

Hong Kong Offshore LNG Terminal Project

Emergency Response Plan for the Double Berth Jetty at LNG Terminal

3 February 2023

Project No.: 0505354

Document details	
Document title	Hong Kong Offshore LNG Terminal Project
Document subtitle	Emergency Response Plan for the Double Berth Jetty at LNG Terminal
Project No.	0505354
Date	3 February 2023
Version	1
Author	Var
Client Name	Hong Kong LNG Terminal Limited

Document history

	Revision	Author	Reviewed by	ERM approval to issue		Comments
				Name	Date	
	0	Var	RC	JN	18/11/2022	N/A
	1	Var	RC	JN	3/2/2023	N/A

Signature Page

3 February 2023

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Emergency Response 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:	Emergency Response Plan for the Double Berth Jetty at LNG Terminal
Date of Report:	3 February 2023
Date received by ET:	3 February 2023
Date received by IEC:	6 February 2023

Reference EP Requirement

EP Condition:	Condition No. 4.9 of FEP-01/558/2018/A
Content:	<i>Emergency Response Plan</i>
<p>The Permit Holder shall implement measures to prevent accidental spillage or leakage of gas, oil and chemicals during operation of the Project and contingency measures to respond the accidental spillage or leakage in order to avoid and minimize the potential environmental impacts. 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 an emergency response plan. The emergency response plan shall include but not limited to information relating to preventive measures to prevent accidental spillage or leakage of gas, oil and chemicals, contingency measures and procedures to handle the accidental spillage or leakage, rehearsal arrangements for the contingency measures and procedures and reporting arrangements for the accidental spill event.</p>	

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: 3 February 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: 7 February 2023

1.	INTRODUCTION	1
1.1	Background.....	1
1.2	Purpose of the Emergency Response Plan.....	2
1.3	Structure of the Emergency Response Plan.....	2
2.	PREVENTIVE MEASURES FOR ACCIDENTAL SPILLAGE OR LEAKAGE.....	3
2.1	Emergency Scenarios.....	3
2.1.1	LNG / Gas Leaks.....	3
2.1.2	Oil, Chemical Spillage.....	3
2.2	Preventive Measures	3
2.2.1	LNG / Gas Leaks.....	3
2.2.2	Oil, Chemical Spillage.....	4
3.	CONTINGENCY MEASURES AND PROCEDURES FOR EMERGENCY SCENARIOS	6
3.1	Emergency Levels Classification	6
3.2	Roles and Responsibilities	6
3.2.1	HKLTL Emergency Management Team.....	6
3.2.2	Terminal Emergency Control Team (ECT).....	7
3.2.3	Terminal First Intervention Team.....	7
3.3	Intended Procedures for Dealing with Accidents	9
3.3.1	Intended Strategy	9
3.3.2	Procedures of Handling Emergency Scenarios	10
3.3.3	Evacuation	13
3.3.4	Re-Start of Operation.....	13
3.4	Mitigation Measures.....	13
3.5	Trainings & Drill Exercises	14
3.5.1	Training.....	14
3.5.2	Drills	14
4.	PROCEDURES AND REPORTING ARRANGEMENTS FOR EMERGENCY SCENARIOS ...	16
4.1	General Requirements.....	16
4.2	Statutory Requirements	16
4.2.1	Reporting of Major Gas Emergency.....	16
4.2.2	Reporting of Power Company Incidents.....	17
4.2.3	Reporting of Marine Related Spillage	17
4.3	Emergency Communication	18
4.4	Investigation Procedures.....	18
4.4.1	Preliminary Investigation.....	18
4.4.2	Detailed Investigation	18
4.4.3	Timely Report Completion.....	19
4.4.4	Lesson Learned.....	19
4.5	Review and Audit.....	19

Annexes

Annex A	Flow Chart – Response to Gas Leakage Event (Including Fire Incident)
Annex B	Flow Chart – Response to Oil/Chemical Spillage Event
Annex C	Event Log Checklist

List of Tables

Table 2.1	Summary of Preventive Measures for Gas Leaks Scenarios	3
Table 2.2	Summary of Preventive Measures for Oil / Chemical Spillage	4
Table 3.1	Incident Categorization and Classification for Emergency Response.....	6

Table 3.2	Summary of Key Roles and Responsibilities of the Terminal ECT	7
Table 3.3	Summary of Key Roles and Responsibilities of the Terminal FIT.....	9
Table 3.4	Summary of Mitigation Measures for Gas Leaks Scenarios.....	13
Table 3.5	Summary of Mitigation Measures for Oil / Chemical Spillage.....	14
Table 3.6	Summary of Drills & Exercises.....	15
Table 4.1	Incident Notification Timeframe.....	16

List of Figures

Figure 1.1	Indicative Location of Key Project Components
Figure 3.1	Terminal First Intervention Team (FIT)
Figure 3.2	Jetty First Intervention Team (FIT)

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 4.9 of the FEP of the LNG Terminal (FEP-01/558/2018/A) ('the Project'):

FEP No. FEP-01/558/2018/A, Condition 4.9:

"The Permit Holder shall implement measures to prevent accidental spillage or leakage of gas, oil and chemicals during operation of the Project and contingency measures to respond the accidental spillage or leakage in order to avoid and minimize the potential environmental impacts. 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 an emergency response plan. The emergency response plan shall include but not limited to information relating to preventive measures to prevent accidental spillage or leakage of gas, oil and chemicals, contingency measures and procedures to handle the accidental spillage or leakage, rehearsal arrangements for the contingency measures and procedures and reporting arrangements for the accidental spill event."

- (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.

Legend

- Boundary of HKSAR
- Proposed GRS Location at BPPS
- Proposed GRS Location at LPS
- Proposed Route of BPPS Pipeline
- Proposed Route of LPS Pipeline
- Proposed Site for LNG Terminal
- Proposed LNG Terminal Safety Zone

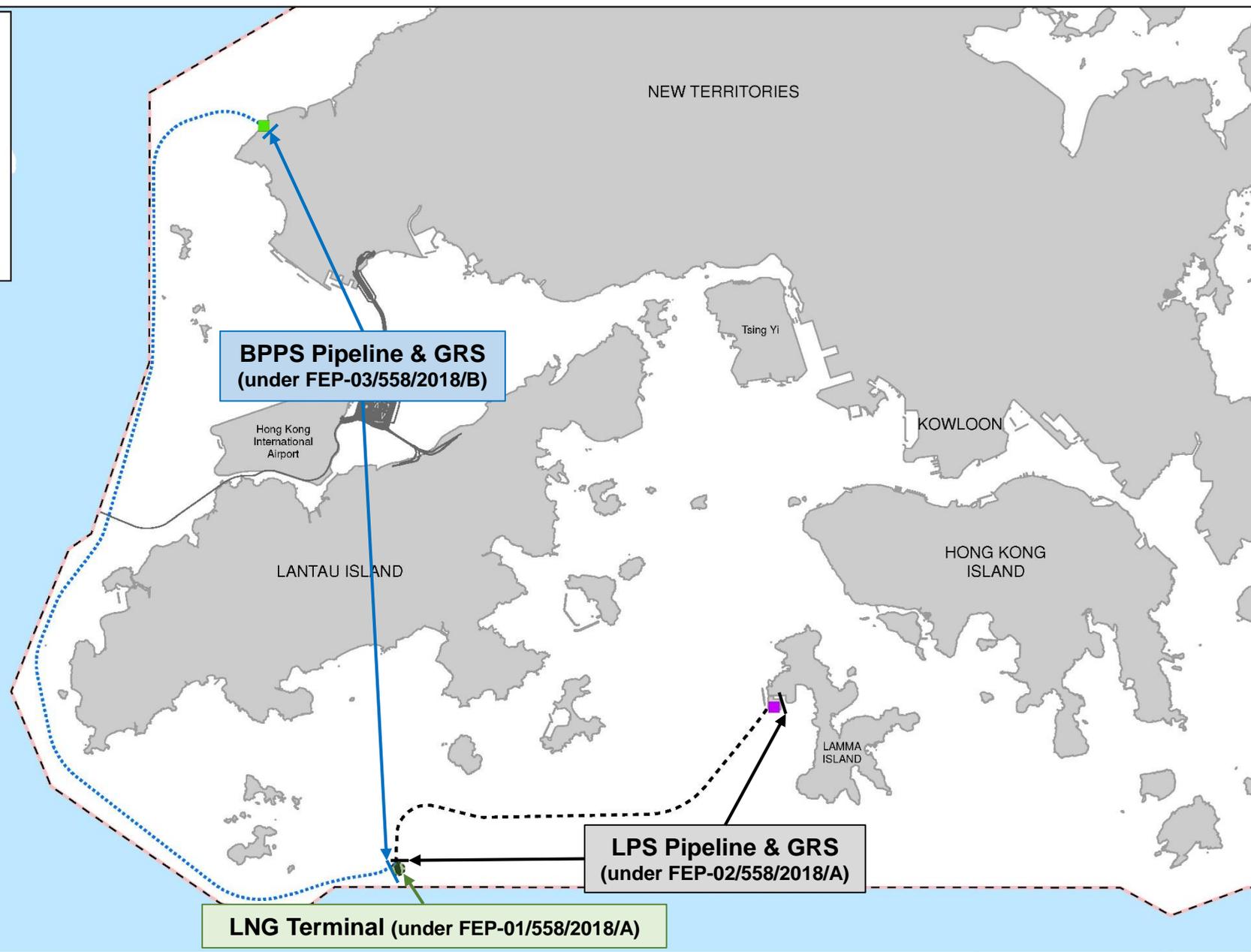


Figure 1.1

Indicative Location of Key Project Components

1.2 Purpose of the Emergency Response Plan

As stated in Condition 4.9 of the FEP of the LNG Terminal (FEP-01/558/2018/A), this Emergency Response Plan presents the information relating to preventive measures to prevent accidental spillage or leakage of gas, oil and chemicals, contingency measures and procedures to handle the accidental spillage or leakage, rehearsal arrangements for the contingency measures and procedures and reporting arrangements for the accidental spill event.

This Emergency Response Plan covers the works associated with the double berth jetty at the LNG Terminal.

1.3 Structure of the Emergency Response Plan

The remainder of this Emergency Response Plan is set out as follows:

- **Section 2** presents the preventive measures to prevent accidental spillage or leakage of gas, oil and chemicals;
- **Section 3** describes the contingency measures and procedures to handle emergency scenarios and the rehearsal arrangements for the contingency measures;
- **Section 4** presents the procedures and reporting arrangements with regular review and revision for emergency scenarios.

2. PREVENTIVE MEASURES FOR ACCIDENTAL SPILLAGE OR LEAKAGE

This section describes potential natural gas incidents and spillage events, with proposed precautions to be taken in dealing with these scenarios. It also proposes mitigation measures that could be applied to minimize the effects of the incident and to prevent escalation, suggests precautions to be taken to prevent further casualties.

2.1 Emergency Scenarios

2.1.1 LNG / Gas Leaks

The onshore gas facilities and the submarine pipeline may suffer a spontaneous failure or damage to gas pipework or equipment that results in a loss of containment of the gas. Depending on the type and rate of the gas release, the ignition of the gas may result in the following:

- A flash fire;
- A jet fire; or
- An explosion.

2.1.2 Oil, Chemical Spillage

Refer to Marine Oil Pollution Contingency Plan by the Marine Department and the approved EIA report, oil spillages include:

- Any spillage of diesel (heavy fuel oil), marine diesel oil, lubricating oil;
- Any oil spill of un-attributable source; and
- Any chemical spill.

2.2 Preventive Measures

2.2.1 LNG / Gas Leaks

In order to minimize the possibilities of accidental spillage of LNG/gas at the LNG Terminal, the following precautionary measures will be implemented and summarized in **Table 2.1**.

Table 2.1 Summary of Preventive Measures for Gas Leaks Scenarios

Preventive Measures	Description
Hazardous Area Classification	<ul style="list-style-type: none"> ▪ The hazardous area classification and subsequent equipment selection for the facilities is made based on IEC60079; ▪ The distances required between adjacent equipment and fire areas/zones have been minimized.
Safety Assessments	<ul style="list-style-type: none"> ▪ A number of safety studies / risk assessments (e.g. Hazard and Operability Study (HAZOP)) have been undertaken for the operation of Jetty. Safety Integrity Level (SIL) classification was also held to determine the criticality of the Safety Instrumented System; ▪ Recommendation is made for the relevant parties to provide a maintenance practice to address the issue.
Relief System	<ul style="list-style-type: none"> ▪ In order to provide protection against overpressure for piping and vessels, pressure relief devices such as pressure safety valves are provided;

Preventive Measures	Description
	<ul style="list-style-type: none"> Piping and equipment will also be rated for the highest predicted overpressures. Blowdown systems are also provided to reduce internal pressures during incidents.
Protection of Flanges	<ul style="list-style-type: none"> One of the principal sources of leak may be from 36" flanges. Thus, the flanges and valve bonnets shall be kept in tight and regular inspected and maintained.
Emergency Shut-Down (ESD)	<ul style="list-style-type: none"> The safeguarding systems (i.e. The fire and gas detection and protection systems, and ESD System) facilitate the safe isolation and depressurization of the Jetty equipment / piping in the event of an emergency condition when the safety of personnel or equipment is threatened.
Safety Instrumented System (SIS)	<ul style="list-style-type: none"> The ESD system is powered by dual feed UPS power supply. All critical operations are provided with a secured air supply for use as motive fluid for instruments.
Jetty Monitoring and Control System	<ul style="list-style-type: none"> The plant control system will 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.
Control of Ignition Sources	<ul style="list-style-type: none"> Selection and installation of electrical equipment for use in hazardous area shall be in accordance with IEC and Hong Kong SAR Codes and Standards. Upon flammable gas detection by the fire and gas detection and protection systems, the ESD system will carry out ignition source control by isolating any potential ignition sources that could ignite a gas atmosphere.

2.2.2 Oil, Chemical Spillage

In order to minimize the possibilities of accidental spillage of oil or other hazardous chemicals at the Terminal, the following precautionary measures will be implemented and summarized in **Table 2.2**.

Table 2.2 Summary of Preventive Measures for Oil / Chemical Spillage

Preventive Measures	Description
Storage Area and Proper Storage Practice	<ul style="list-style-type: none"> Provide adequate ventilation in the storage area as necessary; Store chemicals and chemical waste in separate storage areas at FSRU. Never mixing of incompatible chemicals together, such as acidic and alkalis which should be separated; Use suitable containers which are resistant to the stored chemicals or the chemical waste so as to prevent leakage; Use drip trays for storage containers of chemical oil fuel tanks and/or generators; The storage areas of chemicals and chemical wastes on FSRU Vessel should be located in a designated area that is sheltered on at least 3 sides and the top, and is locked and kept clean and free from obstruction; Keep the ingress to the chemical storage area locked and restrict access; No hot work is allowed where near the chemical and fuel storage area.
Material Safety Data Sheet (MSDS)	<ul style="list-style-type: none"> MSDS of the chemicals are available at the storage area and share drive.

Preventive Measures	Description
Personal Protective Equipment (PPE)	<ul style="list-style-type: none">Provide the appropriate PPE.
Labelling	<ul style="list-style-type: none">Label the storage containers and the chemical tanks according to the EPD's "Code of Practice on the Package, Labelling and Storage of Chemical Wastes Labelling".
Emergency	<ul style="list-style-type: none">Chemical spill kits shall be available at Mooring Dolphin (MD)1 and MD6.Provide training to the responsible persons who handle the chemical spillage.Provide a bucket of dry sand and a suitable fire extinguisher in the storage area.300m hard boom shall be kept in Stand-by Vessel (SBV) to handle the oil spill at sea.Oil spillage equipment will be checked by Jetty Operation & Maintenance (O&M) Team under Maintenance Inspection Plan.

3. CONTINGENCY MEASURES AND PROCEDURES FOR EMERGENCY SCENARIOS

The following initial actions to be taken after emergency scenarios (including fire incidents) is reported and the rehearsal arrangements including training and drills for the contingency measures have been developed.

3.1 Emergency Levels Classification

The classification of emergency levels is given in **Table 3.1**. A total of four classes of emergency levels are defined, ranging from Level 0 to Level 3. The emergency response and control measures are based on the classification of various emergency levels.

Table 3.1 Incident Categorization and Classification for Emergency Response

Emergency Classification	Definition
Level 0 (Minor)	<ul style="list-style-type: none"> An undesired event that requires only first aid treatment, or with minimal effect on HKLTL's property or operations.
Level 1 (Major)	<ul style="list-style-type: none"> Abnormal or unplanned events or conditions that adversely affect the safety, security, environment or health protection performance or operation of a facility; Causes business disruption at departmental level.
Level 2 (Critical)	<ul style="list-style-type: none"> An emergency that has significant impact or potential for impact on safety, environment, health, security, or operations; Prosecution is possible, minor effect on HKLTL's image and reputation, or multiple Level 1 incidents occurring within a short time span.
Level 3 (Catastrophic)	<ul style="list-style-type: none"> The most serious occurrence; Requires an increased alert status for on-site personnel and in specific cases, for off-site authorities; Causes business disruption; With major effect on company image and reputation, or multiple Level 2 incidents occurring within a short time span.

3.2 Roles and Responsibilities

3.2.1 HKLTL Emergency Management Team

HKLTL Emergency Management Team (EMT) is established at the business group level, when mobilized, will support the Terminal Emergency Control Team (ECT) and Terminal First Intervention Team (FIT) on technical and safety expertise and emergency management of the incident.

3.2.2 Terminal Emergency Control Team (ECT)

Terminal Emergency Control Team is primarily composed of FSRU Terminal onshore team members including General Manager (GM), Duty Manager, O&M Manager, Jetty SHEQ Manager, Maintenance Manager and Ship Management Company. Terminal ECT will support the terminal FIT in managing the incidents and bringing technical and safety expertise if required.

The responsibilities of each role in the Terminal ECT is summarized in **Table 3.2**.

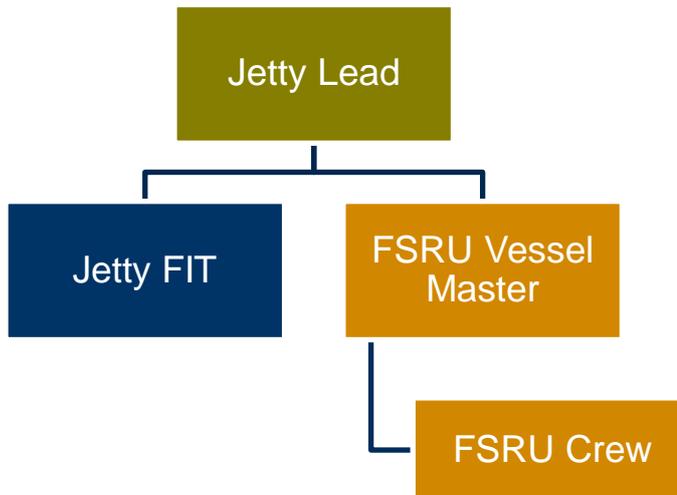
Table 3.2 Summary of Key Roles and Responsibilities of the Terminal ECT

Key Roles	Responsibilities
General Manager (GM)	<ul style="list-style-type: none"> ▪ Provide sufficient resources to deal with incident; ▪ Activate HR to communicate with the employee's family affected; ▪ Responsible for the Business Continuity Plan.
Duty Manager	<ul style="list-style-type: none"> ▪ The Duty Manager will be a rostered onshore member of the Emergency Control Team (role fulfilled by a member of the Onshore Team); ▪ Inform GM; ▪ Support and coordinate with the Jetty Lead activities to control an emergency; ▪ Coordinate external services, any delegation and intervention at the emergency site; ▪ Assign onshore personnel to support the FIT if required; ▪ Consult with Terminal Operations Manager, O&M Manager and Jetty Lead the moment to resume the Terminal.
Jetty SHEQ Manager	<ul style="list-style-type: none"> ▪ Participate in part of Emergency Control Team to provide guidance and assistance; ▪ Report to the GM and coordinate with relevant action parties or stakeholders; ▪ Make sure Terminal Emergency Response Plan is updated.
Maintenance Manager	<ul style="list-style-type: none"> ▪ Part of the Emergency Control Team providing technical expertise; ▪ Ensure the mobilization of any contractor to re-establish the operations.
Ship Management Company	<ul style="list-style-type: none"> ▪ Support and coordinate with the FSRU Master activities to control an emergency; ▪ Coordinate external services, any delegation and intervention at the emergency site; ▪ Assign onshore personnel to support the FIT if required.

3.2.3 Terminal First Intervention Team

When emergency incidents occur, the Terminal First Intervention Team (FIT) which is composed of the Jetty FIT and 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 (IC). **Figure 3.1** illustrates the structure of the Terminal FIT.

Figure 3.1 Terminal First Intervention Team (FIT)

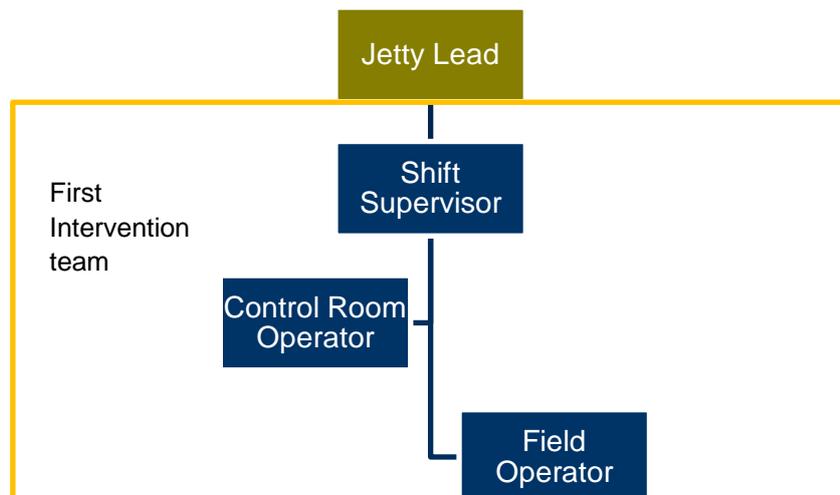


The major composition of the Jetty FIT including the Jetty Lead, the shift supervisor, the control room operator and the field operator as illustrated in **Figure 3.2**. The FSRU master and FSRU crew are also involved when necessary.

The responsibilities of the Terminal FIT are as follows:

- Ensure safe evacuation;
- Guide disabled person to the muster point;
- Isolate, interdict and create safety state;
- Carry out the first intervention actions;
- Continuous Assessment of the situation and update; and
- Carry out all necessary actions.

Figure 3.2 Jetty First Intervention Team (FIT)



The responsibilities of each role in the Terminal FIT is summarized in **Table 3.3**.

Table 3.3 Summary of Key Roles and Responsibilities of the Terminal FIT

Key Roles	Responsibilities
Jetty Lead (i.e. the Incident Controller)	<ul style="list-style-type: none"> ▪ 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 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	<ul style="list-style-type: none"> ▪ Support the Jetty Lead.
Control Room Operator (CRO)	<ul style="list-style-type: none"> ▪ 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 (Annex C).
Field Operators	<ul style="list-style-type: none"> ▪ Support the Jetty Lead.
FSRU Master	<ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none"> ▪ Inform FSRU Master and update the situation; ▪ Assist the FSRU Master and execute the emergency response procedures.

3.3 Intended Procedures for Dealing with Accidents

3.3.1 Intended Strategy

The intended emergency response strategy is as follows:

- IC should consider the escalation potential, identifying the worst case scenario;
- If possible, IC / CRO should notify through the Public Address General Alarm (PAGA) about the safe route of evacuation and to the personal who are at the muster points about the situation;
- Communications between FIT using the walkie-talkie emergency channel;
- Before starting any action, the IC / FIT will define the safest route to escape;

- FIT should remove any equipment, product that is exposed to the risk;
- FIT instructed by IC or CRO should activate necessary pushbutton to stop unloading LNGC and natural gas to send out. This stoppage must be done for as long as it is necessary, to be able to restart the operation only when it is safe;
- CRO activate automatic arms disconnection upon IC request; and
- CRO instructed by IC should stop all pumps and other equipment in the terminal or area that could intensify the incident.

3.3.2 Procedures of Handling Emergency Scenarios

Members of the public could report any emergency scenarios (including fire incidents) to the CLP BPPS Hotline (2678-4700) or HK Electric Customer Emergency Services Hotlines 2555-4000 (English) or 2555-4999 (Chinese).

LPS Central Control Room (CCR) / BPPS CCR will notify Jetty CCR when the accidental spillage or gas escape incident report related to LNG Terminal is received from the public. SBV will patrol at the Marine Control Zone. SBV will notify Jetty CCR if there is any unusual circumstance around the vicinity of the Jetty, such as oil/chemical spillage or gas leakage incidents. CRO will report to Jetty Lead and Jetty Lead will arrange FIT to verify Jetty conditions to see if the reported case is valid as per accidental spillage or gas leakage procedure.

Jetty Lead will notify HKLTL Terminal Operations Manager/ BPPS CCR/ LPS CCR/ FSRU Terminal Duty Manager when accidental spillage or gas leakage (including fire incident) is confirmed.

The response procedures of handling accidental leakage of gas (including fire incident) and oil/chemical spillage events are presented in **Annex A** and **Annex B**, respectively.

3.3.2.1 Procedures at Jetty

In general, any person that notices a gas leak (including fire incident) or chemical spillage must immediately:

- Retreat to the nearest Muster Point(s) (e.g. FSRU Vessel, Mooring Dolphin 1 (MD1) or Mooring Dolphin 6 (MD6)) away from the immediate area of LNG or gas leakage or chemical spillage;
- Activate the nearest fire and gas alarm and/or report to the Jetty CCR with below information:
 - location of the incident,
 - your name and position,
 - nature of the gas incidents or chemical spillage: e.g. gas leak, gas fire, or pipeline damage, etc.,
 - severity of the incident,
 - any injuries, and
 - endangered plant or structure.

When a gas leak (including fire incident) occurs at Jetty, the following procedures should be followed:

- For Jetty CCR:
 - Isolate the affected part of the terminal and consider active ESD System if possible, to limit the magnitude of the leak;
 - Evaluate the level of the emergency considering the gas clouds and LNG puddles;
 - Isolate the ventilation spaces that could be affected (e.g. substations);

- Start fire pumps (electric / diesel) to ensure that the main network has water and can handle as many monitors as necessary hoses;
- Use the foam monitor to minimize the ignition risk, control the vaporization rate and dispersion wherever is appropriate;
- Use fire water monitors to cool the exposed and non-isolated areas of the terminal, particularly the natural gas or LNG pipelines adjacent to the fixed fire protection systems;
- Contact the external emergency services for help if necessary.
- For Jetty FIT:
 - Use the appropriate PPE;
 - Approach the sources of gas leak and gas cloud in the opposite direction to the wind;
 - Cordon off the affected area and make sure all the people are evacuated. Use water spray to divert, disperse and dilute the gas cloud and set gas monitoring limits;
 - Ensure no ignition source in the path and the leakage has stopped;
 - Create a safe atmosphere by depressurizing, draining and purging the affected area;
 - Once the emergency is controlled, Jetty Lead (i.e. the IC) will activate the alarm and announce the end of the emergency through the PAGAs.

When an oil or chemical spillage takes place at Jetty, the following procedures should be followed:

- Report to Jetty Lead (i.e. the IC) immediately;
- Evacuate all workers from the spillage area;
- FIT arrives the site with appropriate PPE;
- Contain the spill (e.g. closing valves, stop transfer, etc.);
- Isolate the contaminated area and use barriers to fence-off the contaminated area to avoid unnecessary entrance and deploy the spill kits to the spillage site. Depending on the scale of the spillage area, the spillage area shall be contained using secondary oil containment (SOC);
- Oil absorbents in the spill kit will be applied to absorb and remove the spillage within the SOC. They will be collected by disposal plastic bags as part of the spill kits item;
- The used spill kits will be treated, stored and disposed of as chemical waste according to the necessary procedures;
- A light cover of absorbent material should be sprinkled over the entire spill site;
- A second light application of absorbent material is usually sufficient to completely clean up the spill and all residues;
- For equipment and vertical surfaces contaminated with these products, oil absorbent wipes can also be used to clean the areas;
- Spill residues at the LNG Terminal will be stored in a steel bucket or lined drum at the FSRU for disposal;
- Require support from SBV if necessary.

3.3.2.2 Procedures at FSRU Vessel

When a gas leak (including fire incident) occurs at FSRU Vessel, the following procedures should be followed:

- Activate the ESD system and the sound alarm followed by the PAGAs announcement;

- Stop any transfer operation on board and operations that may cause an ignition;
- Muster all crew and passengers/visitors;
- Activate the water spray;
- Assess the wind direction and alter the vessel course so that the vapour stream can pass well clear of Accommodation;
- Maintain positive pressure in Accommodation;
- Stop non-essential air intake into the Engine Room/machinery space;
- Assess proximity of the land and other vessels;
- Inform the incident according to the Incident Reporting and Investigation Procedure;
- Prepare and send out the initial report;
- Inform port authorities or the nearest coast state;
- Direct small craft in vicinity away from the vessel;
- Obtain weather forecast and assess the effect on the incident;
- Prepare first aid equipment and breathing apparatus;
- Investigate the cause of pressure rise (if applicable) and check if the single tank has pressure spike;
- Monitor tank pressure trend;
- In case of machinery/valve malfunction, determine the location of the source of leak;
- Confirm LNG affected area;
- Upon discharging, continue discharging to reduce tank pressure;
- Upon loading, reduce loading rate to a minimum or stop loading.

When an oil or chemical spillage takes place at FSRU Vessel, the following procedures should be followed:

- Activate the sound emergency alarm followed by the PAGA announcement;
- Stop all cargo, ballasting and bunkering;
- Close manifold valves and drain deck lines, all tank valves and pipeline master valves;
- Stop air intake into Accommodation and any non-essential air intake into Engine Room/machinery space;
- Locate the source of leakage;
- Check MSDS sheets of the spilt oil for toxic hazards;
- Use a portable pump and Shipboard Oil Pollution Emergency Plan (SOPEP) equipment immediately to stop spill overboard;
- Assess the fire risk from the release of flammable liquids over vapour (if applicable);
- Reduce liquid level in relevant tanks;
- Prepare pumps, connections for the transfer of liquid to other tanks/shore/lighter;
- Pump water into leaking tank to create water cushion under oil or light chemical to prevent further loss;
- If leakage is below the waterline, arrange divers to investigate;

- Calculate the stress and stability, request shore assistance if needed;
- Transfer cargo, ballast or bunkers to reduce high stresses;
- Designate stowage for residues from clean-up prior before disposal;
- Inform the incident according to the Incident Reporting and Investigation Procedure;
- Prepare and send out the initial report;
- Once the leakage is stopped, commence clean-up procedures using sorbents and permitted solvents;
- Evaluate the scale of spill and check levels in all bunkers, keep monitoring tank levels;
- Estimate the amount of spill overboard and assess fire risk from release of flammable liquids or vapour (if applicable).

3.3.3 Evacuation

On receiving the alarm, personnel at Jetty shall evacuate outside to the designated Muster Point(s) to be advised by the Jetty Lead.

The Jetty CCR is located at FSRU Vessel and it is the primary LNG Terminal Emergency Control Centre. The Emergency Control Centre will be transferred from the CCR to the SBV or other nominated location upon the discretion of Jetty Lead.

The SBV supports the emergency and maintain a protected perimeter under the FIT coordination. The SBV reports to the Jetty CCR and access, escort external support services for the emergency. It also coordinates with Jetty Lead the emergency evacuation in case of FSRU departure.

Before evacuating, all the personnel should leave their work area safe and shut down equipment as necessary.

3.3.4 Transit of the LNGC and FSRU Vessel under Emergency Situation

In the case of an emergency situation (e.g. uncontrolled fire event at the Jetty), the FSRU Vessel berthed at the Jetty and any LNGC that may be on berth at the time of the emergency will depart the berth to an area of open sea outside HKSAR waters. In addition, a SBV is available to provide an emergency response in accordance with its operation manual and will follow instructions from the Jetty Lead to assist the FSRU Vessel and LNGC depart the berth.

3.3.5 Re-Start of Operation

Jetty Lead will consult the Duty Manager and the HKLTL EMT and evaluate the situation. After gathering information from all the emergency responders and assessing the situation, Jetty CCR will declare the All Clear and specify any conditions or procedures for re-entry.

3.4 Mitigation Measures

For gas leak (including fire incidents) scenarios, the following mitigation measures are implemented to minimize the risk of leakage, fire or explosion, as summarized in **Table 3.4**.

Table 3.4 Summary of Mitigation Measures for Gas Leaks Scenarios

Mitigation Measures	Description
Fire and Gas Detection and Protection Systems	<p>The following fire and gas detection and protection systems are designed, installed, tested and commissioned in accordance with the local authority requirements & international codes and Standards:</p> <ul style="list-style-type: none"> ▪ Fire & Gas Detection;

Mitigation Measures	Description
	<ul style="list-style-type: none"> ▪ Fire Water Supply; ▪ Fire Hydrant; ▪ Deluge Valve Skid; ▪ Fire Water Hose Reels; ▪ Clean Agent Fire Extinguishing System; and ▪ Fire Extinguishers.
Passive Fire Protection (PFP)	PFP of 2-hour fire rating for Mooring Dolphins and the Jetty structure are considered based on the results of risk assessment, according to the requirements of Building Department.

For oil and chemical spillage events, the following mitigation measures as summarized in **Table 3.5** are implemented to avoid, reduce or remedy the significant adverse environmental effects.

Table 3.5 Summary of Mitigation Measures for Oil / Chemical Spillage

Mitigation Measures	Description
Equip with spill response resources	<ul style="list-style-type: none"> ▪ Absorbent materials, oil-dispersant spray guns and other relevant oil spill response equipment are in good condition and available for use at any times; ▪ Ensure that the oil containment booms, absorbent materials, oil-dispersant spray guns are available.
Clear the affected area immediately	<ul style="list-style-type: none"> ▪ Limit the spread and mitigate the damage by clearing from the immediate area. Thus, the spread can be controlled by absorbent materials around the periphery of the spill area.
Dispose the chemicals according to MSDS	<ul style="list-style-type: none"> ▪ Clean up the spill area and dispose the particular material according to the MSDS.

3.5 Trainings & Drill Exercises

3.5.1 Training

Emergency training for the operation and maintenance staff for the Jetty and HKLTL will be completed before the commercial operation of the Jetty.

All roles nominated for emergency duties will be provided with specific training commensurate according to their duties and responsibilities. All roles will receive appropriate instruction and training on how they will respond to various emergency scenarios and the emergency equipment they may have to use. Regular SHEQ trainings will be conducted by the Jetty SHEQ Manager on a bi-monthly basis.

A training plan for each role with emergency duties will be agreed on an annual basis. The site safety induction, procedures and the operation of safety equipment, also the refresher training are all included in this training process.

3.5.2 Drills

Drills and exercises will be conducted before the commercial operation of the Jetty.

All the workers, contractors and sub-contractors (if involved) should participate the drill exercise. A post drill meeting should be conducted to review the response and address any deficiencies.

Regular drill exercise will be carried out to ensure that all personnel are familiar with the actions to be taken when emergencies occur.

The annual master drill & exercise plan should also be updated on a monthly basis and be discussed during the monthly safety meeting.

Table 3.6 below summarizes the details of each type of drills.

Table 3.6 Summary of Drills & Exercises

Type of Drill	Frequency	Involved Parties
Table Top Drill	Monthly by each shift	<ul style="list-style-type: none">Jetty Crews
Physical Drill	Monthly by each shift	<ul style="list-style-type: none">Jetty Crews and FSRU Crews
Annual Drill with External Parties	Annually	<ul style="list-style-type: none">Jetty Crews,FSRU Crews,HKLTLCLPHK ElectricFire Services Department (FSD)Marine Department (depends on the drill scenarios)

4. PROCEDURES AND REPORTING ARRANGEMENTS FOR EMERGENCY SCENARIOS

This section states the procedures for reporting of, and investigation into emergency scenarios (including fire incidents).

Internal requirements on the investigation into spillage or gas incidents are also described. To avoid the possibility of failure to respond to borderline cases, this instruction must also be followed in the event of all incidents that have the potential to develop into emergencies.

4.1 General Requirements

The timeframe of incident reporting to top management shall be informed in a timely manner as shown in **Table 4.1**.

Table 4.1 Incident Notification Timeframe

Emergency Classification	Reporting Time Limit
Level 0 (Minor)	No later than the next business day
Level 1 (Major)	Within 24 hours
Level 2 (Critical)	Within 24 hours
Level 3 (Catastrophic)	Immediately

4.2 Statutory Requirements

HKLTL/MOL (the owner of FSRU Vessel and the operator of the Terminal) /Contractors follows the external authorities reporting requirements regarding the reporting of various emergencies.

4.2.1 Reporting of Major Gas Emergency

According to clause 15a to 15c of Chapter 51 of Gas Safety (Regulation of Gas Supply Companies) Regulations, the HKLTL shall, on a major gas emergency:

- Report the emergency to the Gas Standard Office (GSO) within 2 hours;
- Provide the GSO with such information and details in relation to the emergency as required;
- Furnish a written report on gas emergency no later than 28 days after the incident;
- Immediate verbal report (per Clause 15a) and written report (per Clause 15c), on gas emergency to the GSO should be directed to The Gas Standard Office, Electrical and Mechanical Services Department.

Following are relevant definitions of major gas emergency that applied to HKLTL gas facilities:

- Significant damage to an offshore terminal facility;
- Loss of containment of not less than one tonne of flammable product within the boundaries of any works for the manufacture of town gas, synthetic natural gas or substitute natural gas;
- Loss of containment, in not more than 1 hour in any place other than within the boundaries of any terminal or works of not less than
 - 250 kilograms of flammable product in liquid form;
 - 250 kilograms of flammable product in gaseous form with a relative density of more than 1; or

- 500 kilograms of flammable product in gaseous form with a relative density of not more than 1;
- Explosion damage caused by gas where the damage extends beyond the immediate source of the explosion;
- Explosion damage to any notifiable gas installation where repair is required, irrespective of whether such installation is rendered inoperable by such explosion;
- Fire damage to any notifiable gas installation; or
- Any casualty, whether fatal or non-fatal, due to the inhalation of unburnt gas or the products of the combustion of gas and includes any similar incident.

4.2.2 Reporting of Power Company Incidents

If the incident at LNG Terminal falls into the reporting criteria to the Electrical & Mechanical Services Department (EMSD), HKLTL Terminal Operations Manager or his delegates shall make the first notification via the registered gas supply company, CLP or HK Electric (1st alternative) to GSO according to the requirement of Gas Safety (Regulation of Gas Supply Companies) Regulations.

Incident Controller shall further coordinate with HKLTL Terminal Operations Manager to provide the follow up notification to EMSD.

4.2.3 Reporting of Marine Related Spillage

According to Part 3 of the Merchant Shipping (Reporting of Pollution Incidents) Regulations (Cap. 413 sub. leg. C), whenever a spillage incident involves the following:

- An actual or probable discharge of oil, or of any noxious liquid substance carried in bulk resulting or likely to result from damage to the ship or its equipment, or made or likely to be made for the purpose of securing the safety of a ship or saving life at sea;
- An actual or probable discharge of a marine pollutant in packaged form from the ship; or
- An actual discharge during the operation of the ship of oil or any noxious liquid substance in excess of the quantity or instantaneous rate permitted under the relevant provision of Part 3 of the Merchant Shipping (Prevention of Oil Pollution) Regulations (Cap. 413 sub. leg. A) or Part II of the Merchant Shipping (Control of Pollution by Noxious Liquid Substances in Bulk) Regulations (Cap. 413 sub. leg. B);

The reporting of the incident shall be made to Marine Department in accordance with the provision of the Merchant Shipping (Reporting of Pollution Incidents) Regulations (Cap. 413 sub. leg. C). Other authorities, such as EPD and AFCD, will also be informed as necessary. Reports shall be made by the fastest telecommunications channels available with the highest possible priority to the nearest coastal state.

The report shall include:

- The identity of ship or ships involved;
- The time, type and location of the incident;
- The quantity and type of substance involved;
- The assistance or salvage measures requested or being undertaken.

At earliest possible, Jetty Lead / FSRU Master shall inform the Marine Department Maritime Rescue Coordination Centre (MRCC) about the nature of the emergency and scope of the assistance required. For any incidents require for search and rescue (SAR) responses, MRCC will draw resources from Government Flying Service (GFS), Hong Kong Marine Police (MarPol) and Fire Services Department (FSD).

4.3 Emergency Communication

Jetty Lead is the initial focal point for reporting and communication whenever the incident occurs. Jetty Lead shall determine the significance of the incident and notify the incident to the HKLTL Terminal Operations Manager or his delegates as soon as possible.

When the assistance of FSD is required, the following information will be advised:

- Location of emergency;
- Nature of emergency (leak, fire or explosion);
- Size of leak (release rate, duration or total quantity);
- Potential for hazard to life;
- Number of casualties / missing persons;
- Potential for escalation;
- Means of access and egress;
- Location for initial attendance;
- Location of water supply and other firefighting services;
- Location of Isolation valves; and
- Number of people on site and any unaccounted.

The Jetty Lead will inform the HKLTL Operations Manager, BPPS CCR and LPS CCR that FSD emergency services has been requested.

4.4 Investigation Procedures

The investigation team should consist of representatives from Operations, Maintenance and Safety, Health, Environment and Quality (SHEQ). The team should make up of two or three investigators at the minimum. Depending on the nature and severity of the incident, the FSRU Terminal General Manager and the Jetty SHEQ Manager shall also be involved in the investigation process if necessary. In the case of any injury, the injured person and/or some the team members should also be part of this process.

4.4.1 Preliminary Investigation

FSRU Terminal General Manager ensures that an investigation is carried out as promptly as practicable with the participation of those who were involved in and witnessed the incident.

The Initial Incident Notification Report will be based on the information obtained at the time of incident.

The intention is to provide quick preliminary information from the Terminal where the incident occurred. The preliminary findings and any immediate follow-ups, may change following further investigation and the finalization of the incident report.

4.4.2 Detailed Investigation

Where required, a more detailed investigation may be needed and include root cause analysis. When third party Investigation analysis tool is used, the trained investigators will follow a thorough, systematic and objective review of the evidence. For more minor accidents, the analysis still needs to be thorough and appropriate to the severity of the incident.

The results of detailed investigation may include systemic or systems failure. The final investigation report is to be finalized and the results will be distributed within one month after the incident.

FSRU Terminal General Manager will ensure that reporting requirements are met. The investigation report will be submitted to HKLTL as per required timeframe.

4.4.3 Timely Report Completion

The investigation and the associated report should be completed within 1 month from the date of the incident. Upon completion of the investigation report that shall be reviewed by legal team, if necessary, HKLTL management may determine the appropriate distribution list for the investigation report.

4.4.4 Lesson Learned

Lessons learnt communications shall be used to share the root cause of the incident, highlight how the incident could have been prevented and what actions are being undertaken to prevent recurrence to relevant parties.

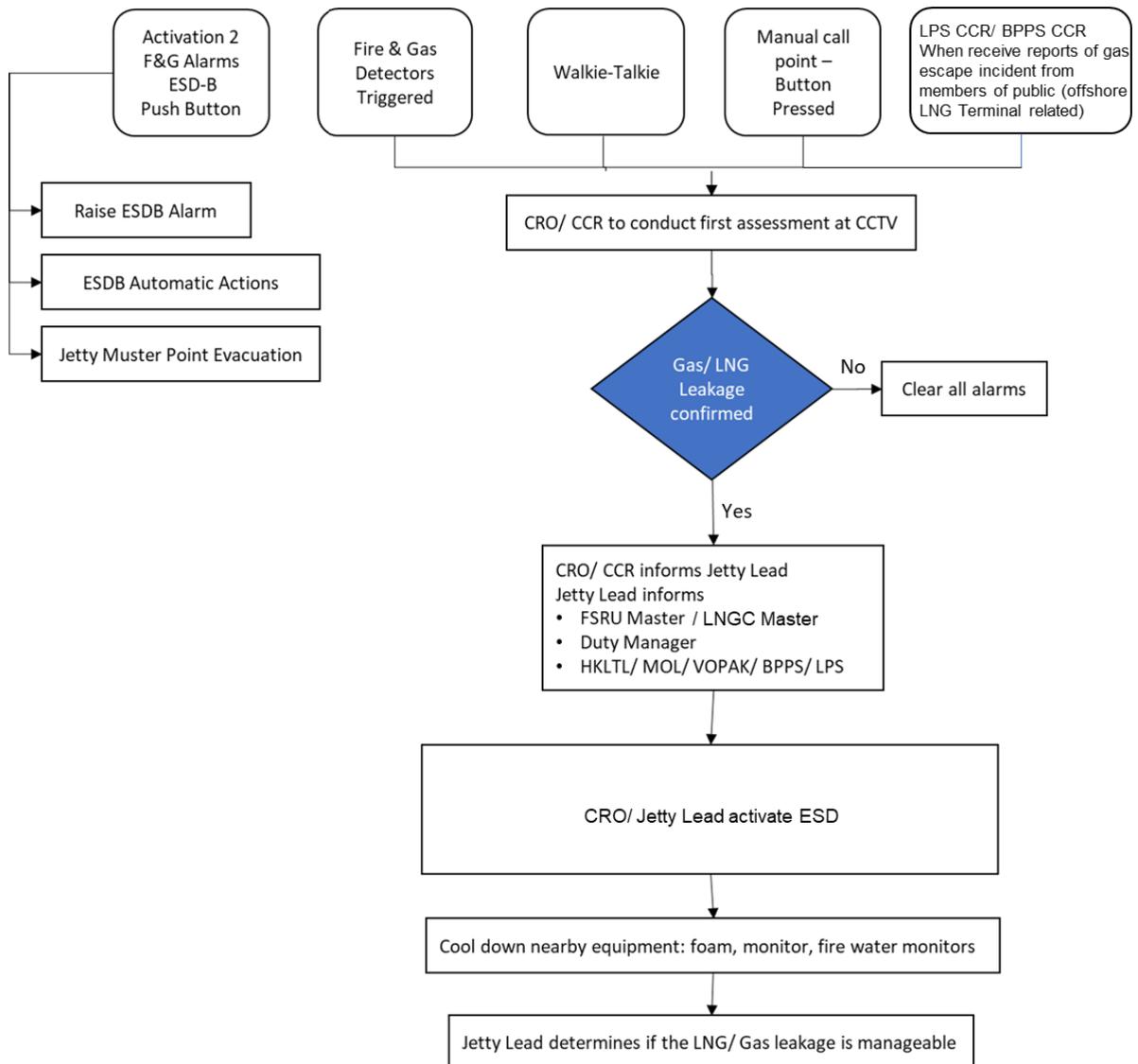
4.5 Review and Audit

Any recommendation and actions derived from the result of the investigation will be assigned with an action party and target completion date.

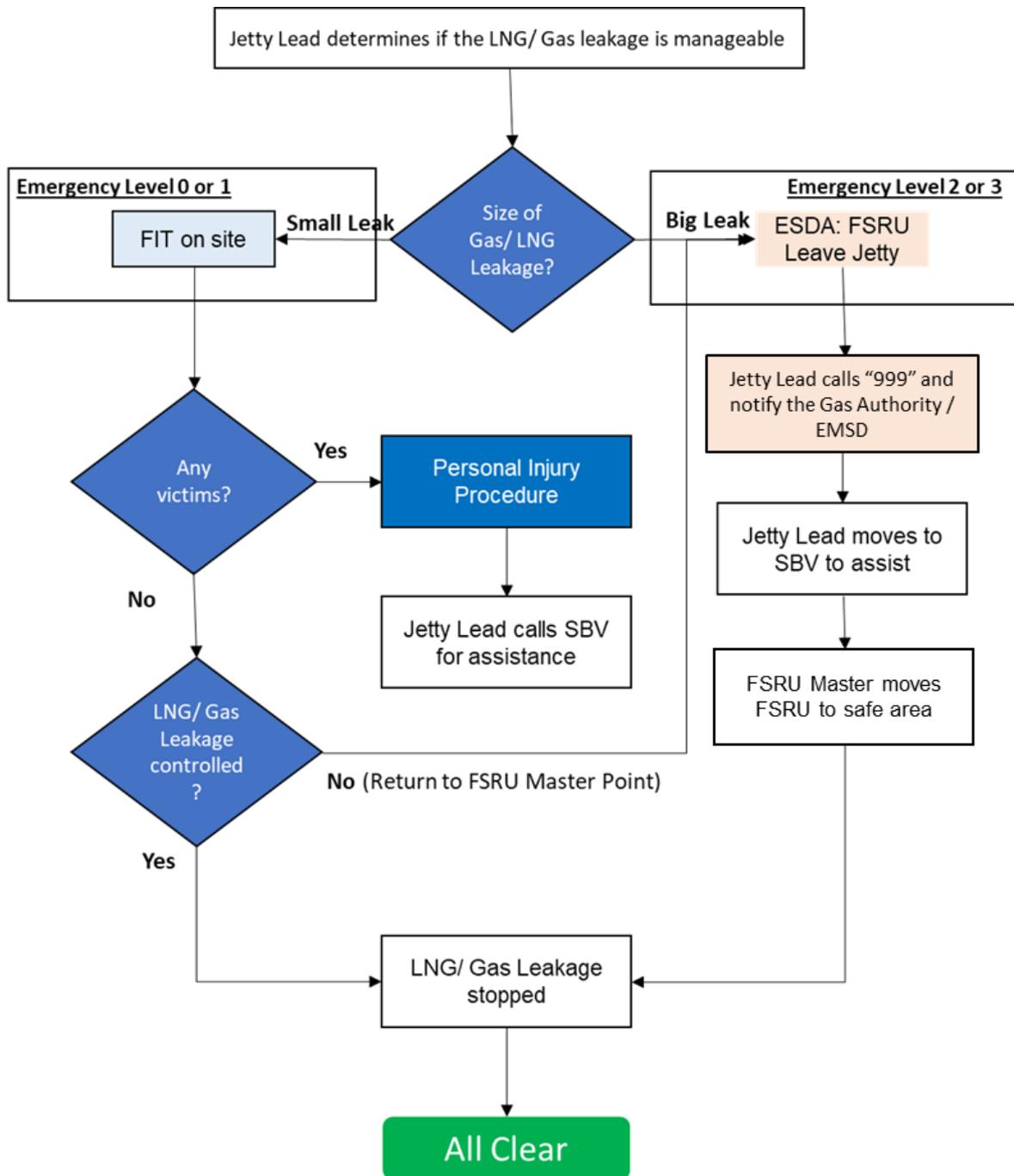
Recommendations and preventive actions with target completion dates will be reviewed and agreed with the HKLTL Terminal Operations Manager and other concerned parties. Any preventive action authorized during the Management Review Meeting is recorded in the minutes of meeting. The results of any preventive action initiated will be submitted to the Jetty SHEQ Manager to review the effectiveness of the action taken.

Assurance of these reporting and investigation processes shall be checked and reviewed during the internal audits. This includes the checking the source of data, records maintained and the process of measurement and monitoring.

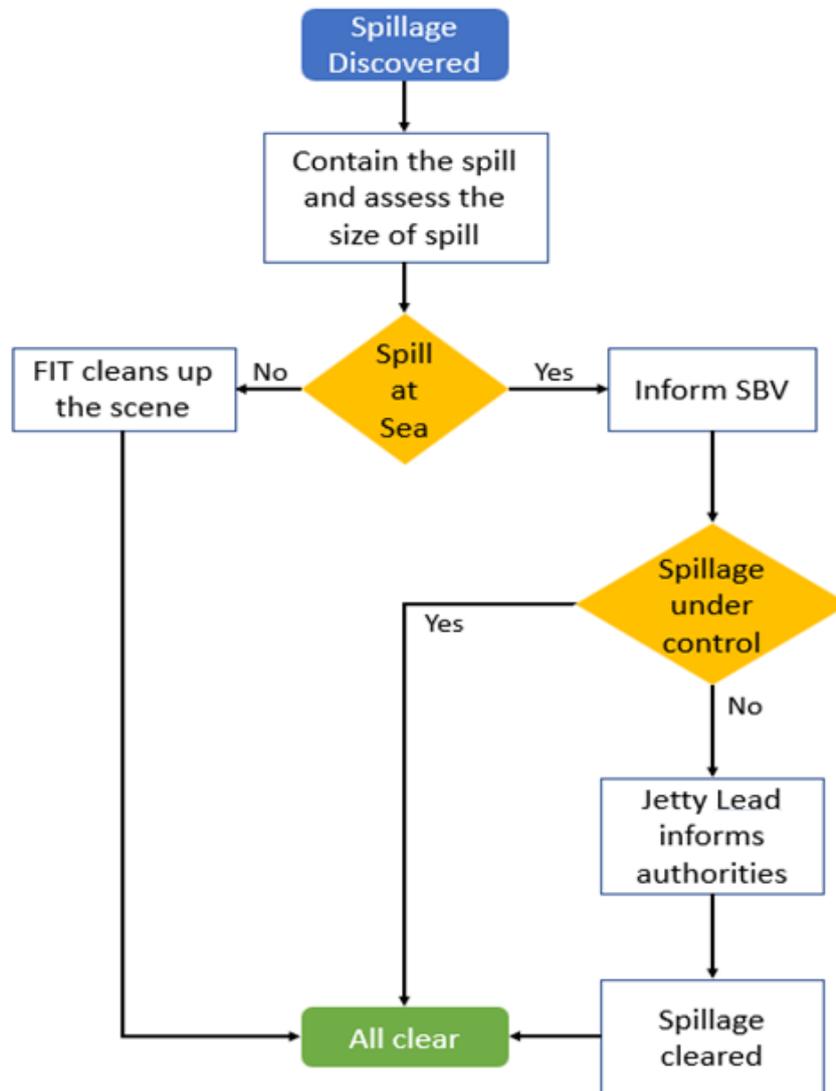
Annex A Flow Chart – Response to Gas Leakage Event (Including Fire Incident)



Cont.



Annex B Flow Chart – Response to Oil/Chemical Spillage Event



Annex C Event Log Checklist

Checklist and Record				Event and Log	
Time	Report of gas incident			Time	
	Name of reporter				
	Location		Employee	Y/N	
	Contact tel. no.		Contractor		
	Pipe marker no.		Any injury		
	Observations	Fire / Smell /Noise / Explosion			
	How serious				
Time	Alert the following parties of the reported gas incident				
	MOL/VOPAK Duty Manager		Direct line / radio		
	HKLTL Terminal Operations Manager No. xxxxxxxx				
	BPPS CCR No xxxxxxxx LPS CCR No. xxxxxxxx				
	Police/FSD		Direct 999		
Time	Dispatch Jetty Lead				
	Send Jetty Lead		Name		
	Raise the appropriate emergency warning light and siren				
Time	Assess situation with information available				
	Pipeline leak	gas leak alarm	Leak location	Leak size	
	detection system	Y / N			