable Gas 2		2WE	04	01.8 - 08.4	365	0.58 (air)

Significant Hazards

Hazard	Control / Precaution
Flammable Vapour Ignition	▪ Remove ignition sources, use protection sprays, utilise gas detection
Asphyxiation	▪ Consider SCBA in case of liquid release or fire
Vessel shell failure	▪ Use cooling sprays and large volume deluge, do not use water jets which spot cool
Fall into water	▪ Do not work over rails, Personal Floatation Device to be worn on unprotected edges. Boat to be mobilised

Installed Protection Equipment

Deluge Activation
Fixed Monitors
Foam System

Portable Equipment Available

Portable Monitor Trailer –2000L/min
50kg DCP – as available

Key Incident Objectives

ALWAYS: ESD and evacuate personnel.
ALWAYS: Account for all people, treat if required.
ALWAYS: Alert emergency response agencies.

IF SAFE: Rescue people only if able and capable.
IF SAFE: Minimise environmental impact.
IF SAFE: Protect assets and minimise escalation.
IF SAFE: Comply with regulatory commitments.
IF SAFE: Safeguard reputation.

Escalation and Exposure Potential

- Flame impingement on adjacent loading arms
- Flame impingement on loading piping
- Flame impingement on ship
- Failure of metal structure
- Hydrocarbon to water
-
-

Control Actions

- Take appropriate ESD plant actions
- Initiate site alarm and muster activation procedures
- Adjust CCTV cameras on location as appropriate
- Isolate and de-pressure inventory as appropriate
- Notify external emergency services
- Access relevant SDS for substances
- Determine available Field Response Team personnel, assess limitations on response
- Mobilise Field Response Team Leader and Field Response Team to monitoring location if safe to do so
- Mobilise site Occupational First Aider to staging location if required and safe to do so
- Determine local weather conditions and advise Emergency Commander
- Evaluate exposure impacts & initiate control actions if safe to do so
- Confirm correct operation of Plant control systems (DCS) inputs in area if safe to do so
- Undertake life rescue only if required and safe to do so
- Set fixed monitors to protect / cool exposures if required and safe to do so
- Set portable monitors to protect / cool exposures if required and safe to do so
- Provide cooling /protection to any exposed vessels if required and safe to do so
- Provide cooling /protection for piping and structures if required and safe to do so
- Provide cooling /protection for auxiliary equipment if required and safe to do so
- Monitor water runoff for signs of contamination

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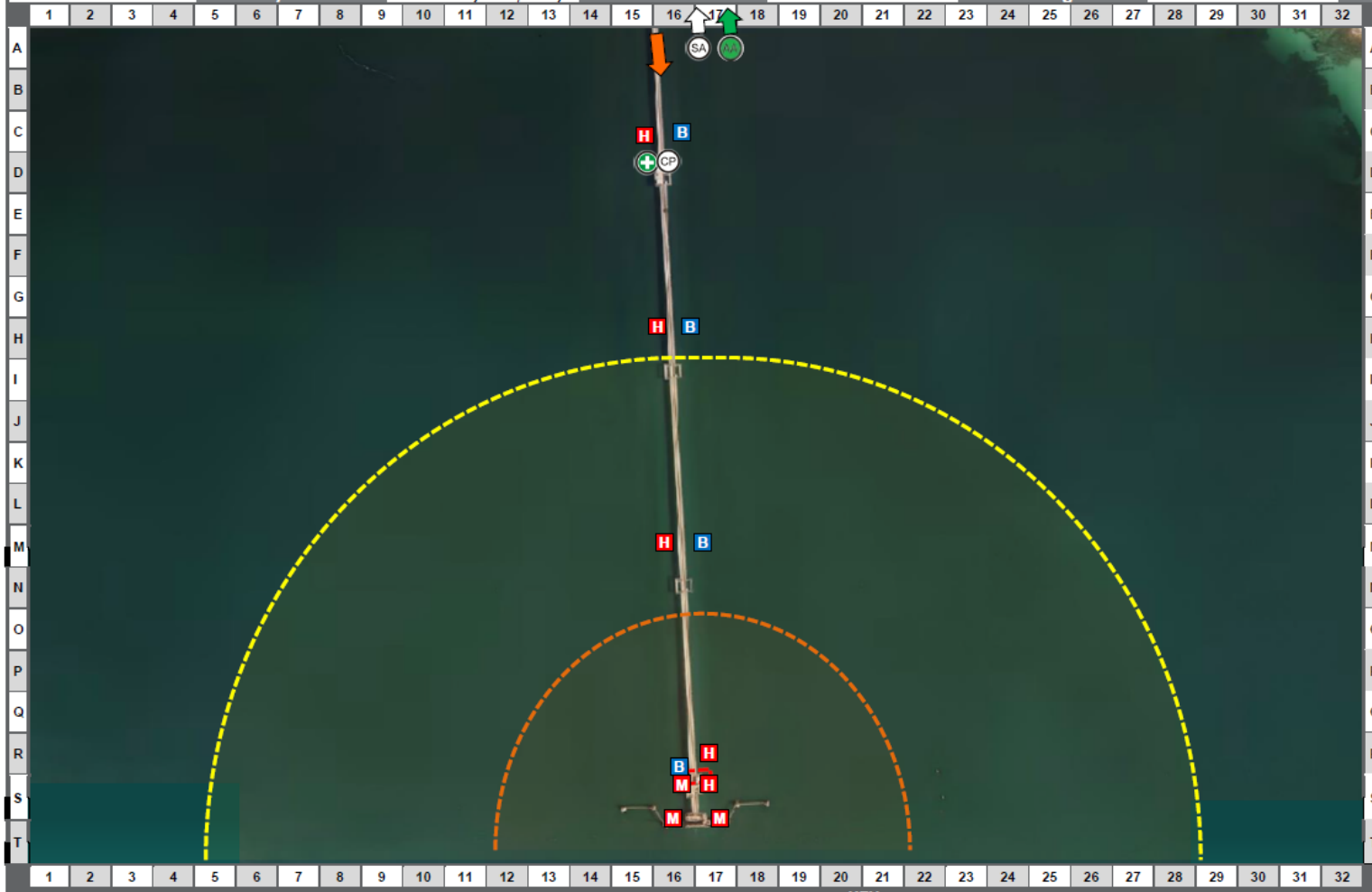
Tactical Incident Response Plan

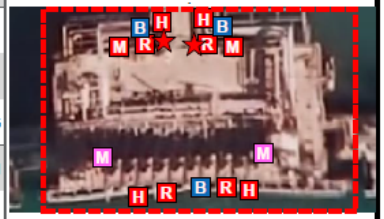
TIRP #	22	Scenario:	LOC or Fire at Jetty Head

TIRP Location Information and Equipment Layout

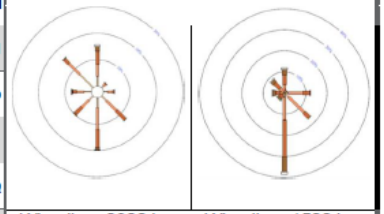
Location Info:	Facility Location	Port Bonython, Jetty	Lat.	S 33.013317	Long.	E 137.765406	Site Map Grid



IAP Event Immediate Area



Area Wind Rose



Whyalla – 0900 hrs | Whyalla – 1500 hrs

Direction (True)

N

Main Image Scale

0 100 200
metres

Main Image 1:10000

KEY

IAP Event Area	Event Origin	Emerg. Shut Down	Assembly/ Refuge Area	Assembly/ Refuge Direction	Eye Wash/ Shower	CCTV Camera	External Services Staging (Direction)	Fire Water Hydrant (Booster)	Monitor (W/-hydrants /Elevated)	Hose Reel (Water/ Foam)	Fixed Foam System
"Hot" Zone	Critical Exposure	Manual Call Point	On Scene Command Point (alt)	HV Hazard	Spill Kit	Storm Water / Oily Sewer	Access Route (Alt)	First Attack (Reel/ DCP Extinguisher)	Monitor Foam (w/-hydrants)	Hose Box (38/70 -water) (38/70 -foam)	High-Ex Foam System
"Warm" Zone	Other Exposure	Fire Water Deluge Activation	Triage Point (alt)	Hazardous Substance	Windsock	Hose Line Water/Foam	ER Vehicle Position	Wheeled Extinguisher (DCP/Foam)	Monitor Oscillating (Grade/ Elevated)	Portable Monitor/ Curtain	Dry Powder System

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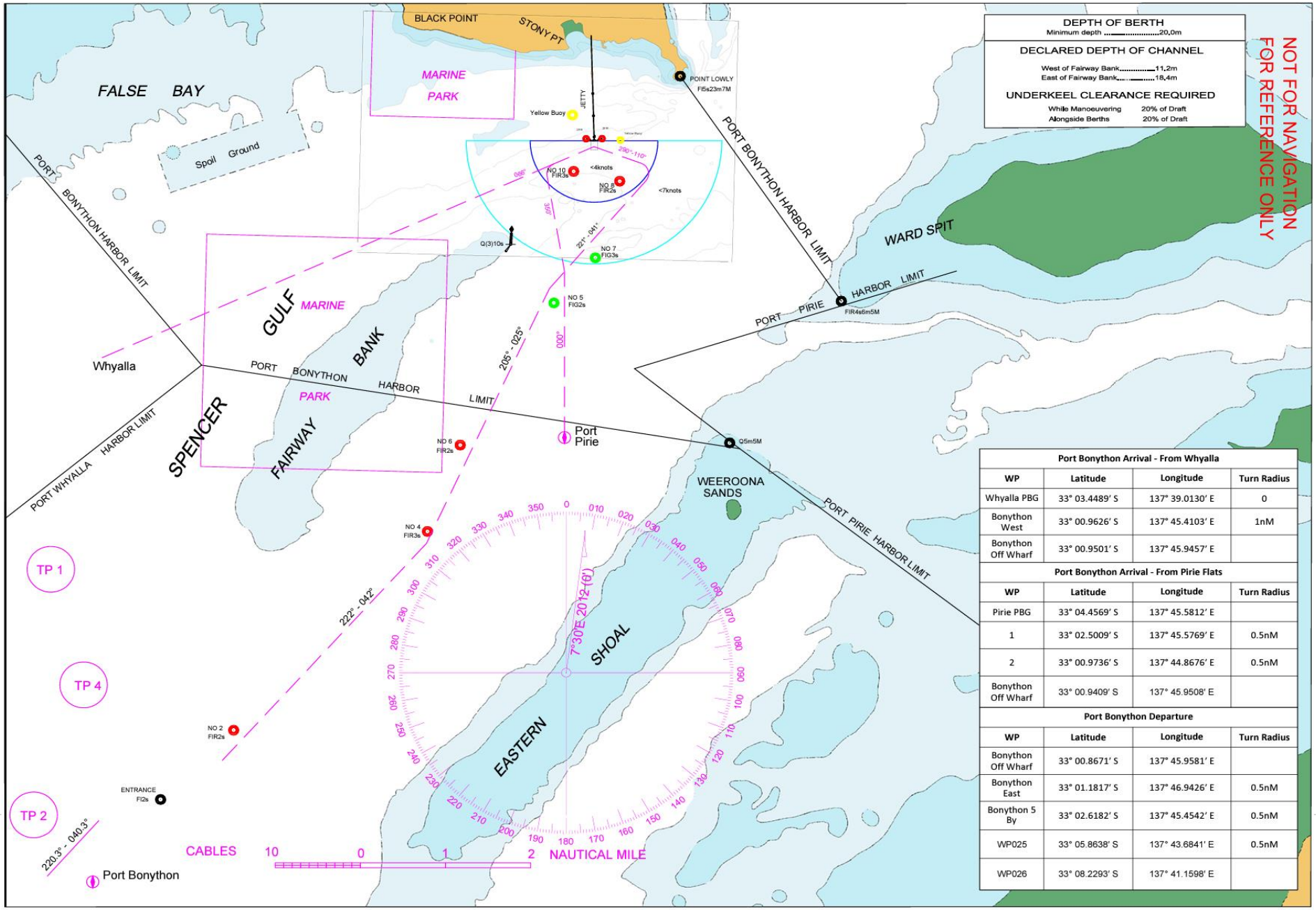
H. Pilotage Passage Plan



DEPTH OF BERTH	
Minimum depth	20.0m
DECLARED DEPTH OF CHANNEL	
West of Fairway Bank	11.2m
East of Fairway Bank	18.4m
UNDERKEEL CLEARANCE REQUIRED	
While Manoeuvering	20% of Draft
Alongside Berths	20% of Draft

Port Bonython Arrival - From Whyalla			
WP	**Latitude**	**Longitude**	**Turn Radius**
Whyalla PBG	33° 03.4489′ S	137° 39.0130′ E	0
Bonython West	33° 00.9626′ S	137° 45.4103′ E	1nM
Bonython Off Wharf	33° 00.9501′ S	137° 45.9457′ E	
Port Bonython Arrival - From Pirie Flats			
WP	**Latitude**	**Longitude**	**Turn Radius**
Pirie PBG	33° 04.4569′ S	137° 45.5812′ E	
1	33° 02.5009′ S	137° 45.5769′ E	0.5nM
2	33° 00.9736′ S	137° 44.8676′ E	0.5nM
Bonython Off Wharf	33° 00.9409′ S	137° 45.9508′ E	
Port Bonython Departure			
WP	**Latitude**	**Longitude**	**Turn Radius**
Bonython Off Wharf	33° 00.8671′ S	137° 45.9581′ E	
Bonython East	33° 01.1817′ S	137° 46.9426′ E	0.5nM
Bonython 5 By	33° 02.6182′ S	137° 45.4542′ E	0.5nM
WP025	33° 05.8638′ S	137° 43.6841′ E	0.5nM
WP026	33° 08.2293′ S	137° 41.1598′ E	

I. Oversize Vessel Form

The oversize Vessel form included herein is provided by the Pilotage Service Provider (Flinders Ports Holdings) and is not the property of Santos. The information supplied by Santos in this form is for informational purposes only and is intended to assist the Master in their responsibilities. While every effort has been made to ensure the accuracy of the information, Santos cannot accept any responsibility or liability for any errors, omissions, or inaccuracies in the information provided. The use of this form does not absolve the Master or any other party of their obligations and responsibilities under any applicable laws, regulations, or standards. We recommend that the Master and all other relevant parties independently verify all information and comply with all applicable rules and regulations.

Flinders Ports Pty Limited
ACN 097 377 172
296 St Vincent Street,
Port Adelaide South Australia 5015

OVERSIZE VESSEL APPLICATION – Port Bonython

Date of arrival Date of departure		Vessel Name	
Berth		Master of Vessel ("Master")	(full name)
Person and company undertaking the Oversize Voyage, if other than the Master ("Operator")	(full name and position of person and company, including ACN)	Owner of the Vessel ("Owner")	(full name and ACN)
Description of Oversize Voyage to be undertaken, including the Vessel's draft and dimensions.	…… ……		

The Master (for and on behalf of the Owner) and Operator (where applicable), in consideration of Flinders Ports Pty Limited ("Flinders Ports ") allowing the Oversize Voyage to occur in the Port, acknowledge and agree that the undertaking of the Oversize Voyage will be at the Master's and Operator's own cost and in accordance with the following terms and conditions:

1. The Oversize Voyage will not be undertaken until Flinders Ports has acknowledged in writing its receipt of this Application and acceptance of the Oversize Voyage.
2. The Master and Operator will comply with and satisfy all present and future laws and applicable standards in respect of the undertaking of the Oversize Voyage.
3. This Application covers only the specified Oversize Voyage and a further application must be given to Flinders Ports before any additional Oversize Voyage is commenced. If the Oversize Voyage is temporarily discontinued (for any reason) during the specified period Flinders Ports must be informed prior to the Oversize Voyage recommencing.
4. The Master and Operator will only undertake the Oversize Voyage whilst it safe to do so, and will only allow the same to be undertaken, without limitation, if:
    a. it occurs in daylight;
    b. the wind speed during the movement of the Vessel is less than 15 knots;
    c. the arrival draft of the Vessel:
        i. has 2/3rd propeller immersion;
        ii. has trim between 1 to 2 metres by the stern;
    d. at the departure of the Vessel has an even keel or is trimmed by the stern with a minimum under keel clearance of 10%;
    e. 3 tugs are in attendance for the berthing (inclusive of 1 Z peller and 2 tugs of which have a minimum bollard pull of 26 tonne or better) and 2 tugs (inclusive of 1 Z peller and 1 tug with a minimum bollard pull of 26 tonne or better) for the sailing of the Vessel; and
    f. the tide is at slack water for the arrival and departure of the Vessel.
5. All hazards, safety incidents or breaches of the terms and conditions of this Application are to be reported immediately to Adelaide VTS on VHF channel 12 or telephone (08) 8447 0902.
6. Notwithstanding any other provision of this Application, the Master, Owner and Operator agree to undertake Oversize Voyage at their own risk in all things and release and indemnify Flinders Ports, its related bodies corporate and their directors, officers, employees, agents, contractors, subcontractors, licensees, subtenants or invitees and any person Claiming through them ("Flinders Ports' Agents") from and against all Claims of every kind arising from or out of undertaking or the occurrence of the Oversize Voyage or any act, matter or thing done or performed by the Master, Owner and Operator, visitors or other persons in relation to the Oversize Voyage or any omission of the said persons including, without limitation, any Claim in respect of:

a. any accident or damage to property or death of or injury to any person of any nature; or
b. loss of or damage to fixtures or personal property of the Master, Owner and Operator or any other person;

on, in or in the vicinity of the Vessel.

7. In this Application:
   a. "**Claim**" means any demand, action, claim, cause of action, proceedings, judgement, order, relief, remedy, right entitlement, damage, loss (including without limitation consequential, incidental, special and indirect losses of profits, contracts and revenue), compensation, reimbursement, cost, expense or liability incurred, suffered, brought, made or recovered of whatever nature, however arising under statute, at law or in equity or whether of a contractual, proprietary or tortious nature (whether in negligence, other breach of duty, of a strict liability or otherwise) including, without limitation, pursuant to the Environment Protection Act 1993).
   b. "**Oversize Voyage**" means the movement within the Port of the Vessel which is oversized in relation to the operational limits of the Port, together with any related or ancillary activities, including without limitation as described above.
   c. No rule of construction applies to the disadvantage of Flinders Ports on the basis that Flinders Ports put forward this Application or any part of it.
   d. Any remedy, power or entitlement given to Flinders Ports in any clause of this Application is in addition to any remedy, power or entitlement which Flinders Ports may have under any other agreement or law.
   e. If any provision of this Application is deemed to be, or becomes void, voidable or unenforceable, it must be read down, or if incapable of being read down, severed, and the remaining provisions of this Application continue to have full force and effect.

SIGNED for and on behalf of **Flinders Ports Pty Limited** by:

_____

Name:
Position:
Date:

We, the undersigned, warrant that we are authorised to represent and bind the Owner, Master and Operator, respectively, and consequently further acknowledge, warrant and represent that the Owner, Master and Operator, respectively, accept and agree to be bound by the terms and conditions set out in this Application:

SIGNED by or on behalf of the **Master**:

_____

Name:
Position:
Date:

SIGNED for and on behalf of the **Operator** by:

_____

Name:
Position:
Date:

J. Safety Data Sheet

SAFETY DATA SHEET

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name **SANTOS COOPER BASIN CRUDE OIL**

Synonyms COOPER BASIN CRUDE OIL ● CRUDE OIL CRUDE

1.2 Uses and uses advised against

Uses FEEDSTOCK FOR OIL REFINERY

1.3 Details of the supplier of the product

Supplier name **SANTOS LIMITED**

Address 1 Port Bonython Road, Whyalla, SA, 5600, AUSTRALIA

Telephone (08) 8649 0100

Email Santos.procurement@santos.com

Website http://www.santos.com

1.4 Emergency telephone numbers

Emergency 13 11 26 (PIC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

Physical Hazards

Flammable Liquids: Category 2

Health Hazards

Germ Cell Mutagenicity: Category 1B
Carcinogenicity: Category 1A
Toxic to Reproduction: Category 2
Specific Target Organ Toxicity (Repeated Exposure): Category 2

Environmental Hazards

Aquatic Toxicity (Chronic): Category 3

2.2 GHS Label elements

Signal word **DANGER**

Pictograms

Hazard statements

H225	Highly flammable liquid and vapour.
H340	May cause genetic defects.
H350	May cause cancer.
H361	Suspected of damaging fertility or the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.
H412	Harmful to aquatic life with long lasting effects.

Prevention statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233	Keep container tightly closed.
P240	Ground and bond container and receiving equipment.
P241	Use explosion-proof electrical/ventilating/lighting equipment.
P242	Use non-sparking tools.
P243	Take action to prevent static discharges.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.

Response statements

P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P370 + P378	In case of fire: Use appropriate media to extinguish.

Storage statements

P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.

Disposal statements

P501	Dispose of contents/container in accordance with relevant regulations.

2.3 Other hazards

No information provided.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS Number	EC Number	Content
SATURATED CYCLIC HYDROCARBONS	-	-	20 to 30%
N-HEXANE	110-54-3	203-777-6	<7%
POLYCYCLIC AROMATIC HYDROCARBONS (PAHS)	130498-29-2	-	<1%
BENZENE	71-43-2	200-753-7	0.2 to 0.4%
MERCURY COMPOUND(S)	-	-	<0.1%
PARAFFINIC HYDROCARBON(S)	-	-	60 to 70%
AROMATIC HYDROCARBON	63231-51-6	-	8 to 10%

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 AB (Organic vapour, Inorganic and acid gas) 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 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.

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 toxic gases (carbon/sulphur oxides, sulphides, hydrocarbons) when heated to decomposition. Vapour may form explosive mixtures with air. Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, heaters, naked lights, pilot lights, etc when handling. Earth containers when dispensing fluids.

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

3WE

3	Normal Foam (protein based foam that is not alcohol resistant).
W	Risk of violent reaction or explosion. Wear liquid-tight chemical protective clothing 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

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.

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.

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

Store in a cool, dry, well ventilated area, removed from incompatible substances, heat or ignition sources and foodstuffs. 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 systems.

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/m³	ppm	mg/m³
Benzene	SWA [AUS]	1	3.2	--	--
Benzene	SWA [Proposed]	0.2	0.7	--	--
Mercury, elemental vapour (as Hg)	SWA [AUS]	0.003	0.025	--	--
Mineral Oil Mist	SWA [AUS]	--	5	--	--
n-Hexane	SWA [AUS]	20	72	--	--

Biological limits

Ingredient	Reference	Determinant	Sampling Time	BEI
BENZENE	ACGIH BEI	S-Phenylmercapturic acid in urine	End of shift	25 µg/g creatinine
	ACGIH BEI	t,t-Muconic acid in urine	End of shift	500 µg/g creatine
N-HEXANE	ACGIH BEI	2,5-Hexanedione in urine (without hydrolysis)	End of shift	0.5 mg/L
POLYCYCLIC AROMATIC HYDROCARBONS (PAHS)	ACGIH BEI	1-Hydroxypyrene (1-HP) in urine (with hydrolysis)	End of shift at end of workweek	

8.2 Exposure controls

Engineering controls Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical 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 splash-proof goggles.

Hands Wear PVC or rubber gloves. With prolonged use, wear Viton® or nitrile gloves.

Body With prolonged use, wear coveralls.

Respiratory Where an inhalation risk exists, wear a Type A (Organic vapour) respirator. Where the boiling point is < 65°C, use an AX filter type.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	LIGHT BROWN LIQUID
Odour	HYDROCARBON ODOUR
Flammability	HIGHLY FLAMMABLE
Flash point	< 23°C
Boiling point	0°C to 540°C
Melting point	9°C
Evaporation rate	NOT AVAILABLE
pH	NOT AVAILABLE
Vapour density	> 1 (Air = 1)
Relative density	0.8
Solubility (water)	INSOLUBLE
Vapour pressure	36.5 kPa @ 38°C
Upper explosion limit	NOT AVAILABLE
Lower explosion limit	NOT AVAILABLE
Partition coefficient	NOT AVAILABLE

9.1 Information on basic physical and chemical properties

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	> 60 %
Pour point	12°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 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. hypochlorites), acids (e.g. nitric acid), alkalis (e.g. sodium hydroxide), heat and ignition sources.

10.6 Hazardous decomposition products

May evolve toxic gases (carbon/sulphur oxides, sulphides, hydrocarbons) when heated to decomposition.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity May be harmful if swallowed, in contact with skin, and/or if inhaled.

Information available for the ingredients:

Ingredient	Oral LD50	Dermal LD50	Inhalation LC50
N-HEXANE	25 g/kg (rat)	3000 mg/kg (rabbit)	48000 ppm/4 hours (rat)
BENZENE	930 mg/kg (rat)	> 9400 mg/kg (rabbit, guinea pig)	9980 ppm/7hrs (mouse)

Skin Contact may result in drying and defatting of the skin, rash and dermatitis.

Eye Contact may result in irritation, lacrimation and redness.

Sensitisation Not classified as causing skin or respiratory sensitisation.

Mutagenicity May cause genetic defects.

Carcinogenicity May cause cancer. Benzene is classified as carcinogenic to humans (IARC Group 1). This product may contain polycyclic aromatic hydrocarbons (PCAHs), some of which are classified as probably carcinogenic to humans (IARC Group 2A).

Reproductive Hexane is suspected of damaging fertility.

STOT - single exposure Over exposure may result in irritation of the nose and throat, coughing, dizziness, drowsiness and headache.

STOT - repeated exposure Contains small amounts of mercury which is a cumulative poison and may result in damage to the CNS and kidneys.

Aspiration Considered unlikely due to the highly viscous nature of the product. However, aspiration or inhalation may cause chemical pneumonitis and pulmonary oedema.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
Harmful to aquatic life with long lasting effects.

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 For small amounts, absorb with sand, vermiculite or similar and dispose of to an approved landfill site. Contact the manufacturer/supplier for additional information if disposing of large quantities (if required). Prevent contamination of drains and waterways as aquatic life may be threatened and environmental damage may result.

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	1267	1267	1267
14.2 Proper Shipping Name	PETROLEUM CRUDE OIL	PETROLEUM CRUDE OIL	PETROLEUM CRUDE OIL
14.3 Transport hazard class	3	3	3
14.4 Packing Group	II	II	II

14.5 Environmental hazards
No information provided.

14.6 Special precautions for user

Hazchem code 3WE

GTEPG 3A1

EmS F-E, S-E

15. REGULATORY INFORMATION

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

Poison schedule Classified as a Schedule 5 (S5) 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

MINERAL OILS - NON REFINED: Animal experiments and human experience have shown cancer risks when handling mineral oils. Such cases are reported to have occurred in conditions where poor occupational hygiene practices resulted in prolonged skin contact. CLEANING MINERAL OIL CONTAMINATED CLOTHING: Cleaners are advised that when cleaning oil contaminated clothing it is essential that freshly distilled solvent is used for each batch, including final rinse, as even filtered solvent will leave oil residues.

EXPOSURE STANDARDS - TIME WEIGHTED AVERAGES: Exposure standards are established on the premise of an 8 hour work period of normal intensity, under normal climatic conditions and where a 16 hour break between shifts exists to enable the body to eliminate absorbed contaminants. In the following circumstances, exposure standards must be reduced: Strenuous work conditions; hot, humid climates; high altitude conditions; extended shifts (which increase the exposure period and shorten the period of recuperation).

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/m³	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]

SAFETY DATA SHEET

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name **SANTOS HEAVY NAPHTHA**

Synonyms HEAVY NAPHTHA ● NAPHTHA FEEDSTOCK ● RUBBER SOLVENT (NAPHTHA)

1.2 Uses and uses advised against

Uses CRUDE OIL

1.3 Details of the supplier of the product

Supplier name **SANTOS LIMITED**

Address 1 Port Bonython Road, Whyalla, SA, 5600, AUSTRALIA

Telephone (08) 8649 0100

Email Santos.procurement@santos.com

Website http://www.santos.com

1.4 Emergency telephone numbers

Emergency 13 11 26 (PIC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

Physical Hazards

Flammable Liquids: Category 2

Health Hazards

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

Environmental Hazards

Aquatic Toxicity (Chronic): Category 2

2.2 GHS Label elements

Signal word **DANGER**

Pictograms

Hazard statements

H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.
H340	May cause genetic defects.
H350	May cause cancer.
H361f	Suspected of damaging fertility.
H373	May cause damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.

Prevention statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233	Keep container tightly closed.
P240	Ground and bond container and receiving equipment.
P241	Use explosion-proof electrical/ventilating/lighting equipment.
P242	Use non-sparking tools.
P243	Take action to prevent static discharges.
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.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.

Response statements

P301 + P310	IF SWALLOWED: Immediately call a POISON CENTRE or doctor/physician.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
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 + P364	Take off contaminated clothing and wash it before reuse.
P370 + P378	In case of fire: Use appropriate media to extinguish.
P391	Collect spillage.

Storage statements

P403 + P233 + P235	Store in a well-ventilated place. Keep cool. Keep container tightly closed.
P405	Store locked up.

Disposal statements

P501	Dispose of contents/container in accordance with relevant regulations.

2.3 Other hazards

No information provided.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS Number	EC Number	Content
NAPHTHA (PETROLEUM), HEAVY STRAIGHT-RUN	64741-41-9	265-041-0	<=100%
N-HEXANE	110-54-3	203-777-6	<6%
BENZENE	71-43-2	200-753-7	<0.8%
MERCURY COMPOUND(S)	-	-	<0.1%
AROMATIC HYDROCARBON	63231-51-6	-	<15%

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 AB (Organic vapour, Inorganic and acid gas) 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 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.

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 toxic gases (carbon/sulphur oxides, sulphides, hydrocarbons) when heated to decomposition. Vapour may form explosive mixtures with air. Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, heaters, naked lights, pilot lights, etc when handling. Earth containers when dispensing fluids.

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.

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.

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.

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

Store in a cool, dry, well ventilated area, removed from incompatible substances, heat or ignition sources and foodstuffs. 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 systems.

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/m³	ppm	mg/m³
Benzene	SWA [AUS]	1	3.2	--	--
Benzene	SWA [Proposed]	0.2	0.7	--	--
Mercury, elemental vapour (as Hg)	SWA [AUS]	0.003	0.025	--	--
n-Hexane	SWA [AUS]	20	72	--	--

Biological limits

Ingredient	Reference	Determinant	Sampling Time	BEI
BENZENE	ACGIH BEI	S-Phenylmercapturic acid in urine	End of shift	25 µg/g creatinine
	ACGIH BEI	t,t-Muconic acid in urine	End of shift	500 µg/g creatine
N-HEXANE	ACGIH BEI	2,5-Hexanedione in urine (without hydrolysis)	End of shift	0.5 mg/L

8.2 Exposure controls

Engineering controls Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical 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 splash-proof goggles.

Hands Wear PVC or rubber gloves. With prolonged use, wear Viton® or nitrile gloves.

Body With prolonged use, wear coveralls.

Respiratory Where an inhalation risk exists, wear a Type A (Organic vapour) respirator. Where the boiling point is < 65°C, use an AX filter type.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	COLOURLESS LIQUID
Odour	PETROLEUM ODOUR
Flammability	HIGHLY FLAMMABLE
Flash point	23°C
Boiling point	180°C
Melting point	NOT AVAILABLE
Evaporation rate	NOT AVAILABLE
pH	NOT AVAILABLE
Vapour density	> 3 (Air = 1)
Relative density	0.73
Solubility (water)	INSOLUBLE
Vapour pressure	45 kPa @ 38°C
Upper explosion limit	NOT AVAILABLE
Lower explosion limit	NOT AVAILABLE
Partition coefficient	NOT AVAILABLE
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	1.22 cSt @ 20°C
	NOT AVAILABLE

9.1 Information on basic physical and chemical properties

Explosive properties	
Oxidising properties	NOT AVAILABLE
Odour threshold	NOT AVAILABLE

9.2 Other information

% Volatiles	100 %

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 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. hypochlorites), acids (e.g. nitric acid), alkalis (e.g. sodium hydroxide), heat and ignition sources.

10.6 Hazardous decomposition products

May evolve toxic gases (carbon/sulphur oxides, sulphides, hydrocarbons) when heated to decomposition.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity May be harmful if swallowed in large quantities.

Information available for the ingredients:

Ingredient	Oral LD50	Dermal LD50	Inhalation LC50
NAPHTHA (PETROLEUM), HEAVY STRAIGHT-RUN	> 5000 mg/kg (OECD TG 401)	> 2000 mg/kg (OECD TG 402 under occlusive conditions)	> 5610 mg/m3 (OECD TG 403)
N-HEXANE	25 g/kg (rat)	3000 mg/kg (rabbit)	48000 ppm/4 hours (rat)
BENZENE	930 mg/kg (rat)	> 9400 mg/kg (rabbit, guinea pig)	9980 ppm/7hrs (mouse)

Skin Contact may result in drying and defatting of the skin, rash and dermatitis.

Eye Contact may result in irritation, lacrimation 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). This product may contain polycyclic aromatic hydrocarbons (PCAHs), some of which are classified as probably carcinogenic to humans (IARC Group 2A).

Reproductive Hexane is suspected of damaging fertility.

STOT - single exposure Over exposure may result in irritation of the nose and throat, coughing, dizziness, drowsiness and headache.

STOT - repeated exposure Available evidence from animal studies indicate that repeated or prolonged exposure to this material could result in adverse skin effects. Effects to lungs and central nervous system have also been reported. Chronic exposure to benzene may result in loss of appetite, tremors, anaemia (bone marrow depression), liver and kidney damage. Contains small amounts of mercury which is a cumulative poison and may result in damage to the CNS and kidneys.

Aspiration Considered unlikely due to the highly viscous nature of the product. However, aspiration or inhalation may cause chemical pneumonitis and pulmonary oedema.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxic to aquatic life with long lasting effects.

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 For small amounts, absorb with sand, vermiculite or similar and dispose of to an approved landfill site. Contact the manufacturer/supplier for additional information if disposing of large quantities (if required). Prevent contamination of drains and waterways as aquatic life may be threatened and environmental damage may result.

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	1268	1268	1268
14.2 Proper Shipping Name	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. (contains paraffinic hydrocarbons)	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. (contains paraffinic hydrocarbons)	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. (contains paraffinic hydrocarbons)
14.3 Transport hazard class	3	3	3
14.4 Packing Group	II	II	II

14.5 Environmental hazards

Marine Pollutant.

14.6 Special precautions for user

Hazchem code 3YE

GTEPG 3A1

EmS F-E, S-E

Other information The environmentally hazardous substance mark is not required when transported in packages of less than 5 kg/L (UN Model Regulations: Special Provision 375; IATA: Special Provision A197; IMDG: Special Provision 969) or less than 500 kg/L by Australian Road and Rail.

15. REGULATORY INFORMATION

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

Poison schedule Classified as a Schedule 5 (S5) 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

MINERAL OILS - NON REFINED: Animal experiments and human experience have shown cancer risks when handling mineral oils. Such cases are reported to have occurred in conditions where poor occupational hygiene practices resulted in prolonged skin contact. CLEANING MINERAL OIL CONTAMINATED CLOTHING: Cleaners are advised that when cleaning oil contaminated clothing it is essential that freshly distilled solvent is used for each batch, including final rinse, as even filtered solvent will leave oil residues.

EXPOSURE STANDARDS - TIME WEIGHTED AVERAGES: Exposure standards are established on the premise of an 8 hour work period of normal intensity, under normal climatic conditions and where a 16 hour break between shifts exists to enable the body to eliminate absorbed contaminants. In the following circumstances, exposure standards must be reduced: Strenuous work conditions; hot, humid climates; high altitude conditions; extended shifts (which increase the exposure period and shorten the period of recuperation).

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/m³	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]

SAFETY DATA SHEET

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name **SANTOS LIGHT NAPHTHA**

Synonyms LIGHT NAPHTHA ● NAPHTHA FEEDSTOCK

1.2 Uses and uses advised against

Uses CRUDE OIL

1.3 Details of the supplier of the product

Supplier name **SANTOS LIMITED**

Address 1 Port Bonython Road, Whyalla, SA, 5600, AUSTRALIA

Telephone (08) 8649 0100

Email Santos.procurement@santos.com

Website http://www.santos.com

1.4 Emergency telephone numbers

Emergency 13 11 26 (PIC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

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 (Narcotic Effects)
Germ Cell Mutagenicity: Category 1B
Carcinogenicity: Category 1A
Toxic to Reproduction: Category 2
Specific Target Organ Toxicity (Repeated Exposure): Category 2

Environmental Hazards

Aquatic Toxicity (Chronic): Category 3

2.2 GHS Label elements

Signal word **DANGER**

Pictograms

Hazard statements

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.
H340	May cause genetic defects.
H350	May cause cancer.
H361	Suspected of damaging fertility or the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.
H412	Harmful to aquatic life with long lasting effects.

Prevention statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233	Keep container tightly closed.
P240	Ground and bond container and receiving equipment.
P241	Use explosion-proof electrical/ventilating/lighting equipment.
P243	Take action to prevent static discharges.
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.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.

Response statements

P301 + P310	IF SWALLOWED: Immediately call a POISON CENTRE or doctor/physician.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340	IF INHALED: Remove person to fresh air and keep 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 + P364	Take off contaminated clothing and wash it before reuse.
P370 + P378	In case of fire: Use appropriate media to extinguish.

Storage statements

P403 + P233 + P235	Store in a well-ventilated place. Keep cool. Keep container tightly closed.
P405	Store locked up.

Disposal statements

P501	Dispose of contents/container in accordance with relevant regulations.

2.3 Other hazards

No information provided.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS Number	EC Number	Content
N-HEXANE	110-54-3	203-777-6	13%
SATURATED CYCLIC HYDROCARBONS	-	-	13%
BENZENE	71-43-2	200-753-7	1.5%
MERCURY COMPOUND(S)	-	-	<0.1%
PARAFFINIC HYDROCARBON(S)	-	-	>60%
AROMATIC HYDROCARBON	63231-51-6	-	3%

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 AB (Organic vapour, Inorganic and acid gas) 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 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.

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 toxic gases (carbon/sulphur oxides, sulphides, hydrocarbons) when heated to decomposition. Vapour may form explosive mixtures with air. Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, heaters, naked lights, pilot lights, etc when handling. Earth containers when dispensing fluids.

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.

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.

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.

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

Store in a cool, dry, well ventilated area, removed from incompatible substances, heat or ignition sources and foodstuffs. 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 systems.

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/m³	ppm	mg/m³
Benzene	SWA [AUS]	1	3.2	--	--
Benzene	SWA [Proposed]	0.2	0.7	--	--
Mercury, elemental vapour (as Hg)	SWA [AUS]	0.003	0.025	--	--
Mineral Oil Mist	SWA [AUS]	--	5	--	--
n-Hexane	SWA [AUS]	20	72	--	--

Biological limits

Ingredient	Reference	Determinant	Sampling Time	BEI
BENZENE	ACGIH BEI	S-Phenylmercapturic acid in urine	End of shift	25 µg/g creatinine
	ACGIH BEI	t,t-Muconic acid in urine	End of shift	500 µg/g creatine
N-HEXANE	ACGIH BEI	2,5-Hexanedione in urine (without hydrolysis)	End of shift	0.5 mg/L

8.2 Exposure controls

Engineering controls Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical 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 splash-proof goggles.

Hands Wear PVC or rubber gloves. With prolonged use, wear Viton® or nitrile gloves.

Body With prolonged use, wear coveralls.

Respiratory Where an inhalation risk exists, wear a Type A (Organic vapour) respirator. Where the boiling point is < 65°C, use an AX filter type.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	COLOURLESS LIQUID
Odour	PETROLEUM ODOUR
Flammability	HIGHLY FLAMMABLE
Flash point	21°C
Boiling point	180°C
Melting point	NOT AVAILABLE
Evaporation rate	NOT AVAILABLE
pH	NOT AVAILABLE
Vapour density	> 3 (Air = 1)
Relative density	0.675
Solubility (water)	INSOLUBLE
Vapour pressure	86 kPa @ 38°C
Upper explosion limit	NOT AVAILABLE
Lower explosion limit	NOT AVAILABLE
Partition coefficient	NOT AVAILABLE
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE

9.1 Information on basic physical and chemical properties

Viscosity	NOT AVAILABLE
Explosive properties	NOT AVAILABLE
Oxidising properties	NOT AVAILABLE
Odour threshold	NOT AVAILABLE

9.2 Other information

% Volatiles	100 %

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 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. hypochlorites), acids (e.g. nitric acid), alkalis (e.g. sodium hydroxide), heat and ignition sources.

10.6 Hazardous decomposition products

May evolve toxic gases (carbon/sulphur oxides, sulphides, hydrocarbons) when heated to decomposition.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity May be harmful if swallowed, in contact with skin, and/or if inhaled.

Information available for the ingredients:

Ingredient	Oral LD50	Dermal LD50	Inhalation LC50
N-HEXANE	25 g/kg (rat)	3000 mg/kg (rabbit)	48000 ppm/4 hours (rat)
BENZENE	930 mg/kg (rat)	> 9400 mg/kg (rabbit, guinea pig)	9980 ppm/7hrs (mouse)

Skin Contact may result in drying and defatting of the skin, rash and dermatitis.

Eye Contact may result in irritation, lacrimation 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). This product may contain polycyclic aromatic hydrocarbons (PCAHs), some of which are classified as probably carcinogenic to humans (IARC Group 2A).

Reproductive Hexane is suspected of damaging fertility.

STOT - single exposure Over exposure may result in irritation of the nose and throat, coughing, dizziness, drowsiness and headache.

STOT - repeated exposure Available evidence from animal studies indicate that repeated or prolonged exposure to this material could result in adverse skin effects. Effects to lungs and central nervous system have also been reported. Chronic exposure to benzene may result in loss of appetite, tremors, anaemia (bone marrow depression), liver and kidney damage. Contains small amounts of mercury which is a cumulative poison and may result in damage to the CNS and kidneys.

Aspiration Considered unlikely due to the highly viscous nature of the product. However, aspiration or inhalation may cause chemical pneumonitis and pulmonary oedema.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Harmful to aquatic life with long lasting effects.

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 For small amounts, absorb with sand, vermiculite or similar and dispose of to an approved landfill site. Contact the manufacturer/supplier for additional information if disposing of large quantities (if required). Prevent contamination of drains and waterways as aquatic life may be threatened and environmental damage may result.

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	1268	1268	1268
14.2 Proper Shipping Name	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. (contains paraffinic hydrocarbons)	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. (contains paraffinic hydrocarbons)	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. (contains paraffinic hydrocarbons)
14.3 Transport hazard class	3	3	3
14.4 Packing Group	II	II	II

14.5 Environmental hazards

No information provided.

14.6 Special precautions for user

Hazchem code 3YE

GTEPG 3A1

EmS F-E, S-E

15. REGULATORY INFORMATION

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

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Additional information

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Abbreviations

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CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
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IARC	International Agency for Research on Cancer
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mg/m³	Milligrams per Cubic Metre
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pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
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STOT-SE	Specific target organ toxicity (single exposure)
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SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

Report status

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[End of SDS]

SAFETY DATA SHEET

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name **SANTOS PROPANE**

Synonyms LPG LIQUEFIED PETROLEUM GAS COOPER BASIN PROPANE ● PROPANE

1.2 Uses and uses advised against

Uses FUEL

1.3 Details of the supplier of the product

Supplier name **SANTOS LIMITED**

Address 1 Port Bonython Road, Whyalla, SA, 5600, AUSTRALIA

Telephone (08) 8649 0100

Email Santos.procurement@santos.com

Website http://www.santos.com

1.4 Emergency telephone numbers

Emergency 13 11 26 (PIC)

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
Risk of explosion if heated under confinement.

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

AUH044	Risk of explosion if heated under confinement.
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.

Disposal statements

None allocated.

2.3 Other hazards

Asphyxiant. Effects are proportional to oxygen displacement.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS Number	EC Number	Content (v/v)
PROPANE	74-98-6	200-827-9	>92%
BUTANE	106-97-8	203-448-7	<8%
ETHANE	74-84-0	200-814-8	<8%
ISOBUTANE	75-28-5	200-857-2	<8%
ETHYL MERCAPTAN	75-08-1	200-837-3	<0.1%

Ingredient Notes Propane may contain stenching agent.

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. 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

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/m³	ppm	mg/m³
Butane	SWA [AUS]	800	1900	--	--
Butane	SWA [Proposed]	--	--	1000	2370
Ethane	SWA [AUS]	Asphyxiant			
Ethyl mercaptan	SWA [AUS]	0.5	1.3	--	--
Isobutane	SWA [AUS]	1000	--	--	--
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.

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 LIQUID)
Odour	SLIGHT ODOUR
Flammability	EXTREMELY FLAMMABLE
Flash point	-104°C
Boiling point	-42°C
Melting point	-190°C
Evaporation rate	NOT APPLICABLE
pH	NOT APPLICABLE
Vapour density	1.8 (Air = 1)
Relative density	NOT AVAILABLE
Solubility (water)	SLIGHTLY SOLUBLE
Vapour pressure	853 kPa @ 20°C (Propane)
Upper explosion limit	9.5 % (Propane)
Lower explosion limit	2.2 % (Propane)
Partition coefficient	NOT AVAILABLE
Autoignition temperature	431°C (Approximately)
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 %
Cylinder pressure (when full)	NOT AVAILABLE

10. STABILITY AND REACTIVITY

10.1 Reactivity

Risk of explosion by shock, friction, fire or other sources of ignition.

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)
ETHYL MERCAPTAN	682 mg/kg (rat)	--	2770 ppm/4 hours (mouse)

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

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

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

	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
14.1 UN Number	1978	1978	1978
14.2 Proper Shipping Name	PROPANE	PROPANE	PROPANE
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. Refer to Commonwealth, State and Territory Dangerous Goods Legislation which contain requirements which affect gas storage and transport.

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 The storage of significant quantities of gas cylinders must comply with AS4332 The storage and handling of gases in cylinders.

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.

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/m³	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]

SAFETY DATA SHEET

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name **SANTOS COOPER BASIN BUTANE**

Synonyms BUTANE LPG LIQUEFIED PETROLEUM GAS ● COOPER BASIN BUTANE

1.2 Uses and uses advised against

Uses FUEL ● HEATING FUEL

1.3 Details of the supplier of the product

Supplier name **SANTOS LIMITED**

Address 1 Port Bonython Road, Whyalla, SA, 5600, AUSTRALIA

Telephone (08) 8649 0100

Email Santos.procurement@santos.com

Website http://www.santos.com

1.4 Emergency telephone numbers

Emergency 13 11 26 (PIC)

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
Risk of explosion if heated under confinement.

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

AUH044 Risk of explosion if heated under confinement.
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.

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
BUTANE	106-97-8	203-448-7	>98%
PROPANE	74-98-6	200-827-9	<2%
ISOPENTANE (2-METHYLBUTANE)	78-78-4	201-142-8	<0.5%
ISOBUTANE	75-28-5	200-857-2	Not Available

Ingredient Notes Butane mix also contains isobutane.

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

2WE

2 Fine Water Spray.

W Risk of violent reaction or explosion. Wear liquid-tight chemical protective clothing 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

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/m³	ppm	mg/m³
Butane	SWA [AUS]	800	1900	--	--
Butane	SWA [Proposed]	--	--	1000	2370
Isobutane	SWA [AUS]	1000	--	--	--
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 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.

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)
Odour	ODOURLESS
Flammability	EXTREMELY FLAMMABLE
Flash point	-83°C
Boiling point	-4°C
Melting point	-130°C
Evaporation rate	NOT AVAILABLE
pH	NOT AVAILABLE
Vapour density	> 1 (Air = 1)
Relative density	NOT AVAILABLE
Solubility (water)	INSOLUBLE
Vapour pressure	450 kPa @ 38°C
Upper explosion limit	8.4 %
Lower explosion limit	1.8 %
Partition coefficient	NOT AVAILABLE
Autoignition temperature	462°C (Isobutane)
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 %
Density	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 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
BUTANE	Study not feasible	Study not feasible	658000 mg/m3/4H (rat)
PROPANE	Study not feasible	Study not feasible	> 800000 ppm/15M (rat)
ISOPENTANE (2-METHYLBUTANE)	> 2000 mg/kg (rat)	--	> 20 mg/L (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

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

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

	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
14.1 UN Number	1011	1011	1011
14.2 Proper Shipping Name	BUTANE	BUTANE	BUTANE
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 2WE

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).

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Inventory listings **AUSTRALIA: AIIC (Australian Inventory of Industrial Chemicals)**
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Additional information

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Abbreviations

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CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
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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
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LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m³	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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[End of SDS]