FOREWORD

These regulations have been compiled for your information and guidance, and contain the essential requirements for safe operation at Pulau Bukom. The following directives are not intended as a substitute for the OCIMF Publication INTERNATIONAL SAFETY GUIDE FOR OIL TANKERS AND TERMINALS (ISGOTT) which should be complied with in full at all times.

This booklet is for your continued use and ready reference during your present stay and future visits to Pulau Bukom.

We look forward to receiving your full co-operation during your port stay in Bukom and you are requested to pay particular attention to matters concerning your safety.

PRODUCTION MANAGER

DOCUMENT HISTORY AND CONTROL

<table>
<thead>
<tr>
<th>Date</th>
<th>Issue</th>
<th>Reason For Change</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>08/2010</td>
<td>1.0</td>
<td>Separated Terminal Safety &amp; Operational Guide from the printed booklet and now being sent as part of Pre-Berthing Questionnaire</td>
<td>Capt. Tay Juet Hui</td>
</tr>
<tr>
<td>05/2012</td>
<td>2.0</td>
<td>Complete review of Safety &amp; Operational Guide to align it with Global Template for Terminal Information Booklet</td>
<td>Capt. B. Jayakumar</td>
</tr>
<tr>
<td>04/2013</td>
<td>3.0</td>
<td>Terminal information section and Part J updated</td>
<td>Capt. B. Jayakumar</td>
</tr>
<tr>
<td>03/2015</td>
<td>4.0</td>
<td>Review of Safety &amp; Operational Guide, changed repetitive ship-shore checks frequency to 3 hours &amp; inclusion of instructions for concurrent bunkering</td>
<td>Capt. Amit Gupta</td>
</tr>
<tr>
<td>04/2016</td>
<td>5.0</td>
<td>Latest maximum draft information updated</td>
<td>Capt. Raghu Iyer</td>
</tr>
<tr>
<td>05/2016</td>
<td>6.0</td>
<td>Reviewed section on H2S Precautions to align with site work instructions</td>
<td>Capt. Raghu Iyer</td>
</tr>
</tbody>
</table>

Superseded issues of this document should be destroyed
COMMUNICATIONS

The Pulau Bukom Refinery Marine Terminal maintains a 24 hour listening watch on the following communication facilities:

1) VHF Channel 19
2) Telephone No: +65 6263 4424
3) Facsimile No: +65 6263 4200

When approaching from seaward, at anchor or in Singapore waters, the terminal can be contacted via any of the above means by the call sign:

“BUKOM OPERATIONS”

Every ship alongside is provided with a Motorola Walkie-Talkie tuned to a dedicated private frequency used for ship/shore communication during cargo operations and linked to our Movements Control Room Centre.

Frequently used telephone numbers and call sign for VHF / Walkie-Talkies for the convenience of ship’s personnel (From Wharf Header Phone) are: -

1. Production Team Leader (PTL) 4404
2. Bukom Operations (SLO Lead) 4424 / 4422
3. SLO (Shore Loading Officer) 4435 / 4436
4. SBM Movement Control 4428
5. DUTY MARINE OFFICER (DMO) 4158
6. FIRE 2222
7. BUKOM POLICE STATION 5516
8. BUKOM TELEPHONE EXCHANGE +65 6263 5000
9. VHF CHANNEL 19 CALLSIGN “BUKOM OPERATIONS”
   (DURING EMERGENCY AND
   SHIP/SHORE WALKIE-TALKIE
   BREAKDOWN)
10. MOTOROLA WALKIE-TALKIE (FOR SHIP/SHORE
    COMMUNICATION) CALLSIGN
    "MOVEMENT CONTROL"

For Calls originated from Mobile / Landline phones, please use the prefix +65 6263 _ _ _ _ followed by the number indicated
Pulau Bukom Marine Department

Dear Sir,

BUKOM MARITIME DEPARTMENT

Bukom MARINE DEPARTMENT provides operational advice on marine-related matters both to ship masters as well as personnel involved in tanker and terminal operation.

All routine communications should be done during office hours (Mon-Fri 0800-1700). Preferred mode of communication is E-Mail to SEPLOP-Marine-Clearance@Shell.com with land line telephone No. +65 6263 4158 used as back up.

In the event of EMERGENCY, the Duty Marine Officer (DMO) can be reached 24/7 at Mobile No. +65 9717 2800.

MARINE MANAGER
PULAU BUKOM
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Updated: May 2016
FIRE & EMERGENCY

ALARM SIGNAL
The alarm signal for a fire or other emergency on the island is a VARIABLE pitch note on the electric sirens.

NOTE: There will normally be a test of the equipment at 1330 HRS every Wednesday.

SHIP OPERATIONS
When the fire alarm is sounded, ships should stand by for possible stoppage of operations. SHIP’S STAFF MUST NOT INITIATE ANY ACTION OF THEIR OWN concerning shutting down of valves (etc.) UNLESS the fire is on board their ship or directly endangering the vessel. Ships must await instructions from shore before taking action regarding cargo or bunkering operations.

Master will be advised by Senior shore personnel regarding the movement of their ships. NO ATTEMPT MUST BE MADE TO UNMOOR AND LEAVE THE WHARF without instructions from the terminal.

COMMUNICATIONS
VHF Radio. On hearing the fire alarm, a member of the vessel’s staff should man the ship’s radio, switch on to Channel 19, and standby for information.

TELEPHONE
If you have anything important pertaining to safety to tell BUKOM OPERATIONS (COMMUNICATIONS), please call on Telephone No. 6263 4424. (when using mobile phone)

SHIP’S PERSONNEL
Ship’s personnel should remain on board until the “ALL CLEAR” has sounded.

“ALL CLEAR”
The signal to indicate that the Emergency is over is a CONTINUOUS NOTE on the electric sirens.

FIRE
INSTRUCTIONS IN CASE OF FIRE
DO NOT HESITATE TO RAISE THE ALARM

SHIPS FIRE ALARM WHEN ALONGSIDE TERMINAL BERTH
Seven or more blasts followed by 1 long blast on the ship’s whistle supplemented by sounding of the general alarm system onboard vessel.

TERMINAL FIRE ALARM
At this terminal, alarm signal is:
A VARIABLE PITCH NOTE ON THE ELECTRIC SIRENS
NOTE: THERE WILL NORMALLY BE A TEST OF THE EQUIPMENT AT 1330 HOURS ON EVERY WEDNESDAY

FIRE ON BOARD SHIP
- - - - Raise alarm
- - - - Fight fire and prevent fire spreading
- - - - Inform terminal
- - - - Cease all cargo operation and then close all valves
- - - - Stand by to disconnect hoses or arms
- - - - Bring engines to standby

FIRE ON OTHER SHIPS OR TERMINAL
- - - - YOU WILL BE ADVISED; AND IF NECESSARY WHEN INSTRUCTED TO:
- - - - Cease all cargo operation and then close all valves
- - - - Stand by to disconnect hoses or arms
- - - - Bring engines to standby and crew to standby ready to unberth

FIRE ON TERMINAL
- - - - Raise alarm
- - - - Cease all cargo operation and then close all valves
- - - - Fight fire and prevent fire spreading
- - - - If required stand by to disconnect hoses or arms
- - - - Inform all ships
- - - - Terminal Emergency Procedure is immediately effected

IN CASE OF FIRE, TERMINAL WILL DIRECT MOVEMENT OF TRAFFIC

MEDICAL EMERGENCY / EVACUATION
INSTRUCTIONS IN CASE CHIP STAFF REQUIRING IMMEDIATE MEDICAL ATTENTION
- - - - Inform terminal and ship’s agent immediately
- - - - Terminal has a duty medic at all times and Emergency Procedure is immediately effected to provide support

(Note: This notice to be displayed on ship’s notice boards by Chief Officer)
TERMINAL INFORMATION

GENERAL
Pulau Bukom Refinery is owned and operated by Shell Eastern Petroleum Pte Ltd Singapore. It is situated in position Lat. 1° 14’ N Long. 103° 46’ E

The Marine Terminal consists of 13 main jetties and one SBM. 12 jetties are located at Pulau Bukom Besar and 1 jetty at Pulau Ular while the SBM is approximately 2 miles to the South of the island.

Wharf safe draft and acceptable freeboard are shown in Page 8 of this booklet. Freshwater is available at all berths; except Wharf 2 and SBM. Ship’s own use bunkers are not available ex-pipeline from the wharves; however, subject to meeting terminal requirements, bunkers can be supplied through approved bunker barges for vessels alongside wharves 5, 6, 7, 8, 10 and SBM. An advance clearance is required from the Marine Department for supply of bunkers.

1. Tidal Information
Tidal information for Bukom can be found in the Singapore Tide Tables and Port Information Booklet published by MPA. The tidal range at Springs is approximately 3.3 meters and current velocities can approach 3.0 knots.

For information on tidal streams at Bukom, reference should be made to predictions for Jong Fairway.

Shipmasters should be aware that counter currents at Pulau Bukom are experienced on strong East going stream. For practical purposes, when the predicated rate of the East going stream exceed 1 knot the counter current at Bukom is assumed to exist from Berth No. 10 at the Eastern end to Berth No. 12 at the Western end. The counter current normally starts about two hours after commencement of the Ebb stream and finishes at the next turn of the tide.

2. Safety
Safety precaution at Wharf 10

Due to the proximity of Wharf 10 to offices, residential areas and ferry passenger terminals, vessels are not allowed to handle or have on board on-carriage volatile cargoes (flash point below 60°C Close Cup Method) even when under inerted conditions. Vessel must arrive with all tanks (including slop tanks) in gas-free condition or purged and inerted (tanks purged to below 2% Hydrocarbon content by volume, oxygen content less than 8% by volume and H2S concentration as low as possible but not more than 5 PPM.)

Vessels at Wharf 10 are only allowed to have a small quantity of volatile slop in their slop tank onboard and the tank must be fully inerted and kept under vapor isolation from rest of the tanks. Discharge of volatile slop is not permitted.
2. **Wharf Safe Draft And Freeboard** (Subject to amendment)

Please refer to the table below:

<table>
<thead>
<tr>
<th>BERTH</th>
<th>Approach Control Depth (M)</th>
<th>Max. Draft @ Berths</th>
<th>Max. Freeboard (M) For Hoses (H) Loading Arm (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 E</td>
<td>10.9</td>
<td>A 8.5</td>
<td></td>
</tr>
<tr>
<td>1 W</td>
<td>10.9</td>
<td>A 8.5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>8.7</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>10.7</td>
<td>A 17.5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>11.4</td>
<td>H 11.1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>12.6</td>
<td>H 13.1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>15.1</td>
<td>16.1</td>
<td>Crude &amp; FO 18.0 / Others 13.6</td>
</tr>
<tr>
<td>7</td>
<td>13.4</td>
<td>A 18.0</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>15.1</td>
<td>A 18.0</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>12.7</td>
<td>Lubs A 17.5 / Jet &amp; Kero A 5.5</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>15.1</td>
<td>15.4</td>
<td>A 14.5</td>
</tr>
<tr>
<td>11</td>
<td>5.2</td>
<td>A 8.0</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>12.8</td>
<td>A 6.0 / A 8.0 (LPG)</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>10.6</td>
<td>A 12.5</td>
<td></td>
</tr>
<tr>
<td>SBM</td>
<td>22.8</td>
<td>23.0</td>
<td>H</td>
</tr>
</tbody>
</table>

**Below information is for guidance only:**

**Freeboard Requirement** - Minimum Freeboard Requirement for all wharves is 1.0 meter except, wharf 10 where minimum freeboard requirement is 1.5 meters and wharf 13 where minimum freeboard requirement is 2.0 meters.

**Wharf Spacing** – Minimum clearance to be maintained between vessels at adjacent wharves is 30 meters.

**Minimum UKC** – As stipulated by Port Authority:  
- Alongside berth for all vessels: 0.3 M  
- For manoeuvring (Below 3000 GRT): 0.6 M  
- For manoeuvring (Above 3000 GRT): 1.0 M

**Tugs Requirement** – Below is the MPA guidelines for usage of tugs for all movements at Bukom terminal  
- Upto 100 meters LOA 1 Small Tug  
- 100 to 152 meters LOA 2 Small Tugs  
- 153 to 180 meters LOA 2 Medium Tugs  
- 181 to 220 meters LOA 2 Big Tugs  
- 221 to 280 meters LOA 2 Big Tugs (Pilot may order additional tug)  
- More than 280 meters LOA 4 Big Tugs (Pilot may order additional tug)

Below is a list of tugs normally used at Bukom wharves and these are arranged by Bukom operations

<table>
<thead>
<tr>
<th>Name</th>
<th>Bollard Pull/Horsepower</th>
<th>Towing Rope</th>
<th>Additional Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>KST Kancil</td>
<td>48 t</td>
<td>Tug’s Line</td>
<td>Class 1 – Fire Fighting + Oil Spill Booms</td>
</tr>
<tr>
<td>KST Kijang</td>
<td>48 t</td>
<td>Tug’s Line</td>
<td>Class 1 – Fire Fighting + Oil Spill Booms</td>
</tr>
</tbody>
</table>

A vessel equipped with suitable thrusters, in good working condition, may dispense with the need for a tug in that position. The pilot upon boarding may thus, in consultation with the Master and Duty Marine Officer, cancel or order additional tugs if required.
Mooring Crew - Mooring crews and line handling boats are arranged by the terminal and are automatically allocated when vessels are called in to berth / unberth. Two line handling boats are available at Bukom to support the mooring of all vessels at Pulau Bukom Terminal.

Pilotage – The Maritime Port Authority of Singapore (MPA) Act 1996, section 60 provides that:
1. Every vessel when navigating in any pilotage district or part thereof shall be under pilotage and the owner, agent or master of the vessel shall comply with that requirement.
2. A vessel while been moved within any area of the port which is or forms part of a pilotage district shall be deemed to be a vessel navigating in a pilotage district.
3. The Authority (MPA) may, if it appears to the authority to be necessary, exempt any vessel or class of vessels while navigating in any pilotage district from being under pilotage subject to such conditions as it may think fit to impose.

There are 7 pilot boarding grounds for vessels coming into port and details of which can be extracted from the Port Information Booklet, ALRS, Sailing Directions and Routeing Chart. Requests for pilotage services should be placed directly with the pilotage service provider which is PSA Marine. Agents should be consulted for pilot booking, who in turn will book pilots and advise the vessel on pilot boarding time and location.

All masters of vessels are advised not to hamper the passage of large or deep draft vessels in the restricted channels of the port.

All vessels berthing at Bukom wharves need to have a PSA pilot onboard. The PSA pilot could either be the residential PSA Pilot in Bukom which will then be arranged by the SLO Lead or directly from PSA which will then be booked by the agents after receiving instructions from SLO Lead. For small coaster port limit vessels which have been assessed by the Bukom Marine Team, the pilot exempted Master does not need to have a PSA pilot onboard for berthing / unberthing to Bukom wharves provided he is within the validity period from the last assessment. In both the above cases mooring and tug services will be arranged as required by the SLO Lead.

Max Berthing Speed – Detailed study has been conducted and it has been verified that the max allowable berthing velocity for Bukom wharves is in compliance / exceed the PIANC guidelines. PSA pilots are trained to adhere to the minimum PIANC guidelines whilst berthing vessel to wharves. Below table summarizes the minimum PIANC recommended design berthing velocity under favorable weather conditions which is applicable for Singapore.

<table>
<thead>
<tr>
<th>Vessel displacement in tonnes</th>
<th>PIANC recommended design berthing velocity (meter/sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 10,000</td>
<td>0.2 – 0.16</td>
</tr>
<tr>
<td>10,000 – 50,000</td>
<td>0.12 – 0.08</td>
</tr>
<tr>
<td>50,000 – 100,000</td>
<td>0.08</td>
</tr>
<tr>
<td>Over 100,000</td>
<td>0.08</td>
</tr>
</tbody>
</table>

Anchorage – There are 34 designated anchorages in Singapore and depending on the vessel’s condition of draft, cargo onboard, air draft, etc MPA allocates the anchorage area to vessels. For more details on the anchorage please refer to Port Information Booklet, Admiralty Sailing Directions and Routeing Chart. Vessel’s agents will keep them advised of the anchorage allocated to the vessel and make arrangements for the necessary port formalities.

Mooring Configuration – Please refer to detailed mooring arrangement plans detailed in the Part M at the end of this booklet.

Water Density – The approximate water density alongside our wharves is 1.023.

PUMPING OVER TIDE IS NOT ALLOWED
PART A
SAFETY REQUIREMENT

GENERAL

1. Responsibilities for the safe conduct of operations on board the tanker whilst at the Bukom Wharves / SBM rest with the Master. Furthermore, since the Terminal’s personnel and property and other shipping may also suffer serious damage in the event of an accident onboard your tanker, the Terminal requires the Master’s full co-operation and understanding of the safety requirements set out in the Ship / Shore safety check list.

2. The safety requirements set out in the check list are based on safety practices widely accepted by the oil and tanker industries. The Terminal accordingly expects the Master and the crew of the tanker to adhere strictly to such practices throughout the tanker’s stay at the Bukom Wharves / SBM. For its part the Terminal will ensure that its personnel do likewise and will co-operate fully with the Master in the mutual interest of a safe and efficient operation.

3. In order to ensure compliance with these safety requirements, the Shore Loading Officer shall, before the start of operations and thereafter from time to time during cargo operations, join one of the tanker’s officers in a routine inspection of cargo decks and accommodation spaces. The Master shall make an officer available for this inspection.

4. If the Master or any of his crew observe any infringement of these safety requirements by the Terminal’s staff or agents onboard the tanker. The master shall bring this to the attention of the Duty Marine Officer (DMO) who will act as the master’s contact with the Terminal during the tanker stay at the berth.

5. As part of the Terminal’s commitment to Shell’s vetting system, a Terminal inspection may be carried out during cargo operations. A report will be forwarded to the Managers of the vessel for corrective action which will be verified again during the vessel’s next call to Bukom Terminal.

6. No fire-fighting or lifesaving appliances may be immobilised and/or removed for servicing ashore whilst at the Bukom Wharves / SBM, unless temporary substitute equipment is provided. Such equipment must be in its proper place and maintained in a state of readiness for immediate use.

7. If the Master feels that any immediate threat to the safety of the tanker arises from any action on the part of the terminal or from any equipment under its control, the Master shall be entitled to demand immediate cessation of operations.

WARNING: In the event of continued or flagrant disregard of these safety requirements by the tanker, the company reserves the right to stop all operations and to order the tanker to vacate the berth to enable appropriate remedial action to be taken by the Owner and / or Disponent owners of the ship.

INCIDENT REPORTING

In the event there is an incident onboard whilst a vessel is at the terminal, the incident report should be used in order in order for the terminal to render support and reduce the potential impact on operations.

ACCEPTANCE CONDITIONS

All tankers nominated for the Terminal must be capable of operating within the physical limitations of the berth as detailed in attached mooring plans

All tankers must declare the main engines can operate full astern, mooring arrangements meet OCIMF guidelines, and that the crane is operational to the stated SWL limitation. In addition to any other conditions which may be prescribed by regulation, law or enactment, any and all facilities and assistance of any sort whatsoever provided by the terminal in connection with the terminal facilities whether or not any charge is made by the terminal therefore, are provided subject to the following conditions:

Shore Loading Officers / Mooring Masters are deemed to be servants of the tanker owner, and neither the terminal nor their servants, agents or contractors (in whatsoever capacity they may be acting) shall be responsible for any loss, damage or delay arising from the use of the Terminal by any tanker including but not limited to any assistance, advice or instructions given or tendered in respect of any tanker, whether by way of pilotage or berthing services, the provision of navigational facilities, including buoys or other channel markings or otherwise, even if such loss, damage or delay shall have been caused wholly or partly by the negligence or other default of either the terminal, it’s servants, agents or contractors. In all circumstances the Master of any tanker shall remain responsible on behalf of his owners for the safety and proper navigation of his tanker.
PART B
REGULATIONS FOR VESSELS

All vessels are expected to have on board the latest edition of the “INTERNATIONAL SAFETY GUIDE FOR OIL TANKERS AND TERMINALS”. In case of any problems, ring Telephone No: +65 6263 4424 or contact Bukom on VHF Channel 19 or the Ship/Shore frequency walkie-talkie.

DRAFT FOR BERTHING/ UNBERTHINGS

For safety of navigation, all vessels are to maintain appropriate positive draft forward and propeller more than 90% immersed when berthing or unberthing.

MOORINGS

Ranging of the ship is to be prevented. Attention should be given to the movement of the ship caused by currents or tides and the cargo operation in progress. Moorings should be adjusted throughout the vessel’s stay. The tidal range at springs is approximately 3.3 meters and current velocities can approach 3.0 knots. At Wharf 10, the west going current has a tendency to move the vessels off the jetty. It is therefore essential that wire ropes and fibre rope should not be used together in the same direction. Moorings lines of the same size and material must always be used for all leads in the same service and all moorings should be in good condition. The Master is responsible for ensuring that the ship remains securely moored throughout the stay alongside. The Master must ensure that all moorings are regularly tended and maintained in a taut condition.

In order to safeguard against injury to the mooring crew handling vessel’s ropes / wires to the shore bollards, vessel should not start heaving until they receive a positive confirmation from the mooring crew that the line has been put / removed from the shore bollard / quick release hook. The mooring crew once clear from the shore bollard would signal the vessel to commence heaving by use of a whistle and marshalling baton. During master-pilot exchange the pilot will again discuss this procedure with the Master to ensure compliance.

The minimum moorings required at each end of a vessel berthed alongside Bukom Wharves are as follows:

Vessels less than 5,000 GRT: 2 breast, 2 spring
Vessel between 5,000 GRT to 15,000 GRT: 2 head/stern, 2 breast, 2 spring
Vessel more than 15,000 GRT: 3 head/stern lines, 2 Forward/Aft breast lines, 2 Forward/Aft spring lines.
(For wharf 10: 3 head/stern lines, 3 Forward/Aft breast lines, 2 Forward/Aft wire spring lines with rope tails removed).

HMPE (High Modulus Polyethylene) ropes can be considered as equivalent to wire ropes.
Note: For ship > 15,000 GT calling to Wharf 10 equipped with HMPE rope springs, it can be considered as equivalent to wire spring lines and nylon tails where fitted, must be removed.

For further information including position of fenders and mooring fittings please refer to mooring arrangements detailed in the Mooring Plans in Appendix I.

As recommended by OCIMF we prefer to maximize the advantage in the use of breastlines over the use of head and stern lines. This practice will also further reduce the necessity to criss-cross mooring lines of vessels berthed at adjacent wharves.

Ships fitted with automatic tension winches should not use winches on “automatic”. The manual winch brakes should be applied and the moorings lines are to be made fast on bitts and not on drum ends and being attended to frequently.

Ships that are equipped with wire back springs that are fitted with nylon tails must remove these nylon tails before they are berthed at Wharf No. 10.

EMERGENCY TOWING WIRES

Embracing the information paper and risk analysis by OCIMF, the terminal does not require rigging of emergency towing off pennants (Fire Wires) on the offshore bow and quarter.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

The following minimum dress code shall be adhered to by ship’s personnel while on duty alongside Bukom wharves and SBM:

- Boiler suit or trousers and long-sleeved shirt.
- Suitable safety helmet
- Safety shoes or boots with steel toe caps.
- Life jacket or buoyancy aid when working outside safety rails.

With the exception for carrying out tasks critical to vessel’s safe operations at our terminal, it is prohibited to work outside the safety handrails or overside. It is also prohibited to enter any enclosed space such as tanks and void spaces for the purpose of inspection or climbing masts for carrying out inspection / maintenance. Working aloft is prohibited whilst alongside Bukom wharves.
Personnel engaged in operations are actively encouraged to utilise PPE to the fullest extent during cargo transfer, hose handling and mooring operations. This includes the wearing of safety helmets and safety goggles. Ships should establish the PPE requirements for visitors and these should include appropriate clothing, safe footwear and safety helmet.

SAFE ACCESS

Where possible, shore gangways will be made available; failing which ship must provide a gangway. Ships must secure a safety net under the gangway. If shore gangway is used, ship to provide a strong landing point for the shipboard end of the gangway and a bulwark ladder where applicable. The provision and use of the shore gangway is on condition that users of gangway do so at their own risk.

SEPL shall not be liable to the vessel, master or any party in respect of any injuries, claims, damages or liabilities arising out of the use of the gangway regardless of the cause of such injuries, damage or liability.

An accommodation ladder or pilot ladder should be kept rigged on the offshore side but due to security concerns raised to deck level when not in use and deployed only when necessary.

SHIP READINESS

The ship must be able to move under its own power at short notice. Where a tug is required to stay alongside a dumb barge, it must remain completely clear from the cargo tank area of the barge (i.e. the part of the deck enclosed by the oil-spill containment plate).

Shipmaster and persons in charge of vessels should be mindful of sudden onset of gusty winds during a thunderstorm. The preparation should include putting the ships’ engine on standby and prepare to stop cargo if necessary. Shipmasters can visit the National Environment Agency (NEA) website at http://www.weather.gov.sg/wip/web/home/further_outlook for the weather forecast and outlook in Singapore. Singapore Port Operations Control Centre is also promulgating the weather outlook regularly on VHF 09.

SHIP-SHORE SAFETY CHECKLIST

As part of the pre-cargo meeting onboard, all vessels berthing at Bukom cargo handling wharves are required to complete a ship-shore safety checklist prior starting cargo operation. Latest revision of ISGOTT should be referenced for the format and contents of the ship-shore safety checklist. Repetitive checks shall be conducted at 3 hours intervals or lesser if deemed appropriate on a risk based approach. Repetitive checks will continue to be carried out even if cargo operations are complete and vessel stays alongside awaiting their turn to depart Bukom.

DECK WATCH

Cargo operations should be under continuous supervision. Vessels are to have on board at least one Senior Deck Officer (Master or Chief Officer) and one Senior Engineer (Chief or Second). In addition, sufficient Officers/crew should be retained onboard to cope with any emergency situation.

All personnel should be familiar with the dangers of the products handled. The handling of cargo must be supervised by a responsible ship’s Officer. Ship’s personnel must not be allowed to take charge of cargo operations or other tanker activities when they are in an intoxicated state or under the influence of drugs.

COMMUNICATIONS

Ship/shore communication in respect of cargo operations is primarily by a walkie-talkie radio set on a dedicated frequency loaned to the ship during her stay alongside. Bukom Oil Movements Control Room will use the call sign “Movements Control”. Secondary means of communication will be via VHF Channel 19. If communications by means of the walkie-talkie fails then vessels should re-establish communication by calling “Bukom Operations” on VHF Channel 19.

The shore walkie-talkie has an emergency trip switch incorporated within it, and in which is linked to the shore loading pumps. In an emergency loading can be remotely tripped with this emergency trip switch function by turning the channel switch to No.16 and depressing the talk button.

It is essential that a listening watch is maintained throughout by the responsible Officer.
ENVIRONMENTAL CRITERIA FOR SUSPENDING OPERATIONS

Vessel is to monitor environmental conditions and following is the criteria for suspending operations:

<table>
<thead>
<tr>
<th>Wind Speed</th>
<th>Suspend Cargo Operations</th>
<th>Disconnect Loading Arms/Hoses</th>
<th>Vessel depart Berth (if safe to do so)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Still Air Conditions</td>
<td>25kts</td>
<td>30kts</td>
<td>35kts</td>
</tr>
<tr>
<td>Electrical Storm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Irrespective of measured wind speed, if either the ship’s Master or the Terminal representative considers that the prevailing conditions potentially threaten the safety of operations, transfer should be suspended and hoses disconnected.

During electrical storms, the handling of volatile petroleum, loading non-volatile petroleum into non-gas free tanks, ballasting into non-gas free tanks, inert gas purging, tank cleaning or gas-freeing after the discharge of such cargoes should be stopped and all tanks’ openings and vent-line valves closed. Any visual sight of lightening in the vicinity must be immediately informed to Movements Control Room (MCR). It is the joint responsibility of the vessel and terminal, whoever first sights presence of lightening, must call to stop cargo operations due to safety reasons. Stoppage of cargo operations may be initiated by either the vessel or Movements Control Room.

OPERATIONAL PROCEDURES

The ship/shore safety checklist will apply throughout the ship’s stay alongside. All procedures in respect to the handling of cargo or of ballast, including precautions, should be established and agreed to during the pre-planning discussion. Any proposed changes or deviation to operational plan should be laid down in writing.

The initial and maximum loading rates, topping off rates should be agreed, having regard to:

1) The maximum allowable pressure and flow rate.
2) Avoiding accumulation of static electricity.
   - If the static accumulation properties of the substance handled and the situation in the tank so requires, no conducting object (notably metallic sounding rods, sampling apparatus, steel ullage tapes and synthetic fibre ropes) should be inserted into that tank during loading and during a period of at least 30 minutes after the cessation of loading (applicable to non-inerted ships only). Synthetic fibre ropes should not be used with sampling cans or other sounding equipment.
   - Clean ballast on board may be pumped overboard on the offshore side of the jetty. The taking of ballast into segregated ballast or cargo tanks should be discussed and agreed with terminal before commencement of pumping.
3) The ship should advise the terminal at least 15 minutes before the final tanks to be topped off and request the loading rate to be reduced sufficiently to permit effective control of the flow on board.

In the case where the ship encounters difficulty with ship/shore walkie-talkie communication, the ship should use the VHF on channel 19 or activate the remote emergency shutdown device.

DRY CERTIFICATES

Ships are advised that Terminal staff or their representatives will not sign any ‘Dry Certificate’ or other documentation attesting to the condition of ship’s tanks on completion of discharge.

FIRE FIGHTING EQUIPMENT

Fire fighting equipment, fire hoses and extinguishers are to be positioned near the manifold. Fire main systems should be pressurised, or be capable of being pressurised at short notice. Ensure that fire mains can be connected utilising the international ship/shore connection.

SCUPPERS, DRIP TRAYS, UNUSED CONNECTIONS AND OVERBOARD DISCHARGE VALVES

All deck scuppers should be effectively plugged. Accumulation of water should be drained off periodically. Where LPG is being handled, the scupper may be kept open, provided that fire main pressure is available in the vicinity of the manifold.

The ship should be provided with fixed drip trays.
On unused cargo and bunker connections, blank flanges should be fully bolted.
Sea and overboard discharge valves when not in use should be closed and lashed.
When lashing is not practical, as with hydraulic valves, some means of notable indication be used to ensure that the valves remained closed.

TANK HATCHES

Entry into any cargo tank, ballast tank, void space, and cofferdam is not permitted and tank hatches or any opening to remain securely closed.
TANK VENTING
Pressure/vacuum relief valves setting and the associated vent system should be checked before operations. During cargo operations, the pressure/relieve valves or other approved venting system must be set in the Operational mode as specified in the manufacturer's manual. Ships carrying low flash cargo (Flash point less than 60°C closed cup method) and all vessels fitted with closed ullaging and an approved venting system are to practice closed loading / discharging unless otherwise agreed.

Where vessel is carrying / discharging cargo high in gaseous H2S in the ullage space, inert gas system pressure in the cargo tanks should be adjusted to avoid venting tank vapour to the atmosphere.

Ship using inert gas must ensure that they follow their inert gas manual. If any part of the inert gas system should become defective then cargo operations must be stopped immediately.

Attention is drawn to the dangers of pyrophoric iron sulphide. For reference see Part F.

TANK CLEANING
Tank cleaning, purging, gas freeing or inerting is not allowed alongside any berth or SBM.

ELECTRICALLY OPERATED EQUIPMENT
Hand torches, portable UHF/VHF Walkie-Talkie, radiotelephone sets, hand phones, Cameras and other battery-powered equipments must be of an approved design or of an intrinsically safe type when used outside accommodation areas of the vessel. The ship’s main radio transmitter should not be used. The main transmitting aerials must be disconnected and earthed. The ship’s radar installation should also be not used without authority from shore. The use of portable electrical equipment on wandering leads is prohibited. The use of hand phones and pagers outside accommodation areas onboard vessels or in the terminal is prohibited unless these equipments are intrinsically safe and approved by Bukom. All ship’s visitors including agents, surveyors and superintendents with non-Bukom approved hand phones and pagers must surrender these at Bukom’s security checkpoint prior to boarding the vessel at the berth. These equipments may be collected upon returning of the visitor’s pass before departure from Bukom.

For transit through processing areas and other hazardous areas, the terminal has a stringent procedure detailing the requirement for Portable Electronic Products. This is especially relevant to cargo surveyors and agents who are authorised to access the vessel from shore side. They have to undergo a Safety Induction Course where the requirements are detailed to them. Ship’s staff is not allowed to transit through the refinery areas.

SMOKING AND NAKED LIGHTS REQUIREMENTS
Smoking on board may only take place in rooms specified by the Master in consultation with the terminal. No smoking is allowed on the jetty or in the refinery area. Notice specifying the Approved Smoking Places shall be conspicuously exhibited on the door of the approved smoking places when vessel is alongside. Places which are directly accessible from the outside should not be designated as places where smoking is permitted, in the designated smoking place, all ports should be kept closed and doors into passageways should be kept closed except when in use.

Open fire cooking (gas cylinders) is banned. Maintenance or repairs involving welding, burning, the use of abrasive tools, chipping or scraping, is prohibited.

SECURITY
Pulau Bukom is gazetted as a protected place under associated Regulations and in accordance with this Act, the islands of Pulau Bukom Besar, Pulau Bukom Kechil, Pulau Ular, SBM and the reclaimed areas adjoining Pulau Bukom Kechil and Pulau Ular are designated a ‘restricted zone’ and unauthorised access is an offence.

In line with the ISPS Code, the following three security levels are adopted:

a) Security Level 1 – Normal – The level for which standard security measures shall be maintained at all times.

b) Security Level 2 – Heightened – The level for which appropriate addition measures shall be maintained for a period of time as a result of heightened risk of a security incident. For the Petroleum Berth, this will include additional security guards and patrols with greater scrutiny of port users.

c) Security Level 3 – Exceptional – The level for which further additional security measures shall be maintained for a limited period of time when a security incident is probable or imminent, although it may not be possible to identify the specific target. For the Petroleum Berth, this may result in the removal of a ship from the berth or the delay in a ship berthing.

In order that ship and Port security plans can be coordinated, information will be exchanged during the pre-transfer conference. Only authorised persons, or those with entry permit issued by the Terminal, shall be allowed access to the Installation Area and such persons must comply with any restrictions imposed upon them.
As non-authorised personnel who include ship’s personnel are not allowed to walk through the shore installation, landing at Bukom or transit via the installation by ship’s crew or agent or any other non-terminal staff onward to Singapore is not permitted. Agents, however, can have access to the vessel or arrange liberty boat for crew via the offshore side, provided an approved launch is used and prior written approval is obtained from Duty Marine Officer and Bukom Police for each and every visit. Approval will only be granted on a case-by-case basis subject to a security assessment. Such visit shall be reduced to a minimum and boat services during dark hours should be avoided as far as possible. Subject to the above, all other small craft will not be allowed to come alongside any vessel at Bukom at any time.

The use of cameras or video cameras anywhere on Bukom is prohibited. It is prohibited to take any photographs or videos of the shore facilities.

The use of boats as a means of transport between a ship alongside and Singapore is prohibited except where boats have been arranged by the Master/Agent and have obtained prior written clearance from Duty Marine Officer and Bukom Police. For additional guidance on this, please refer to Part E.

**INSULATING SHIP/SHORE CONNECTIONS**

Insulated flanges are fitted on all shore hoses and bonding wires are not to be used at Bukom wharves.

**GARBAGE**

No garbage, hot ashes or other hazardous materials nor shall any other objectionable materials, either solid or fluid, be thrown overboard or discharged from the vessel at Bukom. All bio-degradable garbage is to be stored in bins with tight-closing lids or wrapped up in tough plastic bags for disposal into garbage barge at the anchorage.

**PREVENTION OF SPARKING AND EXCESSIVE FUNNEL SMOKING**

Soot blowing is prohibited. Excessive funnel smoking or any sparking must be stopped immediately.

**CONCURRENT BUNKERING**

Ship’s own use bunkers are not available ex-pipeline from the wharves; however, subject to meeting terminal requirements, bunkers can be supplied through approved bunker barges for vessels alongside wharves 5, 6, 7, 8, 10 and SBM. An advance clearance is required from the Marine Department for supply of bunkers. Except at the SBM, bunkering is only permitted during daylight hours. Concurrent bunkering should not cause any delay to vessel operations of loading / discharging at the wharves.

Terminal reserves the right to cancel / stop bunkering operations. Any non-compliance to terminal requirements can lead to the receiving vessel and bunker barge to be ordered to vacate berth, any delay thereof will not be for terminal account.

Master is solely responsible for the safe conduct of bunkering operations whilst alongside Bukom wharves including conduct of the bunker barge.

During concurrent bunkering operations alongside Bukom wharves, shore leave is not permitted and sufficient crew is to be available onboard. Bunkering operations is to be supervised by an officer other than the one responsible for cargo operations. Crane operator should have adequate experience and training; lifting operations is to be supervised by a qualified Officer. Prior operation of crane, permission is to be sought from “Movement Control” and slewing of crane is only permitted on the offshore side and never over the hoses / cargo arms. SOLAS approved lifejackets to be used by all personnel transferring between the receiving vessel and bunker barge. It is an exquisite requirement that sailing of bunker barge should not be delayed for whatsoever reason including quantity disputes. Quantity disputes if any should be resolved post cargo operations after shifting to an anchorage area.

For any emergency between the vessel and bunker barge, please cease bunkering operation and inform “Movement Control” Receiving vessel is responsible to keep “Movement Control” advised of tentative finishing times of bunkering operations and sailing time of bunker barge.

**SLOPS AND DIRTY BALLAST**

Shore facilities are available for slops and dirty ballast, subject to a maximum of 400 metric tonnes. A fee of S$5,000 is charged for each slops discharge to Bukom. Receipt of slops is conditional upon availability of shore ullage and vessel’s acceptance to all provisions as stipulated in the ”DISCHARGE OF SLOPS” Form. Receipts of slops are subject to a satisfactory sample testing and time spent for testing will not be for our account. Discharge of slop must be carried out under inert conditions if the nature of slops is ex-previous cargo crude or volatile products. Pumping and draining of slops into the Terminal’s manifold drip pit is not allowed. ENGINE ROOM SLOPS are not acceptable. Discharge of volatile slops at Wharf 10 is not allowed.

**H2S GAS RELEASE (FOR VESSELS AT WHARF 7 & 8)**

The SRU (Sulphur Recovery Unit) and the Super Claus are situated at Rd. 166 that is opposite to Wharf 7 & 8. The SRU and Super Claus operate continuously on a 24-hour basis and H2S gas is stripped in a close loop system. Precautions are taken to prevent any leakage of H2S gas. However in the event of any H2S gas leak, an alarm (howler) will be sounded to indicate the
emergency. The howler will sound a two-tone hooting alarm. The howlers are located at the entrance gate of Wharf 8 and at Rd 166 between Wharf 7 & 8 and between Wharf 8 & 9.

In the event of such emergency you are advised to take the following action:
1. Alert your crew and all others to remain onboard and inside the accommodation with all the openings closed and standby.
2. Notify other personnel onboard e.g. surveyor, shipping agent to refrain from leaving the vessel or Wharf and keep away from Rd. 166 (the road off Wharf 7, 8, 9).
3. Stop cargo operations until emergency all clear is given.
4. Ensure all external doors are shut and air-conditioning unit in internal circulation mode.
5. Take all precautions to prevent ingress of leaked gas into ship’s accommodation.
6. Maintain listening watch on ship/shore radio and VHF Channel 19.

Note: In a very serious gas release you will be advised by shore personnel regarding movement of your vessel for safe evacuation.

**HFA GAS RELEASE (FOR VESSEL AT WH13)**

The HFA (Hydrofluoric Alkylation Unit) are situated along Rd 80 that is directly opposite Wh13. The HFA unit operates continuously on a 24-hour basis and uses Hydrofluoric acid as catalyst in a close loop system. Precautions are taken to prevent any leakage of hydrofluoric hydrocarbon gas. However in the event of any HF gas leak, Bukom General Siren alarm will be sounded to indicate the emergency and terminal will inform vessel accordingly.

In the event of such emergency you are advised to take the following action:
1. Alert all your crew and all others to remain onboard and inside the accommodation with all openings closed and standby.
2. Notify other personnel onboard e.g. surveyor, shipping agent to refrain from leaving the vessel or wharf and keep away from Rd 51 and Rd 80.
3. Stop cargo operations until emergency all clear is given.
4. Ensure all external doors are shut and air-conditioning unit in internal circulation mode.
5. Take all precautions to prevent ingress of leaked gas into ship’s accommodation.
6. Maintain listening watch on ship/shore radio and VHF Channel 19.

Note: In a very serious HF gas release you will be advised by shore personnel to go into “Dead Ship Mode” condition.

**IGS**

a) Vessel fitted with inert gas system should comply with Safety of Life at Sea Convention (SOLAS) 1974 as amended and before berthing Bukom should inert cargo tanks as required.
b) Vessels that are not fitted with IGS, will continue to be permitted to load volatile cargoes (flash point below 60 Deg. C close up). However, must ensure ISGOTT guidelines are complied with in full and that vessel should be loading under closed loading system.

**AFTER BERTHING**

a) Vessel to rig safety net onto gangway after it is positioned ready for use except for wharves where telescopic gangway has been installed.
b) Vessel is to provide necessary support by means of ship’s crew and equipment to assist when connecting / disconnecting shore hoses / loading arms to ship’s manifold.

**H2S PRECAUTIONS**

All crudes received at Bukom are suspected to contain H2S. It is important to distinguish between concentrations of H2S in the atmosphere, expressed in ppm by volume, and concentrations in liquid, expressed in ppm by weight. The H2S concentration in the liquid phase does not alone determine the concentration in air. In view of high levels of hydrogen sulphide (H2S) detected in crude, fuel oil and Bitumen cargo ullage spaces, please monitor ullage space atmosphere by suitable means, eg Draeger tubes, to determine level of H2S and take the necessary precautions as required and advise Terminal.

For vessels calling wharf 10 for loading or discharging and for vessels coming to load at any of the Bukom wharves, H2S concentration should be purged as low as possible but not more than 5 PPM. Additional tank atmosphere controls also apply to vessels calling at wharf 10 which are detailed in the section earlier under Safety at Wharf 10.

For vessels coming to discharge at wharves other than wharf 10, subject to prior written approval from Duty Marine Officer, vessels arriving with high H2S (>10 PPM) in their ullage spaces would be berthed subject to following conditions being met:

1) Discharge operation is to be carried out at a wharf clear from Bukom’s residential blocks and offices.
2) Vessel’s IG system is to be fully operational and under normal circumstances, venting of cargo vapor is not permitted from vessel.
3) Vessel is to conduct risk assessment against potential exposure of H2S to personnel / visitors and implement required control measures to reduce the risk to ALARP.
4) In addition guidance given in ISGOTT 5th Edition, section 2.3.6 and in particular section 2.3.6.7 should be complied.
5) All delays herewith with any additional measures taken due to the nature of this cargo will not be for Terminal’s account.
Prior written approval should be applied through the Duty Marine Officer and the following documents submitted for review:
1) H2S content in the vapor space of cargo tanks
2) MSDS for the cargo
3) Risk Assessment as required above

Except where it is not permissible to have H2S in vapor space of >5 PPM, following precautions need to be adhered to for when handling crude oil, fuel oil and products containing high levels of H2S (>10PPM in the vapor space) at the SBM and alongside wharves:

- Cargo Surveyors, Agents and all other personnel on the vessel are to be warned of H2S content of cargo prior to proceeding to the vessel.
- Tool box meeting to be carried out with all personnel involved in the cargo operation.
- The vessel should display a warning sign “H2S Danger” at the ship’s gangway entrance.
- 2 Self-Contained Breathing Apparatus (SCBA) sets with spare cylinders and 2 EEBD sets are to be provided by the vessel and stationed at the manifold area.
- All personnel working on deck must wear personal H2S gas meter.
- If the H2S personal gas meter alarm is activated while onboard the vessel, all personnel are to immediately evacuate the area and proceed to a safe location upwind of the H2S source.
- Personnel should always be on the upwind side when sampling, ullaging, ROB dipping and connecting/disconnecting hoses. When for operational reason (example hose connection disconnection) it is not possible to stand upwind, then all efforts should be made to stand crosswind but never in the down wind direction.
- Closed Loading Operations - All cargo operations by vessels calling at Bukom wharves and SBM require to be carried out under “Closed” condition. If for any reason “Closed” operations cannot be maintained, all cargo operations are to be stopped and Duty Marine Officer is to be contacted immediately for advice. In no case what so ever, should cargo operations proceed without it being carried out under closed conditions. If the defect cannot be rectified, consideration is to be given to shift vessel to anchorage to enable repairs.
- Sampling, ullaging and ROB dipping - If for any reason, a vapor free atmosphere cannot be guaranteed during sampling, ullaging and ROB dipping, the task should be suspended and Duty Marine Officer is to be contacted immediately for advice. Task is to only proceed after a thorough risk assessment is completed and mitigations verified by the SBM Duty Officer / Shore Loading Officer. In such case where a vapor free atmosphere cannot be guaranteed, donning of SCBA sets is mandatory for all personnel directly exposed to the H2S vapor during the sampling operation.
- Hose Connection / Disconnection – Before initiating connection / disconnection of loading arm / hoses it is imperative that it is positively ascertained that all isolation valves are holding and the line section is well drained with no remaining cargo in the pipe section outboard of the ship’s manifold valve. In order to test for a well-drained manifold section and a vapor free atmosphere, the manifold drains and pressure gauge can be used to ascertain condition. If a pressure / presence of cargo is detected then draining through closed ship system is to continue till a well-drained condition can be positively verified. If in any event that a vapor free atmosphere cannot be reached (example presence of cargo / pressurized vapor when removing manifold blanks for connecting the cargo hose / loading arm, draining manifold lines to open containment, etc.), the connection / disconnection of loading arm / hoses is to be suspended and Duty Marine Officer is to be contacted immediately for advice. Task is to only proceed after a thorough risk assessment is completed and mitigations verified by the SBM Duty Officer / Shore Loading Officer. In such case where a vapor free atmosphere cannot be guaranteed, donning of SCBA sets is mandatory for all personnel directly involved in the hose connection / disconnection.
- For the aforementioned operations, vapor free condition means when there is minimal release of vapor such that the LEL is less than 2% and the H2S content less 5 PPM in the immediate vicinity.
- Personnel required to use SCBA should be trained in its use and in the event that personnel normally performing the task / those present at work site are not trained, then the job is to be kept suspended till suitably trained personnel can be identified to carry out the task (vessel staff may be considered).
- No personal visitors allowed to the vessel. If essential to the vessel’s operations, visitors to the vessel on business are to be instructed by vessel agents and Master of the presence of H2S.
- Vessels with H2S in their vapor space >10 PPM should arrive at the terminal with cargo tanks pressure at acceptably low limits to avoid accidental / intentional release of gas. It should be noted that the tank vapor pressure will rapidly increase if vapor space is exposed to heat or the product is agitated. The low cargo tank pressure in cargo tank will ensure that any increase in tank vapor pressure stays below the PV valve setting for venting and thereby does not necessitate venting whilst the pre-cargo operations activities like gauging, ship shore conference and hose connection is completed. All efforts should be made by all parties to start the cargo with the minimum delay after berthing.
- When loading high H2S cargoes to vessels at wharves / SBM, Mode of venting is to be agreed with terminal representatives (loading master/shore or marine officer). Venting to the atmosphere from a relatively low tank pressure should be avoided, particularly in calm wind conditions. Cargo loading should be stopped if there is no wind to disperse the vapors or if the wind direction takes cargo vapors towards the accommodation.
- During discharging cargo tank pressure from the Inert Gas system should be such maintained that there is no need to do any venting during the cargo operation. Taking in view that excessive cargo vapors will be generated during Crude Oil Washing (COW), the tank pressure should be maintained in the lower range such that during the entire crude oil washing the tank pressure does not exceed safe limit necessitating venting to release the tank pressure. Certain crudes are not fit to do crude oil washing (example Maya Crude) and permission for COW will be declined by the Marine Department. For grades, where COW is permitted, it should be planned such that most of the COW is done concurrently with discharge and tank pressure controlled to eliminate the need for any venting. If venting is required to be carried out then all personnel onboard and on deck should be informed and exposure on deck during the venting should be minimized having only minimum required staff on deck standing upwind and clear of the venting area. In still air conditions, consideration should be given to stopping cargo operation.

Updated: May 2016
PART C
RESPONSIBILITIES

JURISDICTION

The Pulau Bukom Terminal is within the jurisdiction of the Maritime Port Authority, Singapore and officers may board arriving ships at random to undertake safety and anti-pollution inspections.

CONDITIONS OF SHIP ACCEPTANCE

Ships are accepted at the Pulau Bukom Terminal on the understanding that operations will be conducted in accordance with all applicable legislation, together with practices contained in relevant Codes of Practice, in particular, the guidance contained within the latest edition of the International Safety Guide for Oil Tankers and Terminals (ISGOTT).

Ships found deficient on arrival may be subject to refusal until the deficiencies have been rectified.

RESPONSIBILITIES

As stated in the Safety Letter, responsibility for the safe conduct of operations whilst the ship is at the Pulau Bukom Terminal rests jointly with the Master of the ship and with the responsible Terminal Representative. Emphasis is placed on the fact that the completion of a safe and successful cargo transfer operation is dependent upon effective Co-operation, Co-ordination and Communication between all parties involved. All operations should be conducted in the spirit of this mutual agreement.

RESPONSIBILITY FOR LOADING

Ship's personnel are advised that responsibility for the loading operation on board the ship rests solely and absolutely with the Master. It is the responsibility of the ship's personnel to operate valves and to ensure safe and secure connection of all transfer equipment to the ship's manifold.

Ship's personnel are advised that the responsibility for the discharge or escape of oil from a vessel rests with the ship. In the event of a prosecution being taken by the appropriate authorities, heavy penalties together with liability for dispersal costs and damages for pollution damage, is provided for by legislation.

RESPONSIBILITY FOR UNLOADING

Ship's personnel are advised that responsibility for the unloading operation on board the ship rests solely and absolutely with the Master. It is the responsibility of the ship's personnel to control pumping rates, to operate valves and to ensure safe and secure connection of all transfer equipment to the ship's manifold.

Ship's personnel are advised that responsibility for the discharge or escape of oil from a vessel rests with the ship. In the event of a prosecution being taken by the appropriate authorities, heavy penalties together with liability for dispersal costs and damages for pollution damage, is provided for by legislation.
PART D
SHELL’S HSSE COMMITMENT & POLICY

SHELL’S COMMITMENT

Shell has a commitment and Policy on Health, Security, Safety, the Environment and Social Performance. In Shell we are all committed to:

- Pursue the goal of no harm to people
- Protect the environment
- Use material and energy efficiently to provide our products and services
- Respect our neighbours and contribute to the societies in which we operate
- Develop energy resources, products and services consistent with these aims
- Publicly report on our performance
- Play a leading role in promoting best practice in our industries
- Manage HSSE & SP matters as any other critical business activity; and
- Promote a culture in which all Shell employees share this commitment

In this way we aim to have a Health, Security, Safety, the Environment and Social Performance we can be proud of, to earn the confidence of customers, shareholders and society at large, to be a good neighbour and to contribute to sustainable development.

SHELL’S POLICY

Every Shell Company

- Has a systematic approach to HSSE & SP management designed to ensure compliance with the law and to achieve continuous performance improvement
- Sets targets for improvement and measures, appraises and reports performance
- Requires contractors to manage HSSE & SP in line with this policy
- Requires joint ventures under its operational control to apply this policy, and uses its influence to promote it in its other ventures
- Engages effectively with neighbours and impacted communities; and
- Includes HSSE & SP performance in the appraisal of staff and rewards accordingly

Originally published in March 1997 and updated by the Executive Committee December 2009

LIFE SAVING RULES

Shell’s 12 Life-Saving Rules help keep employees and contractors safe while they work for Shell and support our Goal Zero journey. The 12 Life-Saving Rules were introduced to save lives and make Shell a safer place to work. The Life-Saving Rules set out clear and simple “dos” and “don'ts” covering activities with the highest potential for serious injury or death if safety rules are broken.

Whilst these rules are not compulsory for your officers and crew we share these Life-Saving Rules as they apply to all Shell employees and contractors when on business or on Shell sites, and at all operations under Shell’s operational control or governance.

The Life-Saving Rules support the Goal Zero journey by driving a more compliant culture, underpinned by the three HSSE Golden Rules Comply, Intervene, and Respect.
Life Saving Rules

1. Work with a valid work permit when required
2. Conduct gas tests when required
3. Verify isolation before work begins and use the specified life protecting equipment
4. Obtain authorisation before entering a confined space
5. Obtain authorisation before overriding or disabling safety critical equipment
6. Protect yourself against a fall when working at height
7. Do not walk under a suspended load
8. Do not smoke outside designated smoking areas
9. No alcohol or drugs while working or driving
10. While driving, do not use your phone and do not exceed speed limits
11. Wear your seat belt
12. Follow prescribed Journey Management Plan
PART E
ADDITIONAL CHECKS - BULK LIQUID CHEMICALS

All chemical tankers should have a copy of the following publications:

1) ICS: Tanker Safety Guide (Chemicals)
2) Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code) or

Information and cargo operations on the product to be handled should be available on board the ship and shore before and during the operation. This information should include:

a) a cargo stowage plan;
b) a full description of the physical and chemical properties, including reactivity, necessary for the safe containment of the cargo;
c) action to be taken in the event of spills or leaks;
d) counter measures against accidental personal contact;
e) fire-fighting procedures and fire-fighting medium;
f) procedures for cargo transfer.

When cargoes that require to be stabilised or inhibited are to be handled, information should be exchanged thereon.

Personnel who are required to use breathing apparatus during operations should be physically fit and trained in its safe use. Unfit or untrained personnel should not be selected for operations involving the use of breathing apparatus.

Sufficient and suitable means should be available to neutralise the effects and remove small quantities of spilled products. A suitable safety shower and eye rinsing equipment should be fitted and ready for immediate use in vicinity of places on board where operations regularly takes place.

When automatic shutdown valves are used, the cargo handling rate should be so adjusted that a pressure surge evolving from the automatic closure of any such valve does not exceed the safe working pressure of either the ship or shore pipeline system. Alternatively, means may be fitted to relieve the pressure surge created, such as re-circulation systems and buffer tanks.

Cargo system gauges and alarms should be regularly checked to ensure they are in good working order.

Suitable equipment should be available for measuring flammability. Calibration should be carried out before the operation commences.

Special attention should be given to any products that are being handled which may be water reactive or require specialised fire fighting procedures.

Hoses should be indelibly marked so as to allow the identification of the products for which it is suitable, its specified maximum working pressure, the test pressure (including the last date on which it was tested at this pressure), and if used at service temperatures other than ambient, its maximum and/or minimum service temperature.

The use of non-permanent equipment inside tanks is not permitted. The electrical discontinuity of the ship and shore pipelines should be checked. Whenever cargo hoses are used to make connections within the ship or shore permanent pipeline system, these connections should be well secured, kept as short as possible and made electrically discontinuous to the ship or shore line system respectively.
PART F
BULK LIQUEFIED GASES

All LPG tankers should have a copy of the following publications:

2) IMO: Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk; or
3) IMO: Code for Existing Ships Carrying Liquefied Gases in Bulk.

Information on the product to be handled should be available on board the ship and shore:

a) a description of the physical and chemical properties necessary for the safe containment of the cargo;
b) action to be taken in the event of spill or leaks;
c) counter measures against accidental personal contact;
d) fire-fighting procedures and fire-fighting medium;
e) minimum cargo containment system and temperature.

Personnel who are required to use breathing apparatus during operations should be physically fit and trained in its safe use.

In case where cargo tanks are permitted to have more than one relief valve setting, it should be verified that the relief valve is set as required by the cargo to be handled and that the actual setting of the relief valve is clearly marked and visibly displayed onboard the ship.

Span gas should be available to enable calibration of gas detection equipment. Fixed gas detection equipment should be calibrated for the product to be handled prior to commencement of operations. Portable gas detection instruments, suitable for the products handled, capable of measuring flammable and/or toxic level, should be available and calibrated for the product handled.

Cargo system gauges should be regularly checked to ensure that they are in good working order. The system alarm should be set to the required level.

Ship/shore emergency shutdown systems should be tested regularly.

The safe cargo-handling rate should be noted.

If a leak occurs from a pipeline the depressurising caused by the leak and the consequential cooling may cause the metal of the pipe to be lowered below its safe pressure/temperature equilibrium. In the event that this happens, the line must be allowed to “warm up”. To prevent the lines cooling below freezing point, vessels are required to have the sprinkler system immediately available for operation throughout loading and two fire hoses should be connected to the fire line so they can be sprayed on any leakage.

Fully pressurised vessels arriving from dry dock with their cargo tanks N₂ purged, the tank atmosphere composition must be less than 0.5 percent O₂ and at least a minimum N₂ pressure of 3.0kg/cm to avoid sudden “boiling” effect during initial loading. This must be certified by a recognised surveying Company.
PART G
CRUDE OIL WASH OPERATIONS

Ship must maintain a constant pollution-prevention patrol while COW is in progress.

The discharge/crude oil wash plan should include the discharge of free water plus one meter debottoming of all tanks from which crude feed for COW is to be taken.

All component parts of the inert gas system must be operational including alarm system, analysers, indicators and recorders.

Vessel must have available a crude oil washing Operations and Equipment Manual approved by the flag state administration.

The Master/Chief Officer in charge of crude oil wash operations must either:

a) hold a certificate of competency for crude oil wash issued by the ship’s flag state administration; OR

b) be able to prove at least one year’s experience on oil tankers where his duties have included the discharge of cargo and associated crude oil washing. Where his duties have not included crude oil washing operations, he shall have completed a training programme in crude oil washing in accordance with Appendix II to the Revised Specifications for the Design, Operations and Control of Crude Oil Washing System, AND he must have participated at least twice in crude oil wash programmes, one of which shall be on the particular ship for which he is required to undertake the responsibility of cargo discharge. Alternatively this latter participation may be acceptable on a ship that is similar in all relevant aspects, AND he must be fully knowledgeable of the contents of the COW. Operations and Equipment Manual.

Any other persons having particular responsibilities as defined in the Operations and Equipment Manual must prove he has at least 6 months experience on oil tankers and in the course of his duties has been involved with cargo discharge operations. He must also have been instructed in operations on this particular ship.

We wish to draw your attention to the guidelines issued by the Institute of Petroleum on Crude Oil Washing, in Petroleum Measurement Paper No. 8 dated March 1999. In order to reduce cargo loss through vaporisation and VOC emission into the atmosphere, you are hereby advised to minimise COW whilst discharging at our terminal. The minimum number of cargo tanks to COW is to comply with MARPOL and/or flag state requirements only and COW of any additional tanks to be avoided. To minimise cargo retention on board you are advised to maintain maximum safe stern trim and list vessel if required during draining and all tanks to be stripped at least twice or three times if time permits.
PART H
OTHER REQUIREMENTS

BOATS AND SERVICE LAUNCH ALONGSIDE

Except pilot boat; other boats and service launches to wharf 11 and 13 (LPG / C2 Vessel) are not permitted at any time. Similarly other small craft movements to wharf 12 when handling LPG vessel are not permitted.

Boats and service launches in hours of darkness to the wharves and SBM are to be avoided. If needed due to operational reasons / exceptional circumstances of the case, explicit prior written approval from Duty Marine Officer is required when arranging services to vessels during night hours. Day light restriction does not apply to boats arranged for cargo surveyors and vessel’s agents requiring access due to having legitimate business in connection with cargo operations onboard the vessel.

Bukom waters are prohibited areas as declared under MPA Port Marine Circular no. 21 of 2006. In all cases of boats and crafts requiring providing services to a vessel alongside at Bukom Wharf, the following procedures will apply.

1. The agent incharge of the respective vessel should make an application by email (SEPLOP-Marine-Clearance@shell.com) to Duty Marine Officer during office hours, preferably at least 24 hours before vessel’s arrival and seek approval for the services proposed to be carried out at the wharves and / or SBM. Each application will be assessed on its own merits and approval would be given to the agent with the message copied to Bukom Police. For services exempted for prior approval from Marine Department, please refer to guidelines below.

2. Closer to the date of actual berthing, agents should apply for the MPA permit and send the following documents to Bukom Police for their signature and approval:
   a. Approval email sent by Duty Marine Officer.
   b. MPA Permit Form for signature.

   On sighting the marine approval, Bukom police would sign and stamp the MPA form accordingly.

3. On the day of visit, the visitor / small craft (including those exempted from prior approval by Duty Marine Officer) is required to report to Bukom Police prior boarding. Police is to confirm verbally by telephone either from the SLO Lead (for a vessel at wharves) or the SBM Duty Officer (for a vessel at SBM) that it is in order for the boat to attend to the service applied for.

4. Following services do not require pre-approval from Marine Department with an exception for wharf 11 and 13 (LPG / C2 Vessel) and wharf 12 when handling LPG vessels, where no visitor is allowed to board or disembark from the vessel. Bukom Police would directly handle approval for services mentioned below and would sign the MPA permit form accordingly.
   a. Ship’s agent attending to vessel for arrival or departure formalities.
   b. Cargo Surveyors attending onboard the vessel for cargo operations.
   c. Crew shore leave / doctor visit (SLO Lead to be notified in advance).

5. Boats are not allowed to proceed / leave the vessel at the wharves / SBM direct from / for any other terminal or public jetties but report to inwards / outwards at Bukom Police Station, to obtain the necessary security clearance.

6. No boat will go alongside any wharf for the purpose of landing personnel or equipment onto the wharf.

7. No boat providing service to a vessel will wait alongside a wharf / SBM. Any boat providing services to a vessel on any of the Bukom wharves / SBM will attend that vessel on the seaward side only or on starboard side of vessels moored at the SBM. Alongside time should be kept to as minimum as possible and only sufficient enough to carry out the proposed services. Waiting alongside to vessels at wharves and SBM is strictly prohibited. In case of any waiting, such boat will proceed to clear the area at least 100 meters away from the vessel and wait in that area until requested by the vessel to re-approach. Only hand carried packages or equipment are allowed to be off-loaded from boats alongside the vessel.

8. Delivery of stores is only permitted for vessels at SBM after completion of cargo operations. This should not interfere with post discharge operations onboard the vessel and also not interfere / delay sailing of the vessel which is normally within two hours of completing discharge. Stores should only be picked up using the utility crane / gantry on poop deck and not the midship hose handling crane.

9. The action and behavior of any boat attending to a vessel will be the responsibility of the Master who, at all times, will remain responsible to the Terminal for ensuring that launch operation is conducted in accordance with Industry Safety Practices.

10. No smoking and no naked lights will apply to all boats and launches whilst in Bukom waters.

In connection with the foregoing, owners / agents are advised that service launch in attendance to vessels at Bukom wharves should only be considered on an exceptional basis and every effort should be made to service a vessel prior to her arrival alongside or after departure.

For easy reference, please refer to flow chart on next page:
Services proposed to be carried out at the Wharves and SBM

- Wharf 11 and 13 (LPG / C2 Vessel) and Wharf 12 when handling LPG vessel
- No Small Craft movements allowed

Other Wharves and SBM than those listed above

- Ship’s Agent, Cargo Surveyors, Crew Shore Leave, Doctor Visit

Any other services than those listed above

- Apply for Marine approval as detailed in Step 1
- If Disapproved by Duty Marine Officer – No Services Allowed
- Do not require Marine Approval

Approved by Bukom Marine

- Apply for MPA Permit as detailed in Step 2

On day of Visit / Services, Visitor / small craft to report to Bukom Police for Clearance

Bukom Police to confirm verbally by telephone either from the Assistant Shift Controller or the SBM Duty Officer (as detailed in Step 3)

After permission by Bukom Police, board vessel at Wharf / SBM (as detailed in Step 6)

On disembarking / completion of services, report to Bukom Police

Updated: May 2016
TESTING OF BUNKER TANKS

The International Maritime Organisation has recently expressed concern over the number of occasions where tankers have been found with bunker tanks containing substantial quantities of crude oil or other volatile materials added to the fuel oil. The addition of these substances has produced bunkers with flash points below the 60°C required by the SOLAS Convention, and resulting to ullage space atmospheres near to or within the flammable range.

In order to protect our terminal, we may require, as part of the pre-cargo operation ship/shore checking, to test the atmosphere of some or all of your bunker tank ullage spaces. Should a reading of 50% LEL be exceeded, we will collect samples of the oil contained in the tank for laboratory determination of flash point. In the event that this analysis shows the oil to have flash point below 60°C, all cargo operations will be suspended, and the vessel may be ordered to vacate the berth until measures have been taken to ensure bunker tank contain only bunkers with an acceptable flash point. All costs incurred will be for your Owner’s account. The Port Authority will be advised of our findings in order that they may take whatever action they consider necessary.

PRECAUTIONS TO BE TAKEN DURING DISCHARGE OF CARGO

You are reminded that the back pressure at the ship’s cargo manifold should not exceed 10.0kg/cm² at any time throughout the discharge. In the event a serious leak is found on deck lines/manifolds, you should stop cargo discharge, close manifold valves and alert Bukom Operations immediately via the Ship/Shore walkie-talkie provided.

LOADING OF HIGH VAPOUR PRESSURE CARGOES

You are reminded to refer to Chapter 11.1.8 of the International Safety Guide For Oil Tankers and Terminals (ISGOTT) latest edition that details special precautions to be taken when handling such cargoes.

PREVENTION OF POLLUTION OF THE SEA

We draw your attention to the following Government Regulations.

THE PREVENTION OF POLLUTION OF THE SEA ACT 1990 and THE MERCHANT SHIPPING (Civil Liability & Compensation for Oil Pollution) ACT 1998

In the event of any spillage of oil from a vessel, irrespective of reasons or source, the Master and Owners shall be held responsible for all expenses involved in the cleaning up of such spillage.

INSPECTORS & TECHNICIANS

Inspectors & technicians are not allowed onboard unless explicit prior approval is given by Duty Marine Officer and Bukom Police.
PART I
INERT GAS OPERATION AND PYROPHORIC IRON SULPHIDE

A. Pyrophoric iron sulphide is a recognised source of ignition in the petroleum industry. Three elements in the formation of pyrophoric iron sulphide are:

– the presence of iron oxide (rust);
– a crude oil which emits hydrogen sulphide concentrations into the cargo tank ullage space;
– a lack of oxygen in the ullage space.

Pyrophoric iron sulphide can heat to incandescence when it comes into contact with air, and is capable of igniting-flammable hydrocarbon/air mixture. The initial reduction of the oxygen level in ullage space of cargo tanks brought about by the operation of inert gas systems, combined with further absorption of oxygen by the crude oil, may promote the formation of pyrophoric iron sulphide.

In the normal operation of inerted tankers the cargo tank atmosphere is not allowed to become flammable at any time. Thus the presence of any pyrophoric deposits would not result in ignition. However, if the inert gas plant were to fail, cargo or ballast discharge would cause air to enter the cargo tanks and result in a flammable atmosphere that could be ignited by pyrophoric deposits if present.

Against this background (and following research work undertaken by major oil companies), the Oil Companies International Marine Forum (OCIMF) and the International Chamber of Shipping (ICS) recommend the following precautions for crude oil tankers with inert gas systems:

(a) Diligent maintenance of inert gas plants should be stressed.

(b) Spares should be kept on hand for critical parts which cannot be obtained quickly or which can fail abruptly, such as the blower.

(c) In the event of inert gas plant failure prior to or during cargo or ballast discharge, Terminal must be informed immediately and discharge should not commence or continue until the inert gas plant operation is restored or an alternative source of inert gas is provided.

B. Vessels fitted with an inert gas system should maintain cargo tanks in an inert condition when carrying all crude oils and when carrying products whose flash point is less than 60OC.
PART J
COMPARISON OF SHIP SHORE FIGURES AT SBM

Discharge of cargo through SBM is routed into Bukom tanks via a system of 16” to 20” floating hoses, 20” submarine hoses which are then joint via 2 plenm valves onto a 48” rigid submarine pipeline extending a distance of 5km from SBM to Bukom Kechil island (see BA 4035).

Upon starting up of cargo, the responsibility to monitor & respond to the possibilities of cargo leaks during the ship/shore interface to be jointly managed by both the ship and shore. It is therefore the Terminal’s stringent requirement that the following is adhered to all times during cargo operations:

1. Hourly rounds on deck/pump and manifold connections are maintained ship duty crew – hourly manifold pressure log is maintained by the attending Duty Marine Officer (DMO) which will be provided at end of discharge for vessel acknowledgement; SBM support craft in attendance will maintain 2 hourly surveillance patrol along pipeline and around ship for the look out of possible oil leaks during operation.

2. All vessels discharging at SBM should record and cross check ship-shore volumes during offtake. Hourly record of Ship/Shore discharged and received quantities (GSV - Cubic Meters at 15 Deg C) is to be maintained in the provided Ship/Shore comparison record sheet. Applicable differences between ship and shore timings are also to be considered to verify recorded variances. In the event of a discrepancy greater than 1.0% following mitigating measures as detailed in the flow chart is to be adopted.

3. It is therefore our requirement that should there be large variance between Ship and Shore discharged & received cargo quantity, every effort be made to investigate the matter immediately with cargo discharge operations suspended immediately with the shore informed if required.
PART L: MOORING PLAN & BERTH LAYOUT

WHARF 1E & 1W

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LEGEND

- BOLLARDS
- QUICK RELEASE HOOKS
- FENDERS
- REDUNDANT BOLLARDS/QUICK RELEASE HOOKS
- LOADING ARM
- LOADING HOSE
- DIMENSION OF VESSEL
- MOORING POINT IDENTIFICATION
PART L: MOORING PLAN & BERTH LAYOUT

WHARF 3

CARGO                  CONNECTION SIZE
ULG/ PCG/ MTBE     12”
ULG/ PCG                  12”
JET/ AVTUR              12”
FO 12”
GO/ BALLAST           12”
FO BUNKER              6”
GO/ MD                    6”

LEGEND
- BOLLARDS
- QUICK RELEASE HOOKS
- FENDERS
- REDUNDANT BOLLARDS/QUICK RELEASE HOOKS
- LOADING ARM
- LOADING HOSE
- DIMENSION OF VESSEL
- MOORING POINT IDENTIFICATION

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CARGO CONNECTION SIZE

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LEGEND

- BOLLARDS
- QUICK RELEASE HOOKS
- FENDERS
- REDUNDANT BOLLARDS/QUICK RELEASE HOOKS
- LOADING ARM
- LOADING HOSE
- DIMENSION OF VESSEL
- MOORING POINT IDENTIFICATION
PART L: MOORING PLAN & BERTH LAYOUT

WHARF 5

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LEGEND

- BOLLARDS
- QUICK RELEASE HOOKS
- FENDERS
- REDUNDANT BOLLARDS/QUICK RELEASE HOOKS
- LOADING ARM
- LOADING HOSE
- DIMENSION OF VESSEL
- MOORING POINT IDENTIFICATION
Pulau Bukom Safety & Operational Guide

PART L: MOORING PLAN & BERTH LAYOUT

WHARF 6

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LEGEND

- BOLLARDS
- QUICK RELEASE HOOKS
- FENDERS
- REDUNDANT BOLLARDS/QUICK RELEASE HOOKS
- LOADING ARM
- LOADING HOSE
- DIMENSION OF VESSEL
- MOORING POINT IDENTIFICATION
PART L: MOORING PLAN & BERTH LAYOUT

WHARF 7

CARGO                     CONNECTION SIZE
ULG/ PCG                                            10"
JET/ AVTUR                                         10"
ULG/ PCG                                            10"
ULG/ PCG                                            10"
JET/ AVTUR                                        10"
GO/ LSGO/ GO-MD BUNKER      12"/ 6"
GO/ FO BUNKER                           12"/ 6"
CRUDE/ BALLAST                                   12"

LEGEND
- BOLLARDS
@ QUICK RELEASE HOOKS
□ FENDERS
☒ REDUNDANT BOLLARDS/QUICK RELEASE HOOKS
○ LOADING ARM
○ LOADING HOSE
★ DIMENSION OF VESSEL
★ MOORING POINT IDENTIFICATION

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Updated: May 2016
PART L: MOORING PLAN & BERTH LAYOUT

WHARF 8

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LEGEND

- BOLLARDS
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- FENDERS
- REDUNDANT BOLLARDS/QUICK RELEASE HOOKS
- LOADING ARM
- LOADING HOSE
- DIMENSION OF VESSEL
- MOORING POINT IDENTIFICATION
PART L: MOORING PLAN & BERTH LAYOUT

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LEGEND

- BOLLARDS
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- FENDERS
- REDUNDANT BOLLARDS/QUICK RELEASE HOOKS
- LOADING ARM
- LOADING HOSE
- DIMENSION OF VESSEL
- MOORING POINT IDENTIFICATION
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### LEGEND
- **:BOLLARDS**
- **Quick Release Hooks**
- **Fenders**
- **Redundant Bollards/Quick Release Hooks**
- **Loading Arm**
- **Loading Hose**
- **Dimension of Vessel**
- **Mooring Point Identification**
**LEGEND**

- **BOLLARDS**
- **QUICK RELEASE HOOKS**
- **FENDERS**
- **REDUNDANT BOLLARDS/QUICK RELEASE HOOKS**
- **LOADING ARM**
- **LOADING HOSE**
- **DIMENSION OF VESSEL**
- **MOORING POINT IDENTIFICATION**

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**CARGO**

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<td>MD</td>
<td>4”</td>
</tr>
<tr>
<td>FO BUNKER</td>
<td>4”</td>
</tr>
<tr>
<td>LPG/VAPOUR RETURN</td>
<td>6”/3”</td>
</tr>
</tbody>
</table>

**Note:**

a) For movements of floating crane barges passing wharf 11(Ular), there shall be no vessel moored at Wharf 11.

b) During HF barge transits towards HF Jetty (Ular), cargo operations at Wh11 shall be momentarily stopped and valves in system closed.

For above cases, Marine (MFBOM) shall be consulted for advice.
PART L: MOORING PLAN & BERTH LAYOUT

WHARF 12

CARGO                CONNECTION SIZE
LPG/ VAPOUR RETURN               6”/3”
LUBOIL-HVI-160B                            8”
LUBOIL-HVI-60/650 8”
DACO/ DUTREX                               8”
ULG                                                   8”
ULG                                                   8”
JET                                                     8”
FO BUNKERS                                    6”
FO BUNKERS                                    6”
GO/ MD                                            4”

LEGEND

- BOLLARDS
- QUICK RELEASE HOOKS
- FENDERS
- REDUNDANT BOLLARDS/QUICK RELEASE HOOKS
- LOADING ARM
- LOADING HOSE
- DIMENSION OF VESSEL
- MOORING POINT IDENTIFICATION
CARGO | CONNECTION SIZE
--- | ---
ETHYLENE | 6"

Note:

a) For movements of vessel to/from wharf 11, cargo operation at Wh13 shall be momentarily stopped and valves in system closed. This is due to requirement of min safety distance of 260m.

b) During HF barge transits towards HF Jetty (Ular), cargo operations at Wh13 shall be momentarily stopped and valves in system closed.

For case (b), Bukom Marine shall be consulted for advice.
**PART L: MOORING PLAN & BERTH LAYOUT**

**SBM**

**PRINCIPAL PARTICULARS**

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOA</td>
<td>240 M</td>
<td>345 M</td>
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<tr>
<td>Displacement</td>
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<td>355,000 MT</td>
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<tr>
<td>Bow To Centre Of Manifold (BCM)</td>
<td>175 M</td>
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<tr>
<td>Beam</td>
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<td>70 M</td>
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<tr>
<td>Draft</td>
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<tr>
<td>Distance Of Presentation Flange From Ship Side</td>
<td>4600 MM</td>
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<tr>
<td>Centre Of Presentation Flange Above Drip Tray</td>
<td>900 MM</td>
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</tr>
<tr>
<td>Centre Of Presentation Flange To Edge Of Drip Tray</td>
<td>1200 MM</td>
<td></td>
</tr>
<tr>
<td>Centre Of Presentation Flange Above Ship Side Support Rail</td>
<td>700 MM</td>
<td></td>
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