



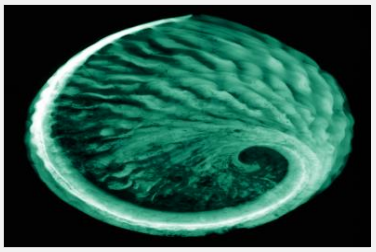

HKLTL

Hong Kong Offshore LNG Terminal Project

Safety Management Plan for the Double Berth Jetty at LNG Terminal

13 April 2023

Project No.: 0505354

The business of sustainability

ERM

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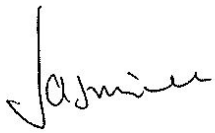
Hong Kong Offshore LNG Terminal Project

Safety Management Plan for the Double Berth Jetty at LNG Terminal



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Hong Kong Offshore LNG Terminal - Works associated with the double berth jetty at LNG Terminal

Environmental Certification Sheet

FEP-01/558/2018/A

Reference Document/Plan

Document/~~Plan~~ to be Certified/ Verified:	Safety Management Plan for the Double Berth Jetty at LNG Terminal
Date of Report:	13 April 2023
Date received by ET:	13 April 2023
Date received by IEC:	19 April 2023

Reference EP Requirement

EP Condition: Condition No. 4.2 of FEP-01/558/2018/A

Content: *Safety Management Plan*

The Permit Holder shall, no later than 3 months before the commencement of operation of the Project, deposit with the Director 3 hard copies and 1 electronic copy of a safety management plan for the operation of the Project. The safety management plan shall describe the safety management system (SMS) for the operation of the Project and shall include but not limited to information relating to the key safety design features, operation and maintenance procedures, emergency response procedures, marine safety arrangements and procedures and regular safety audit for the operation of the Project. The safety management plan shall also include the delineation, control and implementation details of a marine safety zone around the jetty for the operation of the Project and the operational arrangements and procedures for adverse weather and met-ocean conditions. The Permit Holder shall fully and properly implement the safety management measures in the deposited safety management plan during operation of the Project.

ET Certification

I hereby certify that the above referenced document/~~plan~~ complies with the above referenced condition of FEP-01/558/2018/A.

Mr Raymond Chow,
Environmental Team Leader:  Date: 13 April 2023

IEC Verification

I hereby verify that the above referenced document/~~plan~~ complies with the above referenced condition of FEP-01/558/2018/A.

Ms Lydia Chak,
Independent Environmental Checker:  Date: 19 April 2023

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1. INTRODUCTION

1.1 Background

To support the increased use of natural gas in Hong Kong from 2020 onwards, Castle Peak Power Company Limited (CAPCO) and The Hongkong Electric Co., Ltd. (HK Electric) have identified that the development of an offshore liquefied natural gas (LNG) receiving terminal in Hong Kong using Floating Storage and Regasification Unit (FSRU) technology ('the Hong Kong Offshore LNG Terminal Project') presents a viable additional gas supply option that will provide energy security through access to competitive gas supplies from world markets. The Project will involve the construction and operation of an offshore LNG import facility to be located in the southern waters of Hong Kong, a double berth jetty, and subsea pipelines that connect to the gas receiving stations (GRS) at the Black Point Power Station (BPPS) and the Lamma Power Station (LPS). The location plan is shown in ***Figure 1.1***.

The Environmental Impact Assessment (EIA) Report for the Project was submitted to the Environmental Protection Department (EPD) of the Hong Kong Special Administrative Region Government in May 2018. The EIA Report (EIAO Register No. AEIAR-218/2018) was approved by EPD and the associated Environmental Permit (EP) (EP-558/2018) was issued in October 2018. An application for Further Environmental Permits (FEP) was made on 24 December 2019 to demarcate the works between the different parties. The following FEPs were issued on 17 January 2020 and the EP under EP-558/2018 was surrendered on 5 March 2020:

- the double berth jetty at LNG Terminal under the Hong Kong LNG Terminal Limited, joint venture between CAPCO and HK Electric (FEP-01/558/2018/A) (1);
- the subsea gas pipeline for the BPPS and the associated GRS in the BPPS under CAPCO (FEP-03/558/2018/B) (2); and
- the subsea gas pipeline for the LPS and the associated GRS in the LPS under HK Electric (FEP-02/558/2018/A) (3).

In accordance with Condition 4.2 of the FEP of the LNG Terminal (FEP-01/558/2018/A) ('the Project'):

> FEP No. FEP-01/558/2018/A, Condition 4.2:
>
> *"The Permit Holder shall, no later than 3 months before the commencement of operation of the Project, deposit with the Director 3 hard copies and 1 electronic copy of a safety management plan for the operation of the Project. The safety management plan shall describe the safety management system (SMS) for the operation of the Project and shall include but not limited to information relating to the key safety design features, operation and maintenance procedures, emergency response procedures, marine safety arrangements and procedures and regular safety audit for the operation of the Project. The safety management plan shall also include the delineation, control and implementation details of a marine safety zone around the jetty for the operation of the Project and the operational arrangements and procedures for adverse weather and met-ocean conditions. The Permit Holder shall fully and properly implement the safety management measures in the deposited safety management plan during operation of the Project."*

(1) Application for variation of an environmental permit for FEP-01/558/2018 was undertaken and the latest FEP (FEP-01/558/2018/A) was issued on 6 November 2020.

(2) Application for variation of an environmental permit for FEP-03/558/2018/A was undertaken and the latest FEP (FEP-03/558/2018/B) was issued on 25 August 2021.

(3) Application for variation of an environmental permit for FEP-02/558/2018 was undertaken and the latest FEP (FEP-02/558/2018/A) was issued on 22 December 2020.

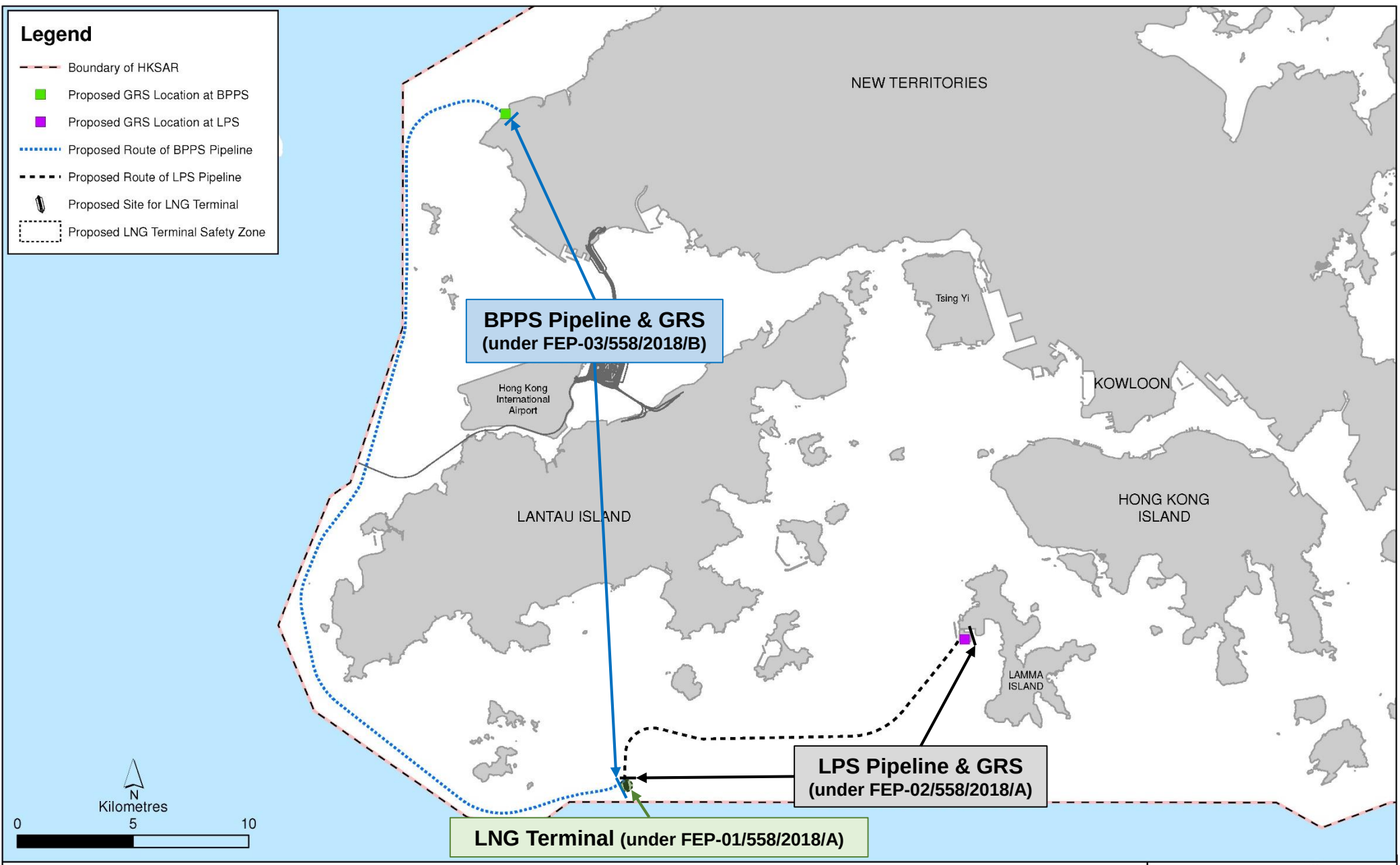

Figure 1.1

Indicative Location of Key Project Components

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Date: August 2021

Environmental Resources Management

ERM

1.2 Purpose of the Safety Management Plan

As stated in Condition 4.2 of the FEP of the LNG Terminal (FEP-01/558/2018/A), this Safety Management Plan presents the safety management system (SMS) for the operation of the Project, including information relating to the key safety design features, operation and maintenance procedures, emergency response procedures, marine safety arrangements and procedures and regular safety audit for the operation of the Project. In addition, the delineation, control and implementation details of a marine safety zone around the jetty for the operation of the Project and the operational arrangements and procedures for adverse weather and met-ocean conditions are described.

1.3 Structure of the Safety Management Plan

The remainder of this Safety Management Plan is set out as follows:

- ***Section 2*** presents the safety management system for the operation of the Project;
- ***Section 3*** describes the key safety design features of the LNG Terminal;
- ***Section 4*** details the operation and maintenance (O&M) procedures of the Project;
- ***Section 5*** presents the emergency response procedures;
- ***Section 6*** presents the marine safety arrangement and procedures; and
- ***Section 7*** presents the mechanism for regular safety review and audit.

2. SAFETY MANAGEMENT SYSTEM

2.1 Safety Policy

HKLTL is the owner of the HKOLNG Jetty. HKLTL cares for the safety and health of our staff, contractors, customers and the public, therefore, in order to ensure Zero Harm in our workplace and everyone goes home safely, it aims to achieve zero exposure at all of our work locations including:

- Eliminate exposures which may lead to serious injuries and fatality;
- Uphold safety and health as an integral part of our work and a value that is never compromised;
- Develop a proactive, positive and interdependent team safety culture amongst our staff and contractors, such that everyone works safely and support each other, and issues are communicated openly, fairly and with mutual respect;
- Provide a safe and healthy environment for all who work on or visit HKLTL's premises;
- Use Plan-Do-Check-Act approach to proactively manage safety and health as an integral part of our work processes and activities, including the demonstration of innovative ways to improve the safety management;
- Comply with the requirements of all applicable safety and occupational health laws and regulations;
- Define clear accountability and responsibility for safety at all levels of the organization, reinforcing the idea that everyone working for the Project has a responsibility to work safely. Management must lead by example and provide continued and visible support to safety;
- Continuously enhance the knowledge, competence, awareness and behaviour of the management team, our staff and contractors in safety and hazard management, through sharing and exchanging knowledge and experience;
- Actively pursue continuous improvements on safety performance through executing targeted, defined safety initiatives and establishing challenging measurable objectives and targets while regularly reviewing performance;
- Execute "Fair and Just Culture"; and
- Nurture an off-the-job safety and health culture.

Together the Jetty and FSRU Vessel are managed by MOL FSRU TERMINAL (HONG KONG) Limited, below namely FSRU Terminal HK, which is the operations & management company based in Hong Kong.

FSRU Terminal HK aspire to be Hong Kong's most admired LNG jetty operations and maintenance services company and believe that this ambition can only be achieved by living and acting according to values that speak to the economic, social, and environmental responsibilities of business and society.

The Safety Policy of the Project is:

- Protection of the environment, the safety and health of MOL FSRU Terminal Hong Kong's employees, customers, suppliers and all those involved is an integral part of our activities;
- MOL FSRU Terminal Hong Kong
    a. is committed to continuous improvement in the processes to manage safety, health and environmental performance;

b. will contribute to the continuity of the company by the systematic control, prevention and elimination of hazards. We will continuously work towards the goals of zero incidents and no damage to the environment; and

c. will strictly adhere to safety, health and environmental governing regulations as a minimum.

- Line Management's responsibility is to demonstrate visible commitment, enforcement and provision of appropriate resources to implement FSRU Terminal HK's Safety, Health, Environment (SHE) policy; and
- Safety is everyone's responsibility, and we expect every all personnel involved in the MOL FSRU Terminal Hong Kong operations to contribute to the prevention of accidents by reporting, analyzing and controlling safety, health and environmental hazards. This will be supported by efficient and effective training programs, empowerment right to stop anyone from unsafe act, and the development of annual SHE improvement plans.

2.2 Governance

The goals of no accidents, no harm to people, and no damage to the environment are committed from top down through all levels of HKLTL. Management shall lead by example, and its commitment to health and safety should be seen and felt by all employees as genuine and deep.

Leadership Commitment Vision, Values and Policies are in place and aligned with all personnel. Management expectations are translated into a management system, working procedures and instructions. Periodic review is conducted against evolving management expectations. All health and safety regulatory requirements are complied with.

HKLTL will take the responsibility to monitor the overall Health, Safety, Security and Environmental (HSSE) performance of business under the implementation of the Safety Management System. Other contractors will produce their own Safety Management Plan.

A Health and Safety Organisation with various Committees should be established and one that engages people at all levels involving both contractors and suppliers. Roles and responsibilities, authorities and accountabilities for each position should be clearly defined, communicated, understood and implemented.

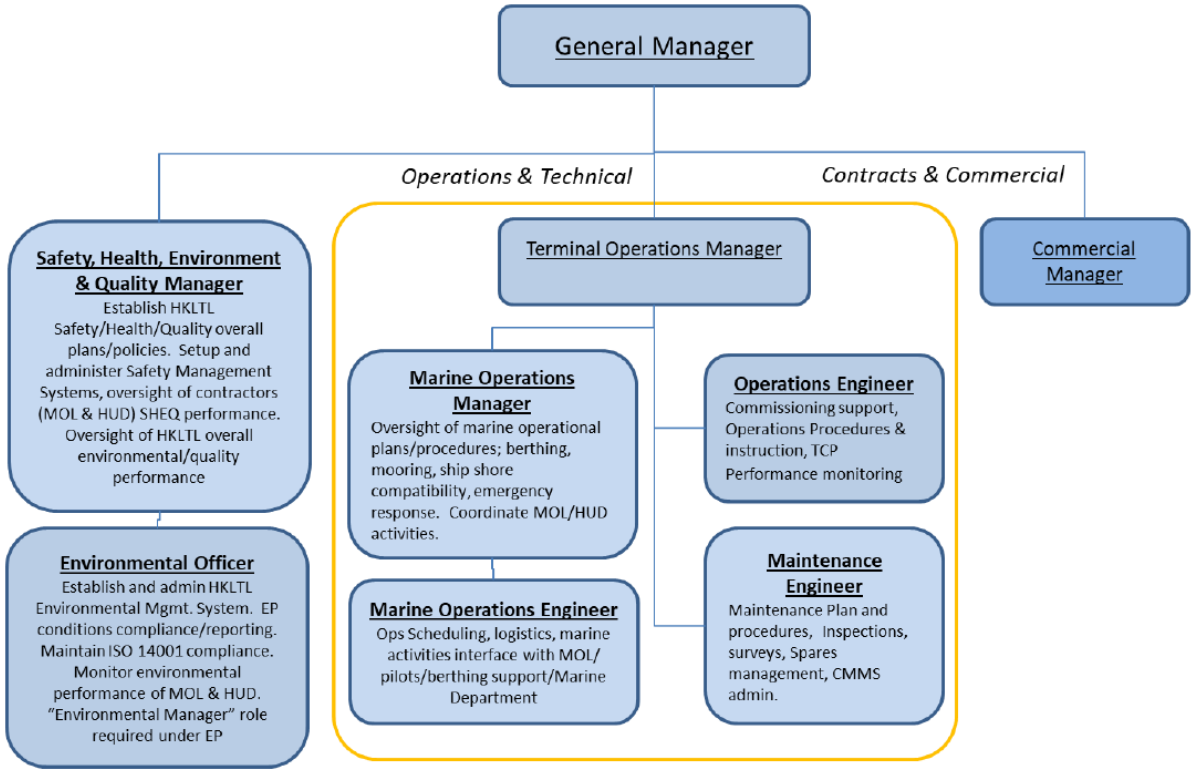
Health and safety professionals are required to provide and facilitate overall health and safety effort and give advice on health and safety matters, while responsibility for health and safety rests with line management.

Managers should demonstrate active engagement and enhance ownership and involvement from employees and contractors in health and safety matters. They motivate the team through recognition and continue to drive interdependent culture, sustainable health and safety improvements and health and safety leadership across the organisation.

2.3 Organisational Structure

The overall HKLTL organization chart as illustrated in ***Figure 2.1*** identifies the reporting hierarchy and lines of communication. Safety is a duty of all and reporting of safety issues is given among other factors on all business.

Figure 2.1 HKLTL Safety Organisation Chart



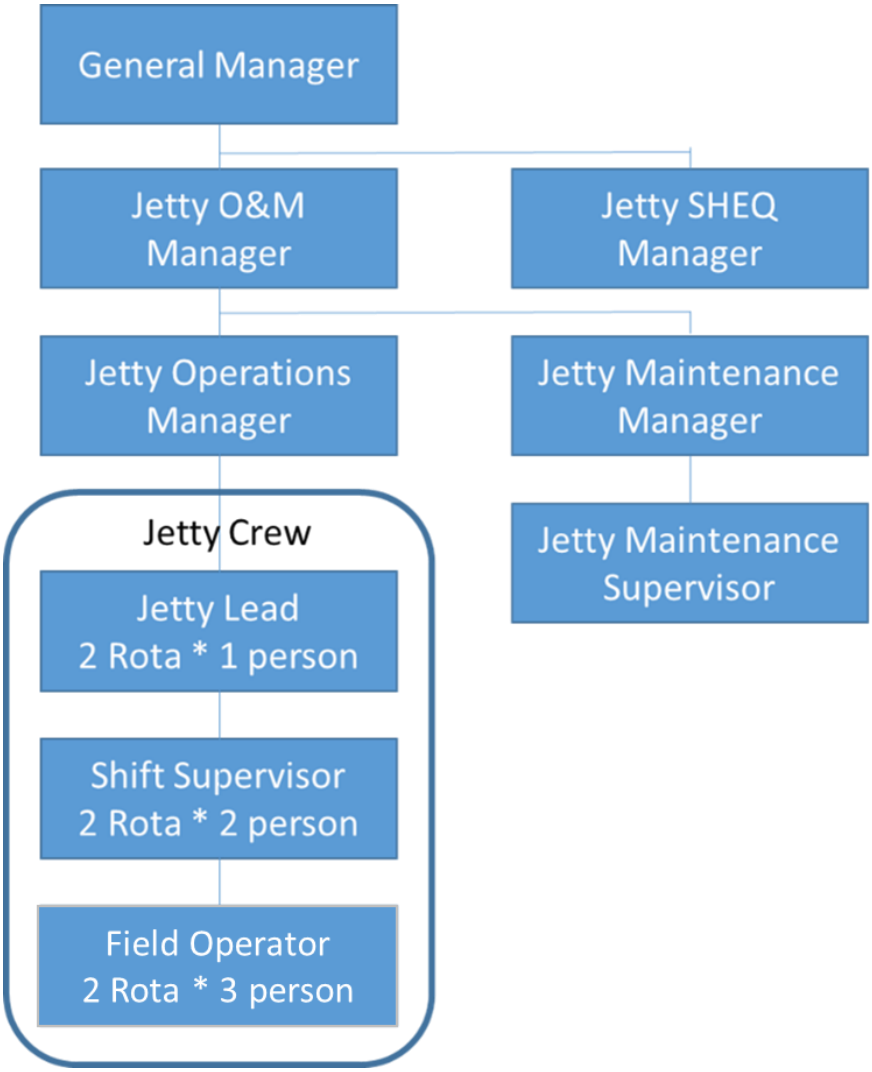
At the LNG Terminal operations level, the FSRU Terminal HK has established an organization chart to ensure that the job functions and their interaction are clear to the staff as shown in ***Figure 2.2***.

The FSRU Terminal HK shall establish, implement & maintain the integrated management system with reference to ISO 9001, ISO14001, ISO 45001 aspects and other local regulatory requirements on FSRU Terminal HK process. The key roles and responsibility are presented in ***Table 2.1***.

Table 2.1 FSRU Terminal HK Key Roles and Responsibilities

Key Roles	Responsibilities
General Manager (GM)	▪ Ensure adequate resources for the development, implementation, & improvement of Integrated Management System (IMS) ▪ Responsible to ensure that requests, feedback, and complaints are forwarded to the relevant department and acted upon
Jetty Safety, Health, Environment and Quality (SHEQ) Manager	▪ Responsible for the overall performance monitoring of the IMS ▪ Report to GM on the status of IMS implementation ▪ Provide HKLTL the monthly HSSE performance report
Other Jetty Managers/ Supervisors/ Jetty Lead	▪ Lead the implementations of IMS ▪ Encourage their staff to participate in the development and improvement of IMS
All employees	▪ Implement the IMS ▪ Participate effectively in the consultation of IMS aspects

Figure 2.2 FSRU Terminal HK Organization Chart (LNG Terminal Operations)



2.4 Safety Rules

The major in-house safety rules are presented below:

- No alcohol and drug abuse
  - No staff or contractors will be allowed to work under the influence of alcohol or drugs. Use of possession of illegal substances is strictly prohibited;
- Stop work authority
  - All staff or contractors may stop a work activity where a hazardous situation exists;
- No smoking
  - Smoking is strictly prohibited at the LNG Terminal, except in the designated areas.

All the safety standards, rules and procedures shall meet the statutory requirements and industry practices and the contractors shall conduct the yearly review for those standards, rules and procedures. In addition, they are required to submit to HKLTL for notification.

2.5 Safety Training

The FSRU Terminal HK shall provide in-house safety training related to all activities / tasks with natural gas safety at the LNG Terminal and safety induction training to staff, contractors and other

visitors who are visiting the LNG Terminal. According to Permit-to-work System, the natural gas safety training should cover all levels of individual frontline workers, competent supervision, authorization and auditing. Moreover, marine and vessel operation safety training should be included in the safety training programme according to international practices.

The training plan includes the following major elements.

- Theoretical training and the LNG Terminal description:
  - General safety induction;
  - Basic LNG training (e.g. terminal design, operation, process and utilities and a basic understanding of the equipment and systems installed in the plant, describing their functionality and characteristics).
- Safety, Health and Environment (SHE) training:
  - All specific aspects of safety from the specific product (e.g. LNG) environment;
  - Terminal safety and emergency procedures with the aim of preventing the occurrence of any situations which might pose a hazard to people, environment and the offshore jetty.
- Procedures training:
  - Get familiarized with the work instructions, procedures and equipment (e.g. start, stop, draining, purging, venting, cool down or emergency response of the equipment).
- Vendor training - theoretical and practical:
  - Emergency diesel generator, typhoon generator, fire service generator;
  - Fire water pump, fire monitor & foam system;
  - Instrumentation & control;
  - Telecommunication system.
- On-the-job training during commissioning and operation:
  - Practical knowledge about the equipment and the overall functioning of the jetty facility.
- Any other training based on statutory and regulatory requirements:
  - HKSAR laws and regulations require (part of) the Jetty team to be certified and/or qualified in order to be allowed to perform certain work activities (e.g. confined space, crane, radar, first aid, abrasive wheel operation, green and blue cards, etc.).

Refresher training frequency is also identified in the safety training programme. Hence, each employee / contractor involved in operating a process to assure that they understand and adhere to the current operating procedures of the process.

2.6 Inspection Programme

Routine inspections are required for major process units and equipment, such as pressure vessels, storage tanks, piping systems, relief and vent systems, emergency shutdown (ESD) systems, control systems (e.g. monitoring devices and sensors), and pumps to ensure the mechanical integrity of the component meets requirements.

Identify inspection and testing procedures in alignment with manufacturer's requirements and recommendations by Mechanic for pneumatic / mechanical type and Registered Electrical Worker for electrical equipment including:

- Qualifications for inspection and testing personnel;
- Frequency of inspection and testing for various types of tools and equipment.

Regular workplace inspections should be conducted to monitor site health and safety performance. Prior to approval, a visual inspection is conducted for the worksite to identify any overlooked problems. The work site must be inspected daily before a permit to work can be issued. Aside from confirming that all work permit requirements have been fulfilled, this check is essential to identify any remaining hazards and to see that the threat they pose are controlled or eliminated.

Hazards during inspections to be aware of including the following but not limited to:

- Residual flammable material;
- Adequacy of isolation;
- Radioactive sources;
- Loose or poorly supported materials/equipment overhead;
- Sharp objects; and
- Drains are covered or enclosed.

The work site must always be inspected by a competent person before the permit is issued to ensure that conditions are safe and have not materially changed.

All inspections and tests need to be well-documented and must follow documented procedures.

2.7 Hazard Control Programme

Hazardous process would be covered under the scope of the process safety management system, which focuses on providing sufficient controls and/or redundancies to avoid a set of conditions that can lead to process safety incidents.

The FSRU Terminal HK Process Safety Management framework covers the following major elements:

- Process Safety Information (PSI);
- Process Hazard Analysis (PHA) & Risk assessment;
- Operating Procedures;
- Management of Change;
- Mechanical Integrity and Reliability;
- Pre-Startup Safety Review (PSSR);
- Training;
- Employee Participation;
- Compliance Audit;
- Permit to Work (PTW).

It is essential for risks to be eliminated or reduced "at source". If a risk cannot be controlled completely by engineering measures, it is necessary to protect the employees by administrative control or personal protection. The control of hazards and reduction of risks can be accomplished by following the hierarchy of control methods. These control measures are not usually mutually exclusive, e.g. engineering controls can be implemented together with administrative controls like training and safe work procedure.

Personal Protective Equipment (PPE) programme is required for all work activities, including marine transportation, to protect personnel from hazards to be encountered. The PPE Standard would be adopted from the recommendation by Marine Department (MD) and Labour Department (LD) of Hong Kong.

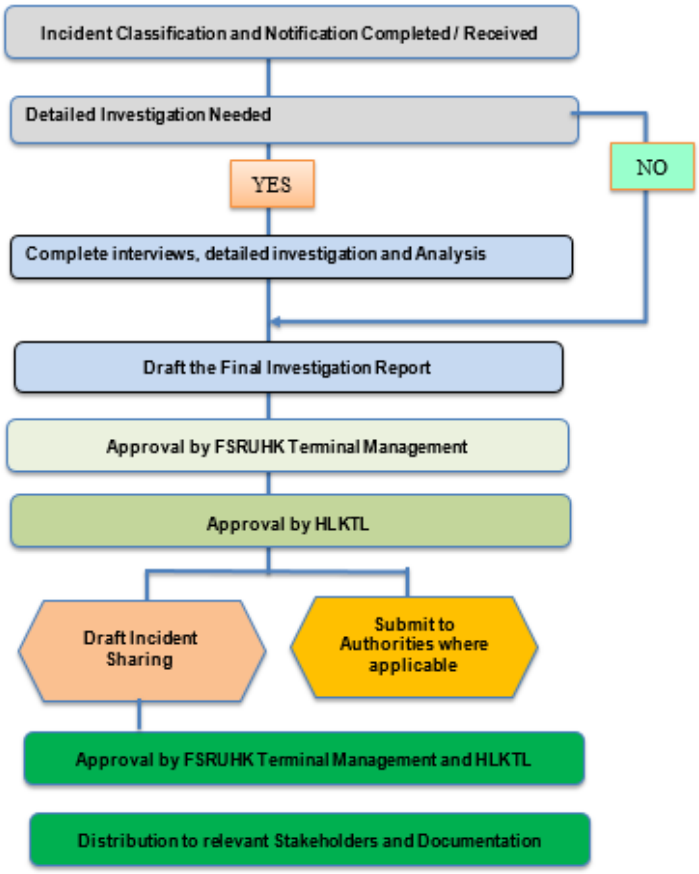
PPE shall include as appropriate:

- Head protection;
  - Fitted with Y-shape chin strap
  - Adopt different colours helmet for specific position / trade persons
- Eyes protection;
- Hearing protection;
- Respiratory aid;
- Foot protection;
- Fall protection;
- Hand protection;
- General protective clothing;
  - High visibility straps displayed on the protective clothing / uniform;
  - Anti-static protective clothing;
- Drown prevention.

2.8 Accident / Incident Investigation

An incident investigation shall be initiated immediately following an incident by an investigation team and the investigation team members shall be appointed by senior management. The work flow for investigation and reporting is illustrated in ***Figure 2.3***.

Figure 2.3 Work Flow for Investigation & Reporting



The FSRU Terminal HK shall ensure that responsibilities are assigned, and the scope of the investigation is defined.

The importance of an incident investigation process is to ensure that:

- appropriate incident investigation team with proper training is formed to identify the cause of incident;
- for potential significant incident, root cause can be identified;
- findings and recommendations are effectively evaluated and corrective actions are implemented;
- incident sharing with others to prevent reoccurrence of similar incident etc.

For severe incidents and loss time injury cases, an accident investigation panel shall be formed for investigation.

The investigation and the associated report should be normally completed within 1 month from the date of the incident.

Each responsible party shall develop a well-designed incident investigation report form to provide guidelines for the investigator. Upon completion of the investigation report, it shall be reviewed by legal team, if necessary.

The FSRU Terminal HK shall determine the responsible parties/persons and targeted time frame for implementing each recommended action and any follow up action plan. A corrective action classification, tracking and close out system and procedure is required for all assets.

2.9 Emergency Preparedness

The FSRU Terminal HK establish, implement, and maintain a process needed to prepare for and respond to potential emergency situations. The preparations include:

- Establishing a planned response to emergency situations, including the provision of first aid;
- Providing training for the planned response;
- Periodically testing and exercising the planned response capability;
- Evaluating performance and, as necessary, revising the planned response, including after testing and, in particular, after the occurrence of emergency situations;
- Communicating and providing relevant information to all workers on their duties and responsibilities;
- Communicating relevant information to contractors, visitors, emergency response services, government authorities and, as appropriate, the local community; and
- Taking into account the needs and capabilities of all relevant interested parties and ensuring their involvement, as appropriate, in the development of the planned response.

The FSRU Terminal HK maintains and retains documented information on the processes and on the plans for responding to potential emergency situations, through the establishment of an Emergency Response Plan. The Emergency Response Plan defines the emergency organisation, authorities and responsibilities, list of key personnel, internal and external communication plans, details of emergency services and information on hazardous materials. In addition, Incident Action Plans are developed to ensure a planned response to emergency situations.

The Emergency Response Plan has been prepared under Condition 4.9 of FEP-01/558/2018/A. The Emergency Response Plan is also documented and made available in the LNG Terminal's document management system and the Central Control Room.

The Emergency Response Plan is communicated to the relevant staff through briefing and training. The Operations teams are the de-facto emergency responders and are subjected to monthly and full-scale drills and exercises.

An annual programme of drills and exercises is established as part of the Annual SHEQ Plan. Relevant information on emergency response is provided to visitors to the LNG Terminal through the mandatory safety induction.

2.10 Evaluation and Control of Services Providers

A cooperative approach is used to work with services providers to achieve excellent SHEQ performance.

The FSRU Terminal HK has developed a system to screen the suitable services providers for tendering, selection criteria will be developed for the evaluation and selection of contractors, suppliers, etc. The selection criteria will consider significant aspects such as cost, technical ability, reputation, and the ability to meet schedule. SHEQ management will be given an appropriate weighting along with other selection criteria.

The role to control the execution of the key safety concern areas are as follows, but not limited to:

- SHEQ organization;
- Work planning;
- Method statements;
- Risk assessments;
- Toolbox talks;
- Permit to work; and
- Others where appropriate.

Key concerns for services providers during the execution of the contract include:

- Goods conformance to the technical specifications and all applicable laws;
- SHEQ considerations for delivery of Goods to site, such as heavy lift required, extra-long/ wide Goods, etc.;
- SHEQ consideration for installation/ assemble work required on site.

The FSRU Terminal HK will ensure the SHEQ performance of the services providers during the implementation of the contract works will be regularly and systematically monitored according to statutory requirement and the contract terms (in particular, the safety plan submitted by the contractor) to ensure the expected level of SHEQ performance is being achieved. The evaluation aspects will be considered as follows:

- accident / incident statistics;
- summons & convictions;
- close out of findings from observation;
- warning / penalty letter / pause work order received;
- PPE compliance;
- observation, near miss reporting & safety innovation;
- works in accordance with HKLTL and statutory standards & requirements;
- sufficient levels and quality of supervision etc.

In addition, all safety performance of each service provider can be discussed and reviewed at the monthly SHEQ Committee meeting.

2.11 Safety Committees

The FSRU Terminal HK shall establish monthly SHEQ Committee meeting to monitor the implementation of the safety management plan and recommend the company's SHE policies, standards, compliance requirements, and performances.

Membership of the Safety Committee comes from as many levels as practicable and shall include:

- General Manager (Chairman);
- Jetty SHEQ Manager (Secretary);
- Representatives from Managers, Jetty Lead & Supervisors, field operators of Operations and Maintenance Team; and
- invited FSRU representative and HKLTL representative, if relevant (sub) contractors and other staff, as appropriate.

2.12 Job-hazard Analysis

The job-hazard analysis shall determine the risk to the environment, workers and property. The assessments to identify the environmental aspects/impacts and health/safety hazards shall be conducted when there is a change in the terminal operation/process, materials usage, equipment / machines and new installation.

The following information may be obtained when conducting the job-hazard analysis:

- Site plan and work flow;
- Inputs such as types and quantities of materials in storage;
- Outputs such as types and quantities of waste, fugitive emission, wastewater and nuisance;
- Process/activity of the work methods for company's operations; and
- Other information such as previous incidents/accidents / non-compliance, safe work procedure, details of existing risk control, method of storage, handling and transfer of materials.

The job-hazard analysis team shall identify the possible health/safety hazards/risks and environmental aspects/impacts covering the following but not limited to:

- Injury and fatality;
- Downtime & operational issues;
- Damage to property;
- Short/Long term occupational illness and ergonomic hazards;
- Fire & explosion hazards;
- Implosion hazards;
- Chemical release;
- Human behaviour, human capabilities and other human factors;
- Air contamination;
- Water & ground contamination;
- Hazardous and non-hazardous wastes;
- Resource depletion; and

- Aesthetic effects (e.g. noise, odour etc.).

The risk assessment matrix covers the following two parameters:

- The likelihood of occurrence of the given environmental aspect / impact or health/safety hazards; and
- Consequence (severity of occurrence) of the environmental effect/Impact or health/safety hazards.

The overall risk rating shall be computed by multiplying the scores for the two parameters above for the risk evaluation. Activities with risks rated as Extreme Risk and High Risk shall not commence until the risk levels have been brought to at least Medium Risk through additional safeguards or adjustments to the design.

Jetty O&M Managers shall approve all job-hazard analysis for all routine and non-routine activities.

All job-hazard analyses must be reviewed at least once every three years or

- upon any accident, incident, near miss or dangerous occurrence;
- when there is any significant change in work process, products / materials, equipment / machinery, persons or activity;
- when new information on SHEQ risks is made known and affecting our operations, such as applicable legal and other requirements; and
- corrective action that introduces a new hazard or changes the hazard.

The Jetty SHEQ Manager shall keep the latest copy of all job-hazard analyses related to the terminal operations and maintenance.

Besides, any changes to operating procedures shall be communicated to the relevant personnel. The operating procedures and safe work practices shall be reviewed by operations staff every year to evaluate their relevance and adequacy.

2.13 Safety and Health Awareness

All staff are made aware of:

- The safety management system policies and objectives;
- Their contribution to the improvement of safety and health performance;
- The implications and potential consequences of not conforming to the safety management system requirements;
- Incidents and the outcomes of investigations that are relevant to them;
- Hazards, risks, and actions determined that are relevant to them; and
- The ability to remove themselves from work situations that they consider present an imminent and serious danger to their life or health, as well as the arrangements for protecting them from undue consequences for doing so.

The policies are communicated to all staff during induction, meetings and displayed at accessible areas within the office, Jetty Control Room and other appropriate means.

All staff are trained on the relevance and importance of their activities and how they contribute to the achievement of safety policies and objectives.

All staff are notified of the importance of safe work and that “no job is so urgent that time cannot be taken to do it safely”, through the Permit to Work, safety posters and other safety programs.

2.14 Accident Control and Hazard Elimination

A risk management process involving the identification, assessment, and prioritization of risks shall be established. Risks will be managed until they are eliminated, reduced or controlled to an acceptable level. Suitable monitoring and control measures to minimize the probability and/or impact on potential incidents must be in place.

The risk management system aims to identify hazards, assess probabilities and, consequences as well as determining and implementing preventive and mitigation measures for managing the risks to As Low As Reasonably practicable (ALARP) level.

The risk management system shall be composed of the following elements, but not limited to:

- Hazard identification;
- Risk Register;
- Risk Evaluation;
    - Risk assessments are conducted for ongoing operations, projects / products to identify the potential hazards to personnel, facilities, public and environment are assessed.
    - The risk assessment report would be reviewed with considering the following areas:
        - Facilities and operations
        - Schedule and frequency of assessments
        - The required resources
- Competence in Risk Assessment;
    - a dedicated team composed of members who are trained in risk management and poses good knowledge of the operation or work activity to be assessed.
- Risk controls;
    - risk assessment follow-up action plan includes priority, responsibility and planned timing, and a periodic report is provided to HKLTL management on the status of action items.
- Periodic Review.
    - Risk owners are properly defined for on-going monitoring, action taken in mitigating the risks and regular review and re-assessment.

2.15 Occupational Health Assurance Programme

Occupational Health Assurance Programme is required to develop for the health concern applied on all personnel in the HKLTL. Health risks would be identified and mitigated as early as possible in operation phase by various risk assessments and through the life cycle of HKLTL. Where applicable, contractor(s) shall produce health management procedures to cover occupational health issues that workers will be exposed to.

The Occupational Health Assurance Programmes including:

- Pre-employment Medical Examination
    - The designated position of terminal staff/ contractors are required to complete a medical declaration and attend a pre-employment medical examination to ensure that they are fit to work and will not pose a hazard to themselves or their co-workers;
    - Special work groups require employees to undergo medical examinations in order to comply with statutory requirements and relevant internal procedures.
- Health monitoring for specific work groups

  - First aiders should be responsible in monitoring the health status on special work groups from different workforce.

- COVID-19 Prevention & Control Program
  - A COVID-19 Prevention and Control Plan should be in place;
  - This program shall be reviewed periodically as the threat and risk level of the COVID-19 Epidemic change.
- Industrial Hygiene Monitoring – Indoor Air Quality & Illumination
  - Specialist should be assigned to check for working environment monitoring in which the indoor air quality and illumination set up shall be complied with statutory requirements of the Hong Kong government.
- Personal Protective Equipment (PPE)
  - PPE programme is required for all work activities, including marine transportation, to protect personnel from hazards to be encountered;
  - All types of PPE shall be the approved type and certified by recognized international code;
  - All types of PPE shall be inspected, used, stored, maintained and replaced in alignment with manufacturer's requirements and recommendations and inspection records maintained as required.

2.16 Communication and Safety Promotion

Various communication mechanisms and platforms have been developed to ensure effective and efficient communications are maintained between FSRU Terminal HK and its stakeholders.

The communication will be documented and submitted to HKLTL for record purpose. Random checks are conducted by HKLTL and the selected stakeholders to check on their understanding of information communicated and timeliness. Various example of communication including the following, but not limited to:

- Meetings, e.g. Safety Committee Meeting;
- Trainings;
- Workshops;
- Stand down;
- Newsletter;
- Memo;
- Safety Alert;
- Safety Moment.

Contractors are required to develop a scheme to promote the proactive incident prevention involvement together with HKLTL. Each scheme should have its own specific theme in promoting different safety aspects. All activities should be recorded and documented.

The following areas should be covered, but not limited to:

- Hand Protection;
- Observation and Intervention Scheme;
- Boat Transfer Safety;
- Offshore Lifting Operation;

- Smoking Cessation;
- Drugs and Alcohol Abuse;
- Health Promotion Day.

3. KEY SAFETY DESIGN FEATURES

3.1 FSRU Vessel

The Project has an FSRU Vessel, which will be moored at the Jetty, providing facilities that enable LNG Carriers (LNGCs) to deliver cargoes of LNG which will be transferred and stored in the FSRU Vessel's LNG storage tanks.

Manual fire protection system actuation switches are provided on the Fire & Gas System in the FSRU Vessel Control Room and Satellite Instrument Enclosure for remote actuation of fire protection. The Fire and Gas Alarm Panel Cabinet (FGAPC) have been provided on the upper deck of Mooring Dolphin (MD) 1 as per requirement from the Fire Services Department.

The following safety systems are included in the FSRU Vessel:

- Overpressure Protection System:
  - The boil-off vapour in the cargo tanks can be sent to Boil-off Gas (BOG) System to maintain the vapour pressure inside the cargo tanks. Pressure relief system is also provided for the LNG cargo tanks. The cargo tank and interbarrier space are fitted with pressure relief valve(s) which connect to a venting system. The setting of the pressure relief valves will be lower than the vapour pressure adopted in the design of the cargo tanks.
- Navigation System:
  - The FSRU Vessel is equipped with advanced navigational systems such as Digital Global Positioning System (DGPS), radar and communication system. The marine traffic is monitored by the Vessel Traffic System (VTS), providing an active monitoring and navigational advice for vessels.
  - The navigation is constantly monitored by well trained and experienced master and the officers to make good use of the navigation system for the transit to the LNG Terminal.
- Double Containment System:
  - The containment system is designed as per international standards including the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code). The containment system is provided with a full secondary liquid-tight barrier capable of safely containing all potential leakages through the primary barrier and, in conjunction with the thermal insulation system, preventing the lowering of ship structure temperature to an unsafe level.
  - Leak detection system is provided between the primary and secondary containment barriers. In addition, the LNG cargo tanks are provided with pressure relief valves which connect to a designated vent piping system.
- Process Control System:
  - Process control valves (e.g. pressure control, temperature control etc.) are provided in the process facility in order to continuously maintain the stability of the overall process operation. Process deviation alarms are also provided to alert the operators to take necessary actions.
- Emergency Shutdown (ESD) System:
  - ESD System is provided at the FSRU Vessel to stop LNG flow in the event of an emergency and to return the system to a safe, static condition so that remedial action can be taken. The ESD system can be activated automatically through various initiators (e.g. power failure, cargo tank overfill etc.) and manually through push buttons.
- Custody Transfer Measurement System (CTMS):

- The FSRU Vessel is provided with an automatic system for the calculation of LNG and gas volumes in each cargo tank. The use of such system will facilitate the process of determining quantities transferred during loading and unloading. The CTMS processes data from tank level, temperature, pressure sensors, etc. in real time, taking into account the required corrections and certified gauge table, to produce a calculation of volumes before, during and after LNG transfer operation.

Overfill protection, vacuum protection and excess flow protection systems are also installed in the FSRU Vessel.

3.2 Jetty Monitoring and Management System

Jetty monitoring and management system is provided at the LNG terminal, which serves to closely monitor the mooring line tension and vessel motion. Excessive mooring line tension and vessel motion will activate alarm and subsequent ESD system to shutdown the LNG cargo transfer operation.

3.3 Fire Fighting System

The firefighting philosophy for fires involving LNG/NG is to isolate the source of fuel and allow the fire to continue to burn, mitigating the consequences and preventing spread/escalation, until the available fuel has been consumed.

3.3.1 Fire & Gas Detection

Generally, fire water monitors with deluge valve are manually activated by the push button on both Jetty Spark Ignition Engine (SIE) fire alarm system, FSRU Central Control Room (CCR) fire alarm system, Fire Alarm Mimic Panel at MD1 and site. Fixed clean gas extinguishing system (NOVEC 1230) can be activated automatically by fire and gas detection system with 30 seconds time delay and the fire and detection system on NOVEC 1230 local panel repeat to fire alarm panel on Jetty SIE and Jetty CCR at FSRU Vessel, as well as activated by manual push button that is outside the protection room and on the fire and gas control panel both on Jetty SIE and Jetty CCR at FSRU Vessel.

Flammable gas detectors are located where the leakage source is nearby and the flammable gas could accumulate. Gas detection also installed at equipment air intakes such as firewater pump diesel engines and diesel generator air intakes and inhibit start up if confirmed gas detected.

3.3.2 Fire Water Supply

Three fire water pumps are provided, one as duty fire water pump (1x100% on MD4) has a design capacity of 100% of maximum fire water demand. The other two as standby pumps (2x50% on BD1), each standby pump has a design capacity of 50% of maximum fire water demand.

During fire conditions, Fire water pump has been designed to start automatically via fire detection system as well as the pressure drop in fire water ring main. The fire pumps also can be activated manually via manual call point located near hydrants as per FSD requirement.

3.3.3 Fire Hydrant

Two outlets type, non-corrosive metal, hydrants are installed on the Jetty area for protection not less than every 30 meters. Each hydrant assembly conforms with Hong Kong local government requirement. Each outlet of all hydrants shall be instantaneous type conforming to British Standard (BS) 336 and be individually controlled by a wheel-operated screw valve designed to open by counter clockwise rotation.

3.3.4 Fire Monitors

Fire monitors are used for thermal radiation exposure protection of Jetty equipment. Monitors are constructed from corrosion resistant material, suitable for seawater use and marine environment.

3.3.5 Deluge Valve Skid

Deluge valves are activated from the Jetty SIE, FSRU CCR and Fire Alarm Mimic Panel at MD1 or on site. Push buttons of deluge valves must be tagged with different fire zone number guide operator to operate the deluge valves. The firefighting system includes automatic fire and gas detection systems that shall alert the operators to the presence of gas release or fire, and continuously monitor detection systems for faults and system alarms.

Deluge Valve Skids are used for the activation of fire remote manual operated fire water monitors. Deluge valves are located at a safe distance from the protected area to avoid damage to the Skid during fire and explosion. Each deluge system is equipped with manual bypass valve.

3.3.6 Fire Water Hose Reels

Hose reels are located near the access ways. The fire water hose reels are provided and can be used to extinguish the initial fire by non-professional fireman. Hose reels are strategically located on the Jetty to ensure that every part of the Jetty except jacket walkway can be reached by a length of not more than 30m.

3.3.7 Clean Agent Fire Extinguishing System

A total flooding clean agent FK-5-1-12 (NOVEC 1230) fire extinguishing system is provided for each Jetty SIEs, electrical enclosures, emergency diesel generator enclosure, typhoon diesel generator enclosure, fire service emergency generator enclosure and firewater pump enclosures at Breasting Dolphin (BD) 1.

The total flooding clean agent fire extinguishing systems comply with the requirements of National Fire Protection Association (NFPA) 2001 and relevant local codes and regulations. A clean agent fire extinguishing system is provided to protect the area and above the ceiling as they are not separated by a fire rated partition. Visual and audible alarm is activated during release of the gas system.

3.3.8 Fire Extinguishers

Wheeled dry power extinguisher are provided at key locations where there is LNG fire risk and step-down transformers. Wheeled CO_2 extinguishers should be located in areas with electrical hazards such as outside electrical enclosures and near switchgears. Portable dry chemical fire extinguishers are installed on the entire Jetty area where there is a fire hazard.

3.4 Fire Boat Berthing Point

The Jetty is a typical double berth marine structure that uses mooring / fender facilities to safely moor the FSRU Vessel and LNGC. The Jetty is designed to be unmanned except during daily/normal routine inspection and activities such as vessel berthing and Marine Loading Arm (MLA) connections, preventative/routine maintenance and general operations attendance.

The design criteria for the boat berthing point is based on the evaluation whether ship collision impact probability onto exposed pipeline on MD1 above and below the boat landing. On boat landing area at MD1 deluge valve activation would also be provided as an alternative location.

3.5 CCTV and Surveillance System

The Jetty Monitoring and Control system is designed to operate continuously, to automatically take corrective actions for disturbances caused by changes in process conditions and to alert the operator on the abnormal conditions of the unit/plant. If the operating conditions approach the mechanical

limits of the plant equipment or the process parameters exceed defined limits, the plant ESD system will initiate actions automatically, to bring the plant into a safe condition.

In the emergency event to facilitate remote monitoring and status update using CCTV information of the Jetty, HKLTL would provide necessary support and access to relevant authorities (e.g. Electrical and Mechanical Services Department (EMSD) as gas safety authority).

3.6 Lift Raft & Escape Chute

The life raft is a lifesaving appliance for persons in danger when the jetty has some dangerous. The life rafts were installed on the MD1, MD6, BD1 and BD3.

The escape chute system is used to transfer the persons from the embarkation station to the platform through the vertical chute of the system, and then the persons used the life raft to rescue. The escape chutes were installed on the BD1 and BD3.

3.7 Standby Vessels

The standby vessels (SBV) support the emergency and maintain a protected perimeter under the Terminal First Intervention Team coordination. SBV can access and escort external support services for the emergency, and coordinate with the Jetty Lead. SBV is also available in case of rescue of man overboard.

3.8 Weather Forecast and Warning System

Hong Kong has adopted the Tropical Cyclone Warning Signal regime. Tropical Cyclone Warning Signal T1 is the universally recognised signal used by the authorities throughout Hong Kong and is the trigger for ordering pilots, linesman, tugs etc. Prior to Signal T1 the Terminal management will be monitoring the met ocean forecasts but Signal T1 becomes the trigger to implement the typhoon departure procedure which means that the FSRU Vessel will be off the berth before Signal T3 is hoisted.

Super Typhoons are generally large and intense storms reach this level in the Pacific Ocean giving ample time for departure preparation. Super Typhoons should be considered the worst-case scenario and preparations for departure should be expedited in close consultation with Hong Kong Observatory (HKO).

Wind speed and direction will be the main concern, if the sea/swell will not have had time to build to significant heights/periods for adverse met ocean conditions, other than typhoons.

The HKO raises the Strong Monsoon Signal when a replenishment of the prevailing monsoon is expected to give rise to mean wind speeds in excess of 22 knots. This is a regular occurrence during the NE monsoon, less so for the SW Monsoon. When raised, vessel operators in exposed waters can expect wind gusts up to 70km/hour (37.8 knots) during the initial surge with winds declining thereafter until the Signal is lowered.

Sea state will be a major consideration for small craft and work boats (line handling boats) and will have a bearing on the decision-making process at the time.

Typhoons and other adverse met ocean events will be assessed and dealt with on a case-by-case basis in relation to their potential severity.

4. OPERATION AND MAINTENANCE (O&M) PROCEDURES

4.1 General Jetty Information

HKLTL is the owner of the HKOLNG Jetty. The terminal is two facilities in one, the FSRU Vessel and the Jetty. Together the Jetty and FSRU Vessel are managed by the O&M management company, MOL FSRU Terminal Hong Kong Limited.

The Operations Manager of HKLTL oversees the O&M of FSRU Vessel and Jetty and is the focal point with FSRU Terminal HK on O&M. HKLTL will manage the coordination of the facility with the users and LNG suppliers for the nomination and LNG delivery schedules.

HKLTL O&M mobilization team includes HKLTL and MOL FSRU Terminal HK for the terminal, led by the Terminal Operations manager, including engineers and managers from commercial, marine and HSSE.

The O&M mobilization activities focus on:

- Development of the O&M philosophy;
- Development of HSE standards for contractors;
- Defining HKLTL and O&M contractor staffing requirements;
- Defining and contracting the O&M contracts for materials and services considered critical to operations;
- Organizing proper logistics infrastructures and marine support base to support the FSRU Terminal HK;
- Ensuring all the required permits, licenses, and certifications to operate are in place;
- Assist contractors to develop O&M budget and monitoring costs to maximize effectiveness and cost optimization;
- Ensuring that the right resources are deployed to support a safe and effective handover of the facilities;
- Ensuring a safe and effective performance test in coordination with the contractor/ licensors before provisional acceptance of the facilities.

4.2 High Level Information of O&M Manual

Operating procedures shall include for mode of normal, start up, shutdown, alarm response, foreseeable emergency operations as well as special operations of operating processes.

The operating procedures should document the safe work conditions such as operating limit, location of sampling, timing, and safety precautions in consideration of process safety, occupational safety and health aspect. Operating procedures shall include the operating limits resulting from the information specified in the process safety information and where safety considerations are present, a known-why description of the following:

- The consequences of deviation;
- The steps required to correct or avoid deviation;
- Safety systems and their function;
- Occupational safety and health consideration;
- Properties of hazardous substances;
- Special precautions to prevent exposure to hazards; and
- Other unique hazards.

A maintenance program must be developed that addresses all safety related equipment, such as relief devices, temperature and level controllers and other devices or equipment whose failure could cause a catastrophic accident.

The mechanical integrity program should include the following provisions:

- Categorize list of process equipment, electrical system and instrumentation for inclusion in the mechanical integrity programmed;
- Prioritize the criticality of these equipment in view of the Occupational Safety & Health and process safety impacts resulting from equipment failure;
- Establishment of operating and maintenance manuals for mechanical, civil, electrical and instrument equipment and devices that ensure the mechanical integrity of the hardware;
- List of hardware and indication of their respective level of safety criticality;
- The frequency and scope of inspection and testing;
- Procedure for inspection and testing, acceptable limits and criteria for passing the inspection and test;
- Procedures for equipment defects, maintenance defects and equipment failure reporting and follow up;
- Documentation of inspection and test records and implementation of corrective actions which shall be reported to the responsible person;
- System for reviewing changes in tests and inspections by designated persons;
- Training of maintenance employees and contractor workers in the maintenance tasks and ensure they are competent;
- Part of the mechanical integrity program should include quality control and assurance system to ensure that the maintenance materials, spare equipment and parts used in the maintenance meet design specifications, and any changes in material or equipment parts shall be appropriately reviewed before use. The system also helps to ensure that proper materials of construction are used, fabricated and that proper inspection and installation procedures are carried out; and
- Reliability analysis on the equipment is applied in routine maintenance plan to ensure that appropriate intervals of check, inspection and testing are carried out for both corrosion and erosion rate of the materials of construction. There should a long-term maintenance for periodic maintenance of major and critical equipment. Such plan shall be reviewed annually to take into consideration of the inspection findings, incident reports and regulatory requirements.

4.3 Reference to the O&M Manual

The primary framework of Safety and O&M working procedures associated with Gas Safety and Safety Management on Jetty are summarized in ***Table 4.1***.

Table 4.1 Summary of Safety and O&M Reference Manual

Document No.	Reference Manual
FSRUHK-SH-001-MA	Integrated Management System
FSRUHK-SH-013-PR	SHEQ Committee Management
FSRUHK-SH-031-PR	Safety Observation Round
FSRUHK-SH-030-PR	Process Safety Management
FSRUHK-SH-006-PR	Compliance with Regulation
FSRUHK-SH-029-PR	Control of Work

Document No.	Reference Manual
FSRUHK-SH-038-PR	Management of Change
FSRUHK-OP-007-WI	Work Instruction - High Pressure Gas Send Out Arms
FSRUHK-SH-016-PR	Terminal Emergency Response Plan
FSRUHK-CM-003-PR	Contractor Management
FSRUHK-MA-002-PR	Inspection and Maintenance Management
FSRUHK-SH-008-PR	Performance Measurement and Monitoring
FSRUHK-SH-042-PR	Internal Audit Management
FSRUHK-SH-043-PR	Management Review
FSRUHK-SH-041-PR	Non-Conformance Management
FSRUHK-SH-040-PR	Incident Reporting and Investigation
FSRUHK-SH-033-PR	Lock out Tag out
FSRUHK-SH-017-PR	Fire and Explosion Incident
FSRUHK-SH-024-PR	Emergency Response Plan - LNG/Gas Leakage
FSRUHK-SH-018-PR	Man Overboard
FSRUHK-SH-019-PR	Terminal Emergency Response Plan Hydrocarbon and Chemicals Spillage
FSRUHK-SH-020-PR	Personal Injuries
FSRUHK-SH-021-PR	Security Event - Bomb Threats
FSRUHK-SH-022-PR	Jetty Blackout Start-Up
FSRUHK-SH-023-PR	Collision
FSRUHK-OP-001-MA	Project Management - Jetty Operations Manual
FSRUHK-SH-034-PR	Permit to Work
FSRUHK-OP-006-WI	Work Instruction - Unloading Arms Activities, Unloading and Cool Mode
FSRUHK-OP-011-WI	Work Instruction - Open Drain System
FSRUHK-SH-064-PR	Emergency Departure Plan - Typhoon & Tsunami
FSRUHK-OP-026-WI	Work Instruction - Fire Extinguishing Systems
FSRUHK-SH-048-PR	Chemical Waste Handling Procedure
FSRUHK-OP-004-PR	Defeat of Safety Critical Equipment
FSRUHK-SH-035-PR	Working at Heights
FSRUHK-OP-021-WI	Work Instruction - Jetty Blackout Start-Up
FSRUHK-MA-003-MA	Maintenance Manual
FSRUHK-SH-039-PR	Incident Management
FSRUHK-SH-047-PR	Garbage Management Procedure
FSRUHK-OP-035-FO	SOP for Jetty Typhoon Readiness
FSRUHK-OP-036-FO	SOP Jetty Typhoon Readiness for the event of FSRU Reconnection
FSRUHK-SH-036-PR	Confined Space Entry Procedure
FSRUHK-SH-011-PR	Communication & Meeting Structure
FSRUHK-SH-101-PL	SHEQ Plan
FSRUHK-HR-051-FO	Competency & Training matrix & schedule
FSRUHK-SH-049-FO	Risk Matrix
FSRUHK-SH-025-PR	Escape, Evacuation and Rescue
FSRUHK-SH-026-PR	Full, Partial and Single Mooring Failure Emergency
FSRUHK-SH-045-PR	Personal Protective Equipment Management

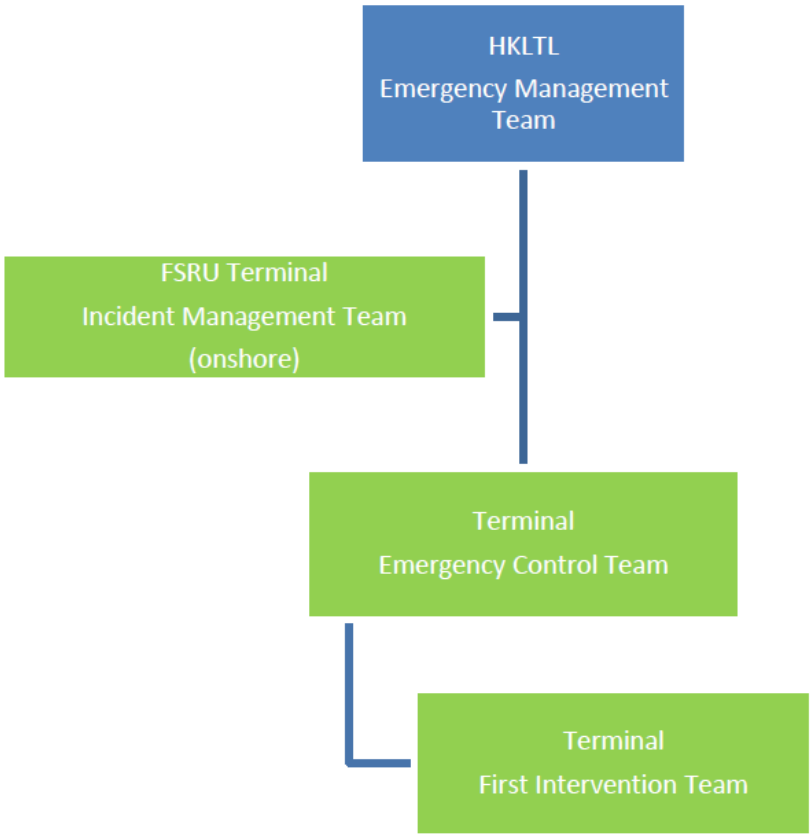
Document No.	Reference Manual
FSRUHK-OP-005-PR	Alarm Management
FSRUHK-SH-004-PR	Business Continuity
FSRUHK-SH-044-PR	COVID 19 - Prevention and Control Plan

5. EMERGENCY RESPONSE PROCEDURES

5.1 Emergency Team Organisation and Responsibility of Key Persons

The organisation chart of the HKLTL Emergency Management Team (EMT) is shown in ***Figure 5.1***. The EMT supports the LNG Terminal Emergency Control Team / Terminal First Intervention Team on technical and safety expertise if require.

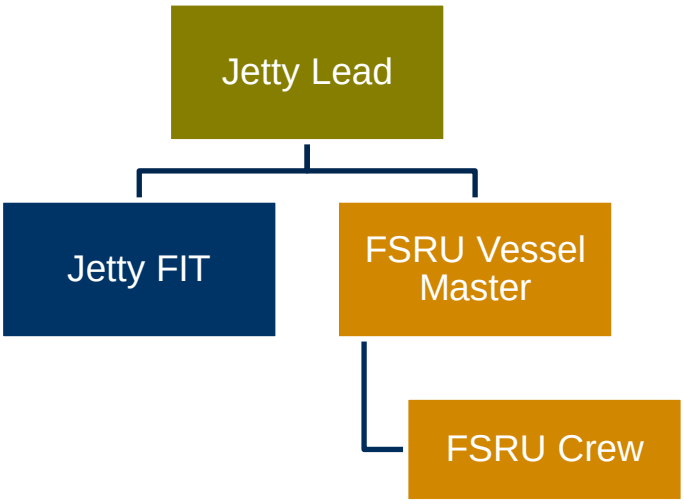
Figure 5.1 HKLTL Emergency Management Team



When emergency incidents occur at the Jetty, the Terminal First Intervention Team (FIT) which is composed of the Jetty FIT, FSRU Vessel Master and FSRU Crew, is responsible for the execution of the appropriate emergency procedures as advised by the Jetty Lead, who is the Incident Controller. The composition of the Terminal FIT is illustrated in ***Figure 5.2***.

The Terminal Emergency Control Team is primarily composed of FSRU Terminal HK onshore team members including General Manager, Duty Manager, O&M Manager, Jetty SHEQ Manager, Maintenance Manager and Ship Management Company. It will support the terminal FIT and bringing technical and safety expertise if required.

Figure 5.2 Terminal First Intervention Team (FIT)



The Jetty FIT mainly includes the Jetty Lead, the Shift Supervisor, the Control Room Operator (CRO) and the Field Operator. The FSRU Vessel Master and FSRU Crew will also be involved if needed. The responsibilities of each roles in the Jetty FIT is listed in ***Table 5.1***.

Table 5.1 Summary of Key Roles and Responsibilities of FIT

Key Roles	Responsibilities
Jetty Lead	▪ Incident Controller (IC) of FIT; ▪ Assess the emergency severity; ▪ Activate communication protocol in case of accident at the Jetty or at the FSRU Vessel and is the focal point with the government departments if assistance is required; ▪ Monitor and control active and/or passive personnel headcount process. Confirm FSRU personnel headcount with the FSRU Vessel Master; ▪ Coordinate with FSRU Vessel, LNGC, SBV the evacuation of personnel from the place of the incident; ▪ Confirm with the FIT team the operational actions that will be necessary; ▪ Direct all operations without danger to the personnel (FIT, etc.); ▪ Ensure the search for casualties; ▪ Supervise the actions that take place after the emergency; ▪ Use the Public Address General Alarm (PAGA) to declare “All Clear”; and ▪ Restart the operations.
Shift Supervisor	▪ Support the Jetty Lead.
Control Room Operator (CRO)	▪ Initiate emergency procedures; ▪ Conduct personnel headcount at the Jetty and update Jetty Lead; ▪ Immediate remote actions to shut down and isolate affected area; ▪ Constant monitoring of the Terminal Safety Systems; ▪ Close communication with FIT: equipment status, process, etc.; ▪ Update Jetty Lead of any potential/escalation or any other impact caused; and ▪ Update Event Log Checklist.
Field Operator	▪ Support the Jetty Lead.

Key Roles	Responsibilities
FSRU Vessel Master (if needed)	▪ In case of emergency at the FSRU Vessel, inform Jetty Lead and Ship Management Company; ▪ Responsible for the headcount at the FSRU Vessel; ▪ Responsible for on-board operations, life and emergency departure according to Emergency Departure Plan (EDP)
FSRU Crew (if needed)	▪ Inform FSRU Vessel Master and update the situation; ▪ Assist the FSRU Vessel Master and execute the emergency response procedures.

All the Jetty personnel including visitors, contractors, employee are responsible for the following:

- Must follow emergency procedures in case of accidents or emergency situations
- In case of emergency, notifies Jetty Central Control Room (CCR) with walkie talkie or activate alarm through any manual call point and follow the instructions given by the Jetty Team;
- Move to muster points and wait for orders.

5.2 Emergency Contact

The reporting of emergencies may need to inform HKLTL Terminal Operations Manager, BPPS, LPS and the relevant government departments.

The emergency contact list includes the following:

- CLP – BPPS CCR
- HK Electric – LPS CCR
- HKLTL
    - Terminal Operations Manager
    - SHEQ Manager
    - Marine Operations Manager
    - Environmental Officer
- Terminal
    - General Manager
    - O&M Manager
    - Jetty SHEQ Manager
    - Duty Manager
    - Jetty Operations Manager
    - Jetty Lead
    - FSRU Vessel Master
- Government Department
    - Fire Services Department
    - Environmental Protection Department
    - Marine Department
    - Hong Kong Police Force

- Electrical and Mechanical Services Department

5.3 Fire

Fire and explosion hazards at LNG facilities may result from the presence of combustible gases and liquids, oxygen, and ignition sources during loading and unloading activities, and/or leaks and spills of flammable products.

A formal fire response plan supported by the necessary resources is prepared and provide fire training and response as part of workforce health and safety induction/training.

Facilities with fire detection and suppression equipment that meets internationally recognized technical specifications for the type and amount of flammable and combustible materials should be properly equipped. A combination of automatic and manual fire alarm systems should be present. When active fire protection systems are installed, they should be located to enable rapid and effective response. Fixed systems may also include foam extinguishers attached to tanks, and automatic or manually operated fire protection systems at loading/unloading areas.

5.4 Oil Spillage

Two major types of oil spillage are considered:

- Spill contained at Jetty or on the deck of a vessel;
- Spill from Jetty into the marine environment.

When spillage occurs, the first step is to determine whether it can be handled internally regarding the size of spill. The second type of oil spillage is considered as the most serious in terms of the possibility of causing impact to the local cetacean community and other marine organisms. Upon spillage, hard boom shall be deployed SBV. The boom will be acted as secondary oil containment (SOC) to enclose the spillage area to contain the spillage spreading outside.

5.5 Ship Collision

Ship collision is the structural impact between two ships or one ship and a floating or still object. Ship Collision Study for the Terminal project was conducted to review the current local marine traffic activity around the Jetty.

5.6 Man Overboard

A Man Overboard (MOB) incident refers to a man fell overboard while involved in mooring operations. A SBV is available in case of rescue of man overboard. A man-overboard emergency action plan is established for the Project.

5.7 Fall from Height

Personnel have exposure to falls from heights when working from scaffolding, mobile aerial equipment or permanent / temporary structure at-height, as well as when they work around unguarded holes and edges, and over waters.

Staff/ contractors shall make available fall protection systems per manufacturer's requirements and recommendations to all personnel supporting the work at its work sites.

A trained rescue team is required which is knowledgeable in "suspension trauma" (orthostatic intolerance) and which is outfitted with fit for purpose emergency rescue equipment located at the work site.

5.8 High Level Security Control Measures

The International Ship and Port Facility Security (ISPS) Code would be adopted and implemented for the Jetty security. Port Facility Security Plan (PFSP) is one of the essential documents in managing marine security.

The PFSP would be prepared for the business operation of HKLTL and will be prepared for each designated port facility based on its security assessment. The Designated Authority is responsible for examining the security assessments and PFSPs, issuing the Statement of Compliance and annual audits, and renewing certificates. In compliance with the ISPS Code, all designated port facilities are required to have security exercises and drills carried out regularly.

All the marine security arrangement would be stated in PFSP. The Port Facility Security Officer (PFSO) will confirm the implementation of appropriate security measures.

5.9 Emergency Departure

In the event of an approaching typhoon, inclement weather or an emergency situation, it may become necessary for the FSRU Vessel and/or LNGC where applicable, to depart the LNG Terminal with a more accelerated timescale than anticipated under normal operational conditions.

The decision to depart the berth by either the FSRU Vessel or the alongside LNGC will be dependent on the met ocean forecasts to ensure adequate margins of safety for all personnel.

6. MARINE SAFETY ARRANGEMENT AND PROCEDURES

6.1 Pilotage Arrangement

International Maritime bodies with an interest in the provision of safe, competent and efficient Pilotage services worldwide universally require that adequate time is allocated for the conduct of a comprehensive Master Pilot Exchange (MPX) on the ship's bridge prior to the commencement of active pilotage orders and manoeuvres.

The pilotage arrangement is set out in accordance with maritime legislation and is primarily on the basis of navigational safety but also the health and safety of Pilots for boarding. These pilotage arrangements and marine transit routes are evaluated based on available meteorological data in relation to operating limits, best industry practice and inputs from relevant marine studies and assessments to confirm safe navigation route and the compliance of local regulatory requirements.

As the Project progresses, due to the associated pilotage arrangement, the marine transit routes of FSRU Vessel and LNGC have been further discussed with the relevant authorities. Consequently, the marine transit routes ('Principal Arrival Route' and 'South Departure Route') are determined and agreed with the relevant authorities for implementation to support the operation of the Project. The Principal Arrival Route for the FSRU Vessel and LNGC will enter HKSAR waters at the due east side of the existing CEDD's South Cheung Chau Disposal Ground and will be subject to the prevailing conditions at the time being. The South Departure Route for the FSRU Vessel and LNGC with tugs and supporting vessels will need to pass through the South Lantau Marine Park (SLMP) and then travel to the south to Dangan Channel. Navigation simulation analysis was conducted to verify the Principal Arrival Route and South Departure Route based on various constraints (e.g. water depth, sea conditions, marine traffic, etc). The indicative Principal Arrival Route and South Departure Route for the FSRU Vessel and LNGC are presented in ***Figure 6.1***. It should be noted that during the arrival and departure of the FSRU Vessel and LNGC, there might be adjustment to the proposed marine transit routes described below to suit the navigation safety and weather conditions.

Principal Arrival Route

On arrival in HKSAR waters, the FSRU Vessel / LNGC will firstly enter Hong Kong waters at the due east side of the existing CEDD's South Cheung Chau Disposal Ground for compulsory pilotage en route to the Jetty with tugs assistance and control. Other supporting vessels will accompany the FSRU Vessel / LNGC as necessary along the designated transit route, travelling along north of CEDD's South Cheung Chau Disposal Ground and approaching the LNG Terminal. It is anticipated that during the transit, LNGC with tugs and supporting vessels will need to pass through the SLMP with a duration of about 30 minutes until berthing at the LNG Terminal. The FSRU Vessel will not pass through the SLMP during manoeuvring to the Jetty. However, in the unlikely / emergency event (e.g. loss of power), the FSRU Vessel with tugs / supporting vessels may need to pass through the SLMP for safe manoeuvring to the Jetty.

No stopping over or anchoring of vessels will be necessary during the transit.

South Departure Route

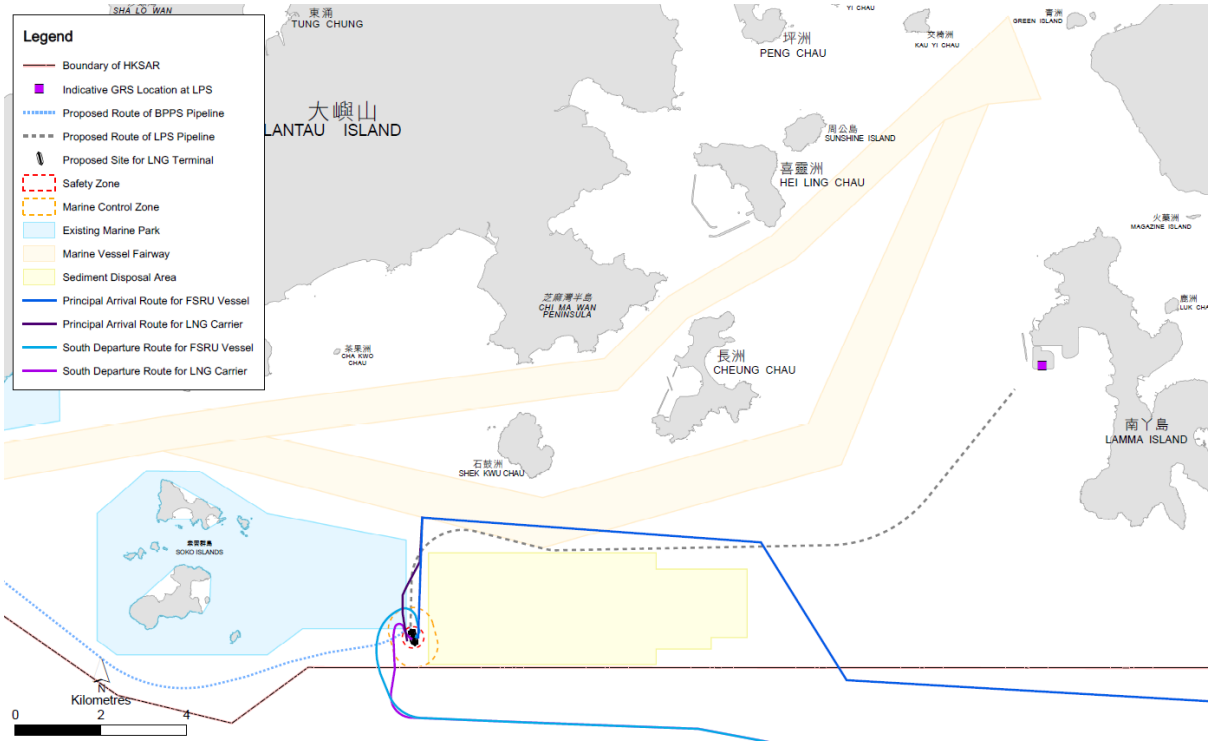
The South Departure Route is the principal route for the departure of the FSRU Vessel / LNGC. On departure from the LNG Terminal, the manoeuvres of the FSRU Vessel / LNGC will be executed by the HK Pilots and captains of FSRU Vessel. Once the ship is clear of the berth and in a safe position before joining Dangan Channel, the tugs will be let go and the Pilots disembarked. The departure route as shown in ***Figure 6.1*** for FSRU Vessel and LNGC with tugs and supporting vessels will need to pass through the SLMP with a duration of about 30 minutes.

In the unlikely event that this southern departure route cannot be used (e.g. structural blockage at sea), the FSRU Vessel / LNGC will need to travel north to follow the same Principal Arrival Route back to the waters south of Cheung Chau before navigating to Dangan Channel. It is anticipated that

during the transit of FSRU Vessel and LNGC, both FSRU Vessel and LNGC as well as the tugs and supporting vessels will need to pass through SLMP with a duration of about 30 minutes until turning to north of CEDD's South Cheung Chau Disposal Ground.

No stopping over or anchoring of vessels will be necessary during the transit.

Figure 6.1 Indicative Proposed Marine Transit Routes



For ship manoeuvres, sufficient tugs will be used in accordance with the relevant berthing guideline.

For emergency departure situation, as evaluated from the simulation runs, the critical off-berth conditions of the FSRU Vessel manoeuvre could be controlled acceptably by the two SBVs. Nevertheless, vessel manoeuvres for emergency in adverse conditions are subject to the precise tug development and the wave conditions at the time. Therefore, it is recommended that Pilots, tug masters and FSRU Vessel /LNGC masters should receive appropriate training on vessel manoeuvres at the LNG Terminal.

Marine traffic studies and assessments were also conducted and proposed marine transit routes are recommended as follows:

- Navigating by pilot for FSRU Vessel and LNGC to the LNG Terminal via the Principal Arrival Route located between the CEDD's South Cheung Chau Disposal Ground and the SLMP is feasible and can maintain a minimum 2m under keel clearance.
- No significant hazards or challenges in terms of boarding pilots, connecting tugs and making a safe approach to the westerly channel transits when inbound.
- No significant hazards or challenges in terms of disconnecting tugs, disembarking pilots and the master being able to make a safe transit into the Dangan Channel avoiding interfering traffic, when outbound.
- Tugs to be used are based on those considered to be available in the local market, consisting of mixture of 70t and 80t Bollard Pull (BP) tugs as well as 95t BP standby vessels. Up to 4 tugs will be used for the operations with option to utilise the SBVs if the Pilot deems it necessary.
- Navigation simulation runs demonstrated that vessels turning into the approach channel can avoid encroaching into CEDD's South Cheung Chau Disposal Ground and the SLMP during the

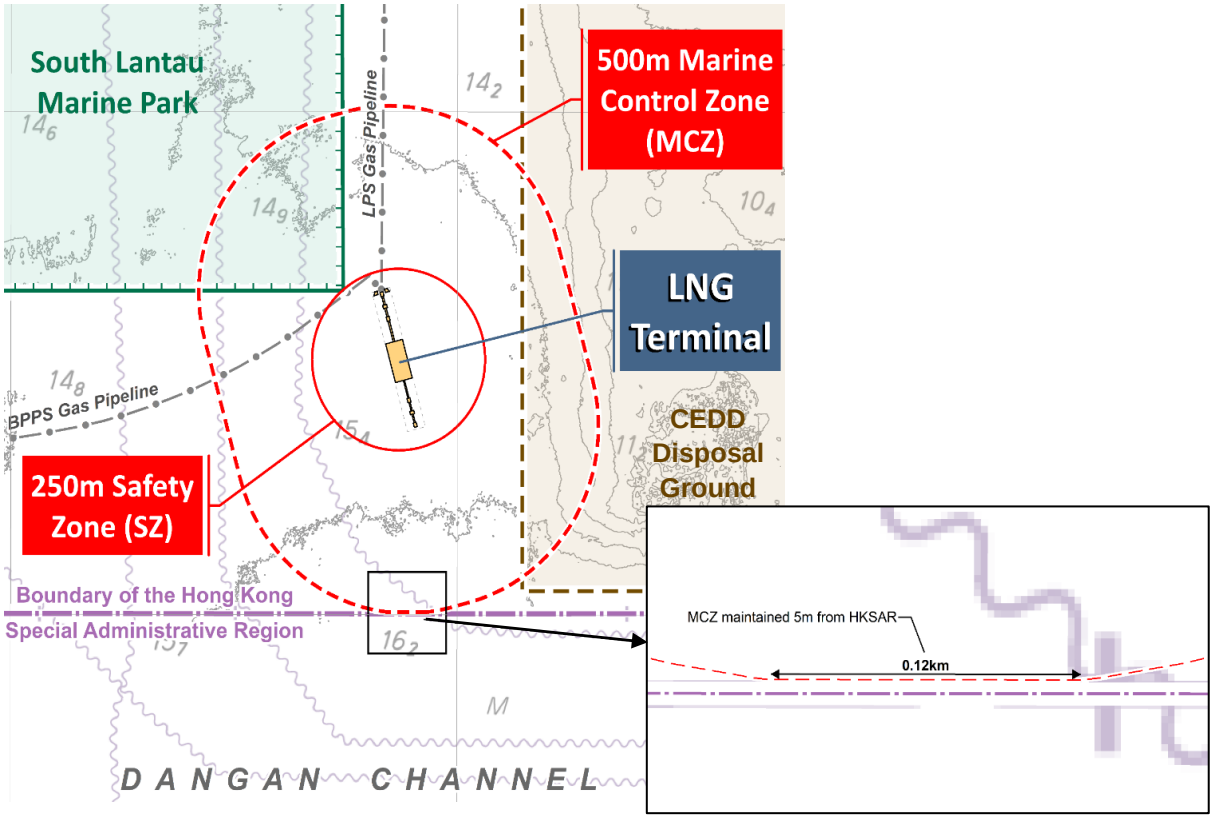
turn at the north of the CEDD's South Cheung Chau Disposal Ground and subsequent transit of the channel, except when operating at the western berth or departure using the same route that the vessels will need to pass through the SLMP boundary with a duration of less than 30 minutes.

- Navigation simulation runs demonstrated that under emergency scenarios of total power and control failure initiated in the Northern Approach Channel, the Master was able to take control of the vessel, assisted by tugs, slow down and safely manoeuvre the vessel clear of the LNG Terminal.
- The effect of squalls on manoeuvring was also investigation and the Master was able to control the vessel during a fast increase in wind speed and reduction in visibility.

6.2 Safety Zone and Marine Control Zone

In the LNG industry, it is best industry practice to have zone(s) of varying control measures in order to protect and maintain the integrity of the LNG Terminal by separating the LNG Terminal's operation from other marine users. The LNG Terminal will comprise of both a Safety Zone (SZ) and a Marine Control Zone (MCZ), see ***Figure 6.2***, which will limit unauthorised marine activities and personnel and thereby maintain an acceptable level of safety and security.

Figure 6.2 Graphical Illustration of Safety Zone and Marine Control Zone



Safety Zone

The Safety Zone (SZ) has been included in the project design as mentioned in the approved EIA Report (EIAO Register No. AEIAR-218/2018) with a restricted area of 250m (radius from the centre of the Jetty) All access into the Safety Zone must be authorized by HKLTL in order to not allow any unauthorized access by vessels or non-essential personnel.

Marine Control Zone

The Marine Control Zone (MCZ) is required to mitigate the likelihood of other marine users adversely affecting the LNG Terminal operations, by limiting speeds and some activities in the near vicinity of the LNG Terminal. This zone is necessary for the safe berthing and unberthing of LNGC and the FSRU Vessel. It will also comprise as one of the control steps to check whether incoming vessels have made advance arrangement with the operator of the LNG Terminal. A detailed description of the process to determine these zones is shown in ***Annex A-1***.

In this section, the following will be explained:

- The necessity to establish the MCZ;
- Sizing of these zones (250m and 500m respectively);
- Restrictions and controlled measures within these zones;
- How to manage these zones (e.g. use of SBVs); and
- How to implement these zones under the Hong Kong Maritime Framework.

6.2.1 Necessity for establishing the MCZ in addition to the SZ

The core reasons for establishing these zones are:

- managing risks from and to the LNG Terminal
- safe and secured operation of the LNG Terminal

The above drivers for establishing these zones are in line with international standards and practices for LNG and offshore facilities, key standards include:

- *EN-ISO-28460:2010 – Petroleum and Natural Gas Industries Installation and Equipment for LNG Ship-to-Shore Interface and Port Operations*
- *The UK Petroleum Act 1987*
- *The* Society of International Gas Tanker and Terminal Operators *(SIGTTO) – Floating LNG Installations – 1st Edition 2021*
- *The IMO ISPS Code*
- *IMO's Convention on the International Regulations for Preventing Collisions at Sea 1972*

In managing risks, the LNG Terminal is required to meet the risk criteria stipulated in Hong Kong Risk Guidelines. This is the main driver for establishing the SZ. However, it was also revealed that SZ alone is not sufficient to ensure the safe and secured operation of the LNG Terminal, mainly berthing and interferences with other marine activities. Therefore, there is a need to have a larger dynamic controlled zone, hence the MCZ.

6.2.2 *Sizing of SZ and MCZ*

6.2.2.1 Main Driver for the sizing of SZ

The dimension of the SZ is proposed to be 250m from the centre of the Jetty, which is consistent with industry best practices and guidelines for LNG terminals of a similar nature. In addition, as assessed the approved EIA Report (EIAO Register No. AEIAR-218/2018), the individual risk contour of 10^{-5} per year is within the proposed SZ, therefore meeting with the respective Hong Kong Risk Guidelines. All access into the SZ must be authorized by HKLTL in order to not allow any unauthorized access by vessels or non-essential personnel. Therefore, implementation of this zone will result in that no public shall be subject to this level of risk, and also serve to protect other marine users as well as managing the risk to the LNG Terminal as far as reasonably practical.

6.2.2.2 Main Drivers for the sizing of MCZ

Considering the significant size of the LNG Terminal and FSRU Vessel and the concern of operational safety, a MCZ of 500m extending from the annulus of the LNG Terminal is to be implemented to ensure the safe and secured operation of the LNG Terminal as well as the safety of other marine users/vessels within the vicinity. The main drivers for establishing MCZ are:

- Ensure the LNG Terminal's operational safety as well as safety of the other marine users/vessels nearby; and
- Enhance the ability of the LNG Terminal to respond to and maintain a sufficient level of security.

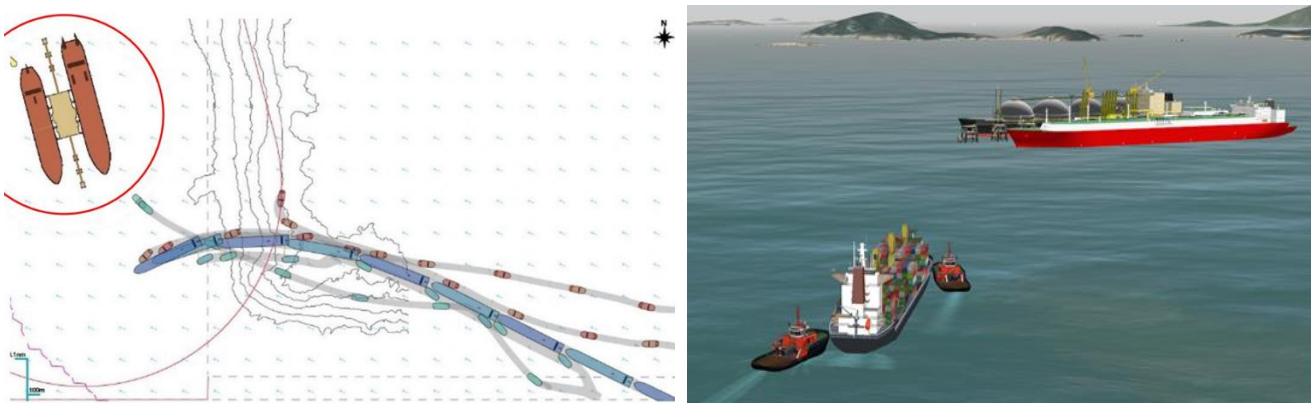
In order to ensure the safe berthing/unberthing of FSRU Vessel/LNGC, extensive navigation simulations have been conducted. These simulations have proven the need for an adequate amount of sea room to allow safe manoeuvring onto the berths at the LNG Terminal. Therefore, an outer zone from SZ is required to ensure that marine activities from other users do not impede on such an operation in order to minimize the risk of collision.

Apart from protecting the berthing/unberthing operation, the LNG Terminal, being offshore in the HKSAR's southern boundary, must monitor potential threats from the flow of traffic in the Dangan Channel to the South.

This includes planning for and preventing collision with vessels that have lost propulsion or steerage and are Not Under Command and potentially on a collision course or drifting into the LNG Terminal area.

Navigation simulation exercises have been conducted to check the effectiveness of using the Standby Vessels to deter and intercept such unauthorised vessels and other intruders. The results show that they are an effective means of deterrent from such a threat where the simulations indicated that between 500m to 1000m is sufficient to provide enough clearance for the interception and preventing the unauthorised vessel entering the SZ. ***Figure 6.3*** illustrates such navigation simulation of a strayed vessel from the Dangan Channel.

Figure 6.3 Navigation Simulation Illustration of a Strayed Vessel from the Dangan Channel



Annex A-1 provides comparison between the sizes of these zones with other LNG/FSRU terminals worldwide, it shows that the proposed sizes follow the best practice.

6.2.3 ***Restrictions within these Zones***

To allow effective management of these zones, the following measures are proposed:

Restrictions:

- No vessels other than those attending the LNG Terminal which are authorised by the HKLTL shall enter into any part of the SZ and MCZ
- No anchoring within the SZ and no unauthorised vessels shall anchor or lie within the MCZ
- Restrict vessel speed to below 6 knots for SZ
- With reference to the Marine Parks and Reserves Regulation (*Cap. 476A*), a speed limit of below 10 knots would be adopted in line with the adjacent proposed SLMP for all passing vessels transiting within and in the vicinity of the MCZ (except the waters within SZ for vessel speed to below 6 knots)
- Masters, coxswains and persons-in-charge of all vessels navigating in the vicinity should keep away from both zones

6.2.4 Management and Control Measures of these zones

For the management and control measures of these zones resides on the following main stakeholders:

- HKLTL – Hong Kong LNG Terminal Limited, the owner of the LNG Terminal
- FSRU Terminal HK – the owner of the FSRU Vessel and the operator of FSRU Vessel and Jetty
- HUD – Hongkong United Dockyard, the operator of SBVs

The daily monitoring and management of these zones will be controlled by FSRU Terminal HK and FSRU Terminal HK will coordinate with the SBV's operator (HUD) for daily operations through visual and electronic (radar, closed-circuit television (CCTV), automatic identification system (AIS) [6]) means including the use of night and thermal vision when required. Remote monitoring via CCTV will be carried out when the FSRU Vessel has left the berth by the FSRU Terminal HK operator. Remoted monitoring via electronic guard zones will be conducted by the Standby Vessel operator. Relevant authorities, e.g. Vessel Traffic Centre (VTC), Hong Kong Police Force (HKPF) will be sought to assist in ensuring enough clearance from other non-essential vessels during berthing of LNGCs or FSRU Vessel where appropriate.

SBV's, operated by HUD are a key component in the management of these zones, more details of the roles and responsibilities of SBVs are detailed in *Section 6.2.4.3*.

6.2.4.1 Hong Kong LNG Terminal Limited (HKLTL)

As the owner of LNG Terminal, HKLTL is responsible for overall safety and security control complying with the International Ship and Port Facility Security (ISPS) Code under the International Convention for the Safety of Life at Sea in 2004. The management approach and control measures of SZ and MCZ are described in the Port Facility Security Plan (PFSP) under separated submission. MD is responsible for examining the security assessments and PFSP. Considering security threats and preventive measures against security incidents, the detail of PFSP is treated as confidential.

6.2.4.2 FSRU Terminal HK

FSRU Terminal HK responds for day-to-day safety and security operation of the LNG Terminal. She should take all necessary actions to ensure that all of the requirements / processes of the Port Facility Security Plan (PFSP) are complied with whilst the jetty facility is operational.

(6) AIS is the short form of "automatic identification system" which is an automatic tracking system that uses transceivers on ships and is used by vessel traffic services (VTS). The AIS can provide real time vessel information such as unique identification, position, course, and speed to be displayed on a screen or an electronic chart display and information system (ECDIS). AIS is intended to assist a vessel's watchstanding officers and allow maritime authorities to track and monitor vessel movements.

6.2.4.3 Standby Vessels (SBVs)

As part of the implementation of the SZ and MCZ, the offshore LNG facility will have 2 multipurpose SBVs located in the MCZ available to monitor the SZ and MCZ.

Having these vessels in attendance additionally forms a mitigation against the threat of a vessel that is off course (steering or engine failure). More details of SBVs can be found in **Annex A-2**.

The main functionality of the SBVs is to assist the FSRU Vessel and visiting LNGC's in the event of an emergency situation but will be routinely patrolling the SZ and MCZ and monitoring/surveillance of the approaches to the MCZ round-the-clock throughout the year, using visual lookout from the bridge of the SBV as well as monitoring of local and dedicated marine VHF radio channels to ascertain the local marine traffic image. Key duties of the SBVs will include but not limited to the following:

- Safeguarding the entire area surrounding the LNG Terminal;
- Patrolling of SZ and MCZ;
- Coordination with MD, Fire Services Department (FSD), Hong Kong Police Force (HKPF) etc. in the event of an emergency;
- Escort scheduled service vessels attending the LNG Terminal. FSRU Terminal HK will engage sufficient SBVs for the monitoring/ surveillance during the period;
- Monitoring/surveillance of the approaches to and inside the SZ and MCZ to include but not limited to; real time CCTV, visual means (night vision, thermal imaging and infrared) and monitoring of electronic guard zone by marine VHF channels and radar;
- Performing an initial security sweep of underside of LNG Terminal prior to FSRU Vessel returning to the Jetty following an evacuation event;
- Coordinate and participate in routine security drills and exercises drills (both internal and multi-Agency);
- Incident command location for any emergency related events as directed by the authorities; and
- Exercises and drills (both internal and multi-Agency), subject to direction of MD and law enforcement authorities.

6.2.5 Implementation of these zones under the Hong Kong Maritime Framework

It is considered that through the promulgation of Marine Department Notice (MDN) to disseminate the SZ and MCZ information to the mariners, while information and advice will be provided through designated VHF channels to the master.

6.2.6 Communication Mechanism

As aforementioned, the HKLTL will arrange sufficient SBVs for round-the-clock watch-keeping duties, such that any approaching vessel if involving potential risk of entering the SZ, MCZ or developing the risk of collision with the LNG Terminal, would be timely alerted to change her course to avoid entering into the SZ or MCZ. Hence, a communication mechanism between the HKLTL, FSRU Terminal HK, MD and other stakeholders shall be worked out, it will help the HKLTL and FSRU Terminal HK to

discharge their watch-keeping duties. Depending on the actual situation, MD will take appropriate action to assist marine safety of the LNG Terminal as far as practicable [(7)(8)].

The communication mechanism shall be developed for the sake of safe navigation in the SZ, MCZ and the vicinity of the LNG Terminal. In normal situation, the HKLTL, FSRU Terminal HK, Authorities and Stakeholders can convey useful information over multiple parties to take necessary action to adjust or modify the procedure, schedule and planning to minimize interface conflicts against LNG Terminal operation. If under emergency incident, the HKLTL and FSRU Terminal HK can facilitate two-way dissemination or broadcast to multiple parties with the details of an occurring or pending emergency.

6.2.6.1 Jetty Central Control Room (CCR) on FSRU Vessel

A Jetty CCR, managed by the FSRU Terminal HK, will operate 24 x 7 throughout the year with real time monitoring of the surrounding water areas of the LNG Terminal by radar and other detection equipment, as well as the deployment of two SBVs patrolling the MCZ to handle potential safety risk, threats and emergency responses.

The FSRU Vessel is fitted with a purpose built the Jetty CCR where the Duty Control Room Supervisor is in-charge to monitor the LNG Terminal operations. This Jetty CCR is fitted with a range of communication devices (VHF/UHF) to communicate with the SBV's on site and also fitted with a radar. In addition, the SBV is fitted with Radar and AIS to monitor vessels in the vicinity of the LNG Terminal.

The Duty Control Room Supervisor will be there to assist the SBVs in communications in the event of unauthorised intrusions into the SZ and MCZ and where we need to advise external parties, e.g., MD or the Marine Police (Marpol) or FSD for any assistance. Communications between the onsite SBVs is via public or Private VHF Channel, mobile phone or satellite phone.

The key roles of SBVs include asset protection from potential vessel collisions and unauthorised intrusions, berthing/ unberthing of FSRU Vessel/ LNGC and/or in the event of adverse weather conditions and emergency situations.

Furthermore, the Jetty CCR will be responsible for stakeholder communication and coordination including the jetty, the FSRU Vessel, LNGC, pilot, harbour tugs, Vessel Traffic Centre (VTC) of MD, Marpol, FSD, other stakeholders such as the operator of Integrated Waste Management Facilities (IWMF) and the Civil Engineering and Development Department (CEDD) South Cheung Chau Disposal Ground, high-speed craft plying in the vicinity area, etc.

In certain circumstances, such as vessel intrusions, emergency events and typhoons, the Duty Control Room Supervisor will make contacts with the aforementioned government departments and/ or other stakeholders for assistance.

An effective watch at the LNG Terminal shall be continuously maintained and kept by the FSRU Terminal HK and SBV Operator with round-the-clock communication channel via VHF, phone call, instant messaging group chat and email as appropriate.

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(7) The patrol launches of the MD are not built to be classed as an intrinsically safe vessel; therefore, any request for MD's assistance in deploying patrol launches at or near the SZ would not be possibly conducted due to gas safety consideration.

(8) Vessel Traffic Centre (VTC) of MD would be able to advise participating vessels not to enter, navigate through or anchor within the SZ, but it might not be appropriate for VTC to give directions via VHF channel to prohibit participating vessels from entering, navigating through or anchoring within the SZ and/or MCZ if there does not exist any of the actual situation of vessel traffic congestion, potential risk of collision, adverse weather, reduced visibility or other hazardous conditions within the SZ and/or MCZ. Furthermore, assistance from VTC may not be available if the vessel involved is a non-participating local vessel.

There will be communication checks throughout the day. Regular drills and table top drill will take place in line with terminal procedures and Full Mission Bridge Simulation (FMBS). These will include activating of the Emergency Response teams within the HKLTL, FSRU Terminal HK and SBV Operator. Third parties where appropriate will be invited to attend and participate in drills.

6.2.6.2 Means of Communication

To ensure the effective and efficient communications are maintained between the HKLTL, FSRU Terminal HK, Authorities, Stakeholders and Outsiders, the following means of communication will be used/ developed:

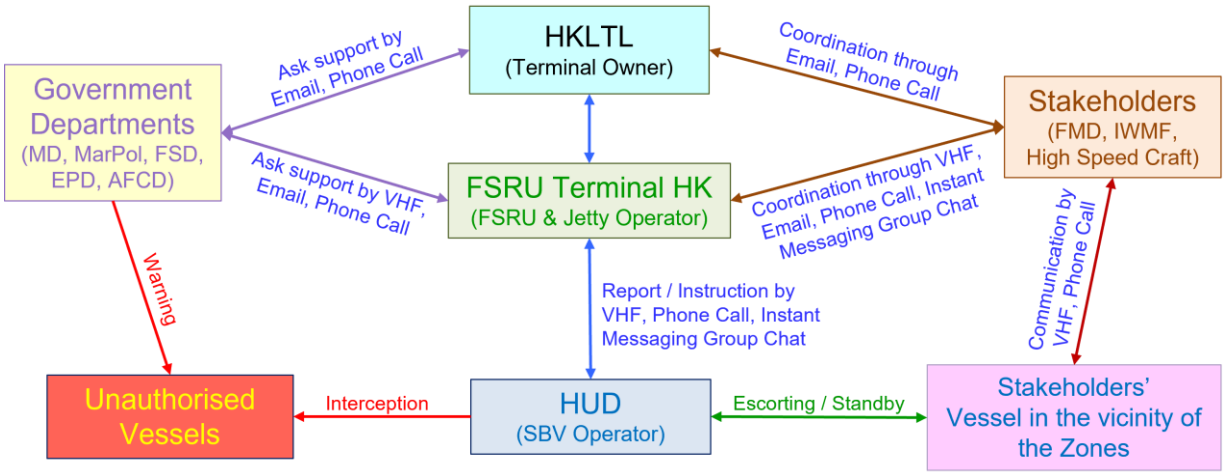
- VHF
- Phone Call
- Instant Messaging Group Chat
- Email

6.2.6.3 Method of Coordination

- Establishment of regular coordination with relevant stakeholders and Government departments including MD, FSD, Marpol, Fill Management Division (FMD) of the CEDD, Agriculture, Fisheries and Conservation Department (AFCD), EPD, IWMF, etc., to share and update marine traffic information and emergency procedures;
- Unavoidable transit through MCZ and/or incident happening should be notified to the HKLTL as early as practical; for example, traffic diversion owning to the reported obstruction, mechanical failure of vessel and/or emergency incidents, etc.;
- Owners, operators, masters, coxswains and persons-in-charge of vessels requiring transit within the MCZ shall communicate with the HKLTL by email or phone call; and
- The HKLTL shall keep relevant stakeholders and Government departments updated of any changes and/or updates on the communication mechanism without delay.

An indicative flow chart of communication is provided in ***Figure 6.4***.

Figure 6.4 Flow Chart of Communication (9)



(9) VTC would be able to advise participating vessels not to enter, navigate through or anchor within the SZ or MCZ, but it might not be appropriate for VTC to warn or give directions via VHF channel to prohibit participating vessels from entering, navigating through or anchoring within the SZ or MCZ if there does not exist the actual situation of vessel traffic congestion, potential risk of collision, adverse weather, reduced visibility or other hazardous conditions within the SZ or MCZ. Furthermore, assistance from VTC may not be available if the unauthorised vessel is a non-participating vessel

6.2.6.4 Vessel Incursion Monitoring

Before any craft is likely to enter the MCZ without permission of the LNG Terminal, the SBVs must take the following actions:

- Try to establish contact with the vessel to advise unauthorised vessel to alter course away from the MCZ
- Manoeuvre the SBVs to a position between the unauthorised vessel and the LNG Terminal
- Contact Marpol if the unauthorised vessel enters the SZ and does not take any avoiding action

The Master of the SBVs must not put his vessel or the unauthorised vessel in any danger during manoeuvres. Communication with the unauthorised vessel must be attempted using the following means:

- Loud hailer
- VHF (on Channel 16 for vessel locate outside HK waters)
- Vessel whistle
- Aldis light

If communication is established the vessel must be requested to leave the MCZ as soon as possible. If communication cannot be established with unauthorised vessel or it refuses to leave the MCZ, any suspicious activity or potential breaches of security at the LNG Terminal must be immediately reported to:

- Jetty CCR
- HUD Control Room (for SBV's operation)
- MD

The unauthorised vessel will be escorted by a SBV throughout the MCZ until finally clear.

The following must be contacted if any vessel enters the 250m SZ:

- Marpol (immediately)
- Port Facility Security Officer (PFSO)/Deputy PFSO (when time permits)

The Master of the SBVs can consider use of fire monitors for drawing attention to the vessel or as a deterrent. Fire monitors should not be directed in a manner which may impair the safe navigation or reduce visibility of the unauthorized vessel. Consideration must be given to the size and speed difference between unauthorised vessel and SBV to ensure the SBV remains in a safe position at all times.

Any intrusions into the SZ or MCZ must be recorded in a separate "Vessel Incursion Log" and capture the following information:

- Vessel name / identity number
- Date and time of entry and exit
- What attempts were made to contact the unauthorised vessel
- Estimated Course and speed of the vessel
- Which zone unauthorised vessel entered SZ or MCZ or both
- Indicate that photographs or CCTV are available

The Forward-Looking Infrared (FLIR) camera will be equipped on SBV to capture a photograph of the vessel in low light conditions. At the end of each watch the information from the Logbook must be

recorded into an excel spread sheet onboard the FSRU Vessel. The “Vessel Incursion Log” may be presented as evidence to a higher authority in the event of any dispute.

6.3 Operational Arrangement and Procedures for Adverse Weather and Met-ocean Conditions

During adverse weather and met-ocean conditions, it may be necessary for the FSRU Vessel and/or LNGC to depart from the LNG Terminal. SBVs, harbour tugs and adequate port services will be used for safe departure of the FSRU Vessel and LNGC to outside Hong Kong waters for shelter. Assessments have been undertaken to simulate different departure scenarios of emergency situations for adverse weather and met-ocean conditions to ensure that vessels at the LNG Terminal can unberth and depart safely in adverse met-ocean conditions, and in particular, tropical storms or typhoons. The departure and timings of the departure for adverse weather and met-ocean conditions will be determined in consultation between HKLTL, FSRU Terminal HK, Jetty Lead, FSRU Vessel Master, HUD and relevant authorities (e.g. MD) on case-by-case basis in relation to their potential severity.

7. REGULAR SAFETY REVIEW AND AUDIT

7.1 Collection of Information on the Safety Management System

HKLTL will have necessary arrangement to conduct internal audits to review the effectiveness of the safety management system. The audit will comply with international and Hong Kong regulatory standards.

The Contractor is required to have necessary arrangement to conduct internal audits to review the effectiveness of the safety management system. The audit will comply with international and Hong Kong regulatory standards. The Contractor will develop its own mechanism or procedures of how and when audit is carried out. The Contractor will have its own audit plan and submit to HKLTL for information. The Contractor will implement internal audits annually and provide the audit report for HKLTL's information.

Apart from annual internal audits, FSRU Terminal HK shall verify compliance of its IMS system at least every twelve (12) months by way of an independent audit and submit the report to HKLTL.

7.2 Assessment and Verification of Information

An audit programme will be planned, taking into consideration the status and importance of the processes and area to be audited, review procedures, results of previous audits and prepare audit checklist. The audit criteria, scope and method will be defined. The audit plan will be distributed to Management, the Managers and all auditors. If required, external consultants or auditors / other external body can be used to audit and verify the system.

The auditing based on status and importance of the activities will include observing, interviewing and assessing representative samples of relevant documents and site inspection, etc. that apply to the scope of the audit. Furthermore, they will assess the overall adherence of the department's day-to-day practices as per the Safety Management System.

The effectiveness of the Safety Management System will be verified through:

- document checks;
- physical condition tours; and
- verification interviews.

In-depth document checks are usually performed during or immediately after interviews with employees. Responses from the auditees are substantiated by interviews with employees at various levels and/or through physical condition verifications.

7.3 Consideration of Improvements

When the auditor's report the non-conformances, the concerned Manager is obliged to assess them objectively, and appropriate corrective/preventive action shall be initiated as per Non-Conformance, Corrective & Preventive Action procedure. An action plan will be developed by the Jetty SHEQ Manager for the agreed action and the action holder shall be assigned. These actions will be verified by the Auditor for proper closeout of the corrective actions.

The observations, recommendations, non-conformities and opportunities for improvement, resulting from internal audits, reviews and interviews will be verified and re-evaluated for effectiveness of the corrective action undertaken in the next scheduled audit of the same scope. The Management Representative can initiate a re-audit, depending on the importance of the issue, at any time.

FSRU Terminal HK shall hold a management meeting annually to review the safety management system to ensure its continuing suitability, adequacy and effectiveness. Processes are reviewed for continuous improvement. Recommendations are implemented on agreed timescale and the progresses are being monitored regularly.

7.4 Appointment of Safety Reviewer and Auditor

The Jetty SHEQ Manager with association of Management representative will be a qualified internal auditor to conduct each internal audit. The auditor will be independent of the department undergoing the audit. If applicable, an independent second auditor can be used. The auditors will receive the appropriate auditor training course.

7.5 Safety Review Report and Safety Audit Report

The safety review identifies the potential higher risk associated with the task for further evaluation. All non-conformance cases are registered and provided with a platform that record all related investigation reports and associated follow up actions for tracking and closure. FSRU Terminal HK shall follow Safety Observation Round Procedure for conducting the safety review.

The performance against expectations, any deviations from standards set in the procedures and policy, unsafe act and conditions as well as unauthorized changes will be within the scope of the safety audit. Regular review meeting with all involved parties is required to monitor and ensure all investigation and follow up actions are conducted by its assigned person/party within the required time frame.

ANNEX A-1

DETERMINATION OF RESTRICTION ZONES FOR THE LNG TERMINAL

ANNEX A-1

Determination of Restriction Zones for the LNG Terminal

The concept of having a control or restricted area around an offshore facility is an established practice. The LNG Terminal is in Hong Kong waters but there is no local regulations for provision of restriction zone. Therefore, the following international standards and practices are cited as reference;

- *EN-ISO-28460:2010 – Petroleum and Natural Gas Industries Installation and Equipment for LNG Ship-to-Shore Interface and Port Operations.*
- *The UK Petroleum Act 1987.*
- *SIGTTO – Floating LNG Installations – 1st Edition 2021*

The above regulations and guidelines require some form of restricted area around an offshore facility or installation. The recommendations from SIGTTO are the most relevant and up-to-date. The Hong Kong Offshore LNG Terminal Project approach to the necessity for Restricted Zones is primarily based on the SIGTTO recommendations and thus, international LNG industry best practice.

SIGTTO = The Society of International Gas Tanker and Terminal Operators. It is the most respected organization in the LNG industry. It was formed as an international organisation through which all industry participants might share experiences, address common problems and derive agreed criteria for best practices and acceptable standards.

SIGTTO – Floating LNG Installations – 1st Edition

- When selecting a site location for an LNG installation, consideration should be given to zone management based on outcomes of safety studies.
- There is considerable difference between zones that are there to lower risk and prevent an incident occurring (passing traffic collision or security incident) and zones that are there to mitigate the consequences of an incident (vapour dispersion, thermal radiation).
- To meet the different functional requirements of the zones, it would be inappropriate to create a single zone for prevention and mitigation of the risks.
- All zones should be fully assessed and defined based on location and what is required by regulatory stipulations, host country/local requirements and project specific needs.

The recommendation of a Safety Zone (SZ) and a Marine Control Zone (MCZ) is in accordance with SIGTTO's Guidelines.

SIGTTO suggested that each site should establish its own restriction zone(s) according to its circumstances. In this section, examples of specific Hong Kong requirements with regards to providing the justification for Restricted Zones are discussed. These are also very typical of those being regulated by port/harbour authorities around the world.

- Hong Kong's Risk Guidelines, specifically the Individual Risk (IR) Criteria of 1×10^{-5}
- The Hong Kong adaptation of the International Ship and Port Facility Security (ISPS) Code
- Operational safety during berthing and unberthing of visiting LNG carriers and FSRU

During the process of obtaining an Environmental Permit (EP) for the Project, a 250m radius (from the centre of the Jetty) Safety Zone was proposed in the Environmental Impact Assessment Report for the Project (EIAO Register No. AEIAR-218/2018) and has been approved by the Hong Kong Government.

From security, and operational safety perspectives, it would also require a Marine Control Zone of up to 500m following the annulus of the LNG Terminal and extending up to the HKSAR Maritime Boundary but not beyond.

Figure A1 Worldwide examples of LNG/FSRU Safety and Marine Control Zones

Project	Cap. km^3	Location	Distance from shore	SZ/MEZ
Pecem Port	139	Brazil	Approx. 900m (jetty based with L-shaped breakwaters)	200m from the breakwater
Adriatic	250	Italy	17km	2km radius plus 2.4km area to be avoided
Neptune	138	USA	16km	500m
Jebel Ali	151	UAE	Open piled jetty. Approx. 200m from breakwaters, 300m from container port	250m
Livorno	135	Italy	19km	3km radius (no fishing or pollution)
Bahia Salvador	138	Brazil	4km	150m safety zone (no maintenance) 500m security zone (no vessels other than support)
Klaipeda	170	Lithuania	4km inland, 100-200m from land	200m
Ain Sokhna	170	Egypt	Jetty moored side-by-side 50-100m from shore, 500m from container port	Container ships pass within 200m of FSRUs.
Port Qasim	151	Pakistan	Jetty moored. Mangrove swamps.	150m from the marine loading arms
Bahia Blanca and Escoba	138 150	Argentina	Jetty Moored	Very restricted areas that require close monitoring. SZ/MEZ becomes irrelevant
Teeside and Grain	150+	UK	Jetty moored near shore terminal	150-250m exclusion distance
Summit FSRU	138	Bangladesh	1.5km from shore	500m
Planned	170	South Africa	FSRU	250m-500m for marine distance, 1000m for residential

ANNEX A-2

SPECIFICS OF STANDBY VESSELS FOR MANAGEMENT OF THE SAFETY ZONE AND MARINE CONTROL ZONE

ANNEX A-2

Specifics of Standby Vessels for Management of the Safety Zone and Marine Control Zone

Standby Vessel (SBV) Specific Crew Training

- All crew to receive in-house security training for general awareness of The International Ship and Port Facility Security (ISPS). Site induction training with respect to gas and LNG operations on site.
- Masters and senior officers of the SBV are expected to undertake in-house emergency response training on the role of the emergency departures, typhoon departures and unauthorised vessel diversions.

Standby Vessel (SBV) specialist equipment (in addition to Radar & Electronic Chart Display and Information System (ECDIS)).

- Real time closed-circuit television (CCTV) with thermal imaging and night vision functionality with live feed to shore control centre.
- Digital secure radio communications system compatible with Jetty system for incident management.
- Controllable search lights, fore and aft.
- Mobile Hand phone (intrinsically safe) with spare battery and charger.
- Night vision binoculars/monocular.
- Voyage Data Recorder (VDR) as a means of recording and storing all appropriate data (radar, ECDIS, video, AIS, VHF etc.) particularly radar signals with respect to unauthorised vessels and infringements into the Marine Park which form part of the additional monitoring.

Standby Vessel (SBV) monitoring procedures

- Monitoring/surveillance of the approaches to the Marine Control Zone.
- Visual lookout from the bridge of the Standby Vessel
- Monitoring of marine VHF channels
- Patrolling of Marine Control Zone and Safety Zone round-the-clock throughout the year.
- Collaboration with VTC (MD), HKPF and other authorised agencies in the event of an incursion, under direction of the Jetty Lead/FSRU Vessel Master as per requirements of the Port Facility Security Plan (PFSP).
- Escort of authorised vessels from 500m Marine Control Zone to LNG Terminal.
- Performing initial security sweep of underside of LNG Terminal prior to FSRU Vessel returning to the Jetty following an evacuation event.
- Coordinate and participate in routine security drills and exercises drills (both internal and multi-Agency).
- Incident command location for any security related events, exercises and drills (both internal and multi-Agency), subject to direction of MD and law enforcement authorities.

Standby Vessel – Technical Specification

SBV	
Trading Area	Sea Going
Installed Power (kW)	7100 - 7500
Min. Bollard Pull Ahead (Tonnes)	95
Proposed Model	RAstar 4200-DF
LOA (m)	42
GRT	~1200
Fi-Fi 1	Y
Dual Fuel (MGO / LNG)	Y
Rescue Boat	Y
Clear Deck Space (m^2)	100
Stern Tow Winch	Y
Treatment Room	Y
Oil Boom Carriage	200m inflatable
Flag Registry	HK
Compulsory ISM	Y
Compulsory ILO MLC 2006	Y
Compulsory ISPS	Y