



भारत सरकार / GOVERNMENT OF INDIA  
पत्तन, पोत परिवहन और जलमार्ग मंत्रालय  
MINISTRY OF PORTS, SHIPPING AND WATERWAYS  
नौवहन महानिदेशालय, मुंबई  
DIRECTORATE GENERAL OF SHIPPING, MUMBAI

DGS (Engineering) Circular No. 17 of 2025

File No. 13-22/2/2025-ENGG – DGS (C.No. 33062)		Date: 05.05.2025
Subject: LNG Bunkering Guidelines		
References:	(1) Merchant Shipping Notice No. 06 of 2024-IGF Code and its applicability (2) Merchant Shipping Notice No. 03 of 2014	
<div>1. Background</div> <div>1.1. The Need for LNG Bunkering Guidelines</div> <p>Increasing global focus on reducing greenhouse gas emissions has led to a surge in the adoption of LNG as a cleaner alternative to traditional marine fuels. LNG offers significant advantages in terms of reduced sulphur oxides, nitrogen oxides, and particulate matter emissions. However, the lack of specific regulations governing LNG bunkering activities in India presents potential risks and uncertainties. This proposed circular seeks to address these gaps by establishing clear guidelines for permitting, safety, environmental protection, workforce training and enforcement for LNG bunkering. By creating a standardized framework, the circular aims to encourage investment in LNG bunkering infrastructure, promote sustainable maritime practices and safeguard the environment and public safety. The guidelines will also stimulate economic growth and create job opportunities within the maritime sector.</p> <p>This circular is essential for ensuring the responsible and sustainable integration of LNG as a marine fuel, aligning with international environmental goals and fostering a modern, efficient, and environmentally conscious maritime industry.</p> <div>1.2. The Directorate General of Shipping (DGS), recognizing the importance of reducing greenhouse gas (GHG) emissions and improving air quality at Indian ports and in coastal waters, issues this circular to facilitate LNG bunkering in accordance with global standards.</div> <div>2. Scope</div> <div>2.1. This circular applies to all ships calling Indian ports, (irrespective of their flag), LNG bunker suppliers and all ports.</div> <div>2.2. It includes safety and operational guidelines for Liquefied Natural Gas (LNG) bunkering operations.</div> <div>3. Current State of LNG Bunkering</div> <div>3.1 LNG bunkering in India is in its early stages of development. While there are a few ports and facilities that offer LNG bunkering services, the overall infrastructure and regulatory framework are not yet fully</div>		

established. This lack of standardization and clarity can create uncertainty for ship owners, operators, and investors considering LNG as a marine fuel option.

3.2 Several factors contribute to the slow pace of LNG bunkering adoption in India, including the high initial investment costs for bunkering infrastructure, concerns about safety and environmental impacts, and the absence of comprehensive regulations. However, increasing environmental awareness, stricter emission standards, and the improved supply of LNG are driving the increased interest in LNG bunkering.

3.3 To accelerate the adoption of LNG bunkering in India, it is essential to address the existing regulatory gaps and create a better ecosystem that is suited for investment and innovation. This proposed guideline seeks to provide the necessary framework for fostering a robust and sustainable LNG bunkering industry.

#### **4. Objectives**

4.1 The primary goal of this proposed guidelines is to establish a comprehensive and consistent regulatory framework for LNG bunkering, promoting safety, environmental protection, and economic growth. The specific objectives include:

- (i) Providing clear guidelines for implementing a regulatory mechanism for LNG bunkering facilities.
- (ii) Establishing robust safety standards and operational procedures.
- (iii) Implementing effective environmental protection measures to minimize adverse impacts on air and water quality.
- (iv) Developing workforce training and certification programs to ensure qualified personnel.
- (v) Creating enforcement and compliance mechanisms to ensure adherence to regulations.
- (vi) Promoting the economic benefits of LNG bunkering and job creation.

By achieving these objectives, the guidelines will create a predictable and supportive environment for investment in LNG bunkering infrastructure, fostering the adoption of LNG as a cleaner marine fuel and contributing to a more sustainable maritime industry.

#### **5. Regulatory Framework**

This guideline as per attached Appendix-I establishes a clear and transparent regulatory regime for LNG bunker supplier. The process includes:

- (i) Submission of a detailed application to the Directorate, including information on facility design, safety procedures and emergency response plans, according to IAPH guidelines.
- (ii) Authorisation to IRS to conduct Interim and Initial and renewal audits.
- (iii) Issue of Interim or full-term Bunker supplier registration certificate
- (iv) Regular inspections and audits to ensure continued compliance with permit conditions.

The permitting and licensing process ensures that LNG bunkering facilities are designed, constructed, operated in a safe and environmentally responsible manner.

This Circular is issued with the approval of the competent authority.

sd/-

(Mahesh Korade)

Engineer & Ship Surveyor cum Dy.DG(Tech)

Encl. Appendix - 1

To

1. The Principal Officers, Mercantile Marine Department, Mumbai/Kolkata/Chennai/Kandla/Kochi.
2. The Surveyor-in-Charge, Mercantile Marine Department, Goa/Jamnagar/Port Blair/Visakhapatnam/Tuticorin/Noida/Haldia/Paradip/Mangalore
3. Indian National Shipowner's Association (INSA), Mumbai.
4. Foreign Owner and Ship-Managers Association (FOSMA)
5. The Maritime Association of Ship Owners, Ship Managers and Agents (MASSA)
6. Indian Coastal Conference Shipping Association (ICCSA), Mumbai
7. Institute of Marine Engineers (India)
8. Hindi cell
9. Computer cell

Copy to:

10. PS to DG (S)
11. PS to the Chief Surveyor with the Govt. of India
12. PS to the Nautical Advisor (i/c) to the Govt. of India
13. PS to the Chief Ship Surveyor (i/c)
14. DDG (SD)
15. DDG (Admin).

---

9वीं मंज़िल, बीटा बिल्डिंग, आई थिंक टेक्नो कैम्पस, कांजुर गाँव रोड, कांजुरमार्ग (पूर्व) मुंबई- 400042

9th Floor, BETA Building, I-Think Techno Campus, Kanjur Village Road, Kanjurmarg (E), Mumbai-400042

फ़ोन/Tel No.: +91-22-2575 2040/1/2/3 फ़ैक्स/Fax.: +91-22-2575 2029/35 ई-मेल/Email: dgship-dgs@nic.in वेबसाइट/Website: www.dgshipping.gov.in

**LNG Bunkering Guidelines**

**1. Introduction:**

This circular outline the safety and operational guidelines for Liquefied Natural Gas (LNG) bunkering operations within Indian waters, encompassing ship-to-ship, truck-to-ship, and shore-to-ship (pipeline) bunkering methods. It is intended for ship owners, ship managers, bunker suppliers, bunker receivers, terminal operators, trucking companies, and all other stakeholders involved in LNG bunkering operations. This circular aims to establish a standardized framework that ensures safety, efficiency, and environmental protection during LNG Bunkering operations.

- 1.1 The guidelines in this circular should be read in conjunction with all applicable Indian maritime laws, regulations, port authority guidelines, and regulations set forth by the Petroleum and Natural Gas Regulatory Board (PNGRB) of India.
- 1.2 This circular is developed in consultation with relevant stakeholders in the Indian maritime industry and regulatory bodies.
- 1.3 All legislative requirements quoted in this circular should be subject to the authentic provisions of the legislative instrument and its latest amended version, as applicable.

**2. Applicable Standards and Reference documents**

This Circular has been developed by referring to the International Conventions and Codes, Guidance notes and recommendations issued by Organizations which have a significant role in ensuring the safety of ships and the bunker supplying facility during a LNG bunkering operation. Some of these are listed below:

1. IGC Code: International Code of the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk.
2. IGF Code: International Code of Safety for Ships Using Gases or Other Low-Flashpoint Fuels.
3. STCW Code: International Convention on Standards of Training, Certification and Watch keeping for Seafarers sets minimum qualification standards for masters, officers and watch personnel on seagoing merchant ships.
4. Class Rules for LNG Bunkering vessels.
5. MSC.1/Circ.1668- Unified Interpretation of Bunkering Manifold Arrangement fitted on LNG Bunkering Ships in IGC Code.
6. ISM Code: International standard for the safe management and operation of ships, and for pollution prevention.
7. ISO 20519: International Standard on the Specification for Bunkering of Liquefied Natural Gas-Fueled Vessels.
8. ISO/TS 18683: Guidelines for safety and risk assessment of LNG fuel bunkering operations.
9. ISO 28460: Installation and equipment for liquefied natural gas – Ship-to-shore interface and port operations.
10. IACS Recommendation 142: LNG Bunkering Guidelines.
11. IAPH Checklist: International Association of Port and Harbour Bunkering Checklist.

12. BIS Standards: Any relevant standards published by the Bureau of Indian Standards (BIS) related to gas handling and safety, including those specific to cryogenic road tankers and pipeline transportation of natural gas.
13. PNGRB Regulations: Regulations and guidelines issued by the Petroleum and Natural Gas Regulatory Board (PNGRB), Government of India, concerning LNG terminals, pipelines, and transportation.
14. PESO Regulations: Regulations and guidelines issued by Petroleum and Explosives Safety Organization (PESO), Government of India, concerning safety aspects of hazardous substances.
15. Other equivalent standards: Subject to prior agreement and approval by the Directorate General of Shipping (DGS), India, and PNGRB.
16. International Safety Guide for Oil Tankers & Terminals (ISGOTT): a) A Guide to Contingency Planning for Marine Terminals Handling Liquefied Gases in Bulk, b) Risk Based Approach for the Evaluation of firefighting Equipment on Liquefied Gas Jetties, c) "LNG Operations in Port Areas", essential best practices for the industry, d) ESD arrangements and linked ship/shore systems for liquefied gas carriers.
17. IS 15656 : "Hazard identification and risk analysis – Code of practice", 2006 – For Quantitative Risk Assessment (QRA).
18. Federal Energy Regulatory Commission (FERC) NFPA 59A, Standard for the production, storage, and handling of liquefied natural gas (LNG).
19. ISO TR 17177: Petroleum and natural gas industries — Guidelines for the marine interfaces of hybrid LNG terminals.
20. ISO 16904-Petroleum and Natural Gas Industries- Design and Testing of LNG Marine Transfer Arms for Conventional onshore Terminals.
21. SIGTTO: Guidance for the Prevention of Rollover in LNG Ships.
22. SIGTTO: Guidelines for the Alleviation of Excessive Surge Pressures on ESD for Liquefied Gas Transfer Systems.
23. SIGTTO: Recommendations for Liquefied Gas Carrier Manifolds.
24. SIGTTO: ESD Systems.
25. SGMF: FP07\_01\_LNG as a marine fuel, Safety and Operational Guidelines – Bunkering, published by the Society for Gas as Marine Fuel.
26. SGMF: FP02-01\_Recommendations of Controlled Zones during LNG bunkering.
27. SGMF: FP08-01\_Simultaneous Operations (SIMOPs) during LNG Bunkering.
28. SGMF: FP04-02\_Bunkering of Ships with LNG Competency and Assessment Guidelines.
29. SGMF: Technical Guidance Notice TGN06-01 Marine LNG Bunkering Quick Connect / Disconnect Couplings
30. SGMF: Technical Guidance notice TGN06-04 Manifold Arrangements for Gas Fuelled vessels.
31. SGMF: TGN06-05\_Recommendations for linked emergency shutdown (ESD) arrangements LNG Bunkering.
32. OISD Standards: Standards published by Oil Industry Safety Directorate, Government of India.
33. Singapore MPA: Technical Reference 56 for LNG Bunkering

### 3. Definitions

- a) LNG: Liquefied Natural Gas.
- b) Bunkering Operation: The transfer of LNG as fuel to a receiving vessel, whether from a bunker supply vessel, a Truck, or Terminal.
- c) LNG Bunker Supplier (LBS): The entity responsible for supplying LNG to the receiving vessel, regardless of the mode of delivery.
- d) LNG Bunker Receiver (LBR): The vessel receiving LNG as fuel.
- e) Truck-to-Ship Bunkering: The transfer of LNG from a road tanker (truck) to a receiving vessel.
- f) Terminal-to-Ship Bunkering: The transfer of LNG from a shore-based terminal via pipeline to a receiving vessel.
- g) Ship to Ship Bunkering: The transfer of LNG from LNG Bunker Vessel to a receiving vessel
- h) Safety Zone: **An** area that must be established around the LNG bunkering station/facilities to control ignition sources and ensure that only essential personnel and activities are allowed in the area that could be exposed to flammable gas in case of accidental release of or other incident involving LNG or natural gas during bunkering
- i) Security Zone: An area that must be defined and established around the LNG bunkering area to monitor and control external activities e.g. ship movements or vehicles that can lead to incidents that threaten the operation. The security zone should be accessible during the LNG bunkering operation only by authorized personnel. The security zone will always be larger than the safety zone
- j) Approved: Approved by the Directorate General of Shipping (DGS), relevant port authority in India, and, where applicable, PNGRB and PESO.
- k) STCW: International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers.
- l) Indian Waters: As defined by the relevant Indian maritime legislation.
- m) PESO: Petroleum and Explosives Safety Organization.
- n) PNGRB: Petroleum and Natural Gas Regulatory Board.
- o) SIMOP- Simultaneous Operations during LNG Bunkering
- p) PIC- Person in Charge

### 4. Application

This circular applies to all entities and vessels engaged in LNG bunkering operations within Indian waters, including:

- a) LNG bunker supply vessels
- b) LNG bunker receiving vessels
- c) LNG trucking companies involved in truck-to-ship bunkering
- d) LNG terminal operators involved in shore-to-ship bunkering

## 5. LNG Bunkering Operations

### 5.1. General Requirements

LNG bunkering operations in India must adhere to the guidelines outlined in this circular, as well as all applicable Indian regulations, port requirements, and PNGRB/PESO regulations.

#### 5.1.1 To conduct LNG bunkering operations, the LBS must:

Possess an approval and certification as a registered Bunker supplier issued by the DG Shipping, with the mode(s) of delivery and area of operation clearly specified. The process is as mentioned below:

#### **Bunker Supplier Registration Process:**

##### **Approval from DG Shipping:**

- i. The DG Shipping had issued a Merchant Shipping Notice (MSN) No. 3 of 2014, which has detailed procedures for registration as a Bunker supplier. For the purpose of registration as a Bunker supplier approved for supplying LNG as a bunker, the Bunker Supplier shall in addition, establish Quality Management System (QMS) and obtain ISO 9001: 2015 Certification for the scope of “LNG Bunkering” from any of the certification bodies accredited by National Accreditation Board for Certification Bodies (NABCB). The existing Bunker suppliers as well as new applicants interested in registering with the DGS as a supplier of LNG bunkers are required to follow procedures provided in the above-mentioned MSN.
- ii. The applicants need to offer a practical demonstration of the Bunkering operation, for which the DGS may, based on the submission made, authorize the Indian Register of Shipping (IRS) to witness the demonstration and submit a report on the same. The DGS shall consider issuance of an *Interim Bunker Supplier Registration Certificate* on receipt of the verification report with recommendation from the IRS. The Interim Certificate shall have a validity of six months.
- iii. The Bunker supplier has to apply at least thirty days before the expiry of the Interim Bunker Supplier Registration Certificate for an Initial audit to the DGS. The detailed procedure is available in the above-mentioned MSN (2014). The DGS shall authorize the IRS for undertaking the Initial audit, which shall focus on but not limited to the following:
  - a) verify level of compliance in the LNG Bunkering operations undertaken after interim certification;
  - b) the Bunker supplier should have demonstrable evidence for conduct of LNG bunkering for at least two vessels in this period;
- iv. the audit essentially has to verify whether the Bunker supplier has suitably incorporated applicable amendments/notification issued by the DGS or any statutory body.

The DGS shall issue a *full-term* Bunker Supplier registration Certificate valid for a period of five years, based on the recommendation by the IRS. The Bunker Supplier has to undergo Annual Surveillance audit during the validity of the Registration certificate and the details are available in the above referred MSN (2014). The Bunker supplier registered for LNG Bunkering has to offer the practical demonstration of their facility and operations at every alternate year during the Annual Surveillance audit, failing which the DGS shall initiate appropriate action against the Bunker supplier including suspension or withdrawal of the Certificate issued

### **Role of PNGRB & PESO:**

- a) The LBS shall mandatorily obtain initial, one-time approval from the Petroleum and Natural Gas Regulatory Board (PNGRB) for the establishment and operation of the LNG terminal, and from the Petroleum and Explosives Safety Organisation (PESO) for all shore-based transport arrangements, including LNG tank trucks and related infrastructure. These approvals shall remain valid unless any substantive modifications are made to the LNG bunkering operations, in which case fresh approvals shall be sought based on the revised operational parameters and lessons learned.

5.1.2 The LNG Bunker Supplier (LBS) shall plan and execute the bunkering operation in accordance with the following standards and best practices, based on the mode of delivery (ship-to-ship, truck-to-ship, or shore-to-ship):

- i. ISO 20519 – Specification for bunkering of liquefied natural gas-fueled vessels
- ii. ISO 28460 – Installation and equipment for liquefied natural gas – Ship-to-shore interface and port operations.
- iii. IACS Recommendation 142 – LNG Bunkering Guidelines
- iv. ISGOTT – International Safety Guide for Oil Tankers and Terminals, including:
  - a) *A Guide to Contingency Planning for Marine Terminals Handling Liquefied Gases in Bulk,*
  - b) *Risk-Based Approach for the Evaluation of Firefighting Equipment on Liquefied Gas Jetties,*
  - c) *LNG Operations in Port Areas – Essential Best Practices for the Industry,* and
  - d) *Emergency Shutdown (ESD) Arrangements and Linked Ship/Shore Systems for Liquefied Gas Carriers.*
- v. NFPA 59A – Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG).
- vi. Any other internationally or nationally recognized best practices, as referenced in Appendix I, and as may be specifically required or approved by the Directorate General of Shipping (DGS), Petroleum and Natural Gas Regulatory Board (PNGRB), or the Petroleum and Explosives Safety Organization (PESO).

5.1.3 The LBS shall maintain valid certifications as required by the STCW Code, IGC Code, IGF code, Classification Society Rules, BIS standards for transport/handling of LNG bunkering.

5.1.4 The LBS shall ensure that for delivery of LNG bunker valid insurance cover is available for an amount acceptable to the concerned Port Authorities and/or as per Flag administration requirements for accident (personnel, property & transport equipment), marine & environmental pollution damage and clearance of pollution liabilities.

5.1.5 The LBS shall ensure that pressure test of the Cryogenic hoses used for LNG bunkering has been conducted in accordance with the manufacturer's specified intervals and, in any case, shall not exceed one year. The testing of hoses should be witnessed by a competent person (such as with a Engineering degree in Mechanical or Production Engineering) having adequate knowledge and experience of pressure testing of cryogenic hoses.



- 5.1.6 The LBS shall ensure that the valid material safety data sheet is maintained for each delivery of LNG bunker being supplied.
- 5.1.7 The Person-in-Charge (PIC) nominated by the Bunker Supplier (LBS), along with the Master of the LNG Bunker Receiver (LBR), shall be jointly responsible for the safety of all activities associated with the bunkering operation.
- 5.1.8 All bunkering operations shall be agreed upon by both the LBS and LBR in accordance with an approved LNG bunker management plan before commencement.
- 5.1.9 The person in charge shall be nominated by Bunker Supplier (LBS) and Bunker receiving vessel (LBR) along with a single point contact specified by the port authority to handle any queries/emergencies during bunkering operation and co-ordinate between LBS & LBR.
- 5.1.10 The LBS Shall ensure effective systems for the 'custody control' of the bunker from reception, storage to delivery end, including the transportation systems. In case of any outsourced processes, viz. terminal operations; barge/lorry operation that affects the product conformity, such outsourced processes shall be identified in the QMS and the Supplier should ensure complete control over such processes.
- 5.1.11 The LBS shall establish procedure for the identification, storage, retrieval, retention period and disposition of records and other evidence generated in relation to delivery of bunkers.

## **5.2 Operational Documentation Requirements**

To demonstrate the ability to systematically plan and safely execute LNG bunkering operations, the LNG Bunker Supplier (LBS) shall submit the following copy of documentation to the relevant Port Authority for each mode of delivery, at least 24 hours in advance of every bunkering operation:

### **I. LBS Vessel Certifications (if applicable - Ship-to-Ship):**

- a) Valid Certificate of Registry
- b) Valid Certificate of Fitness for Carriage of Dangerous Goods
- c) Valid Relevant certificates as required by IGC Code, IGF code and ISM Code.
- d) Valid Certificate from Classification Society

### **II. Trucking Company Certifications (if applicable - Truck-to-Ship):**

- a) Valid PESO licenses for transport of LNG via road tanker.
- b) Valid Certificates of compliance with relevant BIS standards for cryogenic road tankers.
- c) Valid Driver training and certification records for handling LNG.

### **III. Terminal Operator Certifications (if applicable - Shore-to-Ship):**

- a) Valid authorization for operating the LNG terminal and pipeline infrastructure.
- b) Valid Certificates of compliance with relevant safety standards for LNG terminals and pipelines.

### **IV. Reports of Maritime Traffic Impact Assessment (MTIA) and Quantitative Risk Assessment (QRA):**

- a. The LBS, in consultation with the Port Authority, shall prepare MTIA and QRA reports prior to every bunkering operation. These reports must be reviewed and amended as necessary based on

operational experience and any changes to the input parameters or assumptions. All risks to personnel, property, and the environment associated with each LNG bunkering mode must be clearly identified and addressed.

- b. The QRA must determine the required horizontal and vertical extent of the safety zones, based on gas dispersion analyses considering credible leakage scenarios. Local environmental and meteorological conditions must be accounted for. Consequence analyses (Ex fire, explosion, overpressure, heat radiation) must guide the size of the safety zones.
- c. The guidance in IACS Recommendation 142 and ISO/TS 18683 shall also be taken in account when planning and executing the QRA. These studies should be performed by personnel who have knowledge of Port Operations including bunkering and the development of Quantitative Risk Assessments for Ports.

**V. LNG Bunker Management Plan:** The LBS shall prepare comprehensive LNG Bunker Management plan in consultation with port authorities, which outlines procedures and safety measures for the pre-bunkering, bunkering, and post-bunkering phases, in accordance with ISO 18683 and IACS Recommendation 142. The plan must include:

- a. Proposed operation of bunker supply vessel, trucks, or terminal, including the intended location and specific procedures for the chosen delivery method. The operational envelope (e.g. limiting wave height conditions, current speed, wind speed etc.) must also be clearly specified. The conditions/scenarios (e. g. Hurricane, Cyclone, Other natural disasters) under which bunkering operation would be stopped/suspended should also be specified.
- b. Quantity and Quality of LNG to be bunkered
- c. Detailed safety protocols, including risk assessments and emergency response plan.
- d. Specific guidelines for LNG transfers, equipment checks, and communication protocols.
- e. Compatibility assessment checklist templates to ensure compatibility between the LBS and LBR.
- f. Valid Certificates and functional test reports of bunkering equipment, gas detection, alarms system, temperature measuring as applicable based on modes of transport (including truck unloading arms or pipeline connections).
- g. Personnel training (familiarization, safety drills including records) including mandatory and certifications for Bunker supplier personnel involved in bunkering operation.
- h. Protocols on use & availability of Cryogenic personnel protective equipment
- i. Availability & readiness of Intrinsically safe lighting in vicinity of transfer operations
- j. Emergency contingency plans to mitigate potential accidents, fire, spillage etc.
- k. Mechanism for documenting all bunkering-related operations and simultaneous operations in the vicinity (at the Terminal/Anchorage where LNG Bunkering is envisaged)

**VI. Bunkering Compatibility Checklist/Report**

The LNG Bunker Supplier (LBS) shall provide a Bunkering Compatibility Checklist or Report confirming the compatibility of systems, procedures, and safety measures between the LBS and the LNG Bunker

Receiver (LBR) vessels. This document shall verify that both parties can safely and effectively conduct the planned bunkering operation in accordance with applicable standards and port requirements.

**VII. Joint Bunkering Plan**

It shall be endorsed by representatives from both the LBS and LBR, ensuring mutual agreement and compliance with safety standards. This plan should include specific procedures for the chosen delivery method (e.g., truck arrival and connection procedures, pipeline connection and purging procedures).

**VIII.** During the bunkering process, tank pressures shall be monitored and controlled to prevent over pressurization and subsequent release of LNG through the pressure relief valves. The vapour management methodology shall be included within the Joint Bunkering plan. Additionally, the risk of LNG roll-over must be carefully evaluated, particularly when colder LNG is introduced into a tank containing warmer LNG, as this can lead to stratification and sudden vapour release.

**IX.** For truck-to-ship bunkering, a detailed traffic management plan showing the route of the LNG trucks, parking arrangements, and safety measures during truck maneuvering at berth/terminal.

**X.** For shore-to-ship bunkering, confirmation from the terminal operator that the pipeline is ready for LNG transfer and that all safety systems are operational.

**5.3 Operational Requirement.**

- I.** Safety Zone: A safety zone must be established around the bunkering and receiving facilities/vessels to control ignition sources. The extent of the zone should be based on the QRA recommendations and agreed upon by the LBS, LBR and the relevant port authority. The size and configuration of the safety zone will vary depending on the delivery method and the extent of the hazardous area zones defined by the terminal for the vessels and/or vehicles involved in the operation. If a vessel or truck breaches the safety zone, then the bunkering operation must be immediately stopped.
- II.** Security Zone: LBS and LBR must maintain a security zone in line with IACS rec 142. Physical barriers and ISPS borders should also be taken into consideration. They are also responsible for monitoring all activities and operations within this vicinity to identify and mitigate any potential risks to the LNG bunkering operation. The security zone should always be larger than the safety zone. Prior to initiation of the operation the security zone should be communicated to all parties it may concern such as adjacent installations, other vessels and the Port Authority.
- III.** Participation in Vessel Traffic Services (VTS): The bunker supply vessel (if applicable) must participate in the local Vessel Traffic Service (VTS) and maintain continuous VHF watch on the appropriate channels.
- IV.** Traffic Management (Truck-to-Ship): For truck-to-ship bunkering, a detailed traffic management plan must be implemented to control the movement of trucks within the port area. This plan shall include designated routes, speed limits, parking areas, and escort vehicles.

- V.** Monitoring of LNG Transfer: For terminal-to-ship bunkering and the ship-to-ship bunkering, the LBS operator and the relevant LBR crew must continuously monitor the LNG pressure, flow rate, and temperature during the LNG transfer. Emergency shutdown systems must be readily available and tested regularly.
- VI.** Bunkering Operations: The LBS must carry out operations in accordance with the LNG Bunker Management Plan and the Joint Bunkering Plan. A pre-bunkering checklist must be completed within 4 hours of the planned operation and kept ready for inspection. This checklist should include verification of barge/truck/pipeline connections, safety equipment, and communication systems.
- VII.** The following items must be clearly agreed between the LBS and the LBR. These should also be recorded:
  - a) Quantity of LNG to be transferred
  - b) Maximum Pressure during the operation
  - c) Maximum pumping rate during the operation
- VIII.** Double banking or simultaneous ship-to-ship activities such as provisioning, garbage removal, or transfer of stores shall be prohibited during LNG bunkering
- IX.** The LBS shall ensure that bunkering of Diesel Oil, HFO, VLSFO, or other grades of fuel oil, lubricating oil, etc. shall not be undertaken simultaneously with LNG bunkering
- X.** The LBR shall be familiar with the standard operating procedures of the LBS prior to the commencement of operations.
- XI.** All lighting and cables of the terminal that, interfere with the safety zone of the LNG vessel or LNG truck shall be switched off in a way that the lights are totally without any power supply unless the equipment is EX-proof.
- XII.** Equipment such as ro-ro ramps, gangways, hydraulic/pneumatic tools/equipment which can cause sparks/heat during movement or malfunction shall not allowed to be used inside the safety zone.
- XIII.** Passengers and/or Crew should be informed when the LNG bunkering is in progress by means of visual warning signs as well as restriction of access to the areas concerning the LNG bunkering.
- XIV.** If an emergency arises affecting LBS facilities (terminal, vessel, or truck), the LBS must immediately inform the LBR through VHF radio or any agreed communication method, even if the LBR operations remain unaffected.
- XV.** If an emergency arises in the LBS facilities, any decision to abandon vessels or leave berth is the master's or harbour master's responsibility.
- XVI.** Prior to the initiation of each LNG bunkering operation:
  - a) The communication between the LBR facility (whether pipeline, ship or truck) and the LBS, the ESD functions must be tested and their functionality should be confirmed as well as recorded.
  - b) Functionality of the valves involved in the LNG transfer operation both on the LBS and LBR facilities must be confirmed including manual operation
  - c) The availability of emergency services (e.g. ambulance, fire brigade etc.) must be confirmed.

- d) Visual inspection of the transfer manifolds on the LBS and LBR sides to confirm the integrity of equipment, fittings, hoses, piping, valves pertaining to the LNG bunkering.
- e) Confirm the availability of protective measures such as water curtain between the LBS and LBR, drip trays of suitable material and grade at the bunker manifold, cover underneath for the liquefied gas hose for protection of deck plating, QCDC coupling etc.

**XVII.** Technical requirements for bunkering system are maintained as per IACS rec 142.

**XVIII.** Notifications: The LBS must adhere to the following notification procedures:

- a) Pre-Notification: Notify the relevant port authority at least 24 hours before commencement, including the time, location, delivery method and a 24-hour contact number.
- b) Reporting of Bunkering Phases: Report the start and completion of each operation to the port authority via VHF (for ship-to-ship) or other agreed communication channels.
- c) Incident Reporting: Report any incident immediately to the relevant government departments and the port authority.

#### **6. Bunker Delivery Note (BDN):**

The Bunker Supplier (**LBS**) shall be responsible for providing the Bunker Delivery Note (BDN) for each individual consignment of bunker to a ship. BDN should be in-line with IGF code requirements. Copy of every BDN issued to the vessel is retained by the bunker supplier for the period of 3 years.

#### **7. Requirements for Crew Members and Personnel**

- a. Ship-to-ship: Crew members assigned duties related to LNG Bunkering operations on LBR shall be certified in accordance with the IGF Code. Vessels Crew Members on the LBS shall have training in accordance with STCW Code for Gas Carriers.
- b. Truck Drivers (Truck-to-Ship): Truck drivers involved in LNG transport must be trained and certified in accordance with PESO regulations and relevant BIS standards. They must be proficient in handling cryogenic materials, operating emergency shutdown systems, and following safety protocols.
- c. Terminal Operators (Shore-to-Ship): Terminal operators involved in LNG bunkering must be trained and certified as per relevant safety standards. They must be proficient in operating LNG terminal equipment, monitoring pipeline parameters, and responding to emergencies.

#### **8. Enforcement**

The Directorate General of Shipping is responsible for enforcing the provisions of this circular as applicable. Vessels, trucking companies, or terminal operators found to be in non-compliance shall be subject to penalties, including fines, detention, suspension of licenses, or other actions.

Decisions and requirements for LNG bunkering should be based on a risk analysis carried out in advance of any bunkering operation. The Port authority and/or DGS, PNGRB/ PESO shall consider:

- a. Approval of the risk acceptance criteria
- b. Overall responsibility for the good governance and framework for LNG bunker operations in the port
- c. Applicability of an accreditation scheme for LNG bunker operators in the ports under their

authority

- d. Acceptability of the location of bunkering facilities, (bunkering may be limited to specific locations within the port/anchorage)
- e. Restrictions on bunkering operations such as simultaneous operations
- f. Shore side contingency plans, emergency response systems
- g. General procedures for traffic control and restrictions
- h. Whether additional requirements should be applied

**9. Amendments**

This Circular shall be subject to periodic review and revision by the Directorate General of Shipping, as deemed necessary, to incorporate advancements in technology, modifications to relevant statutory or regulatory frameworks and evolving industry best practices in LNG bunkering operations.

\*\*\*\*\*