

# DARWIN LNG (DLNG) EMERGENCY RESPONSE PLAN

## Purpose

The purpose of this plan is to establish Santos' emergency response arrangements to:

- Guide Darwin LNG (DLNG) Emergency Response Team (ERT) in emergency preparedness, emergency response and operational recovery.
- Inform the DLNG facility on the interoperability with the Perth Incident Management Team (IMT).
- Identifies credible potential emergency scenarios that could occur.
- Defines the roles and responsibilities in an emergency event.
- Provide predeveloped Emergency Response Guides to guide response activities.

This document also describes the interfaces with the Santos Management System (SMS) as well as Local, Territory and Federal government agencies.

## Scope

In scope is the Santos DLNG plant operations, pipeline (within designated boundary) production and export facilities located at Bladin Point, Darwin within the Northern Territory, Australia. The plan also includes guidance on responding to incident in adjoining / surrounding land that threatens the DLNG Facility, as well as providing mutual aid, if requested, to other operations

This plan interfaces with the following Santos plans:

- WANATL Incident Management Plan (Perth IMT)
- NT Emergency & Well Control Response Plan.
- DLNG Medical Emergency Response Plan DLNG-HSE-BDG-002
- Darwin LNG Oil Spill Contingency Plan – ALL/HSE/ER/009/1U00-210-ERP-0003
- Darwin LNG Plant Operations Environmental Management Plan – DLNG/HSE/PLN/001
- Marine Terminal Handbook
- Darwin LNG Procedures
- Darwin LNG Port Facility Security Plan
- Darwin LNG Security Plan

This plan is informed by and shall be read in conjunction with the Santos Emergency, Incident and Crisis Management Operating Standard.

DLNG Safety Case as an interfacing document - 1U00-012-PHA-0001 is to be referred to for more detailed information on the DLNG facility operations.

Out of scope is the (pipelines and production fields, with the exception of managing pipeline monitoring and control).

## Document Control

Document Owner:	Fergus Robinson – Operations Superintendent		
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Approved by:	Jesus Marcano – DLNG Production Manager		
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Date	Rev	Reason for Issue	Owner	Approved
	13	Alignment to Santos Standard template	Operations Superintendent – F Robinson	BU & DLNG Production Manager – J Marcano
	14	Update to Incident & Emergency Management technical Standard, MHF NUL Regulations alignment	Operations Superintendent – F Robinson	BU & DLNG Production Manager – J Marcano
	15	Updated OSCP naming, Updated ERGs – 19E, 20A, 20B, 20C, 20D. Added ERG 20B2 First fill. Updated environment license. Added Distribution List.	Operations Superintendent – F Robinson	BU & DLNG Production Manager – J Marcano

## Reference Documents

- DLNG Major Hazard Facility Safety Case (DLNG SC)
- Darwin LNG Oil Spill Contingency Plan (OSCP) (1U00-210-ERP-0003)
- WANATL Incident Management Plan (Perth IMP)
- Santos Crisis Management Plan (CMP)
- DLNG Port Facility Security Plan (ALL/HSE/SEC/007)
- Incident and Emergency Management Technical Standard
- [Emergency, Incident and Crisis Management Operating Standard](#)
- DLNG Medical Emergency Response Plan – DLNG/HSE/BDG/002
- AS2885.3 – 2001 Operations and Maintenance
- Work Health & Safety (National Uniform Legislation) Regulations

## Distribution List

Distribution	ERP		Distributed By
	Electronic	Hardcopy	
DLNG Control Room		•	• Santos Doc Control
DLNG OIM		•	• Santos Doc Control
DLNG Emergency Commanders ( <a href="mailto:abuw-grpabu.dlng.ops.supervisors&amp;2ic@santos.com">abuw-grpabu.dlng.ops.supervisors&amp;2ic@santos.com</a> )		•	• Santos Doc Control
DLNG Production Manager	•		• Santos Doc Control
PERTH IMT SO ER Documentation SharePoint	•		• Santos Senior Crisis, Security & ER Adviser
Santos Offshore ER Tile	•		• Santos Senior Crisis, Security & ER Adviser
NT EPA	•		• Santos Senior Crisis, Security & ER Adviser
NT PFES	•		• Santos Senior Crisis, Security & ER Adviser
NT Worksafe	•		• Santos Senior Crisis, Security & ER Adviser

## Abbreviations

Abbreviation	
AA	Assembly Area (Muster Point)
AIS	Automatic Identification System
AME	Aero Medical Evacuation
AMOSOC	Australian Marine Oil Spill Centre
AMSA	Australian Maritime Safety Authority
AUSREP	Australian Ship Reporting System
BLEVE	Boiling Liquid Expanding Vapour Explosion
CCP	Casualty Clearing Post
CCR	Central Control Room
CMP	Crisis Management Plan
CRTL	Control Room Team Leader
DLNG	Darwin Liquefied Natural Gas
EA	Evacuation Area
EC	Emergency Commander
EDP	Emergency De-Pressure / pressurisation
EOC	Emergency Operations Centre
EP	Environment Plan
ER	Emergency Response
ERP	Emergency Response Plan
ERT	Emergency Response Team
ERV	Emergency response Vehicle
ESD	Emergency shutdown
ESDB	Emergency shutdown boiler
ESDG	Emergency shutdown generation
ESDL	Emergency shutdown loading
ESDP	Emergency Shut Down Process
FCP	Forward Command Post
FRT	Field Response Team
FRTL	Field Response Team Leader
HSE	Health Safety & Environment
HV	High Voltage
IAP	Incident Action Plan
IMP	Incident Management Plan
IMT	Incident Management Team
IR	Incident Response
ISBL	Inside Battery Limits
LNG	Liquefied Natural Gas

Abbreviation	
LNGC	Liquefied Natural Gas Carrier
LOC	Loss of Containment
LV	Low Voltage
MAE	Major Accident Event
MHF	Major hazards facility
MI	Major Incident
MTB	Marine Terminal Building
NT	Northern Territory
NTPFES	Northern Territory Police, Fire and Emergency Services
NTRFS	Northern Territory Fire and Rescue Service
NT Worksafe	Northern Territory Worksafe
OIM	Onshore Installation Manager
OPEP	Oil Pollution Emergency Plan
OSBL	Outside Battery Limits
OSC	On Scene Commander
OSCP	Oil Spill Contingency Plan
PIC	Person In Charge
SDP	Shut Down Process
SME	Subject Matter Expert
SMS	Santos Management System
SOPEP	Ships Oil Pollution Emergency Plan
WHS	Work Health and Safety

## Definitions

In this document the following definitions apply:

Assembly area	The designated place or places where people assemble during the course of a muster upon the sounding of an alarm
Central Control Room	The workspace from which the facility process panel technician remotely operates the process equipment and control storage and loading
Crisis	An abnormal, unstable, complex event or situation that threatens the organisation's commercial and strategic objectives, reputation, or viability (typically considering consequence level V or VI impacts) that may be the result of: <ul style="list-style-type: none"> <li>a sudden disruptive event or situation ("Incident")</li> <li>escalation of non-acute business risks or emerging issues ("Issue")</li> </ul> internal or external triggers
Dynamic Risk Assessment	The continuous process of identifying hazards, assessing risk, taking action to eliminate or reduce risk, monitoring and reviewing, in the rapidly changing circumstances of an operational incident.
Emergency	A sudden or impending hazardous event or situation requiring urgent intervention that has caused, or poses an immediate threat of harm to people, property or the environment.

Emergency Command Centre	The location of the Emergency Response Team (ERT), usually accommodated in DLNG Central Control Room (CCR) in the Admin Building
Emergency Control Organisation	The group of personnel present on the facility who have a designated position in the response to an emergency. This includes members of the Emergency Response Team (ERT), Field Response Team (FRT), Muster Warden and any other person with a responsibility stated in the Emergency Response Plan.
Emergency Response Guide	A facility based, controlled document that details a structured approach to managing a specific emergency scenario based on its geographic location.
Field Response Team	The organised group of Santos personnel tasked with responding to emergencies on the facility and undertaking field-based containing or remediation actions.
Gas Transmission Pipeline	The main gas transmission pipeline(s).
Hazardous Substance	Refer Hazardous Chemicals (as per Global Harmonised System (GHS)) Chapter 7, Asbestos Chapter 8 and Schedule 15.1/15.2 WHS (NUL) Regs
Incident Management Team	The team of Santos personnel tasked with supporting the asset based response. This team is led by the Incident Management Team Leader and is located at Santos WANATL Office, Enex 100, 100 St Georges Terrace Perth, WA.
Major hazards facility	A facility at which Schedule 15 chemicals are present or likely to be present in a quantity that exceeds their threshold quantity or that has been determined by the regulator to be a major hazard facility (WHS (NUL) Regs)
Major Incident	<p>(1) An occurrence that—</p> <p>(a) results from an uncontrolled event at the major hazard facility involving, or potentially involving, schedule 15 chemicals; and</p> <p>(b) exposes a person to a serious risk to health or safety emanating from an immediate or imminent exposure to the occurrence.</p> <p>(2) Without limiting subsection (1), an occurrence includes—</p> <p>(a) escape, spillage or leakage; or</p> <p>(b) implosion, explosion or fire</p>
Major incident hazard	A hazard that could cause or contribute to causing a Major Incident (as per the WHS (NUL) Regulations)

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# 1. Facility and Hazardous Chemical Description

## 1.1. Facility Description and Process Overview

Appendix A provides the following details and information (including maps) about the facility:

- Location and address (includes GPS coordinates)
- Surrounding Land Use
- Facility Layout
- Process Plant
- Utilities Description (including Fire and Safety System)
- Facility Population and occupancy
- Occupied buildings design
- Process / Operational Overview
- LNG Storage and Loading
- LNG Export
- DLNG Facility Supply to Other Parties

## 1.2. Hazardous Chemicals

Appendix B lists an inventory of all hazardous chemicals present or likely to be present at the facility and their location [all GHS chemicals (chap 7) and Schedule 15 (MHF) hazardous materials] as defined in the WHS (NUL) Regs 2011 that will be stored on the facility in quantities that exceed the threshold quantities. DLNG utilises ChemAlert as the master register for all hazardous chemicals onsite.

A nitrogen generation unit (including a nitrogen receiver) are required for storage tank blanket gas and to purge the swivel joints of the LNG loading arms during loading.

Additional hazard chemicals/substances will be present in the facility and are stored and used in accordance with the Safety Data Sheet (SDS) for the product. SDSs are found on the Santos intranet HSE - Approved Chemicals page. A hard copy of all SDS for materials used at DLNG is maintained at the Guard House for emergency services use.

# 2. Emergency Actions.

## 2.1. Immediate Actions

It is the responsibility of all individuals on the facility to report the existence of an emergency incident without delay. This includes adjacent sites that may threaten the facility.

It is important to raise the alarm as soon as possible to ensure that any event is managed as quickly as possible to minimise further escalation. All personnel have the authority to raise / activate the alarms and ESD in case of emergency or potential emergency.

All incidents are raised via either phone call (88) or Emergency channel 1 through the DLNG Central Control Room (CCR).

If there is any doubt as to if the situation is or will become an emergency incident, it MUST always be reported immediately as it is always better to react even if the event doesn't eventuate than wait and allow it to escalate.

The response will be informed by the Emergency Response Guides (ERGs) and Emergency Checklists at Appendix N and D respectively for all emergency events including MHF Major Incidents.

## 2.2. Raising the Alarm

Any individual at the DLNG facility is responsible for reporting an emergency they encounter. An emergency response can be initiated by radio, by dialling 88 on any plant telephone, or by dialling (08) 8919 1580 which is the emergency phone in the Central Control Room. The initial report should be directed to the Operations Supervisor who will assume the role of Emergency Commander. After considering the situation, the Emergency Commander will direct the Control Room Supervisor to mobilise ERT personnel to the emergency if appropriate.

- Phone, dial “88” or (08) 8919 1580 from an internal phone.
- Radio “CH1 EMRG”
- Emergency Hotline access number 1800 DLNG 66 (1800 356 466) information on cyclone watches.

Provide the operator the following information:

- Your name
- Your work group or company
- Your current exact location.
- Your contact details or assigned radio channel.
- Brief description of the emergency.
- Assistance required.
- The number of people involved or exposed (approx. age, gender, injuries,).
- Plant or equipment involved.
- Escalation potential or exposure.
- A location that you will meet the responding assistance if applicable.
- Your work permit number if applicable.
- Actions you have taken so far to control the situation.
- Details and name of other people assisting.

Muster if unsafe to remain at the location or provide assistance if safe to do so and able.

## 2.3. Emergency Information

### 2.3.1. General Site Alarm and Public Address System (PAGA)

The General Site Alarm (GSA) is a manually operated alarm, initiated by Operations Staff in the CCR alerting all personnel on site that an emergency condition has occurred. The GSA is integrated with the site public address and plant radio system so CCR staff can also provide verbal instructions during an emergency. The GSA is designed to provide complete coverage of all exterior plant areas where personnel can be expected to be present and all indoor areas.

The GSA alarm operates in three modes:

- Muster Mode – series of intermittent beeps on two frequencies.
- Evacuation Mode - an oscillating tone continuously sounding from high to low frequency
- All Clear Mode – constant tone of single frequency
- Flashing beacons – In areas where the ambient noise level exceeds 85dB, flashing beacons are used to augment the audible messages/alarm tones to notify personnel that a message/alarm is being broadcast.

The sirens are tested once per week on Friday at 12:00 pm

### 2.3.2. Emergency Muster and Facility Evacuation Process

- A detailed overview of the Emergency Muster and Facility Evacuation process and responsibilities is at Appendix D.
- Assembly Area (muster points) and Facility Evacuation Points are outlined on the map at appendix D and E.
- Evacuation routes to Muster Points are outlined at Appendix E.
- A summary of the muster and evacuation processes are listed below.

### 2.3.3. Plant / Facility Evacuation

- If the Emergency Commander determines that safety of personnel assembled at muster points may be compromised, an order to authorize the activation of the Evacuation Alarm will be issued.
- On hearing the evacuation alarm, all personnel (including those personnel in the DLNG Compound Area) must proceed directly to the DLNG entrance gate emergency assembly point and swipe their card on the muster swipe pad.
- Note: If unsure if the exit route to main gate is safe, contact CCR via the intercom system for further instructions. The CCR will monitor the safety of these travel paths and communicate any potential impairment by radio. Movement from muster points may be done concurrently or in stages as determined by the Emergency Commander.
- On activation of the Evacuation alarm, the Emergency Commander shall ensure that 2 muster wardens proceed directly to the Evacuation Point at the front gate. Additionally, one security guard shall immediately proceed to the Evacuation point card reader and have a manual print out from all personnel on site - this is only to be used should the Gallagher Muster system fail.
- Security is to ensure all personnel swipe their card at the Evacuation Point card reader prior to proceeding to Emergency gate 1. Once swiped at the Evacuation point muster wardens are to direct all people in an orderly manner through emergency gate 1 for assembly in the vehicle search area and await further instruction.
- Prior to leaving site the CCR Emergency command team shall take photos of DCS as evidence of plant state. The Emergency Commander shall ensure the satellite telephone is taken from the Operations Supervisors office to maintain Communications with IMT. The ERT will establish a Forward Command Post outside the facility as directed by the Emergency Commander. The NT Power and Water gas compound is located 1km east from the main gate and can be utilised as a staging area for evacuated personnel if safe to do so.

### 2.3.4. Facility Muster

- The Darwin LNG Muster system incorporates the Gallagher Muster software able to reconcile all personnel registered at Muster Points against those personnel it has recorded as being present on site. It also automatically issues a register of personnel on-site every six hours as a back-up in case of system failure.
- Each muster point has electronic sign in (personal swipe access cards) and direct communications with the CCR.
- Muster Points are clearly identified by a green sign indicating the muster point assembly area.
- If the muster point area is in danger, the ERT Communications Officer will direct personnel to an alternative muster point after consultation with the Emergency Commander.
- The ERT Communications Officer will account for all personnel at muster, referencing the Gallagher Muster software.
- The Emergency Commander and On-Scene Commander will be advised if any personnel are not accounted for by the ERT Communications Officer.

Muster point assembly areas are located as per the map at Appendix D and E.

### 2.3.5. Shelter in Place

- In certain circumstances, the Emergency Commander (EC) may deem it appropriate to give an order to shelter in place.

- This may be appropriate for civil unrest; armed intruder and bomb threats or if there is a release of a toxic chemical.
- Severe weather events may all so see a shelter in place order given.
- Directions are to be provided over the Public Address system to direct the actions of personnel.

### 2.3.6. Emergency Communications

#### Site Emergency Communications

- The plant PAGA is used for informing personnel of the commencement and conclusion of an emergency.
- Telephone communication emergency contacts will be prominently displayed in the CCR.
- Communications that may identify injured or ‘No Vital Signs’/deceased personnel may only be transmitted on direct communications systems that aren’t a broadcast system (e.g phone, direct emails etc vs radio nets, PAGA etc).
- All key emergency communications are to be logged (where possible).
- Emergency communication channels include:

Group	Method
All Personnel	Plant Alarm/Siren
Mustered Personnel	Muster Point Intercom system
Field Response Team	Digital Radio Ch. 1 & 5
IMT	Mobile Phone EOC to ICC via TEAMS Call Connect
Details on the site radio communications system are at appendix F	

### 2.3.7. Initial Contacts

Contact Lists for DLNG can be accessed via the Key Contacts link on [Discover](#). Contact details are also available in hard copy in the DLNG CCR.

### 2.3.8. Building Fire Alarm Control System

The Building Fire Alarm Control System Controller is located on the utilities control panel in the CCR. The system controller is used to alert the Panel Technician to the activation of an alarm in a building on the facility. It provides a graphical representation of the alarm arrangement and locations on the facility.

### 2.3.9. Fixed Alarm and Detection System

The DLNG facility contains an integrated automatic Fire and Gas (F&G) detection system which monitors all areas of the facility. This includes fire and gas detection system in the process areas, i.e., liquefaction plant, LNG storage, jetty and other hazardous areas, and fire detection systems in all permanent buildings.

On detection of fire or gas, an automatic alarm will occur alerting personnel to the event. In all instances of activation, the following actions will occur as a minimum:

Initiator	Action
Flammable Gas Detector	Local Area Audible horns will activate along with BLUE strobe. Alarm annunciates an area F & G Panel and CCR F & G Panel and DCS.

<b>Fire Detector</b>	Local Area Audible horns will activate along with RED strobe. Alarm annunciates an area F & G Panel and CCR F & G Panel and DCS.
<b>H<sub>2</sub>S Detector</b>	Local Area Audible horns will activate along with WHITE strobe. Alarm annunciates an area F & G Panel and CCR F & G Panel and DCS.
<b>Low Temperature</b>	Alarm annunciates an area F & G Panel and CCR F & G Panel and DCS.

### 2.3.10. Additional Emergency Communications and Alarms

Appendix F details further information on the type and use of emergency communications and alarm systems. Alarms include:

- Manual Call Points
- Building Fire Alarm Manual Call Points
- Building Alarms

### 2.4. Onsite Emergency Response Resources

On-site emergency response team (ERT) resources include a trained Field Response Team (FRT) supported as necessary by external local emergency services and mutual aid parties.

The FRT is equipped with fit for purpose appliances carrying specialist equipment including Breathing Apparatus, Hydraulic Rescue Tools and Firefighting Foam Equipment as well as rescue from heights and confined spaces equipment. Details of this equipment can be found in Appendix G.

The most significant hazards at the DLNG Facility are presented by the quantities of LNG (stored and in process) and refrigerants. The facility is designed primarily to ensure the following:

- Rapid detection and isolation of hydrocarbon leaks.
- Blowdown and removal of hydrocarbons in the vicinity of the leak.
- Separation and segregation of process plant and storage.
- Segregation and protection of equipment and buildings.
- Containment of hydrocarbon spillages via impoundment and spill channels.
- Elimination of ignition sources.
- Passive and active fire protection systems to prevent escalation of any fires.

#### 2.4.1. Fire Station / Medical Buildings

A fire station and First Aid Centre (FAC) are in the operations area adjacent to the administration block and maintenance building. This location is clear of major fire and explosion accident hazards.

The Fire Station houses two Fire Fighting appliances, Oil Spill response trailer, High Expansion Foam Trailer, and other equipment for Emergency Response Team (ERT) use. This building will be the assembly point for the ERT before deployment to the emergency scene.

A Medic is available for emergency response on a 12-hour dayshift, 7 days a week. Personnel trained to Occupational First Aid (OFA) level are available 24/7. These personnel are attached to the facility's Security section. The guardhouse role is combined with the OFA role, and the officer performing guardhouse duties, must be able to perform the OFA role as well.

The First Aid Centre is located adjacent to the Fire Station. An ambulance, capable of carrying two patients (subject to injury complexity), is located at the centre and available for deployment to the emergency scene to provide a treatment base and transport patients to the First Aid centre for further treatment. The Ambulance can also transport injured persons to offsite medical treatment facilities if required.

**The DLNG Ambulance and Firefighting vehicles are not a gazetted emergency vehicle so they cannot be driven under emergency conditions on public roads, and as such must be driven to the conditions of the road.**

#### **2.4.2. Control and Shut Down Systems**

An integrated control and safety system provides electronic control, remote monitoring of equipment from the CCR to provide safe and reliable LNG plant operation over the wide range of normal and outside normal operating parameters. Many of these processes are sensor driven and require little operator intervention.

If a major incident hazard or event were to occur, the following actions typically would be initiated by the safety systems described below:

- isolation of plant inventories,
- de inventory of the source(s),
- activation of fixed firewater systems

There are two levels of shutdown, the first level is a *Shutdown Process (SDP)* and if required, a second deeper *Emergency Shutdown Process (ESDP)* that completely shuts down the entire process area of the facility.

##### **Shutdown Process / Loading (SDP/SDL)**

A process shutdown will be initiated when specific process conditions reach a predetermined upper or lower limit and act to bring the plant to a safe state from which it can be safely and readily restarted once the problem is resolved. Process shutdowns are provided for Train 1 (shutdown plant –SDP), LNG Loading (shutdown loading –SDL).

In general, a process shutdown will put the particular operation into recycle (where applicable) and close feed inlets. For example, an SDP within Train 1 will shut down the feed gas and put the compressors into recycle and in the LNG loading area, SDL will close the valves at the jetty and shut down the LNG load out pumps.

##### **Emergency Shut Down Process (ESDP)**

The ESDP stops the entire plant and blocks in major gas and liquid inventories by shutting additional valves and tripping the LNG Train compressor turbines. Any Overpressure will still be controlled via relief valves relieving to the wet/dry flare system, which remains on-line.

##### **Emergency Shut Down Loading (ESDL)**

The ESDL stops loading by stopping the LNG pumps, closing block valves, and disconnecting the loading arms from the ship via the PERC valves (Powered Emergency Release Coupling). Any overpressure will still be controlled via relief valves relieving to the Marine Flare system which remains on-line.

##### **Emergency Shut Down Power Generation (ESDG)**

The ESGD stops feed gas to the power generation turbines and shuts down the turbines. This results in a loss of power to the facility, which in turn will initiate an ESDP

##### **Emergency Shut Down Boilers (ESDB)**

The ESDB stops the Acid Gas Incinerator and standby boiler.

#### **2.4.3. Firefighting**

Appendix G provides an overview of the fixed and mobile firefighting capabilities on site.

### **2.5. Mutual Aid Support**

The DLNG Facility does not have any formally defined Mutual Aid Agreements in place, however it is understood by all operators in the surrounding area that a “best efforts approach” will be made to provide required support to each other’s operations in case of emergency.

## 2.6. Territory Emergency Support Services

The Northern Territory Police, Fire and Emergency Services (NTPFES) has legislated responsibilities to protect persons, property, and the environment from fire (structural and vegetation), hazardous materials emergencies and release persons trapped in vehicles or structures. The NT Police have the legislated role for coordinating any major incident in the NT. The interagency response will be coordinated from the Emergency Operations Centre at Berrimah Police Centre.

The DLNG facility shall notify the NTPFES of all confirmed fires and hazardous material spills which occur on the facility. For minor incidents which have been assessed as having a LOCAL impact only and within the capability of the ERT, NTPFES notification will be via non-emergency telephone number **(08) 8922 1583** (NTPFES Communications Centre).

NTPFES will be contacted by 000 when the DLNG Emergency Commander has assessed that the incident will:

- have major SITE impacts (incident impacts are expected to spread to or affect multiple areas of the facility, but not off-site) or impact EXTERNAL–OFFSITE within the facility and beyond the boundary of the facility see Table 2.3; or
- that NTPFES support will be required to control the emergency.

The NTFRS will assess all information they receive from the DLNG facility and advise if they will attend any incident or deploy their mobile command vehicle to the DLNG facility or establish an IMT at Berrimah Fire Station to support their deployment.

### 2.6.1. Access to site

The DLNG Guard House will be the designated staging area for all external response personnel.

The external Emergency Response leader and team will be escorted to the Forward Command Post for deployment and provided with site radios for emergency communications. All responders will be involved in a site debrief before they are released.

## 2.7. Offsite Emergency Resources

Organisation	Resources
Darwin Port Operations Pty Ltd	<p>Fleet of tugs dedicated to LNGC movements, including standby tug in attendance alongside LNGCs during loading operations with fire fighting facilities.</p> <p>Vessel traffic system to monitor and control vessel traffic in the Port of Darwin.</p> <p>Procedures for enforcement of controlled and exclusion zones around the LNGCs and the berth.</p>
NT Ambulance Service	Ambulance vehicles available to respond to site incidents.
NT Fire and Rescue Services	<p>Various equipment including pumpers, rescue tenders and foam capacity.</p> <p>Note: as DLNG Facility’s primary fire response philosophy is to isolate, depressure and retreat, combined with the fact that most incidents will be over with regard to the initial event before off-site emergency services are mobilised, there is no identified scenario of NT response organisation equipment being used.</p>
LNGC	<p>On-board fire-fighting systems.</p> <p>On-board emergency response equipment, including pollution control and stretchers.</p>

### 3. Emergency Response Arrangements

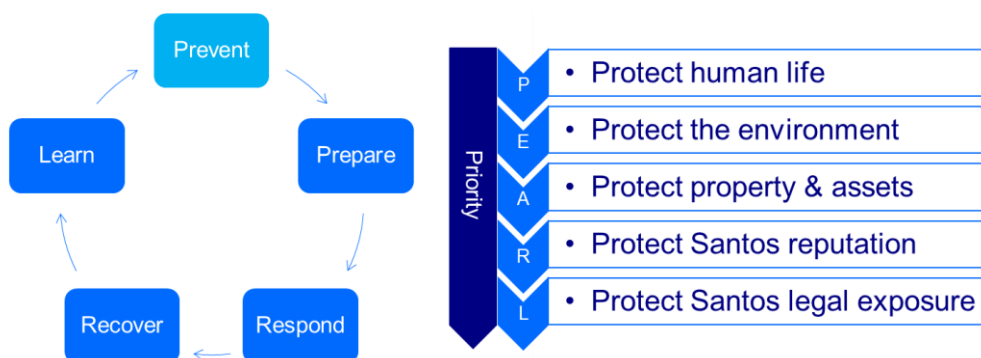
#### 3.1. Approach

##### 3.1.1. Emergency Response Principles & Philosophy

Emergency Response within the DLNG facility shall follow and adhere to the following principles:

- DLNG Operations Supervisors shall undertake the duty of the Emergency Commander and lead the emergency response for all operational process plant emergencies. Operations Supervisors are rostered 24/7 on site. The DLNG Emergency Commander has overall authority and responsibility for conducting emergency response operations at DLNG. The Emergency Commander will determine the level of response to an incident based on safety of personnel, severity of the incident and DLNG ERT resources available at the time.
- Ensure the *Santos emergency response philosophy*, without exception applies:
  - ESD, evacuate, activation of fixed firefighting systems as appropriate for all fire and loss of containment of hydrocarbon events.
  - Account for all people in the affected area.
- Direct competent site / facility Emergency Response personnel IF SAFE TO DO SO to:
  - Undertake incipient phase fire extinguishment and affect non-technical personnel rescue (non PMAWHS213 qualified personnel).
  - Activate and conduct firefighting response & technical rescue (PMAWHS213 qualified ERT personnel)
  - Minimise or prevent environmental impact.
  - Protect assets and minimise escalation of the incident, where practicable.
- Notify Emergency Services as warranted.
- Notify the IMT Lead as warranted.
- Escalation to Level 2 (IMT support) if needed.

Santos Emergency and Crisis Management principals are in order of priority.



- **Prevent** – place highest priority on the prevention of emergencies and crises (achieved via various aspects of the Santos Management System).
- **Prepare** – identify, establish and regularly test response and recovery capability documented plans, competent personnel and necessary resources.
- **Respond** – manage events at the lowest practicable level, while enabling the flow of information to the highest useful level where assessment of the needs may be determined, and appropriate resources allocated or directed.
- **Recover** – implement recovery or business continuity plans to minimise the business impact.
- **Learn** – identify opportunities for improvement after exercises or actual events.

### 3.1.2. Incident Classification

The DLNG facility has three levels of incident categories consistent with the Santos Emergency, Incident and Crisis Management Operating Procedure. Incidents are classified as follows:

#### Level 1:

Incidents that can be controlled by using resources normally available at the facility concerned, without the need to mobilise the Incident Management Team (IMT). This level would include sending personnel ashore for medical examination of a non-emergency nature.

*Examples:*

- Injury/illness not requiring immediate medivac.
- Spills of hydrocarbons or environmentally hazardous chemicals within a localised area (as a guide only – spills <10m<sup>3</sup>).
- Minor asset damage and minor impact on cash flow.
- No media involvement.

#### Level 2:

Incidents that cannot be controlled by the facilities resources alone and require external support and resources to address the situation. The IMT and/or Santos Support Teams/Oil Spill Response Team will be activated to provide operational and technical resources management and liaise with authorities and mutual aid organisations.

*Examples:*

- Injury/illness requiring immediate medivac.
- Spills of hydrocarbons or environmentally hazardous chemicals that can spread/ disperse widely or reach environmentally sensitive areas.
- Major asset damage or major cash flow impact.
- Minor media involvement.
- Liaison with next-of-kin required.

#### Level 3:

Incidents which have a wide-ranging impact on the company's strategic and enterprise interests and/or crisis status, warranting establishment of the Santos Crisis Management Team (CMT). A large scale, sustained response requires the engagement of significant external resources and response vendors.

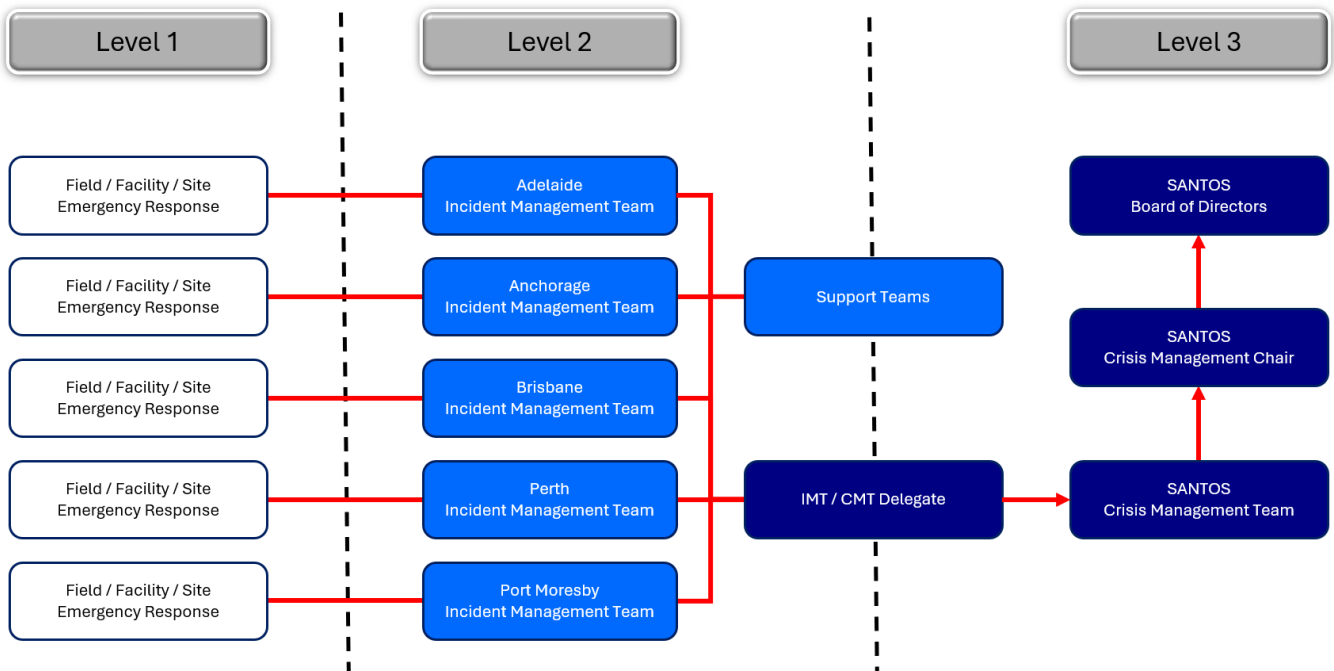
*Examples:*

- Single fatality / multiple fatalities or multiple serious injuries.
- Spills of hydrocarbons or environmentally hazardous chemicals that spread/ disperse on a regional scale or have the potential for significant environmental damage (as a guide only – spills >1,000m<sup>3</sup>).
- Extensive asset damage, extensive cash flow impact.
- Major media involvement (including international media).
- Total loss of asset, total loss of cash flow.

## 3.2. Structure

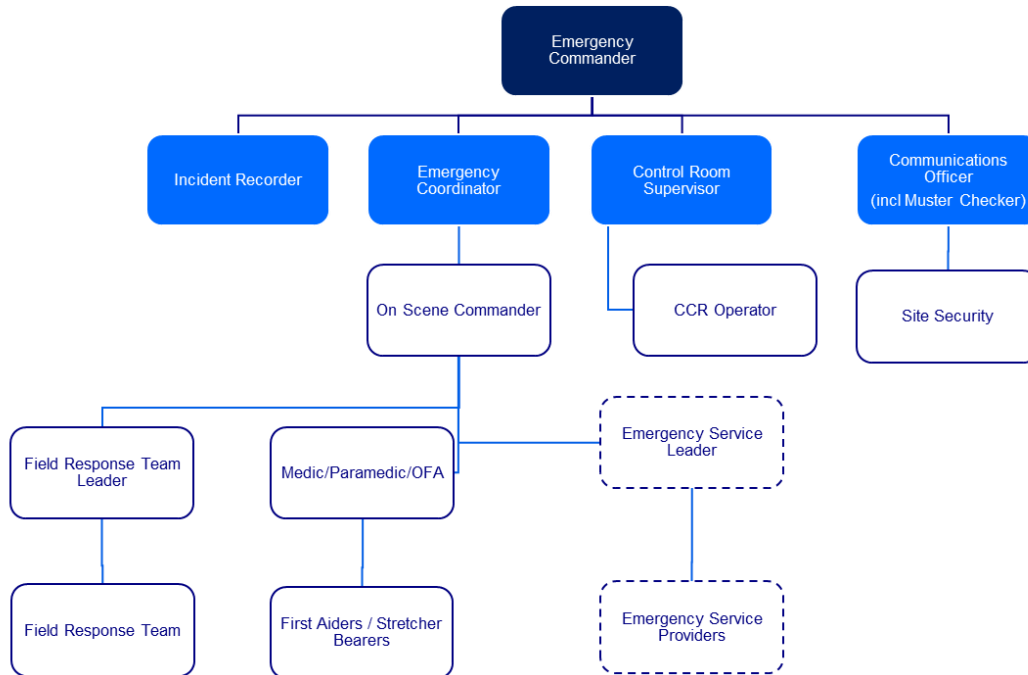
### 3.2.1. Emergency response Structure

The diagram below shows the overall emergency response structure and incident management levels.

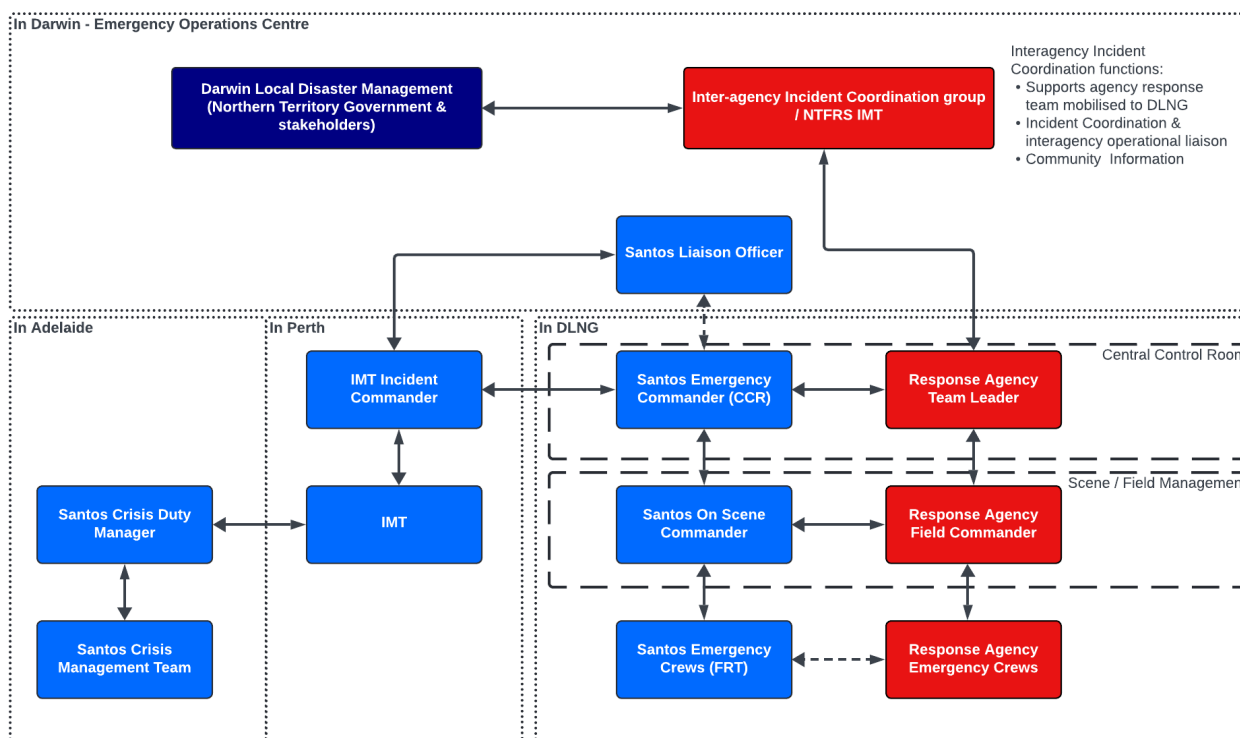


### 3.2.2. Emergency Response Team

The DLNG Emergency Response Team (ERT) structure consists of:



### 3.2.3. Unified Command Structure



The unified incident management arrangements are implemented at any significant emergency at DLNG when an agency(s) mobilises personnel to control an emergency have been agreed by all agencies.

The concepts are aligned to the principles of the Australasian Inter-Service Incident Management System (AIIMS)

## 3.3. Roles & Responsibilities

### 3.3.1. Role Appointments and Duty Cards

- The paragraphs below provide a summary of the role functions in the DLNG ERT.
- Detailed Duty Cards for each role can be found in Appendix H. The role cards are designed as a pro-active guide only and do not cover every potential scenario or task required.
- The ERT will be staffed according to the number of Operations personnel on-site for the shift, with a full 8-person ERT available once there are 9 or more Operations personnel on-shift. For shift numbers of 8 and less, work activities and locations will be reduced or restricted on a risk basis to account for the reduced ERT availability.

#### Emergency Commander

Has overall authority and responsibility for conducting emergency response operations at DLNG and will determine the level of response to an incident based on safety of personnel, severity of the incident and DLNG ERT / FRT resources available at the time. After undertaking incident appreciation assessment, they may determine that the most appropriate level of response is to not commit ERT / FRT personnel and equipment to firefighting activities and only utilise fixed fire suppression systems for fire protection.

#### Emergency Coordinator (ECoor)

The Emergency Coordinator assists the Emergency Commander with communications between the FRT and CCR, collating the overall muster check and then the deployment of resources as required.

### **Control Room Supervisor and Operators**

The Control Room personnel monitor the control panels and will take any action deemed necessary to safeguard personnel, the environment and plant equipment.

### **Communications Officer**

The Communications Officer establishes and maintains communications as directed by the Emergency Commander.

### **Incident Recorder (IR)**

The Incident Recorder uses information boards to clearly record relevant information including the status of personnel and casualties. The purpose of this board is to record the major elements of the emergency assisting the Emergency Commander to accurately evaluate the situation.

### **On Scene Commander**

The On-Scene Commander oversees operations and other incident site containment activities. The On-Scene Commander has the following position reporting to them:

#### **Field Response Team Leader**

The Fire Team Leader commands the Emergency Response Team and executes tactical response options during the emergency.

#### **Field Response Team (ERT)**

The Emergency Response Team is made up of a mixture of Process operators at DLNG. The personnel have received training in:

Firefighting Operations, Breathing Apparatus Procedures, Hazardous Material operations (HAZMAT), Working at heights, Confined Space Entry First Aid techniques and Basic Rescue Techniques

### **Security**

Security personnel are responsible for delivery of information to the Communications Officer in the event of a muster. Additional direction may be given by the Emergency Commander, ensuring the security of site and maritime security is maintained.

### **Medic**

The medic is responsible to organise treatment for the sick and injured and to arrange for additional medical support to be available.

### **Other Support Members**

Other Support Members may be required to assist the ERT upon direction from the On Scene Commander or Emergency Commander.

### **3.3.2. Incident Management Team (Perth)**

Support the DLNG facility emergency response undertakings:

- IMT Lead
- Operations Lead - technical support
- Logistics Lead – resources, equipment, personnel
- Planning Lead – development of plans for complex long duration response, maintain information and response incident action plans for extended operations
- HSE (Safety) Lead- advise and support with safety advice, safety management and regulatory notifications pertaining to the emergency event consequences
- Support Teams – business function support as needed for response to, and recovery from the emergency incident.

### 3.3.3. Emergency Operations Centre (EOC)

The EOC is located in the Central Control Room (CCR).

## 3.4. Emergency Response Operations

### 3.4.1. Emergency Response Protocol

Upon notification of an incident and / or the activation of the DLNG facility emergency siren, where safe to do so, all personnel will convene and stand-by in the designated muster points.

- The Emergency Commander shall determine the need to establish and task the Emergency Response Team.
- The Emergency Commander will consider ERGs / Checklists in determining what actions to undertake in response to and control/stabilization of the emergency.
- FRT will undertake incident containment actions at the emergency scene when it is safe to do so.
- ERGs are included in Appendix N.
- No emergency response actions will be affected without approval of the Emergency Commander and coordination by an On-scene Commander.
- The On-scene Commander shall have overall accountability for responder safety and directing tactical field response activities.

### 3.4.2. Control of Incident

The Emergency Commander shall assume command and control of all incidents occurring on, from facility or have the potential to impact the facility. Mitigation measures employed to protect personnel on the facility are described in the Safety Case.

A quick response in attending to an alarm is essential to establish control and implement measures to prevent the escalation of the incident. Control measures are either:

- Remotely operated equipment such as ESD, fire water monitors and blowdown systems, described in the Safety Case.
- Deployment of the ERT and FRT if it is safe to do so and attend the site (Control Room) and combat the incident.

Remote operation of equipment and co-ordination of the ERT is performed by the Emergency Commander in the CCR (which is located in the Administration and Control Room Building). The CCTV system provides the Command Team with a view of the facility.

Emergency Management Boards will be used by the Emergency Response Team (ERT) to record information to aid in the management of the emergency. Photos of all boards used in managing the emergency must be taken prior to erasing the content. This may require several photos to be taken throughout the response duration. A copy of ERT boards and tools is at Appendix I.

The Emergency Coordinator will give the On Scene Commander an initial briefing which will include a safe route to approach the emergency scene in the event of a loss of containment. The On- Scene Coordinator will then establish a Forward Command Point, monitor site safety, and remain in constant communication with the Emergency Commander and ERT.

### 3.4.3. Emergency Response Operations

The Field Response Team (First Responders), when established shall:

- Assemble in the designated assembly area (Fire Station) or as determined by the On-scene Commander.
- Be briefed on responder safety and tasked as per the directions of the Emergency Commander.
- Designated emergency response vehicle (ERV) drivers will respond to the Fire Station muster point. Alternately, they will contact the On Scene Commander (OSC) if mobilising direct to the Forward Command Post. The OSC will forward the name of the FRT member/s to the EOC for accountability (in the event of a muster).

- For emergencies within the process area, all ERV, including the DLNG facility medical vehicle, the forward command post unless advised otherwise by the On-Scene Commander.
- Undertake response strictly adhering to the Santos emergency response philosophy and as coordinated by On-scene Commander if deployed.
- Work collaboratively with external emergency, medical and security agencies.

**Emergency Commander** – undertake assessment of the emergency situation to determine the response actions to be taken, considering in priority.

- Safety of all personnel
- Environmental impact
- Asset protection and escalation control.

#### **Emergency Coordinator**

- Will affect field tactical operations as agreed and directed by the Emergency Commander.
- Assist the Emergency Commander in the CCR if the Field Response Team is not deployed.

#### **Control Room Supervisor / Panel Operator**

- Shall manage production plant operations as directed by the Emergency Commander.

#### **Communications Officer**

- Will provide constant updates of muster status to the Emergency Commander and On-scene Commander, verifying when all personnel are accounted for.
- Will affect and receive communications on behalf of the Emergency Commander.

#### **Log Officer**

- Will maintain a written log of activities and actions and key information of response actions.

### **3.4.4. Emergency Response Assistance**

The Emergency Commander shall consider the need for external emergency, medical and/or security assistance.

Assistance can be requested from:

- Mutual Aid providers
- Emergency Services
- Police
- Contracted Medical Support Services
- Local Community Support

The Emergency Commander will authorize any request for external support. Requests should be completed as soon as practicable so logistical arrangements can be made to facilitate timely response of equipment and personnel. It is envisaged that initial requests for local support will be undertaken by the ERT with the IMT in Perth completing any subsequent requests or support from agencies or resources located outside Darwin.

The Emergency Commander is responsible for the safety of all external responders and shall collaborate to determine response activities and outcomes.

Any transfer of Incident Control function will be completed in a consultative manner as a result of:

- Santos requesting the emergency services agency to undertake the Incident Control function; or
- The emergency service agency has determined that it is necessary for the agency to assume the Incident Control function so emergency operations can be completed safely in accordance with their statutory responsibilities.

All emergency response actions at the facility will be coordinated and approved by the Incident Controller. A single integrated tactical plan will be developed so all emergency response operations are aligned and incorporate a briefing that identifies:

- hazards present,
- safe working practices
- incident response priorities

External response agencies will be coordinated in the field by the On-scene Commander, once handover from the ERT has occurred.

### 3.4.5. Exclusion Zones and Decontamination

The OSC shall undertake a dynamic risk assessment and establish emergency exclusion zones, dependent on the emergency conditions. The distance of the emergency exclusion zones are to be determined by the OSC. Refer to the relevant ERG, checklist or SDS, if available, for guidance or risk assess as appropriate. Once exclusions zones are established, the OSC is to communicate the areas and distances of exclusion zones to the FRT.

Appendix J details the zone control and decontamination procedures.

Emergency Zone	Risk Determination Guidelines
Emergency Location	Area of <b>likely</b> threat to health & safety without controls implemented
Hot Zone	Area of <b>occasional</b> risk to health & safety without controls implemented
Warm Zone	Area of <b>possible</b> risk to health & safety without controls implemented
Cool Zone	Area of <b>unlikely</b> risk to health & safety without controls implemented
Evacuation Zone	Area of <b>remote</b> threat to health & safety without controls implemented

**Exclusion Zone Risk Determination**

Emergency Zone	Personnel Exclusion	PPE Control for Zone
Emergency Location	FRT - only if critically required	PPE mandatory-BA, Fire PPC, Harness etc.
Hot Zone	FRT - if required	PPE mandatory-BA, Fire PPC, Harness etc.
Warm Zone	FRT / Support Members	PPE as assessed for risk
Cool Zone	On Scene Commander/ Medic	PPE as assessed for risk
Evacuation Zone	Emergency Assembly Areas	No additional PPE required

**Emergency Zone Occupation**

### 3.4.6. Medical Emergency Response Plan

Document No. DLNG/HSE/BDG/002 – DLNG Medical Emergency Response Plan

**Procedure Scope** - Equipment for use and ability to provide medical assistance to the Facility for single or multiple casualties including medical evacuation of those casualties.

**Primary Actions** - Medical assistance for the DLNG facility including multiple casualty incidents requiring medical evacuation or referral.

### **3.4.7. Cyclone and Severe Weather Procedures**

Cyclone and Severe Weather procedures are covered under the relevant checklists in Appendix C.

### **3.4.8. Emergency Scene Preservation & Investigations**

Once notified to the workplace regulator - NT Worksafe / NT Electrical Safety of a notifiable incident (serious injury or dangerous incident as per s38 of the WHS(NUL) Regs), the incident scene must not be disturbed so far as reasonably practicable until a NT Worksafe Inspector has arrived or any earlier time that an inspector directs as per s39 of the WHS(NUL) Regs. In order to preserve the scene, the following should be implemented:

- Establish and secure a perimeter that prevents unauthorised access.
- Consider protecting the scene from weather.
- Do not move anything unless absolutely necessary.
- Record any evidence located or moved (i.e., what, where, when and by whom).
- Photograph or video the scene as soon as possible and prior to, during and post where items have been moved.
- When evidence is handed over to any law enforcement agency and prior to leaving the scene of the incident, the most senior DLNG member at the incident scene must ensure a Field Property Receipt outlining what has been handed over and to whom is received from the NT Police Service.

Incidents will be analysed and investigated as per the Incident and Reporting SMS requirements. Any corrective actions and recommendations will be incorporated into the Santos EHS toolbox (hazard and incident reporting tool). A report on the incident, findings and recommendations from debrief are to be generated, communicated and updated to the EHS Toolbox Record.

### **3.4.9. Emergency Termination**

The emergency can be considered concluded when ERT is no longer required, however the Emergency Commander must consider several key issues when standing down personnel. These issues relate to ongoing emergency control, investigation processes and recovery actions, including appropriate resources for key responsibilities. In consultation with the Perth IMT, final information releases must be considered for affected parties and key stakeholder groups.

The Emergency Response Team will advise all internal and external parties that the emergency is over when:

- Any external Emergency Services (if involved) have formally declared the emergency is over and returned control of the affected site back to Santos.
- The Emergency Response Team declares the emergency has been terminated and the site facilities have been returned to a safe condition.
- All people have been accounted for.
- Injured persons have been stabilised and / or evacuated.
- Effective environmental controls are in place.

If a site-wide muster has been activated, the direction is to be given to sound the "ALL CLEAR" tone once the decision has been declared.

### **3.4.10. Debrief**

Debriefing sessions must be held after each emergency to discuss strengths and weaknesses and necessary improvements for incorporation into emergency procedures.

An informal session may be held immediately post incident, and a second formal session will be held at a suitable time. This session should include:

- Recognition of success and what was accomplished well
- Equipment or procedure deficiencies

- Unsafe practices / near miss incidents
- The cause of any injuries sustained
- Unforeseen problems and relevant resolution steps
- Communication / supervision problems
- Environmental considerations
- External problems (i.e. media, landholders, local authority or customers)
- Cause of emergency itself and how to prevent it happening again.

The availability and use of the Santos EAP providers should also be considered during, and post, an emergency response for all affected staff.

### 3.4.11. Refurbishment of Equipment

At the completion of the emergency, the Operations Supervisor is to ensure that all facility resources that were used in the emergency response are recommissioned and returned to operational readiness. For items that are unserviceable, the Operations Supervisor is to put into place or delegate actions to restore the resources to operational readiness through the existing work order process.

## 4. Media & Communication Requirements

### 4.1. Media

All media enquiries are to be directed through to the IMT / CMT.

### 4.2. External Notifications

During an emergency situation it may be necessary to communicate the state/type of the emergency, the possible cause, its effects/consequences, likely duration and impact to DLNG personnel, contractors, potential stakeholders and/or the community. Communication approaches have been developed in collaboration with Northern Territory Police, Fire and Emergency Services (NTPFES). The content of the emergency information will be tailored to suit the interests of the various stakeholder and community groups. The Emergency Commander will liaise with the IMT in relation to any external communication.

Community or adjacent facility notification is required as soon as reasonably practicable once it becomes apparent to the Emergency Commander that an emergency on the DLNG facility is, or has potential to, impact on the health and safety the community or an adjacent facility. The primary means of alerting neighbouring facilities of an emergency involving the DLNG facility is via NTPFES for public alerts and via telephone for adjacent facilities. Up-to-date contact details of neighbouring facilities are located in the DLNG Emergency Contacts Directory.

Further details on external community communication, including pre-formatted messaging is at Appendix K

## 5. Emergency Response Preparedness

### 5.1. OIM Responsibilities

The DLNG Plant Onshore Installation Manager / PIC is responsible for maintaining the preparedness of the DLNG Plant Emergency response, including:

- An up-to-date Emergency Response Plan.
- Ensuring appropriate emergency response equipment and PPE is provided and maintained.
- An annual training and emergency drill program based on major accident events, major incident, likely scenarios and Emergency Response Guides is developed by November annually.
- The drill program is scheduled for each shift.
- The OIM may delegate these responsibilities as appropriate.

## 5.2. Training

All Emergency Response Team personnel will undertake, attain and maintain currency of competency in accordance with Emergency, Incident & Crisis Management Operating Procedure and the Emergency & Incident Management Technical Standard. The table below details the minimum competency requirement for the DLNG ERT.

Role	Training (minimum Competency/Skills)
Emergency Commander (EC)	<ul style="list-style-type: none"> <li>+ PMAWHS511 Manage Emergency Incidents</li> <li>+ PMAOMIR322 Manage incident response information</li> <li>+ Oil Spill Management</li> </ul>
Emergency Coordinator (ECoord)	<ul style="list-style-type: none"> <li>+ PMAOMIR322 Manage incident response information</li> </ul>
Communications Officer (Comms Officer)	<ul style="list-style-type: none"> <li>+ PMAOMIR322 Manage incident response information</li> </ul>
Control Room Supervisor	<ul style="list-style-type: none"> <li>+ PMAOMIR322 Manage incident response information</li> </ul>
Control Room Operator	<ul style="list-style-type: none"> <li>+ PMAOMIR322 Manage incident response information</li> </ul>
Incident Recorder	<ul style="list-style-type: none"> <li>+ PMAOMIR322 Manage incident response information</li> </ul>
On-scene Commander - Onshore	<ul style="list-style-type: none"> <li>+ PMAOMIR322 Manage incident response information</li> <li>+ PMAWHS311 Lead Emergency Teams</li> <li>+ PMAWHS213 Advanced Firefighting</li> <li>+ Hazmat Incident Response</li> <li>+ EHS.015 Breathing Apparatus</li> <li>+ EHS.0101 Enter Confined Space</li> <li>+ EHS.016 Work Safely at Heights &amp; GOTCHA</li> <li>+ EHS.009 Gas Test Atmospheres</li> </ul>
Field Response Team Leader	<ul style="list-style-type: none"> <li>+ PMAWHS311 Lead Emergency Teams</li> <li>+ PMAWHS213 Advanced Firefighting</li> <li>+ Hazmat Incident Response</li> <li>+ EHS.015 Breathing Apparatus</li> <li>+ EHS.0101 Enter Confined Space</li> <li>+ EHS.016 Work Safely at Heights &amp; GOTCHA</li> <li>+ EHS.009 Gas Test Atmospheres</li> </ul>
Field Response Team Member	<ul style="list-style-type: none"> <li>+ PMAWHS213 Advanced Firefighting</li> <li>+ Hazmat Incident Response</li> <li>+ EHS.015 Breathing Apparatus</li> <li>+ EHS.0101 Enter Confined Space</li> <li>+ EHS.016 Work Safely at Heights &amp; GOTCHA</li> <li>+ EHS.009 Gas Test Atmospheres</li> <li>+ HLTAID011 Provide first aid</li> </ul>

**All training requirements above are a mandatory formal qualification for the corresponding emergency response Role. If the qualification is not gained by person then a Stand Alone Risk Assessment may be carried out.**

### 5.2.1. Competent Personnel

There shall be adequate numbers of competent personnel at DLNG to respond to incidents. Personnel with specific incident duties and responsibilities shall be provided with the necessary training to enable them to carry out their incident duties in a safe and efficient manner.

Various forms of training and on the job familiarisation will be provided to ensure that all personnel are familiar with the Emergency Response Plan and their individual roles and responsibilities in connection with the plan's implementation.

The training will include:

- Competency based training by a Registered Training Organisation.
- Competency Based Training Assessment (CBTA) by a qualified Workplace Assessor.
- Regular on-site exercises and drills.

Where a formal qualification has been deemed mandatory, then the qualification shall be obtained prior to a person being assigned the role.

### 5.2.2. Competency Maintenance

The competency of the Emergency Response personnel is maintained through structured Emergency Response training and exercise programs. These are conducted regularly and ensure a range of capability, skills and knowledge are practiced against the Major Accident Events (MAEs) and Major Incidents identified in the DLNG Facility Safety Case and risks identified in Environmental Plans.

To maintain competency all Emergency Response Team personnel shall participate in a minimum of 4 drills/exercises a rolling year (target 6 drills/exercises) of the annual drill and training program. All drills, workshops and exercises report for emergency response are captured and recorded in the **Emergency Response section of EHS toolbox**. This captures every individual's participation in emergency response exercises.

Refresher courses for Emergency Response Training are undertaken at a frequency of every three years from attainment.

In the event that an individual is unable to complete refresher training due to unforeseen circumstances an extension to the training period can be given on approval from the Operations Superintendent.

### 5.2.3. Drills

The DLNG Annual Drill and Exercise program must meet the minimum requirements as stipulated in the DLNG Manual Compliance Register.

On completion of every drill or exercise a debrief meeting is held to identify areas of improvement and agree on appropriate remedial action if necessary. This is to be documented within **EHS Toolbox** and reported to the regulator if requested.

The report will include as a minimum:

- The scope and purpose of the exercise or drill
- Role and responsibility of all personnel involved in the drill / exercise
- Performance Standards
- Post exercise debrief and assessment
- Actions identified and placed into the EHS toolbox reporting system

The OIM or delegate is responsible for determining the exercise schedule and documenting the annual divisional schedule in **DISCOVER**. A new yearly exercise schedule shall be drawn up annually in November.

### 5.2.4. Emergency Services Liaison activities

To maintain local emergency service crews' knowledge of the facility, a familiarization visits for all crews will be conducted each year. Santos will work with agencies in developing plans and other documentation to support emergency agency deployment when required. These plans will be included in joint exercising activities.

The Crisis & Emergency Management Specialist is responsible for maintaining liaison with Emergency Services and Government agencies.

The Emergency Commanders are responsible for coordinating agency site visits.

### 5.2.5. Major Emergency Exercises

Periodically DLNG may be required to participate in a major emergency exercise in conjunction with the Perth IMT. These will be scheduled in advance.

### 5.3. Plan Review

A review of this plan should be conducted once every three years, or after any major incident or after any relevant legislative change.

The plan may be reviewed and updated more frequently to capture improvements and updates including:

- Changes to existing infrastructure and /or protective systems
- Exercise and drill findings and recommendations
- Audit recommendations
- Findings from Regulator inspections
- Changes in the DLNG activity/risk profile
- Changes required to align the ERP with broader Santos company-wide standards and procedures
- Legislative changes.

Regulatory Authorities and Emergency agencies that support DLNG emergency response shall also be included in the ERP review process on matters where their agency has statutory responsibilities for particular hazard types, or their resources may be deployed to support an emergency response at DLNG.

The ERP also supports the conditions for issuance of an Environmental Protection Licence EPL 217-04 from the NT EPA. Under Condition 25, where documents specified in Table 1 (this ERP) are amended materially, the licensee must provide the amended document(s) to the NT EPA, within 20 business days prior to any amendment being implemented, with:

- 25.1 a tabulated summary of the amendment(s) with document references;
- 25.2 reasons for the amendment(s);
- 25.3 an assessment of environmental risk associated with the amendment(s)

### 5.4. Audits

Audits of the DLNG emergency response arrangements will be conducted, with audit scope to be determined by consultation between HSE and the OIM in accordance with the Santos Operations Governance Operations Standard (SMS-OES-OS01).

Any actions arising from audits, drills and exercises are to be entered into **EHS Toolbox**.

## 6. Emergency Response Guides

### 6.1. Emergency Response Guides

- Emergency Response Guides have been developed to inform tactical response actions and detail for the Control Room and Emergency Response Team actions.
- Emergency Response Guides have been developed for scenarios within the DLNG facility as follows:
  - Major Event incident scenarios; and
  - General area Emergency Response Guides / checklists that provide more general information for Emergency Response Team.
- Emergency Response Guides are provided in Appendix N.
- Checklists are in Appendix C.

## 7. Security Incidents

### 7.1. Management of Security Incidents

All security related incidents at the DLNG facility will be managed initially by the EC and ERT.

The Marine and Security Supervisor will initially perform the role of the security SME unless the Santos Senior Security Adviser or external authorities are required to take the lead in the security response.

### 7.2. General Maritime Security Measures

DLNG Port Facility Security Plan (ALL/HSE/SEC/007) covers all Port security control measures.

General considerations and response requirements are covered in the ERGs and Checklists in Appendix N and D

### 7.3. Security Risk Management Plans

The following plans, available through the Marine and Security Supervisor will inform the response to a security related event:

- DLNG Maritime Security Plan
- In the absence of the Marine & Security Supervisor, security advice can be sought through Santos Senior Security Advisor.

## 8. Oil Spill Response

For an unplanned hydrocarbon release, reference should be made to the **Darwin LNG Oil Spill Contingency Plan (1U00-210-ERP-0003)**.

For incidents involving the export pipelines, reference should be made to the **Bayu-Undan Emergency Response Plan ALL/HSE/ER/003** or **BW OPAL FPSO Emergency Response Plan BAF-2136896**.

Checklists directing the initial site response are at Appendix N. These should be read and implemented with the Tactical Response Guides (TRGs) and other guidance from the above OPEPs and ERPs.

## Appendix A - Facility Information

### Facility Details and Contacts

Facility Name	Darwin Liquefied Natural Gas (DLNG)
Operated By	DLNG Operations Pty Ltd (DLNG)
MHF Licence Number	MT-MHF-35388
Physical Address	Wickham Point Road, Wickham Point, NORTHERN TERRITORY, AUSTRALIA GPS: <b>S</b> 12°31'13.81"S <b>E</b> 130°52'15.41
Contact Person – Emergency 24 hr	Operations Supervisor
Contact Details – Emergency 24 hr	Emergency (CCR): (+61) 08 8919 1580 Emergency Commander: (+61) 08 8919 5162 Communications Officer: (+61) 08 8919 5163 DLNG Security Gatehouse: (+61) 8919 1600 DLNG Medic: (+61) 08 8919 1589 / +61 498 317 975
Contact Person – General Inquiry	Operations Supervisor – (+61) 08 8919 1603
Contact Details – Plant Manager	Mark Daley - Mobile: (+61) 0473 935 945
Postal Address	41 Smith Street, Darwin, NT 0800

### Facility Location

The DLNG facility is situated close to the city of Darwin on the north-western coast of Australia at the end of Wickham Point Road on the Middle Arm Peninsula. Wickham Point is located 6 km southeast of Darwin across the harbour on the undeveloped Middle Arm Peninsula and 45 km by road from Darwin through Palmerston by way of the access road to Channel Island gas fired power station. The site area is approximately 65 hectares.

A loading jetty on the western side of Middle Arm Peninsular provides marine access to LNG export tankers and other support vessels.

The coordinates of the **DLNG facility** are **Latitude 12°31'13.81"S and Longitude 130°52'15.41"E**. A facility location map can be seen below.



### Surrounding Land Use

The facility is surrounded on three sides by bushland including Mangrove areas within the Darwin Harbour. An LNG facility operated by INPEX is an operational LNG Plant on land to the south-east. The INPEX Export Pipeline is located to the WEST of the BU/DLNG export pipeline in the Harbour and makes land fall approximately 1km south of DLNG facility. The INPEX export pipeline follows the west side of Wickham point road and cross over to the INPEX facility near the INPEX access road. The Channel Island Power Station is located to the south-west.

No residential development is permitted on Wickham Point. The closest residential locations to the facility are the City of Darwin (7.5 Km to the north over the harbour) and the Palmerston area (approx. 8 km to the east).

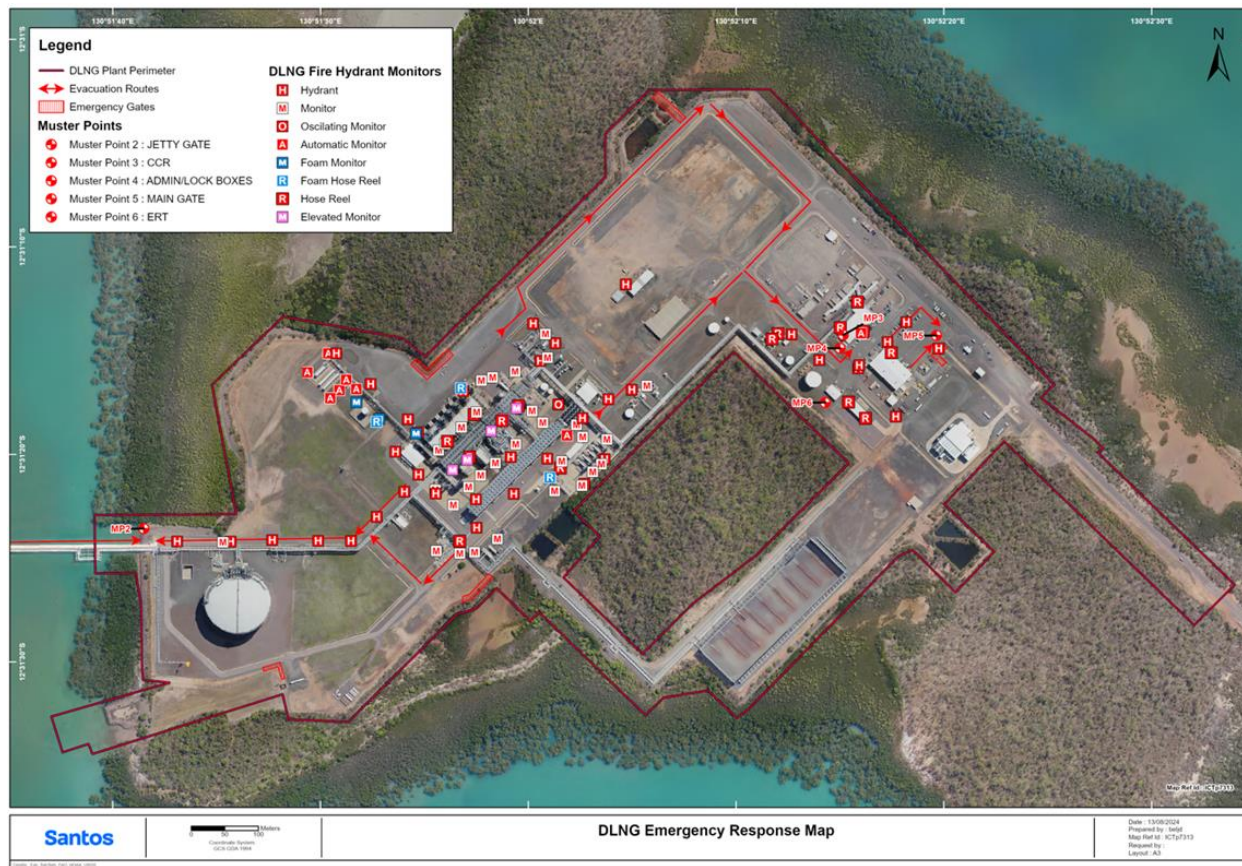


## Facility Population & Occupancy

- + Under normal operations the average site POB will be 120.
- + During an emergency event – only administration building, maintenance building & contracting building will have POB at approximately 40 each building. No POB will be in the operational area.

## DLNG Facility Layout

The principal LNG plant facilities are a single LNG process train, one LNG Storage tank, an LNG loading jetty, ground and elevated flare, the feed gas pipeline and inlet facilities, refrigerant storage vessels, boil-off gas compression, a remote impoundment basin, a utilities area, power generation, a control room, and administration buildings. Space is available for future expansion. A facility layout plan can be seen below.



## DLNG Site Layout

## Process Plant Overview

The LNG Plant incorporates a single process train, occupying a plot measuring approximately 100 m x 250 m to produce LNG. The LNG process plant receives feed gas from the Bayu-Undan and Barossa to Darwin Export Pipeline operated by Santos. The principal process units in the LNG train are CO<sub>2</sub> removal, dehydration and mercury removal, heavies removal and liquefaction. The Optimised Cascade Liquefaction LNG Process technology is used as the basis of the process.

## Inlet Gas Separation, CO<sub>2</sub> Removal & MDEA Regeneration

The feed gas (primarily Methane CH<sub>4</sub>) arrives from the Bayu-Undan platform and Barossa FPSO via a sub-sea pipeline which comes onshore south of the jetty and connects to the inlet receiver which incorporates a Pig receiver. Feed gas passes through an inlet separator to remove any liquids that may be present. The gas is then processed through an activated Methyl diethanolamine (MDEA) gas treating system to remove the carbon dioxide (below 100 ppm), and any trace amounts of sulphur components that may be contained in the gas.

## Dehydration and Mercury Removal

Treated gas from the MDEA system is air cooled and subsequently chilled to around 18°C via high stage propane refrigeration where water and hydrocarbon liquids condense. The chilled gas is dried in a three-bed molecular sieve system to remove any final traces of water. The dry gas is further processed through a two-bed activated carbon system to remove any mercury that may be found in the feed gas. The molecular sieve beds are regenerated with hot dry gas, which is heated in the once through steam generator waste heat recovery units in the Unit 14 gas turbine exhausts.

## Liquefaction

The dry, mercury free gas is subsequently fed to the refrigeration system where it is liquefied as the LNG product. The refrigeration or liquefaction system utilises the Optimised Cascade Liquefaction LNG Process.

Liquefaction reduces the volume to approximately 1/600 of its original gas volume, allowing it to be shipped and stored safely and economically. During liquefaction feed gas is cooled to approximately -160° C and poses a significant cryogenic hazard as LNG.

There are three refrigeration services; propane, ethylene, and methane, which are optimally cascaded to maximise LNG production by utilising the maximum available horsepower of the gas turbine drivers. Propane refrigeration is cascaded to condense ethylene, and ethylene refrigeration is cascaded to condense inlet gas and recycled methane flash gas. Each of the three refrigeration systems uses two 50 percent capacity compressors driven by gas turbines.

## Heavies Removal & NGL Recovery

Cryogenic distillation facilities are provided to remove most hydrocarbons, NGLs, and feed gas. Heavies removal at the start of Unit 15 is required to optimise cooling and condensing in the refrigeration system. The NGLs recovered are stabilised and then stored on site for sale to local markets. (NGL Storage and take-off Area 2)

## Utilities Description

Generally, the LNG facility is self-sufficient as far as utilities are concerned. Most of the utilities consumed in the LNG facility are produced within the limits of the plant. Likewise, most of the waste produced in the LNG facility is treated within the limits of the plant. Water is the main imported utility.

The **Flare and Relief System** (Area 3 in Figure 3.2.) disposes of hydrocarbons and emergency vents from the process units. The system is composed of several parts; a wet flare to collect and burn streams which may contain water vapour or liquid hydrocarbons, a dry flare to collect and burn streams which could be too cold to combine with streams that contain moisture, and a marine vent to dispose of excess methane vapour from the storage and loading system.

The **Refrigerant Storage System** (Area 4 in Figure 3.2.) provides storage volume for refrigerant make- up to the process as well as de-inventory volume for the process loop during maintenance.

**Miscellaneous Storage** is provided for several other fluids used by or available to the process. Diesel fuel, lube oil and cooling water are used for operating the process equipment.

A two-pressure Fuel Gas System is provided to supply the high-pressure users such as the refrigerant turbines and power turbines and the low-pressure users such as the fired heaters and flares.

**Power Generation** (Area 5 in Figure 3.2.) The plant power requirements are met by onsite utilising five (5) "gas turbine" driven generators. Four (4) are required for the expected plant load, the fifth is required during ship loading. A standby diesel driven black start generator is provided with enough power to start up one of the five turbine generators in addition for supplying other emergency power. This additional power is enough for a safe and orderly shutdown and operation of critical utilities as well as for bringing the facility back on-line.

**External power** is supplied by high voltage power lines on Wickham Road. Installed during the construction phase, some non-operational functions on the site are powered from this external source. The power supply follows the east and north boundaries of the facility and feeds into a transformer / electrical switchboard.

Isolation point is a pole fuse located east of the Guardhouse. DLNG also has the ability to run minor operational equipment from PWC supply without running site power generation equipment.

The **Fire and Safety System** is a comprehensive system comprising of several main components. The primary system is the firewater system which includes water storage, a pumping facility, and an underground distribution loop. The distribution includes hydrants, monitors, deluge systems and sprinkler system. Portable hi-expansion foam generators for the LNG impoundment area are provided. Combustible gas and hazardous gas detection systems as well as low temperature detectors are incorporated into the layout design to facilitate rapid response to any uncontrolled release of dangerous materials.

The plant layout philosophy maximises the use of passive protection in the form of equipment spacing and drainage of possible liquid spillages away from critical equipment. Active measures such as fire and gas detection, a fire water system and over-pressure protection have been included in the design. Mobile equipment throughout the facility for ERT use will complement fixed protection systems.

A **Steam System** is used as the heating medium for the amine system. This is a closed loop circulation system with waste heat recovery systems on four of the refrigerant gas turbines exhaust stacks providing the necessary heat. A standby boiler is also available for back-up steam generation if required.

**Compressed air** is supplied from three motor driven air compressors and an emergency diesel driven compressor. The air is cooled and dried to a  $-40^{\circ}\text{C}$  dewpoint.

**Nitrogen** is provided (99.95% pure) from a package unit which includes a pressure swing absorption (PSA) production unit with independent liquid nitrogen storage and vaporisation for header pressure maintenance.

## Water System

**Freshwater/Potable Water** is supplied from NT Power and Water (PAWA) via a 10-inch pipeline on Wickham Point Road. Isolation point is on the south-west side of the gate house.

**Drinking Water** is supplied from facility treatment of fresh water.

**Fire Water** is supplied from NT Power and Water (PAWA) via a 10-inch pipeline.

## Wastewater

The facility includes Effluent Treatment (Area 6 in Figure 3.2.) which treats the waste liquid streams to acceptable standards. The streams include sanitary waste and waste oil.

The LNG process area has a paved drainage system to remove any spill as quickly as possible to minimise heat flux damage to equipment if an ignition occurs. Two drainage sumps are included in the design – one for the process area and a second for the LNG tank pump out.

Any effluent from the process area drains, KO drums or potentially contaminated storm water is routed to the CPI oil / water separator for onsite processing. Potentially contaminated storm water run-off from the LNG processing area is collected via concrete lined ditches in the Process Area Spill Containment Sump (PASCS). This is sufficient to contain a maximum 10-minute LNG leak from the LNG pumps in the process area that export LNG to the LNG Tank and from one export pump at full capacity. These rundown spill sumps ensure that any spills are contained, and that the escalation risk is minimised in the event of a leak. The CPI oil/ water separator itself is contained in containment tanks and concrete bunding to contain any possible oil spill.

## LNG Storage and Loading

LNG is stored in a conventional double containment storage tank of 188,000 m<sup>3</sup> capacity. The tank has an inner container fabricated from 9 % Ni-steel surrounded by approximately 1 metre of perlite insulation, contained within an outer carbon steel shell. The outermost shell is constructed of pre-stressed concrete wall. A small air gap is maintained between the carbon steel shell and the concrete wall. The inner tank contains the LNG product at its boiling point of  $-161^{\circ}\text{C}$  at a pressure slightly above ambient. No refrigeration is provided, and heat leakage (minimised by insulation) produces a small amount of boil-off gas which is compressed by the Boil Off Gas Compressors and returned to the process.

LNG is held in the storage tank (**Area 7**) until it is transferred to the jetty for loading into marine carriers for export. The LNG is pumped from the tank via pipe work connections through the roofs using eight in-tank pumps to obviate the need for any sidewall penetrations.

## LNG Loading System

Loading Design	Piled trestle/bellows/single platform
LNG Loading Rate	10,000 m <sup>3</sup> /hr
Loading Arms	2 for LNG, 1 for Vapour
Loading Line Length	1.3 km (shore to ship)

## LNG Tanker

Min/Max	125,000 m <sup>3</sup> / 180,000 m <sup>3</sup>
Fill Time	Approximately 14 hours
Turnaround Time	24-26 hours

## LNG Export


LNG is exported from the tank by pumping through a cryogenic pipeline to a loading jetty (Area 8). LNG is transferred by in-tank pumps from the storage tanks during ship loading at a total rate of approximately 10,000 m<sup>3</sup>/hr. The capacity of an LNG ship will be up to approximately 180,000 m<sup>3</sup>. Each loading operation is completed within approximately 14-18 hrs. LNG contained in the ship's cargo tanks is held under similar conditions to the on-site storage tank.

The LNG jetty comprises a trestle nominally 1.3 km long with a conventional 'T' head, supported on an open piled structure. The transfer pipeline is cooled using LNG prior to each ship's arrival. Two liquid loading arms are used to transfer LNG to the ship. A separate transfer arm conveys vapour produced in loading to the shore-based recovery system. The transfer arms are equipped with suitable couplings to allow disconnection in an emergency. Mooring dolphins are used to secure the LNG carriers, which berth starboard side to facilitate emergency departures. Tugs are used whenever an LNG carrier is berthed. Ships will call at intervals of about eight days, depending upon ship capacity and scheduling.

Safety considerations are paramount in the design and operation of the LNG loading jetty and in ship handling procedures, Ship and shore safety systems in the table below are checked before each loading operation, and the plant and ship loading shutdown (SDL) systems are hard wired and linked together. Intrinsically safe radios, and a back-up telephone link, are used for communications between a berthed carrier and the jetty, and VHF radio when the ship is offshore.

## DLNG Jetty load ratings

Maximum vehicle weight on jetty - all inclusive	<b>44 000kg</b>
Maximum point load on concrete	<b>11 000kg</b>
Maximum load on grating	<b>200kg</b>

	<i>Any loads greater than these shall be referred to the Site Engineer</i>
	<b>Foam pumper – can access the DLNG Jetty</b>
	<b>Firefighting Pumper – can access the DLNG Jetty</b>

## Appendix B – Schedule 15 Hazard Substances and Inventories:

The quantities, physical form, containment properties and locations of the hazardous chemicals listed in Schedule 15, Tables 15.1 and 15.2 of the WHS (NUL) Regulation are provided in Table 1 and Table 2 below.

**Table 1 Summary of Schedule 15 chemicals (Table 15.1) present or likely to be present**

Schedule 15 Chemical	Quantity (t)	Physical Form	Largest Containment System			
			Quantity (t)	Temp (°C)	Pressure (kPa(g))	Site Location
Natural Gas, Refrigerated Liquid (UN1972, DG Code 2.1) <sup>1</sup>	93,482	Liquid	92,972	-161	5	LNG Storage Tank (T-2401)
Methane (Feed Gas) (UN1971, DG Code 2.1) <sup>2</sup>	52	Gas	-	-	-	(Units 11-12)
Propane (UN1978, DG2.1) <sup>3</sup>	582	Liquid	179	27	920	Refrigerant Storage (V-2002)
Hydrogen Sulphide	Trace	Gas	Trace	-	-	Highest concentration in Acid Gas Removal (Unit 12)
Mercury (UN2809, DG Code 8, extremely toxic)	<<<.1	Solid	Trace	-	-	Highest concentration in Mercury Removal Beds (Unit 13)

**Notes:**

<sup>1</sup> Comprising LNG storage tanks 92972 tonnes maximum and combined inventory 510 tonnes LNG product in rundown line from Train 1 and loading lines

<sup>2</sup> Comprising combined inventory (feed gas pipeline from beach valve/inlet valve and Units 11-12)

<sup>3</sup> Comprising propane storage vessel (179 tonnes maximum) and combined inventory 403 tonnes propane liquid in Train 1

<sup>4</sup> Barossa-DLNG Feed Gas Pipeline up to inlet weld beach valve (outside DLNG MHF boundary) contains 22086 tonnes methane.

There are also gas cylinders at the DLNG Facility which contain minor quantities of Schedule 15.1 chemicals as follows:

Typically, there are a total of 7 G-sized cylinders of Hydrogen Gas (UN 1049):

- Hydrogen is used at the Laboratory (2 cylinders) and 1 cylinder in storage at the Dangerous Goods Storage Building.
- Hydrogen is also now used as an analyser fuel gas (4 for the Inlet Feed Gas Analysers).

**Table 2 Summary of Schedule 15 chemicals (Table 15.2) present or likely to be present**

Schedule 15 Chemical	Quantity (t)	Physical Form	Largest Containment System			
			Quantity (t)	Temp (°C)	Pressure (kPa(g))	Site Location
Ethylene (UN1962, DG Code 2.1)	310	Liquid	99	-78	313	V-2001 A/B
Hydrocarbon Liquids Not Otherwise Specified (contains natural gas liquids) (UN3295, DG Code 3.1)	520	Liquid	520	43	2	T-2102

**Notes:**

<sup>1</sup> Comprising 2 x ethylene storage vessels (90 tonnes maximum each) and combined inventory 111 tonnes ethylene liquid in Train 1 (111 tonnes)

There are also gas cylinders at the DLNG Facility which contain minor quantities of Schedule 15.2 chemicals as follows:

Typically there is a total of 8 G-sized cylinders of compressed gas primarily methane (UN 1956):

- Compressed gas is used for analyser calibration gas at LNG Storage (1 cylinder) Inlet Facility (2 cylinders), Molecular Sieve (1 cylinder) analysers and at the compressor fuel gas meter (1 cylinder) and 3 in storage at the Dangerous Goods Building.

The locations at which Schedule 15 chemicals listed under Schedule 15, Table 15.1 and Table 15.2 are used and stored are provided in the layout drawing shown below.

**Schedule 15 Chemicals which may occur at the DLNG Facility**

Chlorine gas could be produced in the event of inadvertent mixing of sodium hypochlorite and either sulfuric acid or hydrochloric acid at the water treatment facility. Chlorine is classified as a Schedule 15 chemical under Schedule 15, Table 15.1 of the *WHS (NUL) Regulation*.

Sulfur dioxide gas could be produced in the event of inadvertent mixing of sodium bisulfite or sodium metabisulfite and either sulfuric acid or hydrochloric acid. Being toxic, sulfur dioxide gas is classified as a Schedule 15 chemical under Schedule 15, Table 15.2 of the *WHS (NUL) Regulation*.

Production of either chlorine gas or sulfur dioxide gas has been assessed as a rare event, therefore neither chlorine gas nor sulfur dioxide is considered to be “present or likely to be present” with regard to the notification requirements of the *WHS (NUL) Regulation*.

The location of the water treatment facility is provided in the layout drawing shown below.

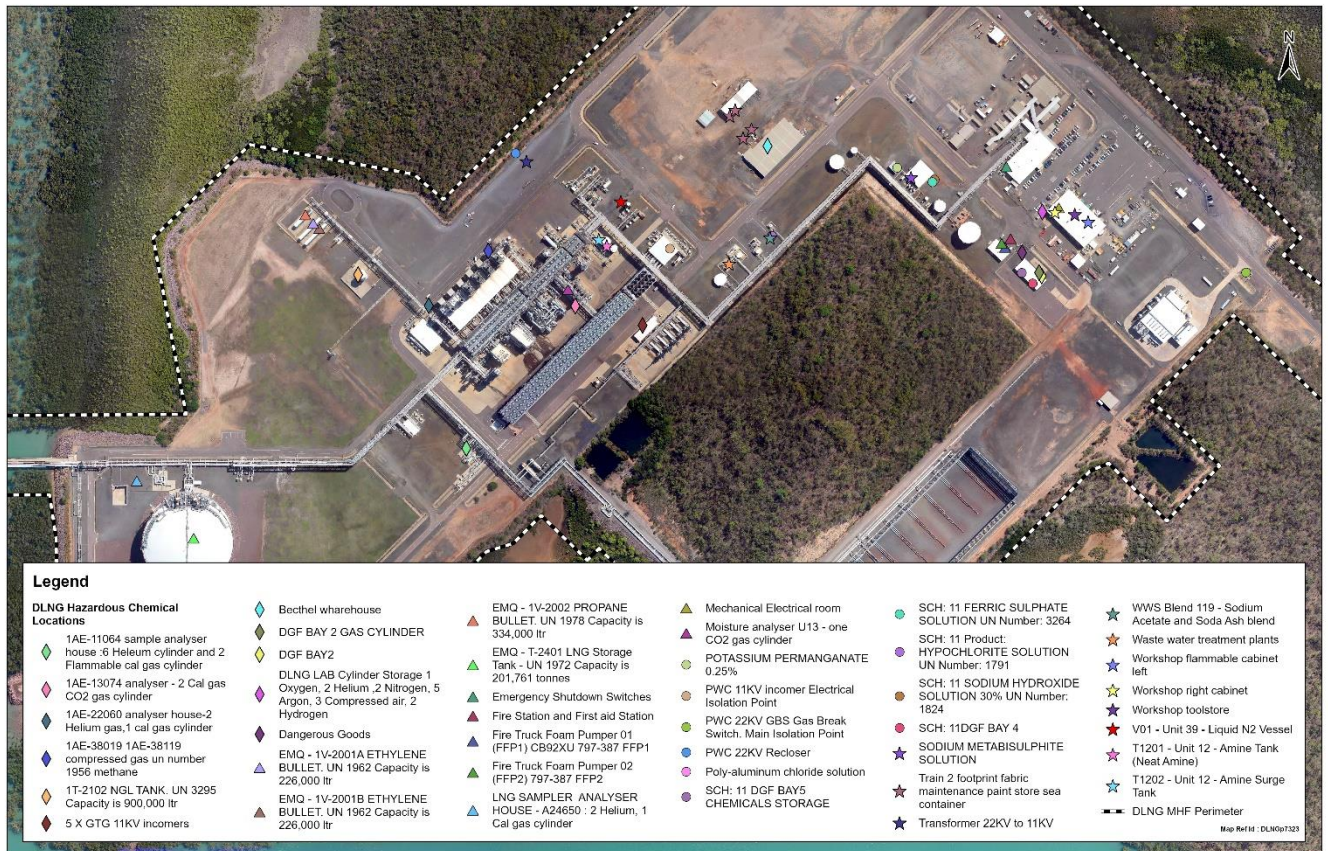
**Other Hazardous Chemicals present or likely to be present**

A number of substances are present at the DLNG Facility that are not classified as Schedule 15 chemicals under the *WHS (NUL) Regulations* but due to their toxic, flammable or combustible properties are considered hazardous. To provide an appreciation of the other hazardous chemicals, the type, quantities and locations are provided in Table 3 below. These chemicals are managed in accordance with the relevant Australian or international standards for handling, storage, transport, use and disposal and/or supplier’s recommendations and in compliance with local regulations.

**Table 3 Summary of other hazardous chemicals present or likely to be present**

Schedule 15 Chemical	Quantity	Physical Form	Largest Containment System			
			Quantity	Temp (°C)	Pressure (kPa(g))	Site Location
Diesel Fuel	42.4T	Liquid	26.6 T	56	Atm.	T-2110 (Unit 31), T-2101 (Unit 21), Day tanks (Unit 33/35)
Neat aMDEA	416T	Liquid	416 T	27	Atm	T-1201 (Unit 12)
Liquid Nitrogen	75.8 T (94 m <sup>3</sup> )	Liquid	75.8 T (94 m <sup>3</sup> )	-200	1100	X-3902-X01 V-01 (Unit 39)
Molecular sieve adsorbent	142 m <sup>3</sup>	Solid	0.21 m <sup>3</sup>	-	-	V-1302 A/B/C (Unit 13)
Mercury removal absorbent	64 m <sup>3</sup>	Solid	0.21 m <sup>3</sup>	-	-	V-1304 A/B (Unit 13)
BIOC77352A	270 Kg	Liquid	15 Kg Pale	27	Atm	Unit 36/Storage
Sodium hypochlorite	1000 L	Liquid	1000 L IBC	27	Atm	Unit 29
Sodium Metabisulphite	2000 L	Solid	1000 L IBC	27	Atm	Unit 36
Sodium Metabisulphite (40%)	1000 L	Liquid	1000 L IBC and feeder tank	27	Atm	Unit 36
Sodium Hydroxide	21 Kg	Solid	21 Kg	27	Atm	Unit 34
Sodium Hydroxide	20 L	Liquid	5L Pale	27	Atm	Unit 35
Sodium Hydroxide	1000 L	Liquid	1000 L IBC	27	Atm	Unit 36
Sulfuric Acid	5L	Liquid	5L	27	Atm	Unit 36
Poly Aluminium Chloride	2000 L		1000 L IBC	27	Atm	Unit 29
Sodium Acetate / Sodium Carbonate	1000 L	Liquid	1000 L IBC	27	Atm	Unit 36
Potassium Permanganate mixer (0.25%)	4000 L	Liquid	1000 L IBC	27	Atm	Unit 36 X-3601
Nalco PC1611T	399 Kg	Liquid	21 Kg	27	Atm	DG Storage
Ferric Sulphate	4000 L	Liquid	1000 L IBC	27	Atm	Unit 36
Elimin-Ox		Liquid				Unit 36
Carbon Dioxide	Trace	Gas				Highest concentration in Acid Gas Removal (Unit 12/19)

The locations at which other hazardous chemicals are used and stored are used and stored are provided in the layout drawing **Error! Reference source not found.**



Hazardous Chemical Locations & Water Treatment Plant Locations

## Appendix C - DLNG Defined Events

### DLNG Defined Events

The Darwin LNG facility risk register and Safety Case has identified and developed consequences and controls for the most likely and credible threats.

The following scenarios are deemed as credible threats and emergency procedures are in place:

#### Medical Emergency

Serious Injury/ Illness,

Fatality

Multi-Casualty incident

Refer Document DLNG/HSE/BDG/002 for Medical Emergency Response plan

#### Fall from Jetty

#### Marine Vessel Incidents:

LNG Tanker Emergency during Transit in Darwin Harbour, Vessel Collision / Allision and Vessel Fire/Explosion/Vapour Release at Berth

#### Severe Weather

Cyclones

Severe Storm

#### Unauthorised Acts

Criminal Acts, Unauthorised Vessel Approaching the Jetty, Unauthorised Entry to Site, Sabotage/Bomb Threat, and Terrorism / Piracy Acts

#### H<sub>2</sub>S (Hydrogen Sulphide) Alarm

#### Radiation Incident

#### Fire or Explosion

#### Hydrocarbon Release

Hydrocarbon Release in Process Areas

Hydrocarbon Release from Export Pipeline

Hydrocarbon Release to Marine

Environment

#### Chemical Spill (HAZMAT)

#### Hydrocarbon Release NT Power and Water Corporation Incident Off Site

The following defined event procedures provide guidance for the Emergency Commander and emergency response personnel to use as a reference guide for the allocation of roles, responsibilities, and tasking.

The procedures are in checklist format and designed so the Emergency Commander (or as delegated by the EC) can review actions implemented and verify that required elements have been completed.

The Emergency Commander is responsible for:

- The safety of all personnel at the facility
- Determine the most appropriate response priorities, tactical methods and application of internal and external resources and personnel to combat and manage the emergency
- Determine other additional actions the ERT/ FRT personnel are required to complete depending on the nature and circumstances of the incident
- Liaise with IMT, Emergency services, agencies, and other resources for the management of the incident
- Coordinate operations, resources, and activities, including isolations or shutdown of plant and equipment as the situation demands in alignment with policies and procedures
- Consider additional resources to manage the incident e.g., notification person, escort, stretcher bearers etc
- Verify an accurate chronological record of events is maintained
- Declare the end of the emergency in consultation with Emergency Coordinator, On Scene Commander and IMT

### CCR Communications Officer Checklist

Darwin LNG – CCR Communication Officer Checklist												
Emergency Satellite: CCR 0011 870 772 396 080, phone code: 1111												
Operations Supervisor: 011 881 621 461 586												
Notification (IMT, Regulator, Neighbours, stakeholder etc)	Notification Timing  C-Consider Notification	Defined event										
		Medical	Fall from Jetty	Marine vessel incident	Severe Weather	Unauthorised access or terrorism	H2S Alarm	Radiation Incident	Fire or explosion	Hydrocarbon release	Chemical Spill	LOC NT P&W
On Call IMT Lead	Immediate Then as required	X	X	X	X	X	X	X	X	X	X	X
Operations Team Lead -	Immediate Then as required	X	X	X	X	X	X	X	X	X	X	X
Bayu Undan CCR – 1140	Immediate Then as required	C		C	X	C	X	C	X	X	C	C
<b>Emergency Services – 000</b> • NT Police <sup>1</sup> • NT FRS • Ambulance	ASAP	X <sup>1</sup>	X <sup>1</sup>	X <sup>1</sup>		X <sup>1</sup>	X <sup>1</sup>	X <sup>1</sup>	X <sup>1</sup>	X <sup>1</sup>	X <sup>1</sup>	X <sup>1</sup>
<b>Neighbours/Third Parties</b> INPEX CCR – 8983 8888 Ops Spvr – 8983 8060 S&EM Advisor – 8983 8007 / 0459 415 099  NT P&W – 1800 245 090	When Possible	C	C	C	C	C	X	X	X	X	X	X
DLNG Facility Port Security Officer (PFSO) – 0409 029 173	Vessel at jetty or security event	X <sup>3</sup>	X <sup>3</sup>	X <sup>3</sup>	X <sup>3</sup>	X <sup>3</sup>	X <sup>3</sup>	X <sup>3</sup>	X <sup>3</sup>	X <sup>3</sup>	X <sup>3</sup>	
Darwin Harbour Master – 8924 7101	PFSO to notify		C	X <sup>3</sup>	X <sup>3</sup>	X <sup>3</sup>						
Darwin Port – 8919 0816	PFSO to notify		C	X <sup>3</sup>	X <sup>3</sup>	X <sup>3</sup>			X <sup>3</sup>	X <sup>3</sup>		
Water Police – via 000	Immediately if required		C	X <sup>3</sup>		X <sup>3</sup>						
Darwin Airport Tower – 7929 4816	When possible						X	X	X	X		
NT Road Report – <a href="https://roadreport.nt.gov.au/home">https://roadreport. nt.gov.au/home</a> Cyclone info – <a href="https://secure.nt.gov.au/alerts-warnings">https://secure.n t.gov.au/alerts- warnings</a>	Prior and after Site Access				X							
DLNG & Darwin notification line – 1800 356 466	IMT to HR – update call line information ASAP	C	C	C	X	X	C	C	X	X	X	C

NT work safe – <b>1800 019 115</b>	For accidents & injuries – within 2 hrs	X <sup>5</sup>	X <sup>5</sup>	X <sup>5</sup>	X <sup>5</sup>	C	X <sup>5</sup>	X <sup>5</sup>	X <sup>5</sup>	X <sup>5</sup>	X <sup>5</sup>	X <sup>5</sup>
NT Electrical Safety office <b>1800 019 115</b>	Electrical voltage incidents only	X <sup>2</sup>							X <sup>2</sup>			
Employee Assistance Program (EAP) Counsellors	Activation – IMT to HR	X	X	X	C	X	C	X	X	X	X	C
<sup>1</sup> NT Police – will need to investigate serious or fatal injuries – will also inform the community of the event. <sup>2</sup> Utilise Maintenance Superintendent for notifications to Electrical Safety Office <sup>3</sup> If a vessel in schedule to berth, berthed at Jetty or about to depart notify DLNG PFSO <sup>4</sup> Environmental notification completed via OPS Section <sup>5</sup> Use DLNG HSE Supervisor or delegate to be site contact												

### Medical Emergency

A fatality or serious injury/illness is an event that requires compliance with legal requirements. A serious injury/illness is defined as a physical condition requires urgent medical intervention and or immediate transfer of the patient to offsite medical facilities.

Where a fatality or serious injury/illness has occurred, immediate notification to the Operations Section Chief (IMT) and the Police should occur. The Operations Section Chief will confirm that an immediate notification to NT Worksafe has been undertaken.

In the case of a casualty where NO SIGNS OF LIFE are evident, first-aid treatment shall continue until such time as the patient is handed over to a qualified medical practitioner.

Refer to Document DLNG/HSE/BDG/002 for Darwin LNG Medical Emergency Response plan.

### Serious Injury / Illness

A serious injury/illness is one that requires urgent medical intervention and/or immediate transfer of the injured or sick person to Royal Darwin Hospital.

Note: A CareFlight Helicopter from Darwin may be dispatched to DLNG depending on severity of the injury and number of casualties. This will be determined by the triple zero call centre at the time of the incident

### Movement of Ambulance whilst the facility is under Muster

When the facility is under muster or evacuation, the Medic shall contact the Emergency Commander to gain approval to move the ambulance from the FAC to the main gate, or area where incident has occurred.

<b>Serious Injury / Illness</b> <b>Document DLNG/HSE/BDG/002 for Medical Emergency Response</b>	<b>Status</b>
<b>Initial Actions</b>	
Confirm Field Response Team is at muster point – FRT & Medic/OFA	
Notify personnel of situation via the PA and radio emergency channel and request to stay away from the incident scene	
Notify the follow: <ul style="list-style-type: none"> <li>+ external emergency services phone 000</li> <li>+ Operations Section Chief and maintain communication</li> <li>+ Onshore Installation Manager</li> <li>+ NT work safe – HSE to be contact point if available</li> </ul>	
<b>Command / Awareness</b>	
Conduct initial briefing detailing Response strategy – Summary, Potential, Plan, Tasks (Action and Resources)	
Consider suspending maintenance and operational activities as appropriate	
Mobilise FRT and Medic/OFA to Forward Command Post	
Liaise with the Medic regarding: <ul style="list-style-type: none"> <li>+ contacting the on-call doctor for advice concerning the injured persons condition</li> <li>+ additional medical emergency response required</li> </ul>	
In consultation with the Medic, determine the medical emergency response required: Medivac or transport off site by site ambulance or defer until arrival of Ambulance	
Confirm with 000 ETA of the ambulance	
Resources available to be an escort for arriving emergency services <ul style="list-style-type: none"> <li>+ Police – front gate or CCR</li> <li>+ Fire and Rescue service – CCR, Forward Command Post</li> <li>+ Ambulance service – CCR, Medical centre or Forward Command Post</li> </ul>	
For multiple injured persons liaise with Medic for: <ul style="list-style-type: none"> <li>+ Resources required at clearing post - personnel, transport, stretchers, medical supplies etc</li> <li>+ Resources required at Medic centre – Personnel, stretchers, medical supplies etc</li> </ul>	
Consider updating the message on the 1800 Hotline, refer Appendix L	<b>Cont over page</b>

<b>Control Actions</b>	
Secure incident scene for investigation – tape bunding, signs and demarcation tape	
Possible information required for investigation: + Incident information and witness statements + Take photographs of scene, as appropriate + Secure any video footage	
Ensure all documentation is recorded and submitted as required	
Consider the reactivation of any suspended maintenance and operational activities	
<b>Recovery Actions</b>	
Conduct debrief for incident, internal and external	
Assist NT Worksafe in their investigation	
Monitor emotional wellbeing of response personnel and implement support processes as required.	

## **Fatality**

Only a qualified Medical Practitioner can officially declare a person to be deceased – On site Medic in liaison with the on-call Doctor or Ambulance officer.

When reporting a fatality, it must be reported that the “PERSON IS SHOWING NO VITAL SIGNS.”

The report should be made by as secure a means as possible, NOT BY RADIO.

The Police will attend any fatality to conduct a coronial investigation. The deceased should not be moved if possible, however the Police may give permission to move the deceased should circumstances warrant this. In addition, NT Worksafe will attend the scene to initiate the incident investigation process in addition to Santos internal investigation procedure.

The scene of the incident where the fatality occurred must not be disturbed except where there is a risk of fire, vapour cloud, chemical hazard or possibility of the deceased's body being damaged or destroyed. The area shall be secured with appropriate equipment such as bunting, screens, coverings, etc. to not only protect the integrity of the area but also to respect the deceased and screen from general view. Where there is a need to move the deceased or to alter the scene to make the area safe, photographs, drawings and documentation must be undertaken to assist the Police and NT Worksafe with their investigations.

<b>Fatality</b> <b>Document DLNG/HSE/BDG/002 for Medical Emergency Response</b>	<b>Status</b>
<b>Initial Actions</b>	
Confirm Field Response Team is at muster point – FRT & Medic/OFA	
Notify personnel of situation via the PA and radio emergency channel and request to stay away from the incident scene	
Notify the follow: <ul style="list-style-type: none"> <li>+ external emergency services phone 000</li> <li>+ Operations Section Chief and maintain communication</li> <li>+ Onshore Installation Manager</li> <li>+ NT work safe – HSE to be contact point if available</li> </ul>	
<b>Command / Awareness</b>	
Conduct initial briefing detailing Response strategy – Summary, Potential, Plan, Tasks (Action and Resources)	
Consider suspending maintenance and operational activities as appropriate	
Mobilise FRT and Medic/OFA to Forward Command Post	
Liaise with the Medic regarding: <ul style="list-style-type: none"> <li>+ contacting the on-call doctor for advice</li> <li>+ classifying injured person priority P4</li> <li>+ estimated time of arrival of Police for investigation, location of P4, removal of P4 due to hazard to environment, pictures to be taken if moving P4</li> </ul>	
Take all steps to preserve the dignity of the fatality (person)	
Resources available to be an escort for arriving emergency services <ul style="list-style-type: none"> <li>+ Police – front gate or CCR</li> <li>+ Fire and Rescue service – CCR, Forward Command Post. Assist with removal of P4</li> <li>+ Ambulance service – CCR, Medical centre or Forward Command Post to assist with confirmation of fatality if medic is not onsite.</li> </ul>	
Consider updating the message on the 1800 Hotline, refer Appendix L	<b>Cont over page...</b>

<b>Control Actions</b>	
Secure incident scene for investigation – tape bunding, signs and demarcation tape	
Possible information required for investigation: + Incident information and witness statements + Take photographs of scene, as appropriate + Secure any video footage	
Ensure all documentation is recorded and submitted as required	
Consider the reactivation of any suspended maintenance and operational activities	
<b>Recovery Actions</b>	
Conduct debrief for incident, internal and external	
Assist NT Worksafe in their investigation	
Monitor emotional wellbeing of response personnel and implement support processes as required.	

## Multi-casualty Incident

A Multiple Injured Persons Incident is classified as an incident that involves more than one person requiring medical evacuation or referral.

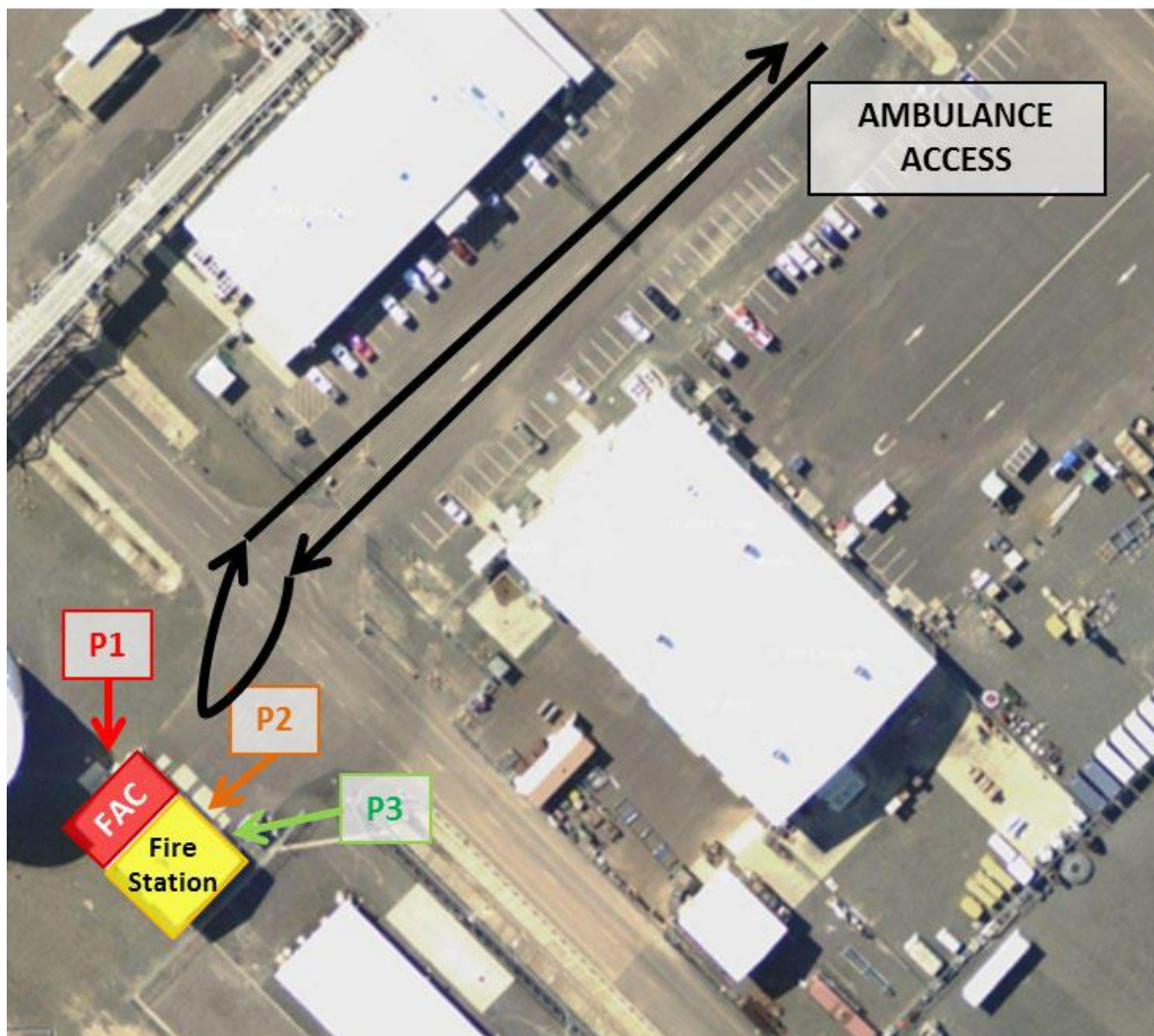
The Medic is responsible for initial sieve triage and if time and resources permit, secondary sort triage. Ref to DLNG/HSE/BDG/002 for Medical Emergency Response for additional information

Triage Area	Casualty Priority	Description
First Aid Centre (FAC)	<b>P1 - Immediate</b>	Casualties require immediate lifesaving procedures
Fire Station	<b>P2 - Urgent</b>	Casualties require definitive treatment within four to six hours
Fire Station	<b>P3 - Delayed</b>	Less serious casualties who do not require treatment within the above times
To be covered and left at scene	<b>P4 - Deceased / Non-Vital Signs</b>	Deceased persons can be declared dead by a paramedic or nurse however Worksafe, police and coronial investigators prefer deceased persons to be left in situ.

The CCP is in Fire Station next to the FAC and has been fitted with industrial fans, bandages, and blankets with ready access to running water, electricity, and further medical supplies from the FAC.



The MEDIC must manage the patients prior to movement off site. A recommendation regarding the need, mode and destination of evacuation will be undertaken by the Medical Director in conjunction with MEDIC and will be based on patients' condition, location, and available logistics. Available logistics can include St John Ambulance, CareFlight helicopter, DLNG Ambulance, DLNG Toyota Prado's and Minibus



## Person In Water / Fall From Jetty

The Jetty facility at DLNG comprises the access jetty, loading dock and mooring dolphins. Due to extreme tidal flows in the Darwin harbour a prompt response is required.

Witness actions for a person falling in water or seeing a person in the water are:

- + Raise the alarm
- + Always keep the person in sight
- + Try and attract the attention of others by shouting “person overboard”
- + Throw a lifebuoy up current of the person or release a life raft if close by
- + Maintain a watch of the person overboard until relieved

<b>Person Falling Into Water</b> <b>Document DLNG/HSE/BDG/002 for Medical Emergency Response</b>	Status
<b>Initial Actions</b>	
Confirm Field Response Team is at muster point – FRT & Medic/OFA	
Active GSA, if required	
Notifications: + external emergency services phone 000 + Darwin Port Harbour Master + Darwin Water Police	
Notify the follow: + Onshore Installation Manager + DLNG PFSO, maybe on vessel + Operations Section Chief and maintain communication + NT work safe – HSE to be contact point if available	
<b>Command / Awareness</b>	
Personnel notified via PA and radio emergency channel – request to stay away from incident scene	
Conduct initial briefing detailing Response strategy – Summary, Potential, Plan, Tasks (Action and Resources)	
Consider suspending maintenance and operational activities as appropriate	
Mobilise FRT and Medic/OFA to Forward Command Post	
Consider updating the message on the 1800 Hotline, refer Appendix L	<b>Cont over page...</b>

Control Actions	
Secure incident scene for investigation – tape bunding, signs and demarcation tape	
Possible information required for investigation: + Incident information and witness statements + Take photographs of scene, as appropriate + Secure any video footage	
Ensure all documentation is recorded and submitted as required	
Consider the reactivation of any suspended maintenance and operational activities	
Recovery Actions	
Conduct debrief for incident, internal and external	
Assist NT Worksafe in their investigation	
Monitor emotional wellbeing of response personnel and implement support processes as required.	

## Marine Vessel Incident

Marine vessels supporting the DLNG facility include LNG tankers, tugboats, and service vessels.

Emergency situations may include:

- Fire / explosion on the tanker
- Propulsion or steering failure on the tanker
- Propulsion or steering failure on one of the tugs whilst berthing is in progress
- + Vapour release
- + Vessel grounding
- + Spills on vessel or to environment (air or water or land)
- + Collision / Allision (Collisions at berth)

The Emergency Commander shall request the Port Facilities Security Officer to assist with the management of any incident involving marine assets. The Marine Superintendent shall liaise with stakeholders to facilitate alignment with marine emergency plans from agency and the vessels involved.

### DLNG Marine Emergency Philosophy

The procedures in this Plan embrace the following guiding principles:

#### Vessel Master emergency responsibilities

- safety of the vessel and all personnel on-board
- every vessel has an emergency response plan for incidents on-board
- emergency response actions to be completed on-board the vessel
- DLNG will aid support the vessel's response actions to protect safety of personnel and DLNG assets.

#### Control of vessel related emergencies

When an incident involving a vessel occurs on the DLNG loading jetty (including any vessel loading infrastructure connected to the jetty), the DLNG DS Emergency Commander is in overall control of the incident and works collaboratively with the vessel Master. The Vessel Master shall remain in control of the vessel's crew in any emergency.

#### Security

**Vessel is berthed or 30 mins either side of berthing** - The PFSO or Delegate must be contact for all Water Restricted Zone (WRZ) or land-based security incidents. For Security incident the PFSO or Delegate will refer to the DLNG Port Facility Security Plan (ALL/HSE/SEC/007) and complete required notification as indicated by MTOFSA (2003).

**NO Vessel berthed** - PFSO or Delegate is notified for incidents occurring in the Water Restricted Zone (WRZ) only

The checklists only contain information relating to the management of the response. Specialist security information is contained in the Security Management Plan and related documents.

## **Fire**

If a fire occurs on a vessel at the berth, the Northern Territory Fire and Rescue Service is the controlling Authority. When the vessel is off the berth within Darwin Port waters, the Darwin Port (DP) will be the lead agency in collaboration with the Northern Territory Fire and Rescue Service, Department of Transport Marine Safety Branch, the vessel Master, and the facility operator (Santos). The DARWIN PORT Harbour Master will make the decision if the vessel is to be removed from the berth or port waters for the safety of the port.

These lead agencies will consult with vessel Master in their emergency response actions.

## **Fire Precautions during LNG loading Marine Spill**

Refer to the **DARWIN LNG OIL SPILL CONTINGENCY PLAN (OSCP)** for spill incidents at DLNG facility.

The Darwin Port is the Controlling authority for the combat of spills within the Port of Darwin under the NT *Darwin Port Corporation Act, 1999*. DARWIN PORT shall be advised of any spill within the port limits and will respond and assess all spills.

Santos is the designated Combat Agency for first strike response to oil spills emanating from the DLNG facility and loading facilities. This includes access to the cooperative arrangements for response to oil spills by the Australian oil and associated industries under the AMOSPlan.

Vessel Masters have a responsibility to maintain and deploy spill containment measures in line with their Ship Oil Pollution Emergency Plan.

## **Standby Tugs**

A standby tug with full fire-fighting capability will be available for immediate response from Fort Hill Wharf to render assistance, within 25mins, whilst and LNG Carrier is located at the DLNG jetty.

The Svitzer Macquarie, Svitzer Stockton, Svitzer Palmerston, and Svitzer Stokes are classed FIF11 with a pump capacity of 2400m<sup>3</sup>/hr with water spray for Firefighting operation involving an LNG vessel or jetty area.

The vessels are equipped with Oil Dispersant and recovery equipment including 2000L of dispersant, a 400L pump, spray arms for the dispersant out to 15 meters and Vikoma boom and skimmer for oily water recovery to on board holding tanks.

## **Workboats**

DLNG does not operate any workboats at the jetty

<b>LNG Tanker Emergency Vessel                      Fire, Explosion, Vapour Release or Vessel Collision                      Document DLNG/HSE/BDG/002 for Medical Emergency Response</b>	<b>Status</b>
<b>Initial Actions</b>	
Initiate GSA and account for all personnel	
Confirm the Field Response Team have mustered - FRT & Medic/OFA	
Notifications: + external emergency services phone 000 + Darwin Port Harbour Master + Marine Safety Branch (DPI)	
Notify the follow: + Onshore Installation Manager + DLNG PFSO, maybe on vessel + Operations Section Chief and maintain communication + NT work safe – HSE to be contact point if available	
<b>Command / Awareness</b>	
Liaise with DLNG PFSO on actions required to manage the incident	
Conduct initial briefing detailing Response strategy – Summary, Potential, Plan, Tasks (Action and Resources)	
Consider suspending maintenance and operational activities as appropriate	
Mobilise FRT and Medic/OFA to Forward Command Post	
Assess all the information to determine response and actions to be taken + Consider potential for escalation / offsite impact. Relay this information to emergency services. Local or Site or External (offsite) impacts + Liaise with ECoor for the situation update, structure/s integrity and status of incident controlled/contained	
Update the message on the 1800 Hotline, refer Appendix L	<b>Cont                      over                      page...</b>

<b>Control Actions</b>	
Secure incident scene for investigation – tape bunding, signs and demarcation tape	
Possible information required for investigation: + Incident information and witness statements + Take photographs of scene, as appropriate + Secure any video footage	
Ensure all documentation is recorded and submitted as required	
Consider the reactivation of any suspended maintenance and operational activities	
<b>Recovery Actions</b>	
Conduct debrief for incident, internal and external	
Assist with external investigation	
Monitor emotional wellbeing of response personnel and implement support processes as required.	

## Severe Weather

### Tropical Cyclone Threat Information

Between November and April, the coastal regions of the Northern Territory are at risk of being impacted by cyclones, however cyclones can occur outside of that period. Tropical lows form in low latitudes in the warmer waters north of Australia and can intensify into tropical cyclones.

Tropical cyclones are often erratic and difficult to forecast accurately thereby requiring sufficient forward planning to prepare for the potential impact on the DLNG facility. Cyclonic gales are when wind speeds are more than 63 km/h (34 knots).

Weather reports may contain information relating to wind speed in knots. 1 knot is 1 nautical mile per hour which is 1.85 kilometres per hour.

The severity of a tropical cyclone is described in terms of categories ranging from 1 to 5 related to the zone of maximum winds. An estimate of cyclone severity is included in all tropical advices issued by the Bureau of Meteorology (BOM).

Category	Strongest Gust (km/h)	Average Maximum Wind (km/h)	Approx. Central Pressure (hPa)	Typical Effects
1	< 125	63 - 88	> 985	Negligible house damage. Damage to some crops, trees, and caravans. Craft may drag moorings
2	125 - 164	89 - 117	985 - 970	Minor house damage. Significant damage to signs, trees, and caravans. Heavy damage to some crops. Risk of power failure. Small craft may break moorings.
3	165 - 224	118 - 159	970 - 955	Some roof and structural damage. Some caravans destroyed. Power failures likely. (e.g., <i>Winifred</i> )
4	225 - 279	160 - 199	955 - 930	Significant roofing loss and structural damage. Many caravans destroyed and blown away. Dangerous airborne debris. Widespread power failures. (e.g., <i>Tracy, Olivia</i> )
5	> 280	> 200	< 930	Extremely dangerous with widespread destruction. (e.g., <i>Yasi</i> )

**Cyclone Information from BOM**

The Northern Territory Emergency Service has adopted the Australian Warning System for cyclone, flood and storm emergencies. There are now three levels of warning. These are:

**Advice (yellow)**

An incident has started. There is no immediate danger. Stay up to date, informed and monitor conditions.

**Watch and Act (orange)**

Conditions are changing and you need to start taking action to protect yourself.

**Emergency Warning (red)**

This is the highest level of warning. You may be in danger and need to take action immediately, **SHELTER NOW**.

The symbols used for the three stages of cyclone warning are:



A **TROPICALCYCLONE ADVICE** is issued by the Bureau of Meteorology if a cyclone or potential cyclone exists and there is a strong indication that winds above gale force (63 km/h) will affect coastal communities within 48 hours. Staff should continue to work normally during a cyclone advice.

A **TROPICAL CYCLONE WATCH** is issued if a cyclone or potential cyclone exists and there are strong indications that winds above gale force (34 knots / 63 Km/hr) will affect coastal or island communities within **24 to 48 hours** of issue. The message contains a brief estimate of the cyclone’s location, intensity, severity category, and movement, and identifies the coastal area that could be affected. Watch messages are updated every six hours and issued to the public. Staff should be sent home or to a cyclone shelter.

A **TROPICAL CYCLONE WARNING** is issued as soon as gales or stronger winds are expected to affect coastal or inland communities **within 24 hours**. It identifies the communities being threatened and contains the Cyclone’s name, its location, intensity (including maximum wind gusts, its severity, and its movement. Forecasts of heavy rainfall, flooding, and abnormally high tide are included where necessary. These are issued at least every three hours and more frequently as cyclone approaches. If in the event DLNG and Darwin is likely to be affected, all direction will come under the local authorities and emergency services. All personnel to take shelter until advised by an official announcement (radio).

The below links can be used for cyclone and weather forecasting.

<http://www.bom.gov.au/>

<https://www.weatherzone.com.au/nt/darwin-daly/darwin>

**ETA to Gales**

The cyclone preparedness and response activities to be undertaken are determined by the estimated time of arrival (ETA) of the cyclone’s gale-force winds at the facility. This is referred to as the **ETA TO GALES**.

The ETA to gales is calculated by the BOM and displayed in the Santos private weather webpage.

Preparedness actions are based on ETA to gales will ensure the facility is prepared for potential cyclone impact to optimise staff safety and asset protection. This process uses information that is specifically tailored to DLNG and produces a different alert classification system than used for community alerts. Consequently, the Santos system **will not be** consistent with cyclone alert status warnings issued by BOM or other authorities.

However, the ETA to gales approach provides an earlier trigger to commence preparedness actions than community alerts.

### **Cyclone Preparedness Actions and Alerts**

A cyclone watch is initiated when BOM identify climatic conditions that have the potential to form into a tropical cyclone that could affect Santos installations. This information is communicated in the BOM website.

The level of alert for DLNG is determined and aligned to the ETA of gales calculations for the facility. Once a potential cyclone has been identified, the following Santos cyclone alerts specify the preparedness and response procedures that are required. The **P**, **T** and **S** system of graduated alerts are in place and specify actions that escalate with an approaching cyclone. See Table below.

### **Determination and Confirmation of Cyclone Alert Status**




The Operations Supervisor will determine the level of cyclone status based on the ETA to gales analysis, review of current weather conditions and operational situation at the facility and submit this recommendation to the Production Manager/ Onshore Installation Manager who will confirm the status of the cyclone alert.

The alert stages can be initiated earlier depending on the extent of work to be completed in the PREPARATION and TIEDOWN alert stage. The critical factor is that all TIEDOWN operations must be completed no later than 8 hours ETA to gales. Non-essential personnel will be required to complete tiedown operations and must be released from the facility no later than 8 hours ETA to gales.

### **Cyclone Alert Stages**

The DLNG Cyclone Alert Stages can be upgraded at the discretion of the Operations Supervisor. This decision will be based on track and cyclone severity forecast information provided by BOM and may be initiated or upgraded ahead of time where necessary to initiate the next stage of preparation.

**DLNG Cyclone Alert Stages**

Stage & Symbol	ETA to Gales	Definition	Actions
<b>Preparation</b> 	72+ to 48 hours	A cyclone is developing and may affect DLNG.	Preparation work commences.
<b>Tiedown</b> 	48 to 8 hours	There is an increased likelihood that the cyclone may affect DLNG.	Equipment is to be tied down or secured. All tiedown operations are to be completed no later than 8 hours ETA to gales. Liaise with Harbour Master if Tanker in berth No later than 8 hours ETA to gales, non-essential personnel released from site.
<b>Shelter</b> 	Inside 8 hours	Local cyclone threat is imminent. Wind speed will progressively increase.	<b>PHASE 1</b> All personnel move to sheltered area. If winds permit, Emergency Commander may allow staff to leave shelter area for short periods to complete specific tasks. <b>PHASE 2</b> No personnel to be outside shelter area. <b>PHASE 3</b> When winds have abated, Emergency Commander may release personnel to leave shelter area and undertake inspection to assess damage. Only completed when personnel safety is not compromised.
<b>Return to Work</b>	Winds have abated		The cyclone has passed. All work sites have been inspected and there are no hazards to the safety of returning personnel. Cyclone status is still being monitored.

### **Cyclone Alert Downgrading and Return to Work**

Due to the irregular and generally unpredictable behaviour of cyclones, it may be necessary to temporarily downgrade the cyclone warning status from 'SHELTER' to 'TIEDOWN' or 'PREPARATION.'

A 'RETURN TO WORK' status can be issued after the cyclone has passed and all work sites have been inspected to ensure there are no hazards to the safety of returning personnel.

After a RETURN TO WORK status has been issued, a constant watch on the path of the cyclone shall be maintained. Cyclones can change direction including sharp turns and loops that could pose further threat and require cyclone alerts to be reinstated or upgraded.

### **Marine Preparedness**

The Bureau of Meteorology issues a **TROPICAL CYCLONE WATCH** when a tropical low or a cyclone is located within the Northern Territory forecasting district, but not expected to bring gale force winds to the Darwin area within the next 24 hours. This watch will be issued by radio, Coast Radio Darwin (VKD) and television stations. If this Tropical Cyclone Watch is issued, the LNG Vessel Master will be contacted by the Terminal Representative and/or Darwin Port to inform him of the cyclone watch status.

If the vessel is in Darwin Harbour at the time, its Master is required to secure the vessel for sea, have engines and crew on one-hour notice and maintain continuous watch on VHF channels 16 and 10 (Port operations), as well as VKD Coast Radio Darwin (operated by the Darwin Port).

If the cyclone is expected to cause gale force winds in the Darwin area within the next 24 hours, the Bureau of Meteorology issues a **TROPICAL CYCLONE WARNING**. Any significant changes or developments will be broadcasted in "Flash" warnings to attract attention. Updated warnings will be issued every 3 hours and repeatedly broadcasted. The Harbourmaster will direct all port operations.

When a **TROPICAL CYCLONE WARNING** has been issued, the LNG Vessel Master will be informed by the Terminal Representative and/or Darwin Port and will be instructed to depart for sea beyond port limits. The LNG Vessel Master will manoeuvre to keep safe and clear from the cyclone outside the port limits until such time as the Port is re-opened by the Harbourmaster.

### **Plant Preparedness**

Prior to cyclone season DLNG shall be inspected and maintained in a state of cyclone preparedness. All unnecessary equipment and materials removed from site and stored securely. Any new equipment brought on site must be appropriately cyclone secured or readily able to be tied down if required if Cyclone Alerts are declared.

All DLNG scaffolds to remain erected and in service during the Australian tropical cyclone season (November 1<sup>st</sup> – April 30<sup>th</sup>) are to be managed as outlined in DLNG-HSE-PRO-019 Working at Heights, Rope Access, and Scaffolding Procedure h) Attachment 7 Cyclone Scaffold Management Guideline.

The DLNG facility has been designed to withstand the worst weather conditions likely to occur. Therefore, it is intended that these facilities shall remain partially manned by Operations Personnel during cyclonic conditions.

**Normal Operations Manning:**

	Dayshift		Nightshift
+	Operations Supervisor	+	Operations Supervisor
+	2 x Central Control Room Operators	+	2 x Central Control Room Operators
+	5 x Process Operators	+	5 x Process Operators
+	1 x Permit Authority		
+	2 x Maintenance Supervisors - Electrical and Mechanical		
+	6 x Mechanical technician		
+	4 x E/I technician		

At the onset of the TIEDOWN stage, a forward plan of essential personnel will be developed by the Operations Supervisor.

This plan shall include provision for all nominated essential personnel having sufficient time to prepare and secure their own homes prior to the forecasted cyclone impact. Shift change and the projected path and timing of the cyclone will be considered when determining these essential personnel.

All identified essential personnel will be required to be on site no later than 8 hours ETA to gales.

A skeleton staff of essential personnel will be required to remain on site to maintain plant operation and ESD activities if required.


**Normal Essential Personnel:**


Dayshift / Nightshift	
+	Operations Supervisor
+	2 x Central Control Room Operators
+	3 x Process Operators

Any additional required skill sets for SHELTER phases on top of the normal essential personnel will be determined by the Operations Supervisor in consultation with the DLNG Production Manager/ Onshore Installation Manager during the Tie Down phase.

Once the Essential Personnel have been determined, other Santos personnel may be identified to assist, where possible, the families of personnel who are remaining on site. These nominated personnel shall be identified in consultation with the essential personnel remaining on-site, the DLNG HR Business Partner and the DLNG HSE Advisor.

<div style="display: flex; align-items: center;"> <div style="border: 2px solid red; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin-right: 10px;"> <span style="font-size: 24px; font-weight: bold; color: red;">P</span> </div> <div> <h2 style="margin: 0;">Preparation</h2> <p style="margin: 0; color: #0070C0;">ETA to Gales: 72+ to 48 Hours</p> </div> </div>	Status
<p>Monitor cyclone warnings:</p> <ul style="list-style-type: none"> <li>+ BOM TC Outlook and forecast emails</li> <li>+ Dial into BOM morning and afternoon cyclone briefing</li> </ul> <p>Liaise with Operation Section Chief and Onshore Installation Manager as required</p>	
<p>Consult with the Maintenance Supervisors to determine the amount of scaffold erected on site and the estimated time taken to de-board and secure erected scaffolds.</p>	
<p>Liaise with Control room supervisor to review inventory of food reserves and bedding</p>	
<p>Communicate revised cyclone information as it is issued by BOM via email and radio to personnel on site</p>	
<p>Liaise with Vessel Master to ensure Darwin Port have communicated the requirements for the Vessel. Note loading will continue in a watch stage until notified by DARWIN PORT that the vessel is to leave the harbour or the captain of the vessel requests loading to be terminated</p>	
<p>Update the message on the 1800 Hotline, refer Appendix K</p>	
<p>Review TIE DOWN checklist</p>	

<div style="display: flex; align-items: center; justify-content: space-between;"> <div style="text-align: center;">  </div> <div> <p><b>Tie Down</b> ETA to Gales: 48 to 8 Hours</p> </div> </div> <th style="background-color: #FFD700;">Status</th>	Status
<p>Monitor cyclone warnings:</p> <ul style="list-style-type: none"> <li>+ BOM TC Outlook and forecast emails</li> <li>+ Dial into BOM morning and afternoon cyclone briefing</li> <li>+ Monitor category of cyclone and projected path to determine necessity for personnel evacuation</li> </ul> <p>Liaise with Operation Section Chief and Onshore Installation Manager as required</p>	
<p>Confirm actions identified in Preparation phase have been completed</p>	
<p>Initiate site preparations including</p> <ul style="list-style-type: none"> <li>+ Tie down and securing outdoor equipment</li> <li>+ De-board and securing of erected scaffold (Refer h) Attachment 7 – DLNG Working at Height, Rope Access, and Scaffolding procedure</li> <li>+ All personnel advised of cyclone warning status via PA/radio</li> </ul>	
<ul style="list-style-type: none"> <li>+ Determine essential personnel required to remain on site during Shelter Phase.</li> <li>+ Identify and notify essential personnel</li> </ul>	
<p>Communicate revised cyclone information as it is issued by BOM via email and radio to personnel on site</p>	
<p>Management to meet to determine an appropriate time for non-essential personnel to leave site</p>	
<p>Develop a forward plan for Essential Personnel and schedule sufficient off-site time so that they can prepare their homes and families</p>	
<p>Liaise with DLNG Security to ensure preparations are being made for a nominated OFA to remain on site with other Essential Personnel</p>	
<p>Close all loading operations when advised by the vessel master or DLNG Port Facility Security Office or DARWIN PORT, vessel unties and moves to safer location</p>	
<p>Coordinate with Vessel Master and DLNG Port Facility Security Office for the Vessel departure to safe area</p>	
<p>Prior to the initiation of SHELTER stage, ensure all tie-down operations are complete on site</p>	
<p>Update the message on the 1800 Hotline, refer Appendix K</p>	
<p>Review Shelter checklist</p>	

 <b>Shelter</b> ETA to Gales: Inside 8 hours	Status
<b>PHASE 1</b>	
Monitor cyclone warnings: <ul style="list-style-type: none"> <li>+ BOM TC Outlook and forecast emails</li> <li>+ Dial into BOM morning and afternoon cyclone briefing</li> <li>+ Monitor category of cyclone and projected path to determine necessity for personnel evacuation.</li> </ul> Liaise with Operation Section Chief and Onshore Installation Manager as required	
Confirm Tie Down Phase actions are complete	
Confirm all personnel: <ul style="list-style-type: none"> <li>+ Are advised of cyclone status via PA/Radio</li> <li>+ Movements into and out of the plant are complete during this phase</li> </ul>	
<b>PHASE 2</b>	
Ensure all personnel move to and remain in sheltered area (CCR) until storm conditions abate	
No personnel movement outside of CCR	
Update the message on the 1800 Hotline, refer Appendix L	
<b>PHASE 3</b>	
Dispatch appropriate personnel to conduct checks of the facilities for damage, including Wickham Point Road in anticipation of RETURN TO WORK stage	
Check all power systems, safety critical systems and communications are not affected	
Coordinate with Vessel Master and DLNG Port Facility Security Office for the Vessel departure to safe area	
Check that roads are safe for traffic use – Call NT road report 1800 246 199  Update the message on the 1800 Hotline, refer Appendix L that plant and road is safe and RETURN TO WORK can be declared  Liaise with IMT Operations Section Chief and Onshore Installation Manager as required	
Review Return To Work checklist	

Return to Work	Status
Winds have Abated	
Monitor cyclone warnings: + BOM TC Outlook and forecast emails + Dial into BOM morning and afternoon cyclone briefing Liaise with Operation Section Chief and Onshore Installation Manager as required	
Update the message on the 1800 Hotline, refer Appendix L	
Dispatch appropriate personnel to conduct checks of the facilities for damage	
Check all power systems, safety critical systems, workshop utilities; administration, fencing, roadways, jetty, bunds, sediment ponds, and communications are not affected	
Confirm that roads are still safe for traffic use – Call NT road report 1800 246 199	
Liaise with Operations Section Chief of status of the facilities.	
Update the message on the 1800 Hotline, refer Appendix L	
Conduct any essential repairs	
Reinstate operational staffing levels when the facility power systems, safety critical systems, utilities and communications are online. Liaise with Operations Section Chief and Onshore Installation Manager as required	

## Severe Storm

Darwin is situated in an area that is subject to severe storms particularly in the period from September through to March. However, storms can occur at any time of the year.

Dangers associated with severe storms are:

- Hail (2cm diameter or more)
- Wind Gusts (> 90 KPH)
- Flash Flood
- Tornadoes
- Lightening

To obtain advanced warning of severe storms, a Weather Mapping System is in place that identifies the location and approach of thunderstorms within a range of 100 nautical miles. This will enable accurate monitoring of the approaching storm to allow for loading operations to LNG tankers to be suspended within a safe time frame and to suspend all outdoor activities involving personnel until the storm passes.

Severe Storm	Status
Commence storm calculations in respect to + Speed + Path of travel + Likely impact onsite	
<b>Initial Actions</b>	
Notify the DLNG PFSO (maybe on vessel) when the storm is estimated to impact site within 30 minutes	
When the storm is assessed as impacting site within 15 minutes issue PA/radio announcement directing + all external operations to cease + all personnel report to an internal safe haven and remain there until notified	
Confirm the Field Response Team are in safe haven and have radio communications	
Notify following personnel and liaise with: + Onshore Installation Manager + Operations Section Chief maintain communications	
<b>Command / Awareness</b>	
Conduct initial briefing detailing + Response strategy – Summary, Potential, Plan, Tasks (Action and Resources)	<b>Cont over page...</b>

Notify emergency services if required 000	
Review the follow once the storm has passed <ul style="list-style-type: none"> <li>+ Confirm Injured person/s and requirements?</li> <li>+ Liaise with ECoor for the situation update, structure/s integrity and status of incident controlled/contained?</li> <li>+ Confirm CCTV footage for damage at the site</li> </ul>	
Mobilise FRT and Medic/OFA to Forward Command Post as required	
Update the message on the 1800 Hotline, refer Appendix L	
<b>Control Actions</b>	
Secure incident scene for investigation – tape bunding, signs and demarcation tape	
Possible information required for investigation: <ul style="list-style-type: none"> <li>+ Incident information and witness statements</li> <li>+ Take photographs of scene, as appropriate</li> <li>+ Secure any video footage</li> </ul>	
Ensure all documentation is recorded and submitted as required	
Consider the reactivation of any suspended maintenance and operational activities	
<b>Recovery Actions</b>	
Conduct debrief for incident, internal and external	
Monitor emotional wellbeing of response personnel and implement support processes as required.	

## Unauthorised Acts

Unauthorised acts can be classified into four distinct areas:

- Unauthorised vessel approaching the Jetty
- Criminal acts - Sabotage, Wilful damage, Violence, Assault, Theft
- Unauthorised entry to the site
- Sabotage/bomb threats
- Terrorism acts

Immediately notify Police communications with concise details as to the type and threat of the act:

- Life threatening acts – via 000
- Non immediate life threat - via Police Communication Centre 131 444

There may be a requirement to hold the suspect in a secure location whilst awaiting the arrival of the Police. Where this is the case, careful observations must be maintained particularly where the suspect is behaving abnormally or where there is a suspicion that the suspect is under the influence of drugs or alcohol.

Port Facility Security Officer (PFSO) to be notified and utilise the Darwin LNG Port Facility Security Plan (ALL/HSE/SEC/007) to complete time critical notifications and documentation that must be completed – PFSO to be utilised to review first reports involving security event/s

Where damage to the facility has occurred, the extent of damage and its effect on the integrity of the facility or its operability must be assessed.

Unauthorised Vessel may arouse suspicion if they:

- Appear to be engaged in unusual activities
- Fail to respond to communications
- Cannot reliably explain the nature and justification of their activities

The Darwin LNG Jetty is located within Darwin Harbour, a traditional recreational fishing area. The Jetty facility comprises an access jetty, loading dock and mooring dolphins. Security of these areas must be maintained, particularly during loading operations

A 500-metre exclusion zone has been established surrounding the Darwin LNG Jetty. Only vessels that have permission from the Darwin Port and Darwin LNG Representative may enter this area and then only under the Permit to Work System.

A flow diagram displaying the security management of unauthorised vessels entering the waterside restricted zone is available at Appendix M. Early notification to the Port Facilities Security Officer (PFSO) or Delegate will allow timely reporting of the incident to meet legislative requirements.

Darwin LNG Port Facility Security Plan (ALL/HSE/SEC/007) contains time critical notifications that must be completed.

**Vessel is berthed or 30 mins either side of berthing** - The PFSO or Delegate must be contact for all Water Restricted Zone (WRZ) or land-based security events. For Security incident the PFSO or Delegate will refer to the DLNG Port Facility Security Plan (ALL/HSE/SEC/007) **and complete required notification as indicated by MTOFSA (2003).**

**NO Vessel berthed** - PFSO or Delegate is notified for events occurring in the Water Restricted Zone (WRZ) only Notifications to be completed within 72 hours

**Criminal Acts**

Where it is suspected that a criminal act has occurred or that a criminal act is taking place, the Emergency Commander must take whatever steps are necessary to control the situation. Safety of personnel must be the priority. Where the situation involves violence or assault, the Emergency Commander may request security staff to restrain the suspect using only the minimum amount of force whilst awaiting the arrival of the Police.

**Unauthorised entry to Site**

Access into the facility is controlled by security swipe card at the only entry point into the facility.

In the event of an unauthorised entry into the Darwin LNG facility, entry into areas, such as the control room building, will be made secure to prevent unauthorised access.

**If there is an LNG tanker berthed at the Jetty, the Port Facilities Security Officer is to be informed immediately. The Port Facilities Security Officer shall complete notifications to security agencies relating to potential for port security breach. (See reporting requirement Appendix M)**

CCTV is used to monitor the location of unauthorised persons whilst awaiting the arrival of the NT Police.

The following guiding principles should be followed:

- + **Observe and Report** – Earliest and accurate reporting of any possible Terrorist or Piracy activities to the Control Room and subsequent immediate notification to the local Police.
- + **Muster and Protect** – Muster and inform all site personnel immediately of the situation
- + **Muster and Evacuate** – If the scenario, time, or conditions dictate the safest option is to either stay in situ or evacuate

**Sabotage/Bomb Threat**

Any persons receiving a sabotage or bomb threat phone call should use the Bomb Threat Checklist at their workstation to assist in gaining as much information from the caller as possible. Do not discuss the threat with anyone other than the responsible persons listed in the response matrix below.

**Response considerations:**

- + Analyse the wording of the threat to guide actions.
- + Notify Police of the threat received (000)
- + Depending on the contents of the message, The Emergency Commander, in consultation with site Security and Police will either muster or evacuate the site in a coordinated manner



## Refer to the Darwin LNG Port Facility Security Plan (ALL/HSE/SEC/007) for Evacuate and Search requirements and processes

### “Example only” Terrorism: Attacks against assets or personnel for political ends.

Typical terrorist events are:

- + Sabotage by bomb or explosive devices, which result in injury, loss of life or damage to infrastructure and production or denial of services
- + Hijacking and hostage siege resulting in lost production
- + Blockage of transport routes and denial of supplies or gas supplies
- + Unauthorised access or use of equipment which results in interruption to production or denial of services
- + Unauthorised access to secure areas or deliberate infringement of exclusion zones
- + Use of industry transport to carry those intending to cause a security incident and their equipment
- + Use of a mode of industry transport or industry facility infrastructure as a weapon or a means to cause damage or destruction
- + Use of a ship to transport explosives, hazardous goods, or weapons

Given the wide range of possible terrorist events that could occur, the response strategies by the DLNG plant ERT should adopt are:

- + **Observe and Report** – Earliest and accurate reporting of any possible Terrorist or Piracy activities to the Control Room and subsequent immediate notification to the local Police.
- + **Muster and Protect** – Muster and inform all site personnel immediately of the situation
- + **Muster and Evacuate** – If the scenario, time, or conditions dictate the safest option is to either stay in situ or evacuate
- + Under the Darwin LNG Port Facility Security Plan (ALL/HSE/SEC/007) the Office of Transport Security, Australian Federal Police, NT Police, the Darwin Port, and the Vessel Master (if applicable) need to be notified. The Port Facilities Security Officer shall be notified of any sabotage or bomb threat or Terrorist event and will complete marine related agency notifications as appropriate

**NOTE:** Should any terrorist event occur, or criminal intruders enter the facility, personnel must not put their own safety or the safety of others in jeopardy.

<b>Criminal Acts - Unauthorised Access</b>	<b>Status</b>
<b>Document DLNG/HSE/BDG/002 for Medical Emergency Response</b>	
<p>IMPORTANT:</p> <ul style="list-style-type: none"> <li>+ Security and FRT to only approach intruder/s if safe to do so</li> <li>+ Never approach if alone – always 2 responders per 1 intruder as a minimum</li> <li>+ Confirm alternative action/s prior to the approaching intruder – plan B</li> <li>+ Never touch or disturb suspect packages or items - Police to assist and control</li> </ul>	
<p>Assess all information, determine actions to be taken</p> <ul style="list-style-type: none"> <li>+ Water incidents ref to WRZ Appendix M</li> <li>+ Site or threats to vessel refer to the Port facility security plan</li> </ul>	
<ul style="list-style-type: none"> <li>+ Consider suspending maintenance and operational activities as appropriate</li> </ul>	
<b>Control Actions</b>	
Secure incident scene for investigation – tape bunding, signs and demarcation tape	
<p>Possible information required for investigation:</p> <ul style="list-style-type: none"> <li>+ Incident information and witness statements</li> <li>+ Take photographs of scene, as appropriate</li> <li>+ Secure any video footage</li> </ul>	
Ensure all documentation is recorded and submitted as required	
Consider the reactivation of any suspended maintenance and operational activities	
<b>Recovery Actions</b>	
Conduct debrief for incident, internal and external	
Assist with external investigation	
Monitor emotional wellbeing of response personnel and implement support processes as required.	

## Hydrogen Sulphide (H<sub>2</sub>S) Alarm

Hydrogen Sulphide (H<sub>2</sub>S) is removed from the process gas stream in the Amine Unit. The unit consists of a CO<sub>2</sub> absorber column (V-1201A) where sour process gas currently contacts lean amine solution, CO<sub>2</sub> and H<sub>2</sub>S are absorbed into the amine solution creating rich amine. The rich amine is then regenerated in the solvent regenerator (V-1202) the overhead gas stream from the regeneration process contains the H<sub>2</sub>S which is then routed to the thermal oxidiser or vented to atmosphere.

This gas has the potential to contain quantities of H<sub>2</sub>S which may be harmful to human life. H<sub>2</sub>S is a colourless gas which is heavier than air and smells of "rotten eggs" in small quantities. In higher concentrations H<sub>2</sub>S nullifies the sense of smell.

H<sub>2</sub>S detectors are fitted on the Thermal Oxidiser (K-1905), Solvent Regenerator Reflux Drum (V- 1206), Acid Gas KO Drum (V-1207) at the vent and the Wastewater Tank (T-2912)

H<sub>2</sub>S local warning lights are fitted at Solvent Regenerator Reflux Drum (V-1206), south of Acid Gas Incinerator (K-1904), Solvent Regenerator Vessel (V-1202), Wastewater Tank (T-2912) and the Acid Gas KO Drum (V-1207).

An H<sub>2</sub>S concentration of 5ppm will set off a H<sub>2</sub>S alarm on the CCR F&G panel and set off the H<sub>2</sub>S warning beacons in the area of the detector. A PA announcement will be made by the CCR operator to advise personnel of the actions to take

### The CCR response to a H<sub>2</sub>S release within the Darwin LNG facility is:

- + **Personnel Safety:** Evacuate the area, raise the alarm, and make a PA announcement to move immediately away from the area
- + **Source of Leak:** Record location and severity
- + **Suppress leak:** Activation of F&G Systems
- + **Eliminating the source of the release:** Isolation and containment

H2S Alarm	Status
<b>Initial Actions</b>	
Confirm activation of H2S alarm	
Initiate GSA and account for all personnel	
Confirm the Field Response Team have mustered - <b>FRT &amp; Medic/OFA</b>	
Notify the following: <ul style="list-style-type: none"> <li>+ External emergency services, if required, 000</li> <li>+ Onshore Installation Manager</li> <li>+ DLNG PFO</li> <li>+ Operations Section Chief &amp; maintain communications</li> </ul>	
<b>Command/Awareness</b>	
Conduct initial briefing detailing Response strategy – Summary, Potential, Plan, Tasks (Action and Resources)	
Mobilise the FRT to Forward Command Post if safe to do so	
Review information and incident potential from CCTV monitoring Facility status/depressurisation and F&G	
Assess all the information to determine response and actions to be taken <ul style="list-style-type: none"> <li>+ Consider potential for escalation / offsite impact. Relay this information to emergency services. Local or Site or External (offsite) impacts</li> <li>+ Liaise with ECoor for the situation update, structure/s integrity and status of incident controlled/contained</li> </ul>	
Notify the follow of any exclusion zones: <ul style="list-style-type: none"> <li>+ Darwin Port Harbour master</li> <li>+ Darwin airport</li> </ul>	
Update the message on the 1800 Hotline, refer Appendix L	
<b>Control Actions</b>	
Secure incident scene for investigation – tape, bunding, signs and demarcation tape	
Possible information required: <ul style="list-style-type: none"> <li>+ Incident information and witness statements</li> <li>+ Take scene photographs as appropriate</li> <li>+ Secure any video footage</li> <li>+ Ensure all documentation is recorded and submitted as required</li> </ul>	
Consider reactivation of any suspended maintenance and operational activities	<b>Cont over page...</b>

Recovery Actions	
Conduct debrief for incident, internal and external	
Liaise with Operations Section chief to request IMT environmental lead to complete notifications or reports for exceedances	
Assist with external investigation	
Monitor emotional wellbeing of response personnel and implement support processes as required.	

## Radiation Incident

All ionising radiation sources brought onto site for specialised tasks such as non-destructive testing (NDT) or pig tracking will be under the control of a licensed contractor and will only be used by trained licensed radiation workers. The contractor shall have appropriate procedures in place for both normal operations and emergency events. Ionising radiation sources shall only be used in controlled areas and appropriately stored when not in use. All measures are to be taken to ensure that there is no potential exposure to other site personnel.

An emergency may arise however in which unplanned, potentially hazardous exposure to ionising radiation has occurred or is likely to occur. These situations may include:

- + Personnel suspected of receiving ionising radiation exceeding the maximum dose limit
- + Physical damage to a sealed source or container
- + Sealed source not returned to its protective container
- + Source lost, stolen or whereabouts unknown
- + Fire or any other incident occurring in an area where radioactive substances are in use
- + A radiation safety and protection plan, which must include emergency procedures, must be prepared by the organisation using the radioactive material and displayed in areas where radioactive substances are used and stored.

To minimise the risk to personnel should an emergency occur, the following must be in place when ionising radiation sources are in use:

- + Trained personnel and emergency equipment are available
- + Specified procedures are in place to bring the situation under control
- + Assessment of doses received because of an incident or accident
- + Access to appropriate medical care/advice for overexposed personnel

In the event of a radiation incident, immediate contact between the licensed contractor and the Emergency Commander must be made. The Emergency Commander shall initiate the appropriate response in accordance with the type of emergency and shall provide support as requested by the licensed contractor.

Responders attending to an incident involving a radiation source must ensure:

- + Time exposure is kept to an absolute minimum
- + Ensure physical shielding between the source and responders
- + Maintain as much distance from the source as is practicable

All personnel who are engaged in the handling of or the use of radiation apparatus of radioactive substances shall comply with the requirements of the following:

- + NT Radiation Protection Act 2009
- + NT Dangerous Goods Regulations
- + WANATL Radiation Management Plan – NORM 7700-294-PLA-0010

Radiation Incident	Status
<b>Initial Actions</b>	
Obtain and confirm information on the Permit - radiation source at the facility	
Initiate GSA and account for all personnel	
Confirm the Field Response Team have mustered - <b>FRT &amp; Medic/OFA</b>	
Notify the following: <ul style="list-style-type: none"> <li>+ External emergency services, if required, 000</li> <li>+ Onshore Installation Manager</li> <li>+ DLNG PFO</li> <li>+ Operations Section Chief &amp; maintain communications</li> <li>+ NT Worksafe (HSE to be contact point if available)</li> </ul>	
<b>Command/Awareness</b>	
<ul style="list-style-type: none"> <li>+ Conduct initial briefing detailing</li> <li>+ Response strategy – Summary, Potential, Plan, Tasks (Action and Resources)</li> <li>+ Hot Zone is 25 meters and approach from up-wind</li> </ul>	
Mobilise the FRT and medic/OFA to Forward Command Post if safe to do so	
Maintain communication with the license’s contractor – radiation source <ul style="list-style-type: none"> <li>+ Requirement to consult with radiation supplier and contractor for response strategies</li> <li>+ Demarcate the hot zone with tape and signage</li> <li>+ Requirement to shut down and depressurise the process system</li> </ul>	
Update the message on the 1800 Hotline, refer Appendix L	
<b>Control Actions</b>	
Secure incident scene for investigation – tape, bunding, signs and demarcation tape	
Possible information required: <ul style="list-style-type: none"> <li>+ Incident information and witness statements</li> <li>+ Take scene photographs as appropriate</li> <li>+ Secure any video footage</li> <li>+ Ensure all documentation is recorded and submitted as required</li> </ul>	
Consider reactivation of any suspended maintenance and operational activities	<b>Cont over page...</b>

Recovery Actions	
Conduct debrief for incident, internal and external	
Liaise with Operations Section chief to request IMT environmental lead to complete notifications or reports for exceedances	
Monitor emotional wellbeing of response personnel and implement support processes as required.	

Important information - answer both questions below to assist in determining the response strategies:

- + Determine if radiation source is secure – information from licensed contractor and other workers
  - **YES** – Confirm its last known location and description of container
  - **NO** – refer to checklist list above
- + Is radiation source within 25m of incident site?
  - **YES** – then refer to checklist above
  - **NO** – demarcate an area of 25m around radiation source location No unauthorized entry

Ensure that the ERT and FRT are advised of radiation source status and location

## Fire or Explosion

Confirmed fire detection shall result in an immediate Muster alarm (GSA) accompanied by a PA / ALL channel radio announcement. Alternative means of initiation include radios and Manual Call Points.

Fixed fire extinguishing systems such as CO<sub>2</sub> will operate automatically in the event of confirmed fire detection. They also have the capability to be manually initiated by the CCR operator

On operation of the muster alarm (GSA), all personnel will proceed to the nearest safe muster point or as designated by the Emergency Commander.

In the event of a fire or explosion, and once the CCR been notified of the incident (by radio, telephone or Manual Call Point or CCTV or Line of Sight detector) they are to activate the fixed fire fighting system, where available.

### **The response to fire within the Darwin LNG facility is:**

- + Personnel Safety – evacuate the area and raise the alarm
- + Source of leak – type of leak, location, and severity
- + Fire Prevention – activation of F&G systems
- + Eliminating the source of the release – isolation and containment
- + Minimising environmental impact – utilise absorbent boom and bags of absorbent granules

Where the fire has been extinguished and the automatic fixed fire system is required to be turned off to allow isolation or salvage or investigation activities, the procedures require that personnel are on Fire Watch duties until the area is deemed safe.

### **Fires within Buildings**

The Field Response Team (FRT) will investigate any report of fires or activation of automatic detection in any facility building if appropriate. Once reports have been received from the Emergency Team Leader, a situation report should be provided to the NTFRS and Police via 000.

The DLNG FRT should only undertake defensive firefighting operations to prevent the spread of fire if possible.

Fire or Explosion	Status
<b>Initial Actions</b>	
Initiate GSA and account for all personnel	
Complete appropriate PA/ALL channel radio announcement	
Confirm activation of ESD and fixed fire systems or initiate manually if necessary	
Confirm the Field Response Team have mustered - <b>FRT &amp; Medic/OFA</b>	
Notify the following: <ul style="list-style-type: none"> <li>+ External emergency services, if required, 000</li> <li>+ Onshore Installation Manager</li> <li>+ DLNG PFO</li> <li>+ Operations Section Chief &amp; maintain communications</li> <li>+ NT Worksafe (HSE to be contact point if available)</li> </ul>	
<b>Command/Awareness</b>	
<ul style="list-style-type: none"> <li>+ Conduct initial briefing detailing</li> <li>+ Response strategy – Summary, Potential, Plan, Tasks (Action and Resources)</li> <li>+ Confirm muster is complete</li> </ul>	
Mobilise the FRT and medic/OFA to Forward Command Post if safe to do so	
<ul style="list-style-type: none"> <li>+ Assess all the information to determine response and actions to be taken</li> <li>+ Consider potential for escalation / offsite impact. Relay this information to emergency services. Local or Site or External (offsite) impacts</li> <li>+ Liaise with ECoor for the situation update, structure/s integrity and status of incident controlled/contained</li> </ul>	
Mobilise the On Scene Commander or FRT to Forward Command Post, IF safe to do so	
+ Mobilise Medic/OFA as required	
Review facility status/depressurisation and F&G systems	
Review CCTV information	
Notify Security that external emergency services are responding, arrange for escort to the incident scene	
Notification of exclusion zones, if applicable <ul style="list-style-type: none"> <li>+ Darwin Port Harbour Master</li> <li>+ Darwin Airport</li> </ul>	<b>Cont over page...</b>

Implement evacuation of site if required – consider weather conditions	
Update the message on the 1800 Hotline, refer Appendix L	
<b>Control Actions</b>	
Secure incident scene for investigation – tape, bunding, signs and demarcation tape	
Possible information required: + Incident information and witness statements + Take scene photographs as appropriate + Secure any video footage + Ensure all documentation is recorded and submitted as required	
Consider reactivation of any suspended maintenance and operational activities	
<b>Recovery Actions</b>	
Conduct debrief for incident, internal and external	
Liaise with Operations Section chief to request IMT environmental lead to complete notifications or reports for exceedances	
Assist with external investigation	
Monitor emotional wellbeing of response personnel and implement support processes as required.	

## Hydrocarbon Release

For an unplanned hydrocarbon release, reference should be made to the **DARWIN LNG OIL SPILL CONTINGENCY PLAN (1U00-210-ERP-0003)**.

Should an unplanned liquid hydrocarbon release refer to the CCR notification checklist and request that Operation Section chief advises IMT Environmental unit lead to complete notifications where:

- + The release has the potential to cause pollution or environmental harm, Northern Territory Environmental Protection Authority (EPA)
- + The release has occurred from the export pipeline, Northern Territory EPA and Department of Industry, Tourism and Trade (NT)
- + The release has occurred from the PWC pipeline, NT Gas Emergency 24 Hour Hotline

### The CCR response to a liquid hydrocarbon/gas release within the Darwin LNG facility or environment is:

- + Personnel Safety – evacuate the area and raise the alarm
- + Source of leak – type of leak, location, and severity
- + Export pipeline gas leaks contact Bayu-Undan CCR Immediately
- + Fire Prevention – activation of F&G systems

### Hydrocarbon Release Process Areas Emergency Team Actions

- + Verify that all personnel have been evacuated
- + Complete rescues (if safe to do so)
- + Bund product that enters sumps and drainage inlets with an absorbent boom
- + Implement containment measures, if possible, with absorbent boom
- + Disperse any gas products emanating from liquid release, water sprays from monitors fixed and mobile
- + Consider the foam application (Hi-Expansion for Propane LNG sumps / B Class foam for banded areas)

### LNG Releases

- + Avoid any contact as LNG has cryogenic properties

### Hydrocarbon Release from Export Pipeline

- + For incidents involving the export pipeline, reference should be made to the **Bayu-Undan Emergency Response Plan ALL/HSE/ER/003** and the **BW Opal FPSO Emergency Response Plan BAF-2136896**.

- + The responsibility for the export pipeline up to the beach valve at Darwin LNG lies with Bayu- Undan / Barossa Operations, however Darwin Port has overall control for response within Port Limits. Darwin LNG will respond and take all necessary actions to support the response effort and minimise risk.
- + The Leak Detection System will indicate to the Bayu-Undan / Barossa CCR Operator and the Darwin LNG CCR Operator that a leak has occurred; however, the detection time will vary according to the size of the leak.
- + The response to an export pipeline leak in the vicinity of the Darwin LNG facilities will be dependent on the proximity to the plant and the degree of threat. If there is a hazard to the Darwin LNG facility and the environment it will be necessary to isolate and if possible, depressurise the pipeline.

### Hydrocarbon Release to Grade or Marine Environment

- + Given the design of the DLNG facility, release of hydrocarbons to water will generally only occur at the jetty end of the facility, and then only when loading operations are taking place or maintenance activities are being undertaken.
- + Risk assessment studies indicate that the most likely event could be the unplanned release of a minimum amount of hydraulic oil to water, refer to **DARWIN LNG OIL SPILL CONTINGENCY PLAN (1U00-210-ERP-0003)**. In order to reduce the effect of this type of release on the environment, a bio- degradable, vegetable oil-based hydraulic oil is used for the loading arms.
- + In respect to heavier hydrocarbons such as diesel, it is not considered that a release to water is likely, however oil spill response equipment is carried on-board tugs should this event occur.
- + A spill response trailer, located at the DLNG Fire Station, is also equipped with additional equipment if required for hydrocarbon release at the site and absorbent boom to act as secondary containment in the drainage ways prior to sediment ponds.

<b>Hydrocarbon Release</b> <b>Process Areas or Export Pipeline to Grade or Marine Environment</b> DLNG OIL SPILL CONTINGENCY PLAN (1U00-210-ERP-0003)	Status
<b>Initial Actions</b>	
Initiate GSA and account for all personnel	
Complete appropriate PA/ALL channel radio announcement	
Confirm activation of ESD and fixed fire systems or initiate manually if necessary	
Confirm the Field Response Team have mustered - <b>FRT &amp; Medic/OFA</b>	
Notify the following: + External emergency services, if required, 000 + Onshore Installation Manager + DLNG PFO + Operations Section Chief & maintain communications + NT Worksafe (HSE to be contact point if available)	
<b>Command/Awareness</b>	
+ Conduct initial briefing detailing + Response strategy – Summary, Potential, Plan, Tasks (Action and Resources) + Confirm muster is complete	
+ Assess information and determine response and actions to be taken + Consider potential for escalation / offsite impact. Relay this information to emergency services. Local or Site or External (offsite) impacts + Liaise with ECoor for the situation update, structure/s integrity and status of incident controlled/contained	
Mobilise the FRT and On-scene commander to Forward Command Post (upwind) if safe to do so	
Review facility status/depressurisation and F&G systems	
Consider and record weather conditions and wind direction	
Notify Security that external emergency services are responding, arrange for escort to the incident scene	
Utilise Darwin LNG OSCP for first strike response actions	
Implement evacuation of site if required – consider weather conditions	<b>Cont over page</b>

Notification of exclusion zones, if applicable + Darwin Port Harbour Master + Darwin Airport	
Update the message on the 1800 Hotline, refer Appendix L	
<b>Control Actions</b>	
Secure incident scene for investigation – tape, bunding, signs and demarcation tape	
Possible information required: + Incident information and witness statements + Take scene photographs as appropriate + Secure any video footage + Ensure all documentation is recorded and submitted as required	
Consider reactivation of any suspended maintenance and operational activities	
<b>Recovery Actions</b>	
Conduct debrief for incident, internal and external	
Liaise with Operations Section chief to request IMT environmental lead to complete notifications or reports for exceedances	
Monitor emotional wellbeing of response personnel and implement support processes as required.	

## Chemical Spill / Gas Release from Cylinders (HAZMAT)

Darwin LNG has a small inventory of chemical products used for the purpose of LNG process and laboratory activities. Safety Data Sheets (SDS) files are kept on all chemicals and provide details on the hazards and handling techniques associated with each chemical and gas. SDSs are found on the Santos intranet HSE - Approved Chemicals page. A hard copy of all SDS for materials used at DLNG is maintained at the Guard House for emergency services use.

The NTFRS is the agency responsible for HAZMAT emergencies in the Northern Territory and should be informed of all HAZMAT emergencies. Life threatening emergencies or urgent assistance requests should be communicated via 000 and other non-life-threatening notifications to NTPFES will be via non-emergency telephone number (08) 8922 1583 (NTPFES Communications Centre).

The establishment of Hot, Warm and Cold zones and Forward Command Post to restrict entry of non-authorized personnel to the incident scene should be one of the first priorities in establishing scene control.

### The CCR response to a chemical spill or gas release within the Darwin LNG facility or environment is:

- + Personnel Safety – evacuate the area and raise the alarm
- + Source of leak – type of leak, location, and severity
- + Fire Prevention – activation of F&G systems
- + Eliminating the source of the release – isolation and containment, if safe to do so
- + Minimising environmental impact – utilise absorbent boom and bags of absorbent granules (kitty litter)

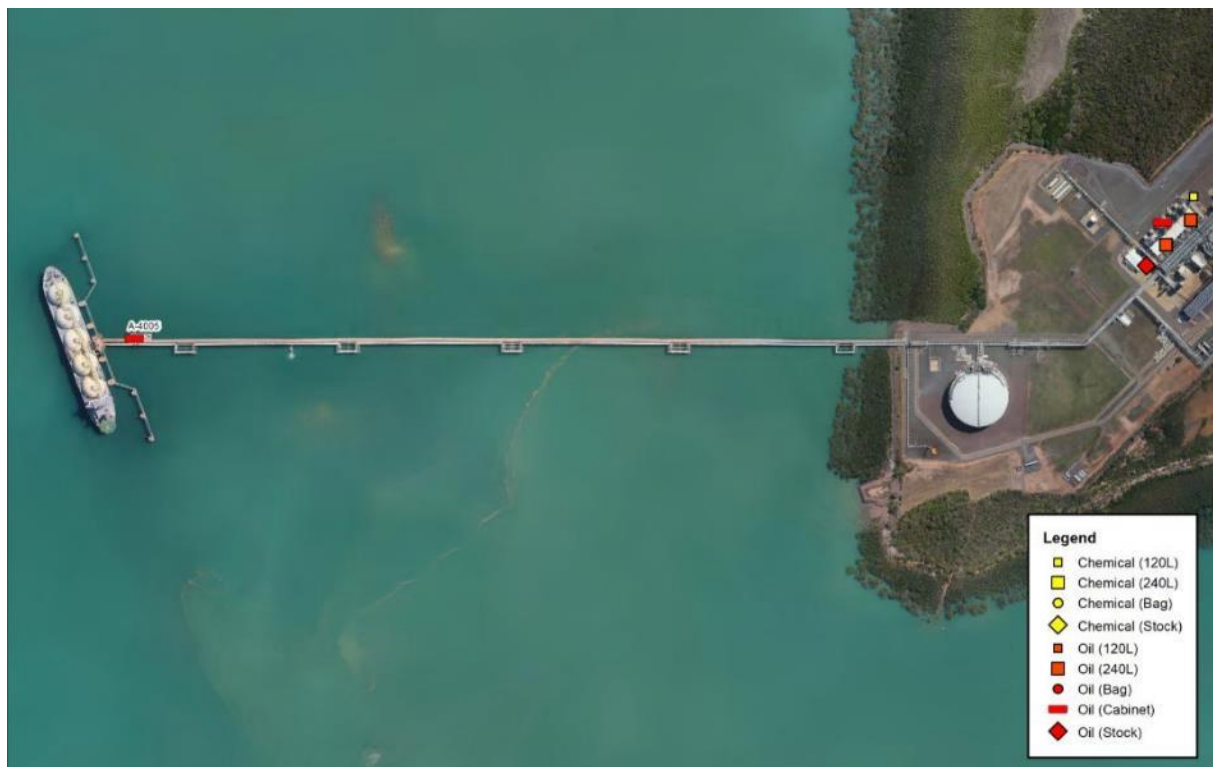
### Spill Kit Location – (Non-Plant)



Plant



Jetty



<b>Chemical Spill / Gas Release from Cylinder (HAZMAT)</b> DLNG OIL SPILL CONTINGENCY PLAN (1U00-210-ERP-0003)	Status
<b>Initial Actions</b>	
Consider GSA and account for all personnel	
Complete appropriate PA/ALL channel radio announcement	
Confirm activation of ESD and deluge systems or initiate manually if necessary	
Confirm the Field Response Team have mustered - <b>FRT &amp; Medic/OFA</b>	
Notify the following: <ul style="list-style-type: none"> <li>+ External emergency services, if required, 000</li> <li>+ Onshore Installation Manager</li> <li>+ DLNG PFO</li> <li>+ Operations Section Chief &amp; maintain communications</li> <li>+ NT Worksafe (HSE to be contact point if available)</li> </ul>	
<b>Command/Awareness</b>	
<ul style="list-style-type: none"> <li>+ Conduct initial briefing detailing</li> <li>+ Response strategy – Summary, Potential, Plan, Tasks (Action and Resources)</li> <li>+ Confirm muster is complete</li> </ul>	
<ul style="list-style-type: none"> <li>+ Assess information and determine response and actions to be taken</li> <li>+ Consider potential for escalation / offsite impact. Relay this information to emergency services. Local or Site or External (offsite) impacts</li> <li>+ Liaise with ECoor for the situation update, structure/s integrity and status of incident controlled/contained</li> </ul>	
Consider Hazmat response (SDS) & PPE requirements <ul style="list-style-type: none"> <li>+ chemical spill suits,</li> <li>+ BA, full face Respirators?</li> </ul>	
Confirm HOT, WARM and COLD zone distances	
Mobilise the FRT and On-scene commander to Forward Command Post (upwind) if safe to do so	
Review facility status/depressurisation and F&G systems	
Consider and record weather conditions and wind direction	
Notify Security that external emergency services are responding, arrange for escort to the incident scene	<b>Cont over page</b>

Utilise Darwin LNG OSCP for first strike response actions	
Implement evacuation of site if required – consider weather conditions	
Notification of exclusion zones, if applicable + Darwin Port Harbour Master + Darwin Airport	
Update the message on the 1800 Hotline, refer Appendix L	
<b>Control Actions</b>	
Secure incident scene for investigation – tape, bunding, signs and demarcation tape	
Possible information required: + Incident information and witness statements + Take scene photographs as appropriate + Secure any video footage + Ensure all documentation is recorded and submitted as required	
Consider reactivation of any suspended maintenance and operational activities	
<b>Recovery Actions</b>	
Conduct debrief for incident, internal and external	
Liaise with Operations Section chief to request IMT environmental lead to complete notifications or reports for exceedances	
Monitor emotional wellbeing of response personnel and implement support processes as required.	

## Hydrocarbon Gas Release – PWC Pipeline

The DLNG to PWC pipeline is divided for context into two Sections, **Portion A** to the isolation valves at the Wickham Receiving Station (WRS) and **Portion B** WRS facility.

### Portion A

The main 250mm pipeline length including buried sections is approximately 2.2km in length and ends at the Santos lease boundary. Emergency supply line is a separate 100mmNB line of 330m approximate length between the inlet valve XV\_11010 and the inlet separator V1101. Portion “A” runs from the beach valve area to the WRS on Wickham Point Road. DLNG ERT and FRT will supply initial response to this section of the pipeline.

### Portion B

Includes all piping and valves from the fence line at the WRS and is the responsibility of NT Gas control. Should an unplanned release occur at the Wickham Receiving Station with the PWC pipeline, the NT Gas Control centre must be notified via the 24-hour Emergency Hot line number **Refer to DLNG CCR Communication checklist for additional notifications**

For an unplanned hydrocarbon release, reference should be made to the **DARWIN LNG OIL SPILL CONTINGENCY PLAN (/1U00-210-ERP-0003)**.

The response to a leak on the PWC pipeline will be dependent on several factors:

- + Proximity to the plant
- + Degree of the leak
- + Threat of an explosion

If there is potential hazard to the Darwin LNG facility within the Operations area, it will be necessary to isolate and if possible, depressurise the pipeline.

### The response to hydrocarbon release from Power and Water Connection (PWC) pipeline is:

- + Personnel Safety – evacuate the area and raise the alarm
- + Source of leak – type of leak, location, and severity
- + Eliminating the source of the release – isolation and containment
- + Minimising environmental impact – isolation of release, disperse with water sprays

Hydrocarbon Release – PWC Pipeline	Status
<b>Initial Actions</b>	
Consider GSA and account for all personnel	
Complete appropriate PA/ALL channel radio announcement	
Confirm the Field Response Team have mustered - <b>FRT &amp; Medic/OFA</b>	
Notify External emergency services, if required, 000 CONFIRM LOCATION IS OFFSITE	
Notify the following: + Onshore Installation Manager + Operations Section Chief & maintain communications + NT Worksafe (HSE to be contact point if available)	
<b>Command/Awareness</b>	
+ Conduct initial briefing detailing + Response strategy – Summary, Potential, Plan, Tasks (Action and Resources) + Confirm muster is complete	
+ Assess information and determine response and actions to be taken + Liaise with ECoor for the situation update, structure/s integrity and status of incident controlled/contained	
Confirm HOT, WARM and COLD zone distances	
Mobilise the FRT and On-scene commander to Forward Command Post (upwind) if safe to do so	
Notify Security that external emergency services are responding	
Implement evacuation of site if required – consider weather conditions	
Notify Darwin Airport of exclusion zones	
Update the message on the 1800 Hotline, refer Appendix L	
<b>Control Actions</b>	
Secure incident scene for investigation – tape, bunding, signs and demarcation tape	
Possible information required: + Incident information and witness statements + Take scene photographs as appropriate + Secure any video footage + Ensure all documentation is recorded and submitted as required	<b>Cont over page</b>

Recovery Actions	
Conduct debrief for incident, internal and external	
Liaise with Operations Section chief to request IMT environmental lead to complete notifications or reports for exceedances	
Assist with external investigation	
Monitor emotional wellbeing of response personnel and implement support processes as required.	



## Incident Offsite

In the case of an incident offsite (either in adjoining land that threatens the facility, or in providing mutual aid to another site), the Emergency Commander shall only approve release of the FRT if an appropriate emergency response capability at DLNG can be maintained and where the safety of the responding FRT is not compromised.

Due to the distance that external emergency services must travel to render assistance in the event of an emergency, there are situations where DLNG FRT personnel may be required to provide first response actions until arrival of the emergency services. Situations where the FRT could be utilised include:

- + Personal injury
- + Severe incident at an adjoining industry facility
- + Fuel spillages from vehicle accidents
- + Provide defensive protection for these events until NT Fire and Rescue Service arrive
- + Car fires

Incident Offsite At BOC or adjoining area or access roads	Status
<b>Initial Actions</b>	
Complete appropriate PA/ALL channel radio announcement	
Confirm the Field Response Team have mustered - <b>FRT &amp; Medic/OFA</b>	
Notify External emergency services, if required, 000 CONFIRM LOCATION IS OFFSITE	
Notify the following: <ul style="list-style-type: none"> <li>+ Onshore Installation Manager</li> <li>+ Operations Section Chief &amp; maintain communications</li> <li>+ NT Worksafe (HSE to be contact point if available)</li> </ul>	
<b>Command/Awareness</b>	
<ul style="list-style-type: none"> <li>+ Conduct initial briefing detailing</li> <li>+ Response strategy – Summary, Potential, Plan, Tasks (Action and Resources)</li> <li>+ Confirm muster is complete</li> </ul>	
Mobilise the FRT and On-scene commander to Forward Command Post if safe to do so	
Notify Security that external emergency services are responding	
Implement evacuation of site if required – consider weather conditions	
Notify Darwin Airport of exclusion zones	<b>Cont over page</b>

Update the message on the 1800 Hotline, refer Appendix L	
<b>Control Actions</b>	
Secure incident scene for investigation – tape, bunding, signs and demarcation tape	
Possible information required: + Incident information and witness statements + Take scene photographs as appropriate + Secure any video footage + Ensure all documentation is recorded and submitted as required	
Consider the reactivation of any suspended maintenance and operational activities	
<b>Recovery Actions</b>	
Conduct debrief for incident, internal and external	
Liaise with Operations Section chief to request IMT environmental lead to complete notifications or reports for exceedances	
Assist with external investigation	
Monitor emotional wellbeing of response personnel and implement support processes as required.	

## Appendix D – Emergency Muster & Facility Evacuation Process

### DLNG Functional Areas

DLNG is operated under the three distinct functional areas listed below:

- DLNG Compound Area (Red Highlighted Area).
- DLNG Operations Area (Blue Highlighted Area)
- DLNG Jetty (Yellow Highlighted Area)



### Accounting for All Persons Present on the Facility

All personnel accessing site must be swiped in by security personnel at the gate house. This will then display on the electronic tag board as being on site. Security will then return the ID badge to the person. The same process must occur when leaving site so that they are recorded on the electronic tag board as being off site. Security will then return the ID badge to the person.

**Note:** Visitors are to sign in and out as per the Onshore Facility Access Control and Vehicle Safety procedure (ALL/HSE/PRO/023).

### Entry to Operations Area

All personnel, including vehicle drivers, entering the DLNG operations area shall swipe their ID card utilising the electronic site access swipe pads located at the plant access turnstile, the rear door of the CCR (alternative entry / exit for operations personnel), and the vehicle plant access gate.

All passengers must exit the vehicle and use the turnstile or CCR rear door; no passengers are permitted to remain in the vehicle upon exiting the operations area.

**Note:** In the event of an emergency, or during severe inclement weather, ERT personnel are exempt from the above, and are permitted to remain in the vehicle upon exiting the operations area. In this case, the driver is responsible for swiping all the passenger's ID cards at the vehicle access gate.

### Muster Points

Designated muster points have been established to ensure the safe and efficient evacuation of personnel in the event of an incident and/or activation of the muster alarm. Muster points are physically separated from process areas and have been assessed for potential hazard impact. While there are potential scenarios that could impair the escape path to a muster point, it is always possible to travel safely in a different direction to an alternative muster point. The designated DLNG muster point locations are:

- Muster Point 1 - Marine Terminal

- Muster Point 2 - Jetty Abutment
- Muster Point 3 – Muster Reader only for Central Control Room (CCR) /
- Muster Point 4 - Operations Access Gate (Located near to the Permit hut)
- Evacuation Point 5 - Main Entrance Gate.
- Muster Point 6 - Fire Station emergency personnel



**Evacuation Routes to Muster Point**

A map showing the evacuation routes to the Muster Points is at Appendix E.

**Muster Responsibilities**

**Emergency Commander**

- Issue instruction for personnel to move from muster points to the evacuation assembly area (if required)
- Shall determine the requirement for facility evacuation.

**Emergency Coordinator**

- Responsible for coordinating and conveying muster related information between the Emergency Commander, Muster Wardens (for building alarm activations) and Security Supervisor.
- Implement the facility evacuation process if directed by the Emergency Commander.

**Security Supervisor**

- Provides a brief to the Emergency Commander and available for tasking as required.
- Coordinate security and site control with the Emergency Coordinator and liaise with law enforcement authorities regarding any necessary security action.
- Be familiar with the requirements of the ERP.
- In the event of a security-based emergency, as appropriate, convey emergency information to the Emergency Commander.
- Maintain a good knowledge of the facility layout.

**Field Response Team**

Field Response Team will mobilise to the Fire station and wait for instructions from the Emergency Commander. When instructed they will:

- Perform the role of muster warden if directed, as outlined in AS 3745 - 2010
- If Safe to do so, investigate the building alarm and report back information as required directed by Emergency Commander or CCR
- If safe to do so, will conduct a search for missing persons when persons do not assemble after muster alarm has been activated.
- May direct personnel from muster points to alternate muster points

**Muster Wardens, Compound area**

- Designated personnel to assist CCR/ERT with the management and wellbeing of personnel at Muster Point 4 and Evacuation Point
- Muster Wardens are responsible for the safety of personnel within their designated muster point
- Follow the direction from Emergency Commander
- Use the Muster warden checklist for full responsibilities

**Muster Warden Checklist**

Muster Warden Checklist – Wear the Helmet	Status
If safe to do so, <ul style="list-style-type: none"> <li>• alert the occupants in the building of the alarm,</li> <li>• collect personnel belongings,</li> <li>• close door to offices/rooms when empty and assemble at muster point.</li> </ul>	
<ul style="list-style-type: none"> <li>• If a person is injured or unable to be moved:</li> <li>• notify the CCR of their position on channel 1 or phone 88 or use muster intercom</li> </ul>	
<ul style="list-style-type: none"> <li>• Confirm that personnel swipe on at muster point</li> <li>• Confirm number of people at muster point, if required</li> </ul>	

<ul style="list-style-type: none"> <li>• Use Muster intercom to communicate with the Emergency Coordinator (emergency only) and inform personnel of relevant information</li> </ul>	
<p>Under direction from Emergency Coordinator</p> <ul style="list-style-type: none"> <li>• Control the movement of personnel away from an area containing specific hazards or risks to designated area or alternate muster point</li> </ul>	
<p>Consider the welfare of personnel at muster point –</p> <ul style="list-style-type: none"> <li>• environmental conditions</li> <li>• shelter</li> <li>• water</li> <li>• rest areas</li> <li>• seating</li> </ul>	
<p>When instructed coordinate the evacuation of personnel at your muster point – initial Evacuation Point is guard house/vehicle search shelter</p>	

**Muster Procedures – GSA Activation**

On activation of a GSA muster alarm all personnel shall move immediately to their nearest safe site muster point. The GSA muster alarm is a series of intermittent beeps on two frequencies and is normally the initial alarm.

The CCR will be monitoring systems and information received to assess if any of the designated muster travel routes have been impaired. If so, they will advise an alternative travel path to the nearest safe muster point by PA announcement and radio.

DLNG also utilises an electronic site access swipe system to record the access of personnel in the three areas listed below and will record and account for all personnel assembling at the designated muster points:

- **DLNG Compound Area** – all administration buildings, maintenance and workshop building, warehouse, welding shed, main island building and temporary buildings at the rear of the administration building
- **DLNG Operations Area** - all areas within the operational area boundary fence including the dangerous goods facility, ground flare, plant areas, beach valve, water treatment area, compressor control room etc. The operational area is accessed through the DLNG Operations Access Gate or turnstile adjacent to administration building

**DLNG Jetty (Jetty and Marine Terminal)**

In the event the muster alarm is activated all personnel including administration, maintenance, and all other external buildings (except DLNG FRT Members) must:

- Prior to moving to muster, personnel will quickly assess their immediate work area and if, for the purposes of assuring safety, need to shutdown machinery, equipment or services will do so in the most expedient manner without compromising their safety.
- Walk to the nearest safe muster point and swipe ID badge over the muster card reader (for muster attendance verification).

- Monday – Friday (0800-1600), DLNG Compound area (muster point 4 and evacuation point) will have designated muster wardens to communicate with CCR/ERT and assist with the welfare of personnel at muster. Muster check sheet table 7.1 All after hours mustering will be managed by the Communications Officer.
- Escape from plant areas can be achieved in almost any direction. Windssocks are provided around the perimeter of the plant to indicate wind direction.
- If personnel are unable to safely escape past a hazard during a major emergency, the site can also be exited via any of six strategically placed emergency gates in the perimeter fence. Opening these gates sends an alarm to the Security Guardhouse.
- In the event of an incident on the jetty that results in personnel isolated from the land, the primary means of egress is on foot or by vehicle off the jetty. If this path is compromised, a secondary means of egress has been provided, with two escape life rafts provided at the berthing dolphins. Ladders at the jetty head have been provided to allow personnel to be taken off by light vessels such as the standby boat or tug, which remain at the Stokes Hill Wharf during loading operations.
- If the muster reader is not operational, stay at Muster Point and contact CCR via intercom system or radio channel 1.
- Vehicles must not be driven to the muster point. Leave at the work location switched off with the keys in the ignition.
- Ship loading will be immediately shut down and ship personnel will move to their muster point as per their vessel ERP. The Marine Specialist on board the vessel will liaise with the vessel Master.
- All mustered personnel must remain at the muster location until the all clear alarm is sounded, or alternate instructions are issued by the ERT. The all clear alarm is sounded when it is declared safe to return to work. This alarm is a constant tone of single frequency.
- At the completion of the site Muster (all clear given) Further information on the emergency will be communicated over the site PA system and personnel with radios should monitor them.

### **ERT and FRT Personnel**

DLNG ERT and FRT Members must ensure their names are recorded on the CCR Emergency Response Board at the beginning of their shift. This is displayed electronically in the CCR

On activation of a GSA, ERT and FRT personnel must report to the assigned location for the emergency role, either the CCR or the Fire Station. Muster readers are located at the Fire Station and the CCR for ERT / FRT personnel to swipe their access cards to record them as being accounted for, otherwise they will still be recorded on the electronic site muster system as being in the last area they swiped their access card.

### **GSA Muster Verification**

Persons who do not report for muster as per this procedure will be deemed as missing. The Communications Officer who monitors mustering numbers will inform the Emergency Commander of any missing personnel. FRT may conduct a search if safe to do so. Emergency Services will be notified immediately if a search for missing personnel is initiated.

Electronic muster processes have an in-built redundancy. If the muster verification processes are inoperable, a manual muster record shall be initiated by the Emergency Commander

### **Muster Procedures - Building Alarm activation**

In the event an incident occurs around the external buildings, the first person who notices the emergency shall notify the CCR on radio channel 1 or dialling 88.

If an automatic building alarm is activated within the Administration, Maintenance building or reported near the temporary office accommodation, the GSA will generally not be initiated, unless this emergency has potential to escalate to plant areas or requires response from the ERT.

Automatic detection systems in buildings will be received in the CCR and the Fire Station and activate the local building emergency warning system and an 'alert' or 'evacuate building' signal will be given. When an 'alert' signal is heard, all personnel in the building will prepare for a possible evacuation. If an 'evacuate building' alarm is heard, personnel shall move safely and assemble at Evacuation Point at the main gate turnstile.

FRT will be mobilised by the CCR when any building alarm activates to investigate and report situation back to the Emergency Commander who will determine actions to be taken

Each Building may have 2 or 3 Muster persons assigned to assist with the management of personnel at Evacuation Point and they will assist CCR/ERT as required (a Muster person chart is located on notice boards)

- If safe to do so, alert the occupants in the building of the alarm, collect personnel belongings, close door to offices/rooms when empty and assemble at Evacuation Point.
- If a person is injured or unable to be moved, notify the CCR of their position on channel 1 or phone 88.
- Shutting doors will limit the spread of the fire and smoke
- The nature of the emergency, areas not searched due to fire or inaccessibility and status.
- For extended events and in consultation with Emergency Commander, consider the welfare of personnel at muster point – environmental conditions, shelter, water, rest breaks, seating
- Notify Guard house of alarm activation and restrict entry and exists from site
- As required, notify all personnel of the building and alarm activated, that personnel from building are mustering, FRT investigating and non-essential personnel to stay clear (via radio channel 1)
- Consider personnel welfare (drinks of water shelter from rain or sun, etc.) at muster point

**Note:** Muster Wardens shall not place themselves or others at risk or attempt to extinguish a fire. Their primary role is to raise the alarm, clear as many personnel as possible and notify the CCR of the situation.

The electronic muster verification system is not intended to verify musters from these local alarms. For these building alarms, designated Building muster personnel will identify personnel that have vacated the building and assemble at the muster point.

FRT will be mobilised by the CCR when any building alarm activates to investigate and report situation back to the Emergency Commander who will determine actions to be taken.

## Evacuation Alarm Response

If the Emergency Commander determines that safety of personnel assembled at muster points may be compromised, an order to authorize the activation of the Evacuation Alarm will be issued.

On hearing the evacuation alarm (an oscillating tone continuously sounding high to low frequency), all personnel (including those personnel in the DLNG Compound Area) must proceed directly to the DLNG entrance gate emergency assembly point and swipe their card on the muster swipe pad.

**Note:** If unsure if the exit route to main gate is safe, contact CCR via the intercom system for further instructions. The CCR will monitor the safety of these travel paths and communicate any potential impairment by radio. Movement from muster points may be done concurrently or in stages as determined by the Emergency Commander.

On activation of the Evacuation alarm, the Emergency Commander shall ensure that 2 muster wardens proceed directly to the Evacuation Point at the front gate. Additionally, one security guard shall immediately proceed to the Evacuation point card reader and have a manual print out from all personnel on site - this is only to be used should the Gallagher system fail.

Security is to ensure all personnel swipe their card at the Evacuation Point card reader prior to proceeding to Emergency gate 1. Once swiped at the Evacuation point muster wardens are to direct all people in an orderly manner through emergency gate 1 for assembly in the vehicle search area and await further instruction.

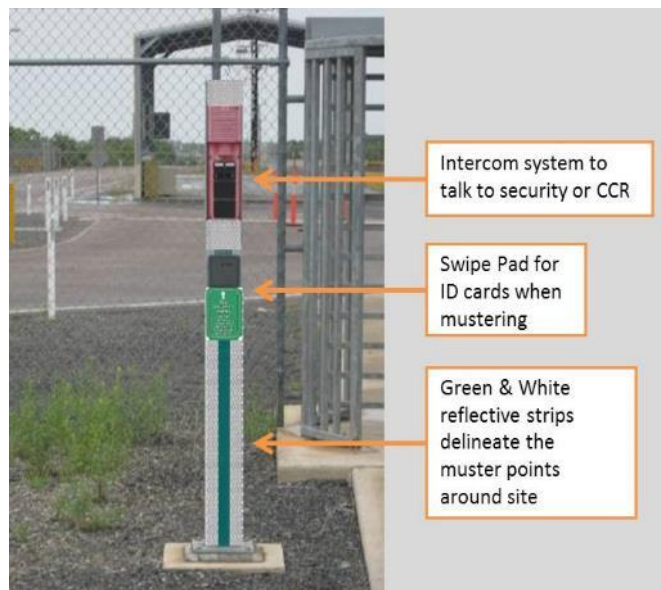
**Note:** No-one is permitted to leave site until instructed to do so by the Emergency Commander. When leaving site all personnel must do so in an orderly fashion and proceed to the offsite staging area that is determined by the Emergency Commander.

Prior to leaving site the CCR Emergency command team shall take photos of DCS as evidence of plant state. The Emergency Commander shall ensure the satellite telephone is taken from the Operations Supervisors office to maintain Communications with IMT. The FRT will establish a Forward Command Post outside the facility as directed by the Emergency Commander. The NT Power and Water gas compound is located 1km east from main gate and can be utilised as a staging area for evacuated personnel if safe to do so.

**Muster Verification Software**

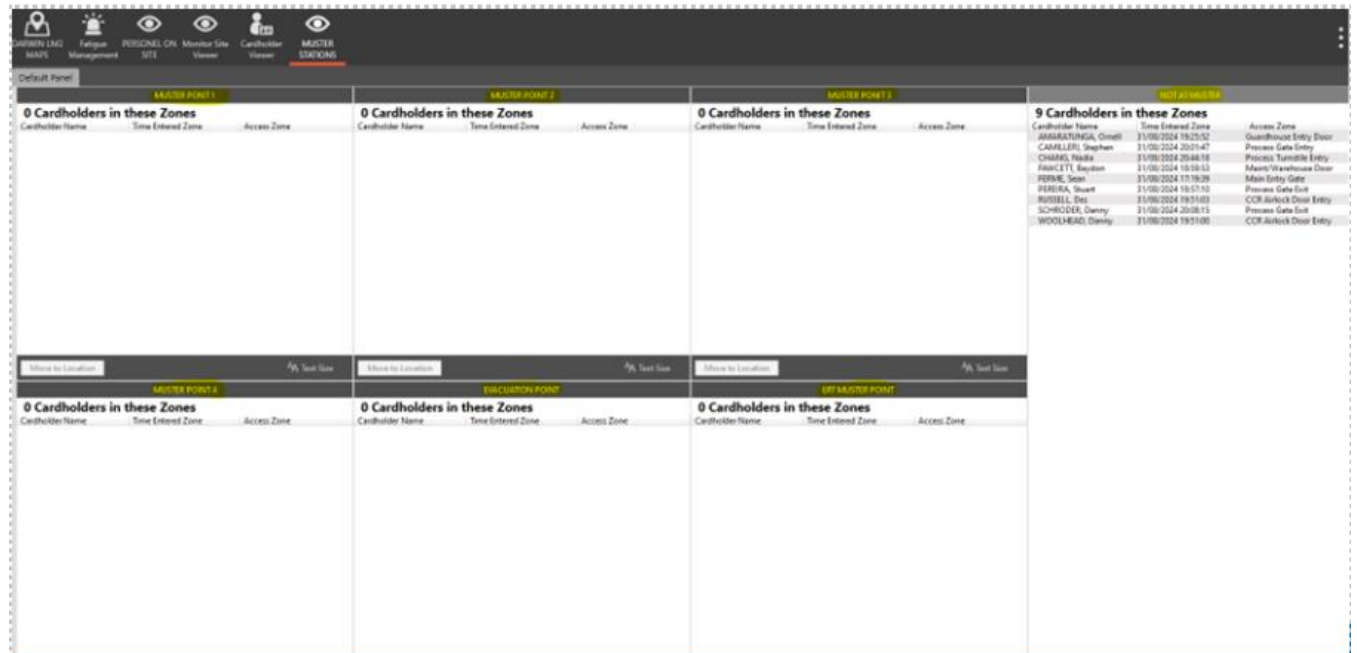
Upon initiation of a GSA all personnel must make their way to the nearest muster point (see illustration below) and swipe their card over the electronic swipe pad.

**DLNG Muster Point**



Upon swiping, the muster system software will move each person's name from 'people not a muster point' to 'people at a muster point' As shown in the figure below.

**Gallagher Muster Software Screen**



Persons who do not report for muster as per this procedure will be deemed as missing. The Communications Officer will notify the Emergency Commander of any missing personnel.

The CCR and Security Personnel utilise the DLNG Muster Verification System in their respective operating areas. Security will assist the CCR to manage the mustering and provide regular updates of the personnel mustering status, if required by the CCR.

**Muster Drills & Training**

**Site Muster**

Site muster and evacuation drills shall be conducted monthly to ensure all personnel are aware of the process; verification of drills must be recorded and debriefs to provide continuous improvement of the process. These may be conducted either as a site muster or a total site evacuation exercise; however, both scenarios must be conducted as a minimum once every six months under various conditions (during ship loading, shutdowns etc.).

Testing of the site muster and evacuation alarms must be conducted every Friday at 12.00pm by CCR, to check they are working, and all personnel can hear them in their work areas. Testing of the emergency radio channel 1 and phone 88 must also be conducted by security during the weekly alarm test.

**Gallagher Muster System Software Training**

A training package and register for the Gallagher Muster System Software is located at the Security building DLNG and is maintained by the Security personnel. The training package consists of Gallagher muster system, how to manual operate gates, turnstile, and emergency gates locations at DLNG.

Security and nominated operational personnel shall complete the training to operate the Gallagher muster system software at the Security building and Central Control Room.

### **Electronic Muster System Redundancy**

In the event there is a failure of the swipe card muster system the site will revert to the manual process. The Security personnel are to follow the process outlined below for manual emergency muster procedure.

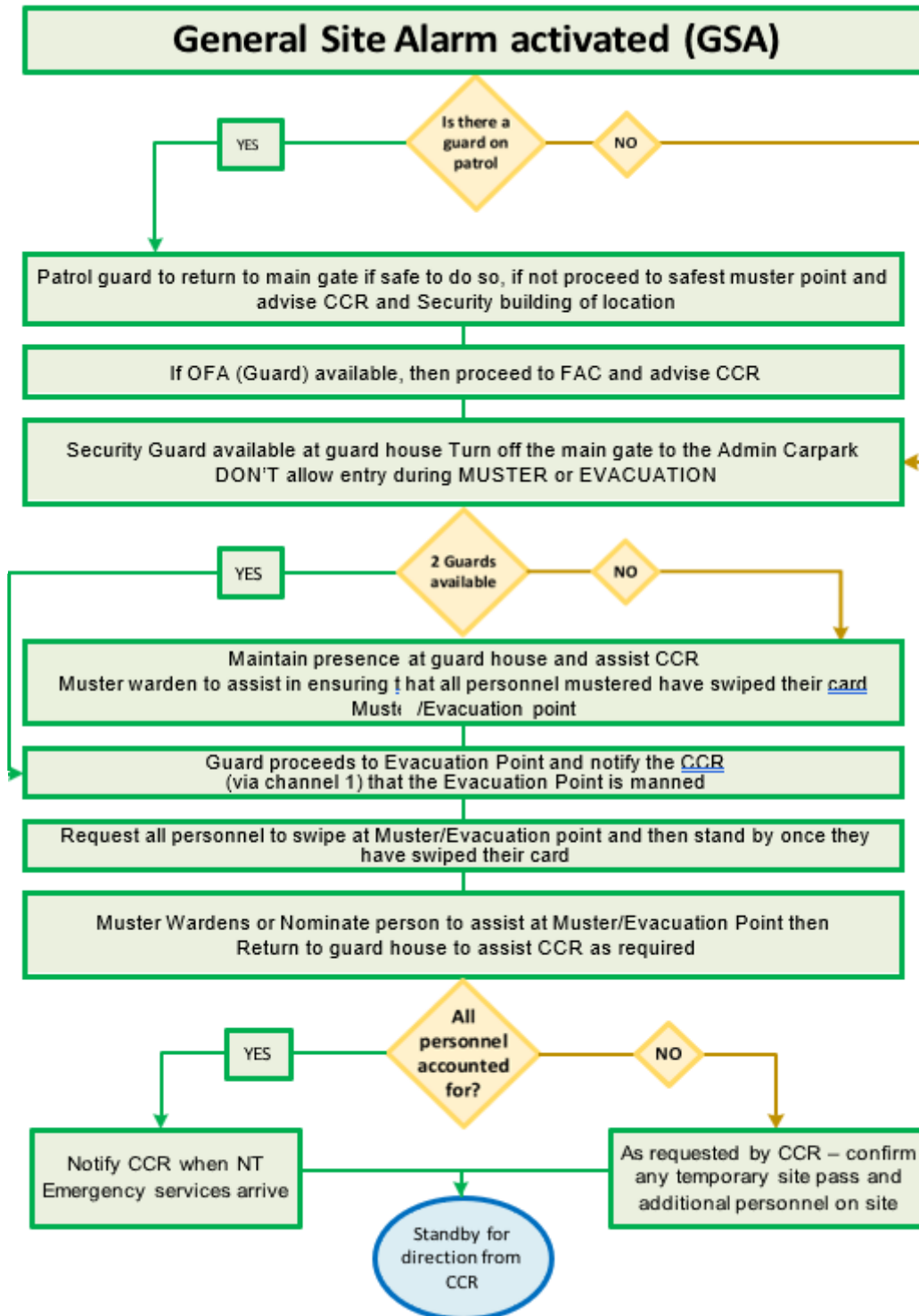
### **Muster Procedure Flowcharts**

The following flow chart diagrams outline the activity process to be followed to undertake:

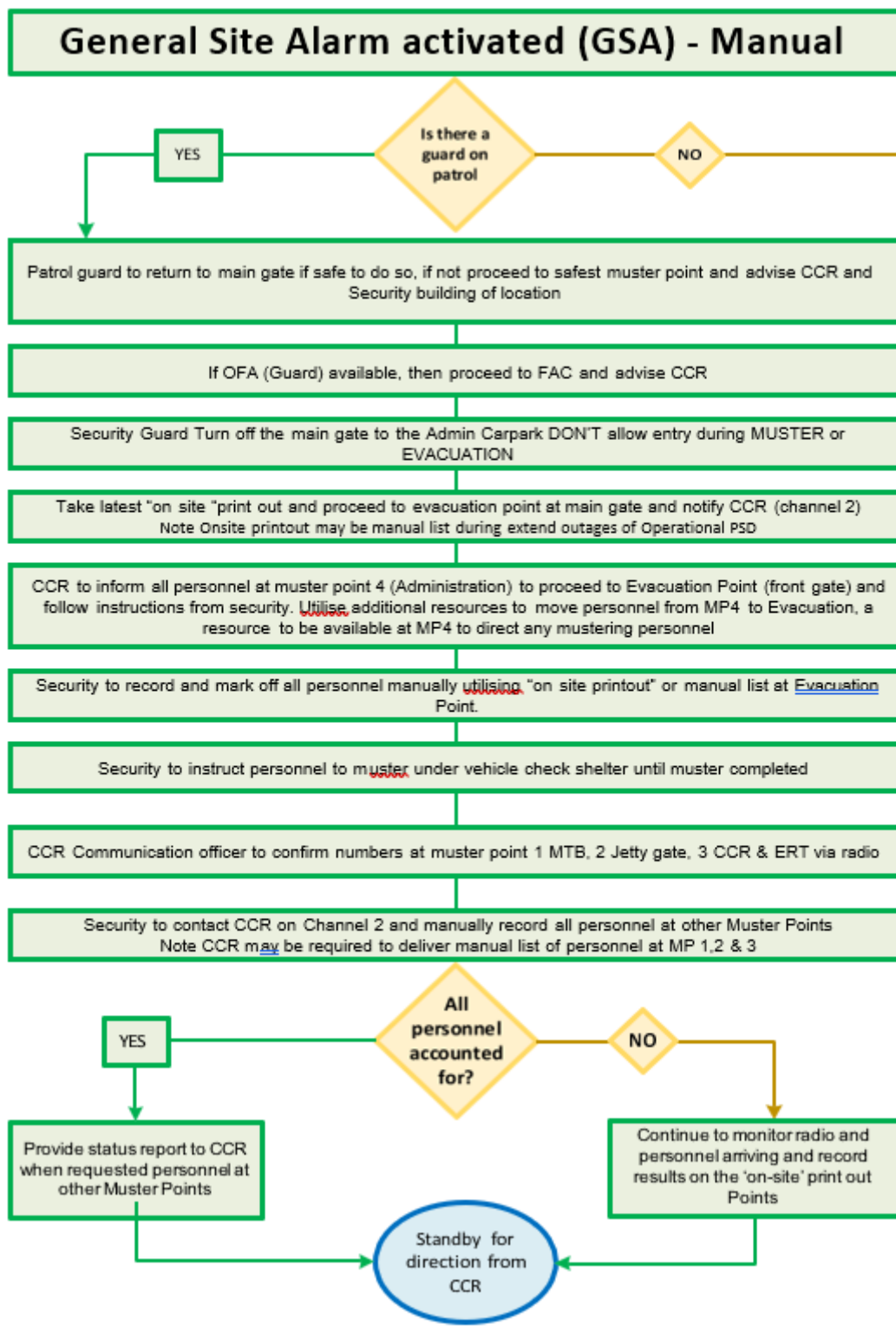
1. DLNG Electronic Gallagher Emergency Muster Procedure
2. DLNG Manual Emergency Muster Procedure

Note: Refer to Document DLNG/HSE/BDG/002 for the Medical Emergency Response plan for Medic and OFA responsibilities.

**DLNG Gallagher Emergency Muster Procedure**



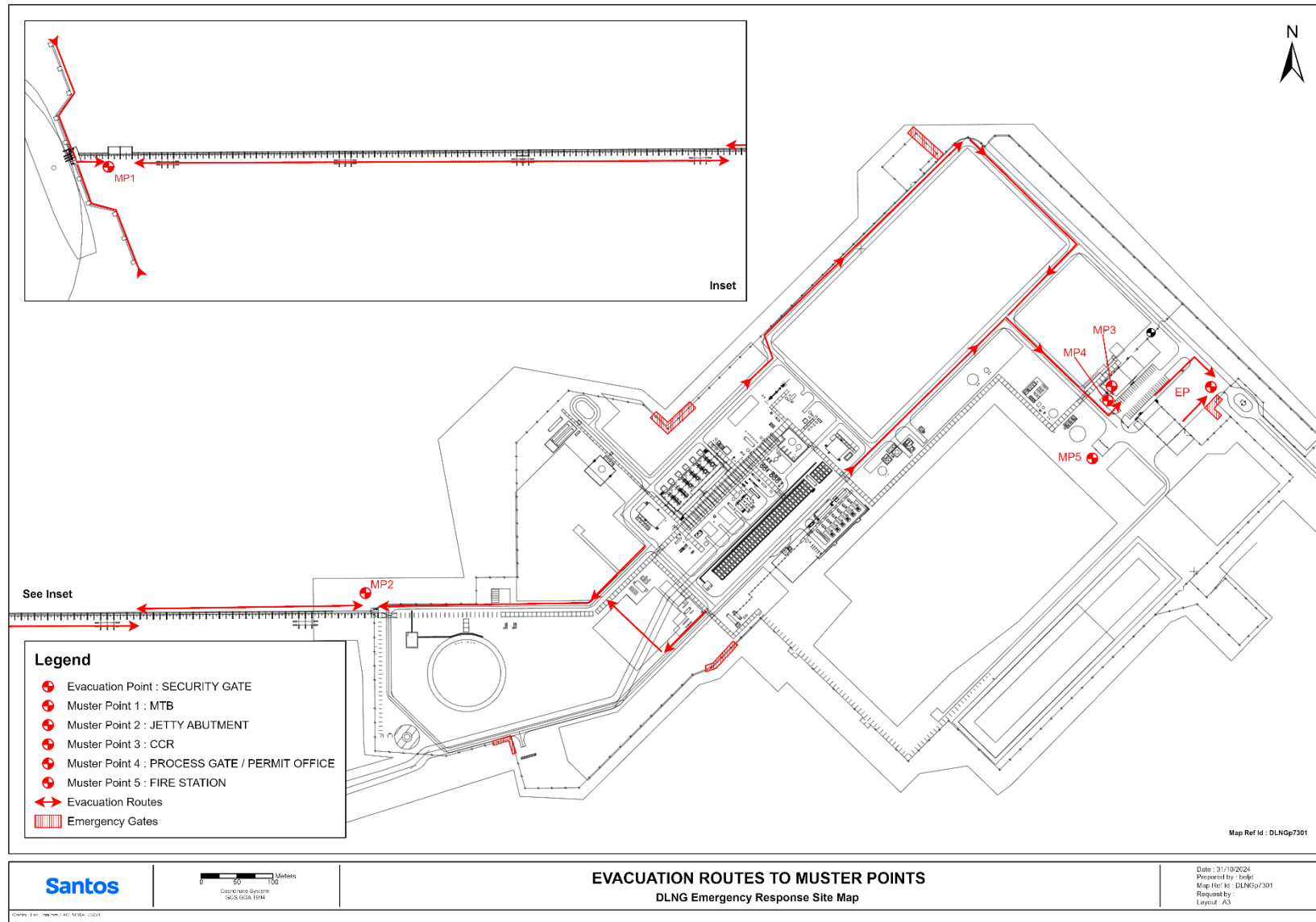
**DLNG Manual Emergency Muster Procedure**



## General Site Alarm Checklist

Emergency Commander	Status
DLNG Port Facility Security Plan (ALL/HSE/SEC/007)	
Confirm who, why and reason for GSA activation Make an appropriate PA/radio announcement Mobilise the Emergency Response Team – CCR & FRT & Medic/OFA	
Assess all the information to determine response and actions to be taken + Consider shutdown and de-pressurisation of the system + Consider suspending maintenance/operational activities as appropriate	
Notify external emergency services as required 000	
Notify following personnel and liaise with: + Onshore Installation Manager + DLNG PFSO – vessel at berth + Operations Section Chief & maintain communications Refer to DLNG CCR Communication checklist for additional notifications – Communications Officer	
Conduct initial briefing detailing + Personnel safety - If personnel are NOT accounted for + Response strategy – Summary, Potential, Plan, Action, Resources Update of information required from incident	
Assess all the information to determine response and actions to be taken + Consider potential for escalation / offsite impact. Relay this information to emergency services. Local or Site or External (offsite) impacts + Communicate with On Scene Commander for situational awareness + Confirm Injured person/s requirements + Structure/s integrity for FRT entering the area + Is the incident under control or contained? <b>Repeat above steps</b>	
Secure incident scene for investigation Commence initial investigation: + gather information + witness statements + take photographs as appropriate + secure any video footage Ensure all documentation is recorded and submitted as required	
Reinstate suspended maintenance/operational activities as appropriate	
Monitor emotional wellbeing of response personnel and implement welfare support	

# Appendix E – Evacuation Routes to Muster Points



## Appendix F - Emergency Communications and Alarms

### Communication Systems

Communication systems installed at the DLNG Site consist of the following:

Fixed	Mobile
+ Internet Protocol phone	+ Trunk radio system
+ Public Address system	+ 2 x Satellite telephones – CCR and Operations Supervisor
+ Plant General alarm system – audio/visual	
+ CCTV system	
+ VHF Marine radio system	
+ Microwave Radio Link *	
+ Ship to shore hotline	

\*Note; Microwave Radio Link interconnecting plant LAN and Telecommunications to the wider Santos and public networks.

Channel 2 OPS-A is the DLNG operations working channel. There is a designated emergency channel and all radios have been programmed with this on Channel 1, and the channel is designated as "**CH1 EMRG**" or "**C1EMRG**" depending on radio type / model. There is an "ALL CALL" group that selected radios can use to ensure that ALL radios do receive no matter what channel they have selected, and this should be incorporated into plans / procedures.

### Command and Tactical radio channels

When there is an incident or muster siren all ERT / FRT personnel are to turn their radios to Emergency Channel "Emerg CH 1" and proceed to either the CCR or Fire station.

The On-scene Commander will conduct a briefing with the FRT in the fire station and utilise the maps to indicate wind direction, Forward Command Post, nearest hydrant or monitor, hazard, tactics from Emergency Coordinator and tactical radio channel "ERT CH 5". At this stage, the FRT team can change their radios to the ERT CH 5 to communicate when using Breathing Apparatus.

The On Scene Commander will require 2 x radio and should utilise the personnel radio and the fixed radio in the fire-fighting vehicle "fast response vehicle" and communicate to

- + Command in CCR, feedback on tactics                      EMERG CH 1
- + FRT in the field, direction based on tactics                      ERT CH 5

## **Ship Loading Operations**

During Ship Loading operations, ship to shore communications will take place using a ship/shore hotline facility or on Radio – Ships Operations Ch 10. Outside of Ship Loading operations, contact with the ship will be made on VHF Marine Channels 10 (Port Operations) or 16 (Emergency).

## **Emergency Telephone Numbers**

Telephones are located at various points around the facility.

Should an emergency occur, contact with the CCR emergency phone can be made by dialling **88**.

## **Emergency Hotline Number**

An emergency hotline telephone number is provided to access information on Cyclone Watches, Warnings, All Clear with Caution, and advice on return to work arrangements. The emergency hotline will also be utilised to provide personnel with information relevant to emergency situations as appropriate.

The emergency hotline access number is **1800 DLNG 66. (1800 356 466)**

## **Loss of Communication**

Although there are several redundancy measures, a loss of external communications from DLNG could occur because of a lightning strike or other extreme event. If this occurs there is a possibility that telecommunications to the wider Santos and public networks could be lost.

The ability to communicate externally is a key requirement for effective emergency management capability.

Any communication loss will require the Emergency Commander to consider implications and identify remedial actions or alternatives to restore essential communications to maintain safe operations.

## **Satellite Telephone & Alternate Communication Methods**

In case of failure to the IP Phone and/or microwave radio link, a satellite phone is available in the CCR to ensure contact is maintained with the Bayu-Undan facility and other key elements who contribute to safe running of the DLNG facility.

The DLNG Operations Supervisor (or delegate) is to contact:

1. Bayu-Undan CPP Central Control Room and notify them of the failure in DLNG communications. The DLNG satellite phones will be the contact point for the CCP CCR.
2. Notify the Operations Section Chief of the failure in communications and that the satellite phones will be the point of contact.
3. Notify Communication specialists (Darwin) advising them of the problem - if unavailable notify On-Call Operation Section Chief and that the satellite phones will be the point of contact
4. Notify Security that a loss of communications has occurred and the two available phones on site are the satellite.
5. Notify all personnel via the radio system that a loss of communications has occurred and the only contact for emergencies is radio channel 1.

The following loss of external communications checklist contains processes and actions that shall be followed when there is a loss of external communication links at DLNG:

<b>Loss of External Communication Checklist</b> <b>Note: Satellite CCR 0011 870 772 396 080 phone code:1111</b> <b>Operations Supervisor: 0011 881 621 461 586</b>		
Action	Responsible	Status/Time
Notify Bayu-Undan CPP Central Control Room of the failure in DLNG communications. The DLNG satellite phones will be the contact point for the CCP CCR.	Control room Supervisor (CRS)	
Notify IMT Operations Section Chief of the failure in communications and that the satellite and mobile phones will be the point of contact.	Emergency Commander (EC)	
Notify Onshore Installation Manager	Emergency Commander (EC)	
Notify Communication specialists advising them of the problem.	Emergency Commander (EC) or, Communication Officer (CO)	
Notify Country Security Manager that a loss of communications has occurred and the two available phones on site are the satellite and mobile phone.	IMT (incident Management Team)	
Notify all personnel via the radio system that a loss of communications has occurred and the only contact for emergencies is radio channel 1.	Control room Supervisor (CRS)	
Maintain an open line of communication with the Operations Section Chief.	Emergency Commander (EC)	
Assess any damage to any towers or communication infrastructure and report to the emergency commander.	On-scene Commander (OSC)	
Maintain a detailed log of events.	Incident Recorder	
Maintain an open line of Communication with the IMT Operations Section Chief	Emergency Commander (EC)	
Assist specialist technical personnel access areas as required to restore communications	OsC	
When communication is resumed advise all site personnel via PA	Emergency Commander (EC)	
Advise key stakeholders of the resumption of normal communications.	Control room Supervisor (CRS), Emergency Coordinator (ECor)	

## Alarms General

A key element of the DLNG facility's safety system is the integration of detection systems that identify abnormal operating conditions without delay, alarms to raise emergency awareness and muster/evacuation arrangements to move personnel to safer locations.

A multi-level fire and gas detection network is embedded in the systems and processes within the facility that will detect abnormal situations and alert CCR personnel. An activation of these automatic detection systems will be verified by CCR personnel by observing the current state of other monitoring mechanisms and ultimately confirmed by field personnel who observe the situation.

Several the detection mechanisms also initiate a local alarm in the immediate area to warn any personnel of the hazardous condition so they can take urgent action to protect themselves.

Any detection system activation shall be evaluated by CCR personnel. When necessary, CCR personnel will initiate alarms as per procedures to maintain personnel safety and activate in-built active protection measures if appropriate. These alarms communicate to personnel in the area what actions they must take.

Alarm activation in many circumstances will result in personnel moving to the designated muster points. There is also provision for the Emergency Commander to initiate a site evacuation where all personnel leave the site to maintain their safety.

## **General Site Alarm (GSA)**

The General Site Alarm (GSA) is a manually operated alarm, initiated by Operations Staff in the CCR alerting all personnel on site that an emergency condition has occurred. The GSA is integrated with the site public address and plant radio system so CCR staff can also provide verbal instructions during an emergency. The GSA is designed to provide complete coverage of all exterior plant areas where personnel can be expected to be present and all indoor areas.

The GSA alarm operates in three modes

- + Muster Mode,
- + Evacuation Mode and
- + All Clear Mode.

The tone for the Muster Mode is a series of intermittent beeps on two frequencies and is nominally the initial mode for operation of the GSA.

Note: On completion of the site muster and for during extend periods (>30mins), the Emergency Commander may silence the muster alarm. This action must be communicated to site personnel via P.A System and confirmed.

Where there is a need to totally evacuate the site, the tone will change to the Evacuation Mode, which is an oscillating tone continuously sounding from high to low frequency.

When it is declared safe to return to work, the All Clear Mode will be activated. This is a constant tone of single frequency.

In areas where the ambient noise level exceeds 85dB, flashing beacons are used to augment the audible messages/alarm tones to notify personnel that a message/alarm is being broadcast. Evacuation warning lights are IECex rated where appropriate.

The CCR and ERT have specific actions to complete on the activation of a GSA and a checklist outlining these are contained at Appendix D.

## **Manual Alarm Initiation (Manual Call Points)**

In addition to the fixed Fire and Gas detection system that initiate actions automatically, a system of manual activation is also available for personnel who observe an emergency.

Manual Call Points have been installed throughout the facility as fire, hydrocarbon releases and other incidents may be detected by personnel before the automatic detection systems.

The Manual Call Points are **RED** in colour.

Upon activation of a Manual Call Point, an alarm will sound in the CCR and on the local area Fire Panel. Communications should be made with the CCR immediately after activating a manual call point to provide details of the emergency event.

### **Building Fire Alarm Manual Call Point**

Manual call points are installed in all buildings fitted with fire alarms. On activation of a Building Fire Alarm Manual Call Point, an alarm will sound in the CCR and on the local area Fire Panel.

### **Building Alarms**

The following buildings are fitted with automatic addressable fire alarm detection systems integrated with an emergency warning system to alert building occupants.

- + Administration/ Main Control Building
- + Propane/ Main Substation
- + Compressor Control Building
- + Switchgear Building (Power Generation)
- + Marine Terminal Building (MTB)
- + Fire Station/ Medical Building
- + Warehouse/ Maintenance Building
- + Guard house at the Main Gate.

Building detection systems are connected to the F&G panel in the CCR and the Fire Station. The CCR shall mobilise the ERT to investigate any building alarm activation.

Activation of the detection system may shutdown building systems including HVAC systems. Flammable gas detectors are fitted to HVAC air intakes and will shut down to prevent flammable atmospheres entering the building.

Activation of the building's emergency warning system by the building's detection system is independent of the GSA and separate from adjacent buildings. The CCR shall only activate the GSA following a building alarm activation if deemed necessary.

Temporary accommodation buildings are fitted with hard-wired smoke detectors and activated detectors emitting a local alarm to alert building occupants. These alarms are not connected to the CCR. Alarm activations are to be reported to the CCR by telephoning 88 or by radio Channel 1 and the ERT will be deployed to investigate if appropriate.

## Appendix G – Emergency Response Equipment

### Firefighting

Fire hydrants are installed throughout the facility at 90m spacing and 60m in production areas. Hydrant risers are fitted with dual couplings, a British Instantaneous Coupling (BIC) – the standard fire hydrant coupling used by the Northern Territory Fire and Rescue Service (NTFRS) and a 100m Storz outlet to supply the facility’s foam tenders. Hydrants are dry barrel, with a foot-valve at the main that is normally closed. This design allows no loss of water from the main in the event the hydrant riser is sheared off, due to either explosion or impact.

Each hydrant coupling fitting is rated at approximately 15 litres/second (900 litres/min). The larger 100 mm Storz outlet will provide approximately 60 litres/second (3,600 litres/min).

The site has a dedicated fire water system consisting of a storage tank, three main diesel-driven firewater pumps (for redundancy), two jockey pumps, underground and pipe rack run ring main system (400mm diameter main). The pumps start automatically based on loss of pressure in the fire water main. Each pump is rated to supply 568 m3/ hr at 11.8 bar (170 psi).

The firewater tank (Area 1.) has a capacity of 4,600 m3, which provides sufficient fire water capacity to meet demand rate – as per the table below. The tank and pumps are sized to accommodate a second processing train on the site (a future Train 2).

	Fire water tank	Fire water pump	Towns mains supply
<b>Capacity</b>	4600m3	568m3 /hr	240m3/hr approx.
<b>One pump operating</b>	8 hrs		
<b>Two pumps operating</b>	4 hrs		

Two Firefighting appliances provide mobile foam and firefighting support to the facility. These vehicles are equipped and are each based on an Isuzu cab truck, diesel powered and a roof-mounted foam monitor with a water / foam nozzle.

The Foam Pumper appliance has a foam-proportioning pump, that is configured to proportion foam at 3 % Foam type is Solberg RF3-3% Re-healing Foam. The foam pump is driven by the inlet water and has a maximum water throughput of 4,000 litres/minute. The roof- mounted monitor can deliver 2,000 litres/ minute for foam pump and 4000 litres/min for firefighting pump of foam via foam/water nozzle.

The Firefighting pump contains a rear Mount Waterous HL400 PTO driven Firefighting Pump capable of delivering 4000 litres of water per minute at 10 bar. The vehicle also carries 2000 litre water tank and 1000 litre foam tank

The following minimum foam supplies are maintained at DLNG, although additional quantities can exist.

4 x 1000 litre Bulki of Solberg RF3-3% Re-healing foam

2 x 1000litre Bulki of Solberg located at NGL tank next to Foam Monitors

2 x 1000 litre Bulki of Jet-X 2¼% High Ex foam stored in the Hazard Facility

1 x High Expansion Trailer with 2 x Hi-Ex generators and 1 x 1000 Bulki and ancillary equipment

Firefighting foam used at DLNG is compatible with extinguishing agents used by the NTFRS. Foam stocks are regularly monitored and tested to remain within service life parameters.

Mobile fire monitors and other equipment that can be deployed by emergency response teams to assist in secondary cooling and are located on Fire fighting vehicles and trailers.

An oil spill and Hazmat response trailer is available for deployment. This trailer also contains equipment for decontamination at the spill scene.

DLNG equipment list is referenced in SAP where equipment lists can be developed from documentation such as the example below.

VEHICLE	FUNCTION LOCATION	SAP DOC NUMBER
Foam pump 2 – Isuzu single cabin	N8-1U40-VEHCL-LVEHCL0010	N8-100000738
Firefighting pump 03 – Isuzu dual cabin	N8-1U40-VEHCL-LVEHCL0046	N8-10000078794
Fast Response – Landcruiser	N8-1U40-VEHCL-LVEHCL0047	N8-10000078797
Spill Trailer – Yellow dual wheel, towed by Ops super, Fast response or Ute	N8-1U40-VEHCL- MVEHCL0004	N8- 10000062621 – Trailer checklist N8-10000009579- maintenance savage pump
HI-Ex foam trailer – Yellow dual wheel	N8-1U40-VEHCL-FOAMGEN001	N8-10000062621
Fire station – Office, engine bay & C-container	N8-1U40-BULDS	N8-10000078799

### Svitzer Tugs

The tugs utilised during vessel operation have Firefighting and Salvage operations/equipment available. The Svitzer MacQuarie and Stockton vessels Class is firefighting vessel 1 with a pump capacity of 2400m<sup>3</sup>/hr with water spray for Firefighting operation involving an LNG vessel or jetty area.

The vessels are also equipped with Oil Dispersant and recovery equipment including 2000L of dispersant, a 400L pump, spray arms for the dispersant out to 15 meters and Vikoma boom and skimmer for oily water recovery to on board holding tanks.

## Appendix H – Duty Cards

### Emergency Commander

Emergency Commander
<ul style="list-style-type: none"> <li>+ Muster in the Central Control Room.</li> <li>+ Determine immediate response requirement in liaison with Communication and Control Room Operator.</li> <li>+ Ensure initial communication is made requesting personnel to stay clear of emergency site and muster immediately.</li> <li>+ Stand up emergency response team.</li> <li>+ Advise Santos IMT Duty Manager.</li> </ul>
<ul style="list-style-type: none"> <li>+ The Operation Supervisors are the designated Emergency Commander for DLNG facility emergencies</li> <li>+ Directs &amp; leads emergency response activities in accordance with the Santos emergency response principles and philosophy</li> <li>+ Assesses the situation</li> <li>+ Considers the DLNG Emergency Response Guides for tactical response plan of action (updating as the incident progresses)</li> </ul>
<ul style="list-style-type: none"> <li>+ Ensure all personnel have been accounted for</li> </ul>
<p>Notifies external response agencies if assistance is required:</p> <ul style="list-style-type: none"> <li>+ Emergency Services</li> <li>+ Medical support</li> <li>+ External emergency and police agencies</li> </ul>
<p>Notifies the relevant IMT Duty Manager, advising:</p> <ul style="list-style-type: none"> <li>+ ERT has been established</li> <li>+ Emergency escalation is or is not likely</li> <li>+ Request for support from the IMT</li> </ul>
<p>Coordinate the overall incident response</p> <ul style="list-style-type: none"> <li>+ Summary, Potential, Plan, Task and Resources required</li> <li>+ Led and direct the Emergency Response Team</li> </ul>
<p>Lead briefing session and Time outs during incident</p>
<p>Coordinate the overall incident response</p> <ul style="list-style-type: none"> <li>+ Summary, Potential, Plan, Task and Resources required</li> <li>+ Led and direct the Emergency Response Team</li> </ul>
<p>Regular conduit of information, to the IMT via the Operations Lead</p> <ul style="list-style-type: none"> <li>+ Status of the incident</li> <li>+ Additional equipment and resources required</li> <li>+ Impact to operations</li> <li>+ Impact to the community</li> <li>+ Welfare of all site personnel</li> </ul>
<p>Ensure that a chronological record of events is maintained, and incident information is captured</p>

<p>Core incident priorities aligned to the Santos Emergency and Crisis Management Principles</p> <ul style="list-style-type: none"><li>+ Protect human life</li><li>+ Protect the environment</li><li>+ Protect property and assets</li><li>+ Protect Santos reputation</li><li>+ Protect Santos legal exposure</li></ul>
<p>Develops a recovery plan post emergency to recover operations:</p> <ul style="list-style-type: none"><li>+ management of the welfare of the team</li><li>+ management of medical cases</li><li>+ checking status of facility equipment</li><li>+ re-establishment of operations</li><li>+ complete emergency debrief</li></ul>
<p>Participates in after action reviews, post incident debriefs, and incident investigations as required</p>

**Emergency Coordinator (ECoR)**

The Emergency Coordinator assists the Emergency Commander with communications between the FRT and CCR command team, collating the overall muster check and then the deployment of resources as required.

Emergency Coordinator
<p>Confirms and informs the Emergency commander of:</p> <ul style="list-style-type: none"> <li>+ confirm personnel at muster or number of missing or injured persons (IP)</li> <li>+ CRR personnel mustered</li> <li>+ ERT are mustered and On-Scene Commander available</li> </ul> <p>Follows up on actions from Emergency Commander and provides feedback</p>
<p>Participate in briefing session and Time outs during incident</p>
<p>Assist the Emergency Commander in formulating an overall incident response</p> <ul style="list-style-type: none"> <li>+ Summary, Potential, Plan, Task and Resources required</li> <li>+ Request any relevant permits to be made available</li> </ul>
<p>Conduit of information, to or from, the On Scene Commander</p> <ul style="list-style-type: none"> <li>+ Equipment and resources</li> <li>+ F&amp;G and firefighting systems</li> <li>+ Blow down time</li> <li>+ Pressure in system</li> <li>+ External emergency service and resources</li> <li>+ CCTV information</li> <li>+ Scene appreciation and actions</li> </ul>
<p>Assist the Incident Recorder in capturing all relevant information as the incident progresses</p>
<p>Verify that a chronological record of events is maintained</p>
<p>Monitors Injured persons (IP) management so they receive adequate attention</p> <p>Coordinates additional assistance for medic/OFA/Medic assist as required</p>
<p>Communicates with muster wardens to:</p> <ul style="list-style-type: none"> <li>+ Verify welfare of personnel at muster points</li> <li>+ Availability of resources at muster points – stretcher bearers, Escorts etc</li> <li>+ Coordinate movement of personnel from muster points or to evacuation point cont over page</li> </ul>

Assist with securing incident scene and participates in investigation (internal – external) Commence initial investigation:

- + gather information
- + witness statements
- + take photographs as appropriate
- + secure any video footage
- + Ensure all documentation is recorded and submitted as required

Participate in de-briefs – internal and external

Monitor emotional wellbeing of personnel and implement support processes as required

### Control Room Supervisor (CRS)

The Control Room personnel monitor the control panels and will take any action deemed necessary to safeguard personnel, the environment and plant equipment. The Control Room supervisor has the following responsibilities:

Control Room Supervisor (CRS)	
<b>Emergency call</b>	Record details from person reporting the incident <ul style="list-style-type: none"> <li>+ Name</li> <li>+ Location</li> <li>+ Type of incident</li> <li>+ Assistance required</li> </ul> All security incident requires immediate notification site Security
<b>Vessel in WRZ</b>	For unauthorised vessels approaching WRZ Call on VHF Channel 16 "This is Darwin LNG (Repeat three times) calling unknown vessel, position approaching the Darwin LNG Jetty." (Repeat three times) "Please state your vessel's name." Upon reply, respond with "Please note you are heading for a restricted area. Please alter course immediately to avoid this area."
<b>H2S GAS</b>	Monitor Gas or H2S detectors, line of sight indicators or gas deluge systems – expanding incident
<b>Fall into water</b>	Person/s overboard into water confirm <ul style="list-style-type: none"> <li>+ How many people are in the water?</li> <li>+ Person/s are visible, and they are keeping track of their location</li> <li>+ Lifebuoy has been deployed</li> <li>+ Direction they are moving in</li> </ul>
<b>GSA request</b>	General site alarm required (GSA) <ul style="list-style-type: none"> <li>+ Confirm why and who is requesting prior to initiating</li> <li>+ Initiate GSA</li> </ul>
<b>Storm or Lighting</b>	Monitor Weather Mapping system for storm activity Notify the Emergency Commander when storm at <ul style="list-style-type: none"> <li>+ 100 nautical miles of site</li> <li>+ 50 nautical miles of site</li> </ul>

**CCR Operator**

<b>CCR Operator</b>	Notify Emergency Commander
	Conduct situational awareness to determine response to: <ul style="list-style-type: none"> <li>+ Initiate shutdown and/or depressurisation</li> <li>+ Confirm activation of F&amp;G or firefighting systems</li> <li>+ Make site PA/Radio communications</li> <li>+ Activate GSA</li> <li>+ Communicate to Bayu-Undan CPP CCR - immediately</li> <li>+ Check and monitor facility status – CCTV</li> </ul>
	Maintain a detail log of actions and events
	Participate in briefing session and Time outs during incident
	Relay relevant information to the Emergency Commander and Emergency Coordinator <ul style="list-style-type: none"> <li>+ Progress of depressurization or shut down</li> <li>+ F&amp;G and firefighting system</li> <li>+ CCTV footage</li> </ul>
	Establish an initial log of events and transfer information accurately to the Incident Recorder when appropriate
	Participate in de-briefs and investigations – internal and external

### Communications Officer (CO)

The Communications Officer establishes and maintains communications as directed by the Emergency Commander.

Communications Officer
Participate in briefing session and Time outs during incident
Record, verifies and communicates the information to the Emergency Commander + All personnel within the emergency affected area are accounted for – MUSTER complete + Maintain a log of communications and events + Liaise with Incident Record and confirm information on events board Communicate with + Bayu-Undan facilities + Marine vessels + Site security
Completes notification as directed by Emergency Commander or coordinator, ref to + <b>Refer to DLNG CCR Communication checklist for additional notifications</b>
Report muster information to the Emergency Coordinator + Direct Muster Checkers as instructed
Organise deployment of personnel resources from Muster Points as directed
Record personnel movements from Muster Points or to Evacuation Point throughout the emergency
Provide back-up for the Control Room Operator as required
Liaise with the Guard House to identify and record external response agency resources + Assist to coordinate escort for emergency services
Participate in briefing session and Time outs during incident
Participate in de-briefs and investigations – internal and external
Record, verifies and communicates the information to the Emergency Commander + All personnel within the emergency affected area are accounted for – MUSTER complete + Maintain a log of communications and events + Liaise with Incident Record and confirm information on events board Communicate with + Bayu-Undan facilities + Marine vessels + Site security

### On-scene Commander (OSC)

In charge of operations and other incident site containment activities. The On-Scene Commander has the following responsibilities:

On-Scene Commander (OSC)
Receive initial briefing from the Emergency Commander, Evaluate the situation – in CCR or via radio/phone
Confirm muster of FRT, Medic and OFA at fire station office Conduct initial briefing <ul style="list-style-type: none"> <li>+ Utilise facility map to indicate Route, wind direction and speed, location of incident, Forward Command Post (FCP), radio channel/s ++</li> <li>+ Utilise facility hydrant map to identify active monitors or firefighting systems or nearest hydrant</li> <li>+ Consider safety factors, identify hazards, and minimise risks to personnel</li> </ul>
Establish Forward Command Post (FCP) as per briefing Communicate the incident needs and resources required to Emergency Coordinator Verify enough back-up personnel are available or request additional resources (e.g., emergency services)
Set plan tactics using <ul style="list-style-type: none"> <li>+ Rescue – if safe to do so</li> <li>+ Exposures – protect people or structures from incident</li> <li>+ Containment – limit or stop spread of incident</li> <li>+ Extinguishment – determine method internal/external and direct / indirect / combination</li> <li>+ Ventilation – to assist with removal of gases and smoke               <ul style="list-style-type: none"> <li>– fire uncontrolled restrict ventilation</li> <li>– fire controlled limit ventilation</li> <li>– fire extinguished allow ventilation</li> </ul> </li> </ul>
<b>Set Hot (operational zone) Warm (FCP zone) and Cold (CCR, staging zone)</b>
Liaise and assist with equipment and resources to external emergency services upon arrival to site
If emergency service response crews are mobilised, liaise directly with emergency services scene commander
If 'Incident Control' function is transferred to emergency services, work alongside emergency services' scene commander to provide hazard advice cont over page
Continue to set tactics considering: <ul style="list-style-type: none"> <li>+ Overhaul – confirmation of incident under control. Initiate HAZMAT processes</li> <li>+ Investigation – secure scene for internal external investigations</li> <li>+ Salvage – confirm area is demarcated and all isolation in place. Recovery of HAZMAT waste from firefighting operations e.g., water runoff, foam, absorbent materials, and pads/boom</li> </ul>
<b>NOTE: Reassess FCP and access to incident depending on weather conditions</b>

Make up of equipment and vehicles – identify what needs servicing cleaning and replacing. Confirm that equipment is fully operation e.g., hoses, rescue equipment and B.A. is serviced and stored on vehicles
Facilitate and document Post-incident Debrief – field or fire station
Participate in debriefs and investigation – internal or external
Monitor emotional wellbeing of personnel and implement support processes as required

**Field Response Team Leader (FRTL)**

The Field Response Team Leader oversees the Emergency Response Team. The Field Response Team Leader responds to an emergency in a planned and structured approach and has the following responsibilities

Field Response Team Leader
Confirm FRT muster and liaise with Emergency Coordinator
Participate in briefing from On-scene Commander at: <ul style="list-style-type: none"> <li>+ Fire station office</li> <li>+ Forward Command Post</li> </ul>
Assist the On Scene Commander to <ul style="list-style-type: none"> <li>+ Determining response tactics for the incident (alignment with EC objectives)</li> <li>+ Carry out instructions as directed</li> <li>+ When required: Provide back-up for the On-scene Commander</li> </ul>
Direct the Emergency Response Team using the following principles: <ul style="list-style-type: none"> <li>+ Rescue - if safe to do so</li> <li>+ Exposures - Protect adjacent areas to reduce spread (exposure protection) using water sprays</li> <li>+ Containment - to point of origin, firefighting medium e.g., Water, B-class foam, Hi-Ex foam</li> <li>+ Extinguishment – using firefighting medium e.g., Water, B-class foam, Hi-Ex foam</li> <li>+ Ventilation:               <ul style="list-style-type: none"> <li>– fire uncontrolled restrict ventilation</li> <li>– fire controlled limit ventilation</li> <li>– fire extinguished allow ventilation</li> </ul> </li> </ul>
Monitor Emergency Response team on site during incident <ul style="list-style-type: none"> <li>+ ensure their safety is not compromised</li> <li>+ Tactics are achieving required outcome Maintain communications between</li> <li>+ Emergency response team members – verbal or BA Ch</li> <li>+ On Scene Coordinator – Verbal or BA Ch</li> </ul>
Continue to set tactics considering: <ul style="list-style-type: none"> <li>+ Overhaul – ensure material exposed to confirm extinguishment</li> <li>+ Confirm that area is secure for any investigation – internal or external cont over page</li> </ul>

- + Salvage and decontamination – Quarantine contaminated equipment and PPE, demarcate area for investigations, make area safe
- + Make up of equipment and fire-fighting equipment – clean use equipment, re-stock equipment on firefighting appliance, send firefighting PPE for servicing, service B.A., send B.A. cylinders for recharging
- + Participate in debrief and investigation – internal or external

Participate in post-incident debrief/s and investigation – internal or external

Monitor emotional wellbeing of personnel and implement support processes as required Record any important information and supply a copy for investigations

**Field Response Team (FRT) member**

The Field Response Team is made up of a mixture of Process operators at DLNG. The personnel have received training in: Firefighting Operations, Breathing Apparatus Procedures, Hazardous Material operations (HAZMAT), Working at heights, Confined Space Entry First Aid techniques and Basic Rescue Techniques.

Emergency Response Team
Muster in the Fire Station, collect PPE and prepare Fire fighting vehicles
Participate in briefing from On Scene Commander at: <ul style="list-style-type: none"> <li>+ Fire station office</li> <li>+ Forward Command Post</li> </ul>
Undertake tasks as directed by Team leader or On Scene Commander
The Emergency Response Team <ul style="list-style-type: none"> <li>+ Responds to emergencies to extinguish fires, contain spills, stop releases which places people, environment, or asset/property at risk</li> <li>+ Conduct Search and Rescue operations (when safe to do so)</li> <li>+ Provides feedback to team leader on changing conditions or hazards</li> <li>+ Conduct all emergency activities in as safe a manner as possible</li> <li>+ Secure area for investigation</li> </ul>
All radio communications will be via <b>Emergency channel</b> and <b>B.A. Channel:</b> <ul style="list-style-type: none"> <li>+ Breathing Apparatus</li> <li>+ Out of sight operations e.g., behind structures</li> <li>+ Extended distances e.g., Fin Fan deck unless otherwise advised during the incident</li> </ul>
Participate in post-incident debrief/s and investigation – internal or external Record any important information and supply a copy for investigations

**Medic**

The paramedic or nurse, or in their absence the Occupational First Aider from Security, shall assume the role of Medic. The Medic provides treatment to any casualties in the Site First Aid Centre (FAC) or if the situation demands, at the incident scene. When necessary, the Medic may request for the Medic Assist and Stretcher Bearers via the On Scene Commander. The Medic has the following responsibilities:

Medic
Participate in briefing from On-scene Commander at: <ul style="list-style-type: none"> <li>+ Fire station office</li> <li>+ Forward Command Post</li> </ul>
Set up Injured person receiving point and communicate with On-scene Commander /team lead
Liaise with On-scene Commander to advise FRT <ul style="list-style-type: none"> <li>+ safe removal of IP's from the incident scene</li> <li>+ Packaging of IP e.g., stretcher or slide mats</li> <li>+ Decontamination of IP prior to handing over – hazmat, hydrocarbon, or chemical spill</li> <li>+ maintain basic life support e.g., open airway</li> <li>+ administer medical care e.g., stop the bleed</li> </ul>
Provide medical assessment and treatment of IP/s Liaise with off-site medical personnel as appropriate – on call Doctor
Liaise with the On-Scene Commander to <ul style="list-style-type: none"> <li>+ Determine the need and request external assistance</li> <li>+ Coordinate transport of IP's to medical centre</li> <li>+ Prepare IP's for transfer to Ambulance personnel – ambulance to notify hospital</li> <li>+ Request that the Police and Coroner are notified for Deceased persons – secure incident scene</li> </ul>
Initiate multi-casualty or injured persons plan and request <ul style="list-style-type: none"> <li>+ Additional resources through On-scene Commander, external ambulances and on call medical support</li> <li>+ Utilise the triage process to sort IP's</li> <li>+ ERT to set up IP clearing post at scene</li> <li>+ ERT to assist in setting up medical centre to receive IP's</li> <li>+ SDS information for burns, chemical incidents, or hydrocarbon incidents cont over page</li> </ul>

<ul style="list-style-type: none"><li>+ That appropriate actions taken for deceased persons</li><li>+ That the Police and Coroner are notified for Deceased persons via the On-Scene Commander</li></ul> <p>A Multiple Casualty Incident (MCI) is classified as an incident that involves more than one person requiring medical evacuation or referral</p>
<p>Participate in post debrief/s and investigations – internal or external</p> <p>Record any important information and supply a copy for investigations</p>
<p>Record confidential information for casualties/Injured persons as per procedure/policy</p>
<p>Monitor emotional wellbeing of personnel and implement support processes as required</p>

**OFA/Medic Assistant – Site Security**

OFA/Medic Assist are designated personnel who are competent Occupational First Aid (OFA) responders. The primary role of the OFA is to assist the Medic in carrying out first aid duties in the event of Injured person/s (IP) during day shifts. During night shift and when medic is not available OFA is to assume first aid duties and Medic assist to provide support/assistance to the OFA as directed by Emergency Commander (EC)

OFA/Medic Assistant
Participate in briefing from On Scene Commander at: <ul style="list-style-type: none"> <li>+ Fire station office</li> <li>+ Forward Command Post</li> </ul>
Set up Injured person receiving point and communicate with On Scene Commander/team leader
Provide medical assessment and treatment as required or instructed
As instructed by Medic or utilise OFA training to <ul style="list-style-type: none"> <li>+ assist with safe removal of IP's from either                             <ul style="list-style-type: none"> <li>- Transfer area between hot and warm zones</li> <li>- For HAZMAT after IP decontaminated – washed down</li> <li>- Incident site if safe to do so</li> </ul> </li> <li>+ maintain basic life support</li> <li>+ administer medical care</li> </ul>
<p><b>Night shift OFA or Medic assist to</b></p> <ul style="list-style-type: none"> <li>+ assist with safe removal of IP's from either                             <ul style="list-style-type: none"> <li>- Transfer area between hot and warm zones</li> <li>- For HAZMAT after IP decontaminated – washed down</li> <li>- Incident site if safe to do so</li> </ul> </li> <li>+ maintain basic life support</li> <li>+ administer medical care</li> </ul> <p><b>Liaise with off-site medical personnel as appropriate – on call Doctor or Ambulance</b></p> <ul style="list-style-type: none"> <li>+ request additional support for external ambulance service</li> <li>+ liaise with ambulance service on their arrival</li> <li>+ assist with preparation of IP for transport to hospital</li> <li>+ record all required document for IP</li> </ul>
Assist with set up and operating of clearing post and triage of IP's when in use...cont. over page

Assist with the transport of IP's to appropriate facility via the On Scene Commander
Participate in post debrief/s and investigations – internal or external Record any important information and supply a copy for investigations
Record confidential information for casualties/Injured persons as per procedure/policy
Monitor emotional wellbeing of personnel and implement support processes as required

**Site Security**

Security Officers communicates directly with the Communications Officer in the CCR in regard to security breaches at DLNG facility. When a security breach threatens (or have potential to threaten) the marine operational areas of the facility, Security Officers are to notify Communication officer in the CCR of the incident and request that the Port Facility Security Officer (PFSO) is advised. Security Officers also passes on information relating to movements of external agency resources and personnel to the Communications Officer.

The OFA Security officer will attend the medical centre as soon as they are released from the initial security duties. If the OFA security officer is the only person available at the guard house for an extend period (more than 10 mins) they will contact the CCR to advise them of the situation and respond as requested.

## Appendix I – Emergency Response Boards & Tools

OPERATIONS SITUATION STATUS		
SUMMARY	POTENTIAL	TACTICAL PLAN / INCIDENT OBJECTIVES

TASK / RESOURCE REQUESTS			
TIME	TASK / REQUEST	RESPONSIBLE PERSON	COMPLETED TIME
TIME	RESOURCE	RESPONSIBLE PERSON	COMPLETED TIME

CCR EMERGENCY LOG		NEXT TIME OUT
DATE	EMERGENCY COMMANDER	INCIDENT NAME
TIME	EVENT LOG	

## Appendix J - Incident Zone Control & Decontamination

### Incident Control Zone

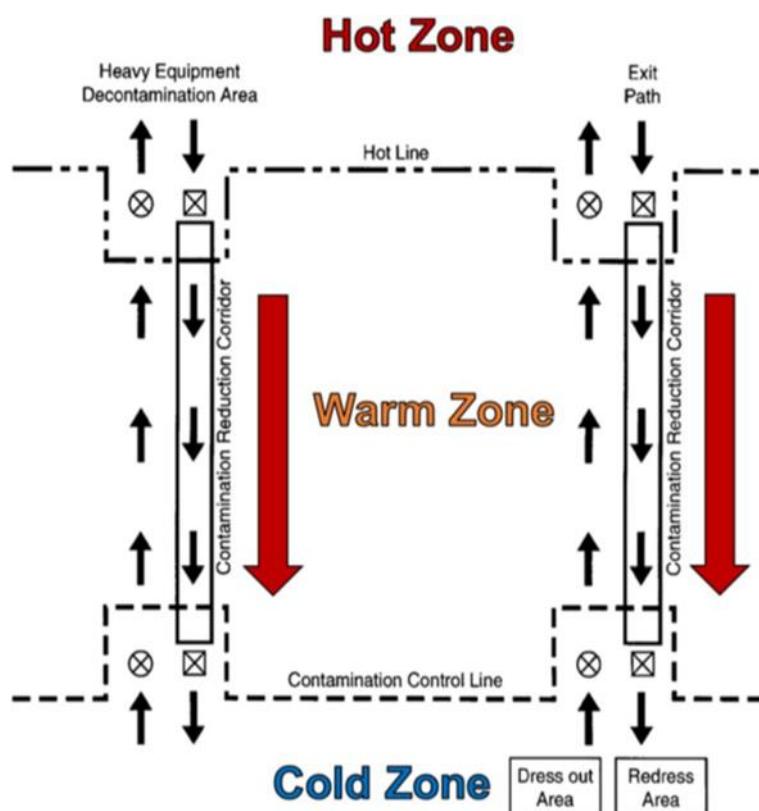
The On-Scene Commander will assess the situation, establish zones and coordinate the interaction of attending personnel into the appropriate zone to ensure a suitable site is identified, secured and designated for decontamination as part of the general layout for a HAZMAT incident, which also confines or contains any run-off.

The control zones must be clearly identified through the use of barrier tape (or other visual marker). The following areas at a HAZMAT incident are designated zones based upon safety and the degree of hazard:

**Hot Zone** – the zone immediately surrounds the HAZMAT incident, which extends far enough to prevent adverse effects from hazardous material release to personnel outside the zone.

**Warm Zone** – the zone at a site where personnel and equipment decontamination is established and hot zone support takes place.

**Cold Zone** – the zone at a site that contains the command post and such other support functions as are deemed necessary to control the incident.



The decontamination or contamination reduction corridor is set up between the Hot Zone and the Warm Zone. As the resources are assembled a decontamination station can be established within the warm zone to clean off and contain any contaminated personnel and equipment exiting the hot zone. If contamination is detected on a person they are recycled through the washing stage. Once no contamination is detected personnel may process to re-dress in clean garments and leave the decontamination station under the supervision of the On-Scene Commander.

## Decontamination

Decontamination is the process of removing or neutralising contaminants that have accumulated on personnel and equipment. Decontamination protects workers from hazardous substances that may contaminate and eventually permeate the protective clothing, respiratory equipment, tools, vehicles, and other equipment used on site by:

- Protecting all site personnel by minimising the transfer of harmful materials into clean areas;
- Assists in separating incompatible chemicals during transfer; and
- Protects the community by preventing uncontrolled transportation of contaminants from the site which may endanger other occupants as well as the casualty.

In the initial stages of an incident the On-Scene Commander should identify an area for decontamination. As the resources are assembled a decontamination station will be established within the warm zone to clean off and contain any contaminated personnel and equipment exiting the hot zone. A separation line between equipment and personnel should be identified within the decontamination area to eliminate unwanted interaction.

The principal agent used for decontamination is water. Although cold water is suitable for the purpose, warmer water should be used for the comfort of casualties where available. The use of surfactants such as soap and detergent that are suitable for use on humans can increase the effectiveness of decontamination.

Decontamination of contaminated persons may include the following actions, or a combination of actions:

- Flushing with water using a decontamination shower or low pressure hose reel;
- Washing with water and detergent, and a final water flush;
- Wiping down with a damp cloth;
- Flushing or irrigating affected area with Diphoterine.

Disposable items involved in the decontamination process such as overalls, gloves, filters; are to be bagged and disposed of as contaminated waste.

## Decontaminants

The decontaminant of choice will depend on factors like the type of contamination and the operational environment. The decontamination plan may outline details such as the type and amount of decontaminant that will be used. For example, airing or air weathering is one method of decontamination; however, it may not be an acceptable alternative at an incident site due to time constraints.

In many HAZMAT incidents, a simple water decontamination regime using a fire hose with the branch, set to produce a spray may be used.

For gaseous contaminants, contaminated clothing and equipment may be hung up and aired for several hours to remove traces of gas in place of water decontamination.

For corrosive or irritant chemical splashes, Diphoterine is located throughout the facility including the water treatment plant, medical centre and rapid response vehicle.

DLNG has hazardous chemicals in quantities (exceeding manifest quantities) which are stored on site including both produced LNG and other treatment chemicals used in liquefaction and water treatment processes. Refer to the Hazardous Chemicals Manifest (3310-DLNG-5-1.3-0053) for location of hazardous chemicals and quantities together with ChemAlert Safety Data Sheets for identification, classification and emergency information.

## Decontamination Planning

The decontamination process should be directed toward confinement of the contaminant within the hot zone and the decontamination corridor. The potential effects of the decontamination process on FRT personnel are considered when developing the decontamination plan, and counter-measures such as adequate work/rest cycles are addressed.

The determination of proper decontamination methods and procedures are considered before the incident as part of the overall pre-incident planning, hazard, and risk evaluation process. No entry into the hot zone should

be permitted until appropriate decontamination methods are determined and established. Relevant PPE should also be identified for personnel facilitating the decontamination process and disposed of post decontamination.

During the course of decontamination planning, the basic steps of mass personnel decontamination and estimating the total number of personnel to be decontaminated will influence the amount of resources used to support the operation. These basic steps include:

- Clothing decontamination and removal.
- Showering (may be as simple as spraying down with fire hoses/using soap and water).
- Monitoring (and medical treatment) for contamination.
- Performing triage and treatment as required.
- Post-Incident Actions
  - Ensure all equipment is thoroughly decontaminated or disposed of after the incident.
  - Any equipment that requires post incident testing is to be tested and recorded in the appropriate manner, defective gear is to be removed from operations and reported to the Operations Shift Superintendent immediately.
  - Hazards include but are not limited to dust, water, animals, other road users, rocks, loose surfaces, pot holes, steep terrain, wash outs and corners.
  - Ensure that all personnel who may have been exposed or potentially exposed to a hazardous material during the incident will have their name recorded.
  - Ensure that the integrity of evidence at the scene is preserved for investigation by NTFRS as required and record all relevant information and observations.
  - Liaise with persons or agency responsible for a handover of site responsibility, providing advice pertinent to site safety and also the restoration of utilities by a qualified person.
  - Conduct an incident debrief and then a post-incident analysis to identify improvements to procedures, training and equipment.

## Appendix K – External Communications

A range of communication methods are available to provide information to stakeholders and the community. Communication approaches have been developed in collaboration with Northern Territory Police, Fire and Emergency Services (NTPFES). The content of the emergency information will be tailored to suit the interests of the various stakeholder and community groups.

Where there is potential for off-site impact during an incident, the Emergency Commander will consider the need to issue timely alerts to the adjacent community. Wherever possible, information to be communicated to the local community will be developed in consultation with the local authorities and emergency services.

The NTPFES have priority access to a range of communication mediums to convey timely emergency warning information to the community including emergency messages on all local radio channels and social media feeds.

In addition, the NTPFES has access to a targeted area communication medium. Text messages advising people of an incident and safety measures are sent to all telephone subscribers within a defined polygon area of the community where it is anticipated incident impacts will be present. This program uses billing addresses to locate relevant residences and sends text messages – both in text format and to voice mail. The system also advises if the message has been sent successfully or not.

Prior to arrival of emergency services at DLNG, if the Emergency Commander determines that community alert messages shall be issued urgently, a request is to be immediately relayed via telephone 000 to the NTPFES Joint Emergency Services Communications Centre who will facilitate the timely release of the information.

Public alerts and warnings are classified according to the severity of the threat that the incident poses to adjacent communities. Three message severity types are available and aligned to the national community alerts issued for other emergency events such as bushfires. The lowest priority messages are referred to as 'Advice' and the highest threat category is 'Warning'. See table below:

### Community Emergency Message Severity Categories

Message Severity	Priority Level	General Meaning to Community
Advice	3 Low Threat	There is no immediate danger. General information to keep you up to date with developments.
Watch and Act	2	It is likely that you may be impacted by the emergency. You may be in danger and should start taking action to protect your life and your family.
Warning	1 High Threat	You will be impacted by the emergency. You are in danger and must act immediately. <i>Voice messages will be preceded by a four second sound of the SEWS.</i>

Preformatted messages containing the basic information to be communicated have been developed for each of these message severity types. See Table below These messages can be conveyed by voice and localised SMS text message if available. Text that is highlighted will need to be tailored to incident type and relevant details inserted.

Preformatted Community Emergency Information Messages

Message Severity	Incident Type	Voice Message	Text Message
<b>Advice Priority 3 (Low Threat)</b>	Chemical Spill / Fire	<p>This is a <i>Chemical Spill / Fire</i> Advice message from the Northern Territory Police, Fire and Emergency Service.</p> <p>A <i>chemical / fire</i> incident at the Santos Darwin LNG plant on Middle Arm Peninsular is expected to impact <u>SUBURBS</u> for the next <u>TIME</u> minutes.</p> <p>Residents are advised to stay informed. For further information, listen to your local radio or go to <a href="http://www.pfes.nt.gov.au">www.pfes.nt.gov.au</a></p>	<p>Advice from NT Fire Service. <i>Chemical Spill / Fire</i> Emergency at Santos Darwin LNG plant. Stay informed- Check radio or <a href="http://www.pfes.nt.gov.au">www.pfes.nt.gov.au</a></p>
<b>Watch and Act Priority 2</b>	Chemical Spill / Fire	<p>This is a <i>Chemical Spill / Fire</i> Incident Watch and Act message from the Northern Territory Police, Fire and Emergency Service.</p> <p>A <i>chemical / fire incident</i> is located at the Santos Darwin LNG plant on Middle Arm Peninsular and is expected to impact <u>SUBURBS</u> for the next <u>TIME</u> minutes.</p> <p>Residents are advised to stay informed and prepare to relocate to a safer area if instructed. For further information, listen to your local radio or go to <a href="http://www.pfes.nt.gov.au">www.pfes.nt.gov.au</a></p>	<p>Incident Watch &amp; Act Message from NT Fire Service. <i>Chemical Spill / Fire</i> Incident Emergency at Santos Darwin LNG plant. Stay informed and prepare for evacuation. Check radio or <a href="http://www.pfes.nt.gov.au">www.pfes.nt.gov.au</a></p>
<b>Warning Priority 1 (High Threat)</b>	Chemical Spill / Fire	<p><b>Message preceded by SEWS warning</b></p> <p><b>Emergency. Emergency.</b> This is a <i>Chemical Spill / Fire Incident</i> Emergency Warning from the Northern Territory Police, Fire and Emergency Service.</p> <p>A <i>Chemical/Fire Incident</i> at the Santos Darwin LNG plant on Middle Arm Peninsular is expected to impact the areas of <u>SUBURBS</u> for the next <u>TIME</u> minutes.</p> <p>Residents are strongly advised to shelter indoors, close windows and doors and turn off air conditioning. For further information, listen to local radio or go to <a href="http://www.pfes.nt.gov.au">www.pfes.nt.gov.au</a></p>	<p>Warning from NT Fire Service. <i>Chemical Spill / Fire</i> Incident Emergency at Santos Darwin LNG plant. Avoid area- Shelter indoors-Close windows doors- Shut off aircon. Check radio or <a href="http://www.pfes.nt.gov.au">www.pfes.nt.gov.au</a></p>

In the event of a major incident, the following information can be added to the pre-formatted community warning information messages above as determined by the Emergency Commander and local emergency service authorities.

- + A general description of the major incident, which may include the nature of the incident (fire, explosion etc.), details of the hazardous chemicals involved and the likely consequences and impacts.
- + A description of the actions DLNG has taken, and proposes to take, to prevent any off-site impact.
- + Recommended actions that members of the local community should take to eliminate or minimise risks to their health and safety.
- + Who community members can contact if they require assistance in dealing with any consequence of the emergency incident.
- + Where further information on the incident can be accessed.
- + A notification when the major incident is under control.

It is anticipated that the initial request for community release will be made by the Emergency Commander at DLNG. Should an incident occur where release of public information is required to be disseminated, the incident will be classified as Tier 2 or 3 and the IMT in Perth will be operating to support ERT operations. The Public Information Officer shall be advised immediately when community alerts are being generated.

In addition, a Darwin Liaison Officer will be established to liaise with NTPFES Joint Agency Coordination at the Berrimah Police Emergency Operations Centre and provide a direct interface between Santos incident management processes and the NTPFES

The Public Information Officer will liaise with the ERT to ascertain the current situation of the incident and liaise with the NT Police, Fire and Emergency Services in subsequent community information releases. Further information on these processes is included in the Crisis and Incident Management Plan ALL/HSE/ER/001.

## Appendix L – Changing the DLNG Hotline Message

**Note:** There is no standing message on the hotline

To change the message on the DLNG HSE Incident Hotline:

+ From an external phone, dial 08 6363 1499.

**NB** An external phone is a mobile or phone outside the Santos phone network.



+ From an Internal phone, dial 1499 then press \*.


**NB** An internal phone is a phone on the Santos network in the Perth or Darwin offices.

1. Enter **3921#** when prompted for a Mailbox number
2. Enter **7378423#** when prompted for a PIN Code
3. Press **4** for setup options
4. Press **1** to change greetings. It will also play the current greeting which is the “Standard” greeting.
5. Press **1** to record a new message
6. After the tone, record the greeting and press **#** to stop.
7. If you wish to re-record your message (greeting), press **1** to record a new message and press **#** at end of message.
8. You can then hang up and the new message will be played when the 1800 number is called.

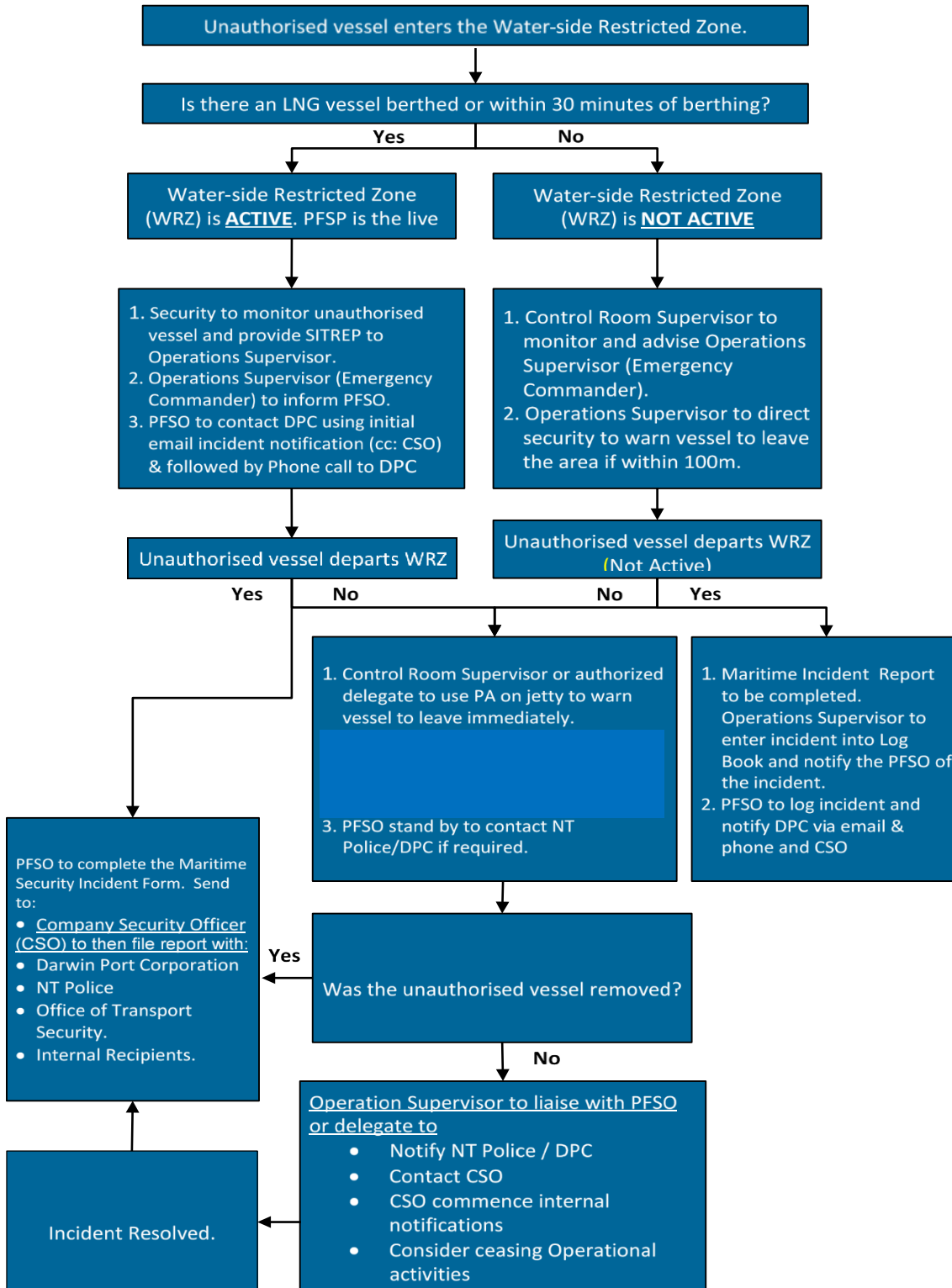
### Example Hotline Messages

#### Cyclone Watch

Stage	Suggested Hotline Message
 <b>P</b> Preparation	As of <u>day</u> – the - <u>date</u> – at – <u>time</u> hrs, Darwin LNG is in a state of ‘P’ preparation stage, although open for business to all site personnel. The cyclone’s movements are being monitored. The next update will occur at <u>time</u> .
 <b>T</b> Tiedown	As of <u>day</u> – the - <u>date</u> – at – <u>time</u> hrs, Darwin LNG facilities are in a state of Tiedown for Operational Personnel. The facility remains operational. The cyclone’s movements are being monitored. Essential personnel should check-in with their supervisor. The next update will occur at <u>time</u> .

 <p>Shelter</p>	<p>As of <u>day</u> –the - <u>date</u> – at – <u>time</u> hrs, conditions have deteriorated, Darwin LNG facilities are closed for business and all essential personnel should seek safe shelter. <b>NO PERSONNEL ARE TO REPORT TO WORK.</b> The cyclone’s movements are being monitored. Plant remains operational. The next update will occur at <u>time</u>.</p>
<p>Return to Work</p>	<p>As of <u>day</u> –the - <u>date</u> – at – <u>time</u> hrs, Darwin LNG facilities are now open for business and all personnel can return to work.</p>

# Appendix M – Waterside Restricted Zone (WRZ) – Incident Reporting Flow Chart



## Appendix N – Emergency Response Guides (ERGs)

Emergency Response Guides	MI Description	Consequence Event
Unit 11	Unit 11: LOC from Feed Gas Arrival Methane Gas	<ul style="list-style-type: none"> <li>Flash fire or explosion</li> <li>Gas under pressure</li> <li>Ignition of gas</li> <li>Gas release noise</li> <li>Static discharge</li> <li>Asphyxiation</li> <li>Vessel shell failure</li> <li>Pyrophoric substances</li> <li>Elemental Mercury</li> <li>Fire water run off</li> </ul>
Unit 12A	Unit 12A: LOC of Feed Gas from AGRU Methane Gas	<ul style="list-style-type: none"> <li>Flash fire or explosion</li> <li>Gas under pressure</li> <li>Ignition of gas</li> <li>Gas release noise</li> <li>Asphyxiation</li> <li>Atmospheric Tank shell failure</li> <li>Pyrophoric substances</li> <li>Elemental Mercury</li> <li>Fire water run off</li> </ul>
Unit 13	Unit 13: LOC from Dehydration and Mercury Removal Methane Gas	<ul style="list-style-type: none"> <li>Flash fire or explosion</li> <li>Gas under pressure</li> <li>Ignition of gas</li> <li>Gas release noise</li> <li>Asphyxiation</li> <li>Vessel shell failure</li> <li>Pyrophoric substances</li> <li>Mercury</li> <li>Hot surfaces</li> </ul>
Unit 14	Unit 14: LOC from Propane Refrigeration Circuit Propane and/or Methane	<ul style="list-style-type: none"> <li>Flash fire or explosion</li> <li>Gas under pressure</li> <li>Ignition of gas</li> <li>Gas release noise</li> <li>Asphyxiation</li> <li>Vessel shell failure</li> <li>BLEVE</li> <li>Cold Surfaces</li> <li>Increasing vapour rate</li> <li>Structural failure</li> <li>Slipping on ice</li> </ul>
Unit 15	Unit 15: LOC from Ethylene Refrigeration Circuit Ethylene (Gas or liquid) and Methane	<ul style="list-style-type: none"> <li>Flash fire or explosion</li> <li>Gas under pressure</li> <li>Ignition of gas</li> <li>Gas release noise</li> <li>Asphyxiation</li> <li>Vessel shell failure</li> <li>BLEVE</li> <li>Cold Surfaces</li> <li>Increasing vapour rate</li> <li>Structural failure</li> <li>Slipping on ice</li> </ul>
Unit 16	Unit 16: LOC from Methane Coldbox Circuit Methane Gas and LNG	<ul style="list-style-type: none"> <li>Flash fire or explosion</li> <li>Gas under pressure</li> <li>Ignition of gas</li> <li>Gas release noise</li> <li>Asphyxiation</li> <li>Vessel shell failure</li> <li>BLEVE</li> <li>Cold Surfaces</li> <li>Increasing vapour rate</li> <li>Structural failure</li> <li>Slipping on ice</li> </ul>

Emergency Response Guides	MI Description	Consequence Event
Unit 17	Unit 17: LOC from Heavies Removal Unit Natural Gas Liquids	<ul style="list-style-type: none"> <li>• Flash fire or explosion</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Static Discharge</li> <li>• Cold burns</li> <li>• Asphyxiation</li> <li>• Vessel shell failure</li> <li>• Structural failure</li> <li>• Slipping on ice</li> </ul>
Unit 19A.1 Ground Flare	Unit 19A.1: LOC from Ground Flare System	<ul style="list-style-type: none"> <li>• Flash fire / Spray Fire</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Asphyxiation</li> <li>• Fire spread</li> <li>• High voltage electricity</li> </ul>
Unit 19A.2 Marine Flare	Unit 19A.2: LOC from Marine Flare System	<ul style="list-style-type: none"> <li>• Flash fire / Spray Fire</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Asphyxiation</li> <li>• Fire spread</li> <li>• High voltage electricity</li> </ul>
Unit 19B.1	Unit 19B.1: Explosion in the Ground Flare System	<ul style="list-style-type: none"> <li>• Flash fire (post explosion)</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Asphyxiation</li> <li>• Fire spread</li> <li>• High voltage electricity</li> </ul>
Unit 19B.2	Unit 19B.2: Explosion in the Marine Flare System	<ul style="list-style-type: none"> <li>• Flash fire (post explosion)</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Asphyxiation</li> <li>• Fire spread</li> <li>• High voltage electricity</li> </ul>
Unit 19D	Unit 19D: Explosion in Thermal Oxidiser System	<ul style="list-style-type: none"> <li>• Flash fire or explosion</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Static Discharge</li> <li>• Asphyxiation</li> <li>• Drains</li> <li>• Hot Surfaces</li> </ul>
Unit 19E	Unit 19E: LOC from Marine Flare Pilot Propane Vessel	<ul style="list-style-type: none"> <li>• Flash fire or explosion</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Static Discharge</li> <li>• Cold burns</li> <li>• Asphyxiation</li> <li>• Vessel shell failure</li> <li>• BLEVE</li> </ul>

Emergency Response Guides	MI Description	Consequence Event
Unit 20A	Unit 20A: LOC from Propane Refrigerant Storage	<ul style="list-style-type: none"> <li>• Flash fire or explosion</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Static Discharge</li> <li>• Cold burns</li> <li>• Asphyxiation</li> <li>• Vessel shell failure</li> <li>• BLEVE</li> </ul>
Unit 20B	Unit 20B: LOC from a Propane Road Tanker during Unloading	<ul style="list-style-type: none"> <li>• Jet Fire or Flash fire</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Static Discharge</li> <li>• Cold burns</li> <li>• Asphyxiation</li> <li>• Tanker shell failure</li> <li>• BLEVE</li> </ul>
Unit 20B2	Unit 20B2: LOC or BLEVE Propane Road Tanker Unloading First Fill - Unit 20	<ul style="list-style-type: none"> <li>• Jet Fire or Flash fire</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Static Discharge</li> <li>• Cold burns</li> <li>• Asphyxiation</li> <li>• Tanker shell failure</li> <li>• Isocontainer failure</li> <li>• BLEVE</li> </ul>
Unit 20C	Unit 20C: LOC of Ethylene from an Isocontainer	<ul style="list-style-type: none"> <li>• Jet Fire or Flash fire</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Static Discharge</li> <li>• Cold burns</li> <li>• Asphyxiation</li> <li>• Isocontainer failure</li> <li>• BLEVE</li> </ul>
Unit 20D	Unit 20D: LOC from Ethylene Refrigerant Storage	<ul style="list-style-type: none"> <li>• Flash fire or explosion</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Static Discharge</li> <li>• Cold burns</li> <li>• Asphyxiation</li> <li>• Vessel shell failure</li> <li>• BLEVE</li> </ul>
Unit 21A	Unit 21A: LOC from NGL Storage and Loading NGL	<ul style="list-style-type: none"> <li>• Flash fire or explosion</li> <li>• Pool fire</li> <li>• Liquid under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Static Discharge</li> <li>• Asphyxiation</li> <li>• Tank failure</li> </ul>
Unit 21B	Unit 21B: Explosion in NGL Storage and Loading Incinerator System	<ul style="list-style-type: none"> <li>• Flash fire or explosion</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Static Discharge</li> <li>• Asphyxiation</li> </ul>

Emergency Response Guides	MI Description	Consequence Event
Unit 22	Unit 22: LOC from Fuel Gas System – Methane Gas	<ul style="list-style-type: none"> <li>• Flash fire or explosion</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Static Discharge</li> <li>• Asphyxiation</li> <li>• Vessel shell failure</li> </ul>
Unit 24A	Unit 24A: LOC or Fire at LNG Storage Tanks	<ul style="list-style-type: none"> <li>• Flash fire or explosion</li> <li>• Pool fire Tank Sump</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Cold burns</li> <li>• High voltage electricity</li> <li>• Steel embrittlement</li> <li>• Falling objects</li> <li>• Injury producing fall</li> <li>• Tank shell failure</li> </ul>
Unit 24B.1	Unit 24B: LOC from LNG Loading Line	<ul style="list-style-type: none"> <li>• Flash fire</li> <li>• Pool fire</li> <li>• Liquid under pressure</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Static Discharge</li> <li>• Asphyxiation</li> <li>• Fall into water</li> <li>• Restricted evacuation</li> <li>• Slipping on ice</li> </ul>
Unit 24B.2	Unit 24B: LOC from LNG Loading Jetty or Ship	<ul style="list-style-type: none"> <li>• Flash fire</li> <li>• Pool fire</li> <li>• Liquid under pressure</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Static Discharge</li> <li>• Cold burns</li> <li>• Asphyxiation</li> <li>• Fall into water</li> <li>• Restricted evacuation</li> <li>• Restricted access</li> <li>• Slipping on ice</li> </ul>
Unit 29	Unit 29: LOC from Effluent Treatment	<ul style="list-style-type: none"> <li>• Flash fire or explosion</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Static discharge</li> <li>• Asphyxiation</li> <li>• Vessel shell failure</li> <li>• Fire water run off</li> </ul>
Unit 31	Unit 31: LOC from Fuel Supply in Power Generation	<ul style="list-style-type: none"> <li>• Flash fire or explosion</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Asphyxiation</li> <li>• Vessel shell failure</li> <li>• Hot surfaces</li> <li>• High voltage electricity</li> </ul>
Unit 38B	Unit 38B: Fire or Explosion in Once Through Steam Generator (OTSG) Methane Gas	<ul style="list-style-type: none"> <li>• Flash fire (post explosion)</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Static discharge</li> <li>• Asphyxiation</li> <li>• Hot surfaces</li> </ul>

Emergency Response Guides	MI Description	Consequence Event
Unit 40	Unit 40: Explosion or fire within plant substations and analyser shelters	<ul style="list-style-type: none"> <li>• Flash fire or explosion</li> <li>• Gas under pressure</li> <li>• Ignition of gas</li> <li>• Gas release noise</li> <li>• Static discharge</li> <li>• Asphyxiation</li> </ul>

# Emergency Response Guide

**ERG # 11 Scenario: LOC from Feed Gas Arrival/Inlet Methane Gas - Unit 11**

Scenario Information										
Application	Loss of containment or fire from inlet gas pipeline, valve shelters, pig receiver, inlet separator and associated pipework and equipment - Unit 11									
Causation	Flange leak, pipeline/piping failure, mechanical damage, static discharge, low temperature embrittlement, pigging operations, initial pressurisation pipeline									
Detection	Gas detection system, thermal detection systems, personnel notification									
Key Substances in Scenario										
Substance	Vol. (m <sup>3</sup> )	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%VOL)	AIT (°C)	SG	
Methane - Feed Gas UN # 1971	336	In Unit			2SE	4	05.3 - 15.0	537	55 (air)	
Flare Gas	-	In Area			2YE	4	02.1 - 09.5	450	1.55 (air)	
LNG UN # 1972		In Area			2SE	4/14	5 - 15.0 (vapour)	600	0.43 (H <sub>2</sub> O)	
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)										
LOC	800 m			Fire	1500 m					
Significant Consequences										
Consequence	Control / Precaution									
Flash fire or explosion	No ignition sources, Don't extinguish flame use water to cool exposed structures									
Gas under pressure	Gas detection, stay clear of release streams									
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection									
Gas release noise	Utilise hearing protection remove persons from area									
Static discharge	Minimise movement of personnel and objects in release cloud									
Asphyxiation	Monitor atmosphere and weather conditions. And move to safe location if required.									
Vessel shell failure	Use cooling sprays, do not use water jets which spot cool									
Pyrophoric substances	Use water to cool smouldering debris									
Elemental Mercury	Personal gas detection, breathing apparatus if detected									
Fire water run off	Control fire water runoff from entering waterways									

Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1		400 LPM
FW Monitors	3	2700 LPM	8100 LPM	Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1		4000 LPM
Oscillating FW Monitors	0	1800 LPM		Fire Appliance Foam Trailer Capacity	1		2700 L
FW Hydrants	3	900 LPM	2700 LPM				
FW Hose Reels	1	20 LPM	20 LPM				
Fire Water Tank Capacity			4600000L				
FW Delivery Duration for Incident			425 mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18934 LPM				
Foam Hose Reels							
Foam Application Rate - Solution							
Foam Application Time			LPM				

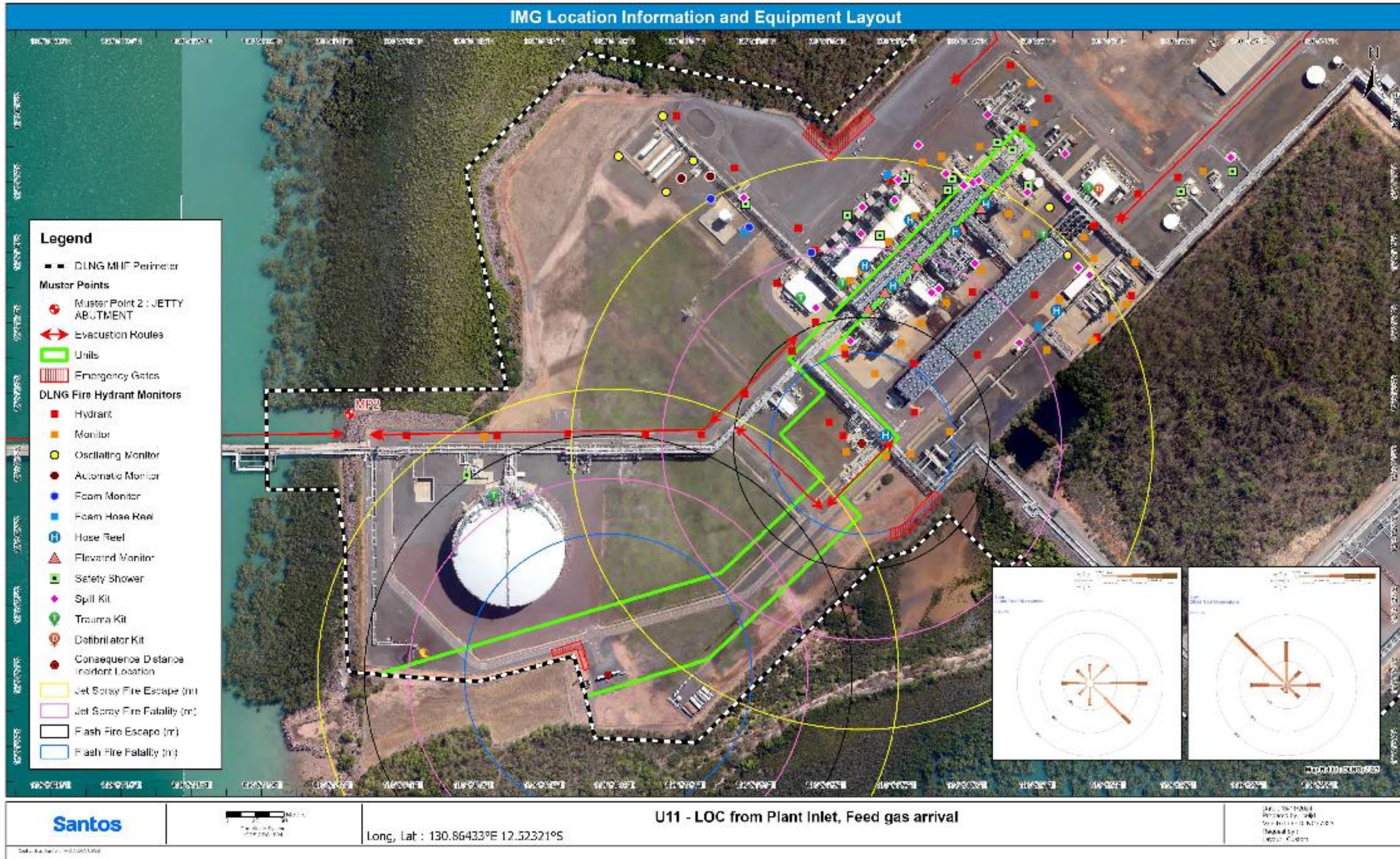
Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	No	Misting System	No
Fixed Monitors	3	HI Ex Foam Sys	No
Hydrants	3	Fixed DCP	No
Water Hose Reels	1	Foam Hose Reels	No

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>Flame Impingement on LNG Rundown pipework to LNG Storage Tank</li> <li>Flame Impingement on Wet/Dry Flare pipework and knock out drums</li> <li>Radiant Heat/Flame Impingement on Marine Flare Structure and LNG Storage Tank</li> <li>Ignition of vegetation fire</li> <li>ESDP and High Flaring rates</li> <li>Fire/Explosion inside/outside Loading Substation</li> </ul>

Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>Commence ESD if required.</li> <li>Initiate site alarm and muster activation procedures.</li> <li>CCTV cameras on location as appropriate.</li> <li>Conduct initial briefing (Summary, Potential, Plan, Tasks).</li> <li>Reduce flaring rate if appropriate to do so.</li> <li>Isolate and de-pressure inventory as appropriate.</li> <li>Identify ERT numbers, assess limitations on response.</li> <li>Mobilise OSC and ERT as/if warranted.</li> <li>Mobilise Paramedic to forward command post as required.</li> <li>Establish local weather conditions and advise OSC.</li> <li>Evaluate exposure impacts &amp; initiate control actions.</li> <li>Notify:                             <ul style="list-style-type: none"> <li>External emergency services</li> <li>OIM</li> <li>PFSO (Port Facilities Security officer)</li> <li>Operations Section Chief.</li> <li>NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>CCR Operator monitor process and escalate issues.</li> <li>Provide regular status updates to OSC.</li> <li>CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>Muster and confirm individual accountability.</li> <li>Minimum PPE requirements for ERT.</li> <li>Provide cooling to pipe rack structure if required.</li> <li>ERT member to escort ahead with gas detector.</li> <li>Establish forward command point and provide SITREP.</li> <li>Confirm unnecessary persons are clear from area.</li> <li>Undertake casualty recovery if required only if safe to do so.</li> <li>Set fixed monitors to protect / cool exposures.</li> <li>Set portable monitors to protect / cool exposures.</li> <li>Use hand lines to protect / cool exposures if required.</li> <li>Provide cooling /protection for auxiliary equipment.</li> <li>Set up water curtains to protect against gas travel.</li> <li>Monitor water runoff for signs of contamination.</li> <li>HAZMAT response according to SDS if applicable.</li> <li>Provide regular SITREP to IMT.</li> <li>Restrict Personnel Access.</li> </ul>

Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li>Update the 1800 Hotline</li> <li>Secure the incident scene for investigation (tape etc)</li> <li>Ensure all documentation is recorded</li> <li>Witness statements, take photos, secure video footage</li> <li>Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li>Conduct de-brief – internal and external</li> <li>Assist with external investigation (WorkSafe, police)</li> <li>Monitor emotional wellbeing and implement support as req</li> </ul>

Considerations
<ul style="list-style-type: none"> <li>Vapours may travel to source of ignition and flash back</li> <li>Change in weather conditions (wind direction)</li> <li>Triage area setup at Medical Centre for multiple IP's</li> </ul>



# Emergency Response Guide

**ERG # 12A Scenario: LOC of Feed Gas from AGRU Methane Gas - Unit 12**

Scenario Information	
Application	Loss of containment of feed gas or fire at acid gas removal area
Causation	Flange leak, piping failure, vessel failure, tank failure, mechanical damage, static discharge, draining activities, high pressure to lower pressure interfaces
Detection	Gas detection system, thermal detection systems, personnel notification

Key Substances in Scenario									
Substance	Vol. (m³)	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL-UFL (%VOL)	AIT (°C)	SG
<b>Feed Gas – Regen Gas</b> UN # 1971	~30	In Area -Unit 12			2SE	4	0.53 - 15.0	537	0.55 (air)
<b>Amine</b> (Activated methyl diethanolamine) UN#	40.8 Liquid	In Area -Unit 12	N/A		N/A	N/A	N/A	280	1.04 (H₂O)

SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)			
LOC	800 m (Flam Gas)	Fire	1500 m (Flam Gas)

Significant Consequences	
Consequence	Control / Precaution
Flash fire or explosion	No ignition sources, don't extinguish flame - use water to cool exposed structures only
Gas under pressure	Gas detection, stay clear of release streams
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection
Gas release noise	Utilise hearing protection remove persons from area
Asphyxiation	Monitor atmosphere and weather conditions and move to safe location if required.
Vessel shell failure	Use cooling sprays, do not use water jets which spot cool
Atmospheric Tank shell failure	Appoint a spotter to observe for signs of failure if suspected. Use cooling sprays, do not use water jets which spot cool. Evacuate area and retreat to CCA if suspected
Pyrophoric substances	Use water to cool smouldering debris
Elemental Mercury	Contain Hg, utilise PPE including respiratory protection and gloves as appropriate
Fire water run off	Control fire water runoff from entering waterways

Installed Fixed Fire Water/Foam Delivery			Portable Fire Water/Foam Delivery				
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure (HL400 model) (40 bar)	1		400 LPM
FW Monitors	5	2700 LPM	13500 LPM	Fire Appliances FW Monitor – Low Pressure (HL400 model) (10 bar)	1		4000 LPM
Oscillating FW Monitors	1	1800 LPM	1800 LPM	Fire Appliance Foam Trailer Capacity			2700 L
FW Hydrants		900 LPM	LPM				
FW Hose Reels	0	20 LPM	LPM				
Fire Water Tank Capacity			4600000L				
FW Delivery Duration for Incident			300 mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18934 LPM				
Foam Hose Reels							
Foam Application Rate - Solution							
Foam Application Time			LPM				

Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	1	Misting System	No
Fixed Monitors	5	HI Ex Foam Sys	No
Hydrants	No	Fixed DCP	No
Water Hose Reels	No	Foam Hose Reels	No

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>Flame impingement on feed gas line</li> <li>Flame impingement on pipes and structures</li> <li>Flame impingement on amine storage tanks</li> <li>Rupture of Amine Surge Tank and projectiles</li> <li>Fire/thermal decomposition of amine may produce irritating and/or toxic fumes</li> <li>H2S – consider hazards</li> </ul>

Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>Commence ESD if required</li> <li>Initiate site alarm and muster activation procedures</li> <li>CCTV cameras on location as appropriate</li> <li>Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>Reduce flaring rate if appropriate to do so.</li> <li>Isolate and de-pressure inventory as appropriate</li> <li>Identify ERT numbers, assess limitations on response</li> <li>Mobilise OSC and ERT as/if warranted</li> <li>Mobilise Paramedic to forward command post as required</li> <li>Establish local weather conditions and advise OSC</li> <li>Evaluate exposure impacts &amp; initiate control actions</li> <li>Notify:                             <ul style="list-style-type: none"> <li>External emergency services</li> <li>OIM</li> <li>PFSO (Port Facilities Security officer)</li> <li>Operations Section Chief.</li> <li>NT Worksafe (HSE to be contact person if available.</li> </ul> </li> <li>CCR Operator monitor process and escalate issues.</li> <li>Provide regular status updates to OSC</li> <li>CCR to confirm local automatic deluge systems has activated</li> <li>CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>Muster and confirm individual accountability</li> <li>Minimum PPE requirements for ERT</li> <li>Provide cooling to pipe rack structure if required</li> <li>ERT member to escort ahead with gas detector</li> <li>Establish forward command point and provide SITREP</li> <li>Confirm unnecessary persons are clear from area</li> <li>Undertake casualty recovery if required only if safe to do so</li> <li>Set fixed monitors to protect / cool exposures</li> <li>Set portable monitors to protect / cool exposures</li> <li>Use hand lines to protect / cool exposures if required</li> <li>Provide cooling /protection for auxiliary equipment</li> <li>Set up water curtains to protect against gas travel</li> <li>Monitor water runoff for signs of contamination</li> <li>HAZMAT response according to SDS if applicable</li> <li>Provide regular SITREP to IMT</li> <li>Restrict Personnel Access</li> </ul>

Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li>Update the 1800 Hotline</li> <li>Secure the incident scene for investigation (tape etc)</li> <li>Ensure all documentation is recorded</li> <li>Witness statements, take photos, secure video footage</li> <li>Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li>Conduct de-brief – internal and external</li> <li>Assist with external investigation (WorkSafe, police)</li> <li>Monitor emotional wellbeing and implement support as required</li> <li>Reassess work area and re issue permits if safe</li> </ul>

Considerations
<ul style="list-style-type: none"> <li>Vapours may travel to source of ignition and flash back</li> <li>Change in weather conditions (wind direction)</li> <li>Consider spill sumps and containment of spillages.</li> <li>Triage area setup at Medical Centre for multiple IP's</li> </ul>



# Emergency Response Guide

**ERG # 13 Scenario: LOC from Dehydration and Mercury removal Methane gas - Unit 13**

Scenario Information											
Application	Loss of containment of Feed Gas or fire at the mercury removal and dehydration area										
Causation	Flange leak, piping failure, vessel failure, mechanical damage, static discharge										
Detection	Gas detection system, thermal detection systems, personnel notification										
Key Substances in Scenario											
Substance	Vol. (m³)	Exposure	DG Class	GHS			HAZ Code	HB76 Guide	LEL- UFL (%/VOL)	AIT (°C)	SG
<b>Methane - Feed Gas</b> UN # 1971	~15	In Area					2SE	4	5 - 15.0	537	0.55 (air)
<b>Propane</b> UN # 1978	Liquid ~650	Adjacent - Unit 14					2YE	4/11	02.1 - 09.5	450	1.55 (air)
<b>Amine</b> (Activated methyl diethanolamine) UN # N/A	40.8 Liquid	Adjacent - Unit 12	N/A				N/A	N/A	N/A	280	1.04 (H₂O)
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)											
LOC	800 m (Flam Gas)			Fire			1500 m (Flam Liquid)				
Significant Consequence											
Consequence	Control / Precaution										
Flash fire or explosion	No ignition sources, don't extinguish flame - use water to cool exposed structures only										
Gas under pressure	Gas detection, stay clear of release streams										
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection										
Gas release noise	Utilise hearing protection remove persons from area										
Asphyxiation	Monitor atmosphere and weather conditions and move to safe location if required.										
Vessel shell failure	Use cooling sprays, do not use water jets which spot cool										
Pyrophoric substances	Use water to cool smouldering debris										
Mercury	May contain Hg, utilise PPE including respiratory protection and gloves as appropriate										
Hot surfaces	Equipment service temp could be up to 315°C										

Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor - High Pressure [HL400 model] (40 bar)	1		400 LPM
FW Monitors	5	2700 LPM	13500 LPM	Fire Appliances FW Monitor - Low Pressure [HL400 model] (10 bar)	1		4000 LPM
Oscillating FW Monitors	0	1800 LPM	LPM	Fire Appliance Foam Trailer Capacity	1		2700 L
FW Hydrants	0	900 LPM	LPM				
FW Hose Reels	1	20 LPM	20 LPM				
Fire Water Tank Capacity	1		4600000L				
FW Delivery Duration for Incident			340 mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18934 LPM				
Foam Hose Reels							
Foam Application Rate - Solution							
Foam Application Time			LPM				

Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	No	Misting System	No
Fixed Monitors	5	Hi Ex Foam Sys	No
Hydrants	No	Fixed DCP	No
Water Hose Reels	1	Foam Hose Reels	No

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>▪ Flame impingement or Blevé on propane vessels</li> <li>▪ Flame impingement on propane substation</li> <li>▪ Flame impingement on regeneration compressor</li> <li>▪ Radiant heat on CO<sub>2</sub> absorber and regenerator area</li> </ul>

Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>▪ Commence ESD if required</li> <li>▪ Initiate site alarm and muster activation procedures</li> <li>▪ CCTV cameras on location as appropriate</li> <li>▪ Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>▪ Reduce flaring rate if appropriate to do so.</li> <li>▪ Isolate and de-pressure inventory as appropriate</li> <li>▪ Identify ERT numbers, assess limitations on response</li> <li>▪ Mobilise OSC and ERT as/if warranted</li> <li>▪ Mobilise Paramedic to forward command post as required</li> <li>▪ Establish local weather conditions and advise OSC</li> <li>▪ Evaluate exposure impacts &amp; initiate control actions</li> <li>▪ Notify:                             <ul style="list-style-type: none"> <li>○ External emergency services</li> <li>○ OIM</li> <li>○ PFSO (Port Facilities Security officer)</li> <li>○ Operations Section Chief.</li> <li>○ NT Worksafe (HSE to be contact person if available.</li> </ul> </li> <li>▪ CCR Operator monitor process and escalate issues.</li> <li>▪ Provide regular status updates to OSC</li> <li>▪ CCR to confirm local automatic deluge systems has activated</li> <li>▪ CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Muster and confirm individual accountability</li> <li>▪ Minimum PPE requirements for ERT</li> <li>▪ Provide cooling to pipe rack structure if required</li> <li>▪ ERT member to escort ahead with gas detector</li> <li>▪ Establish forward command point and provide SITREP</li> <li>▪ Confirm unnecessary persons are clear from area</li> <li>▪ Undertake casualty recovery if required only if safe to do so</li> <li>▪ Set fixed monitors to protect / cool exposures</li> <li>▪ Set portable monitors to protect / cool exposures</li> <li>▪ Use hand lines to protect / cool exposures if required</li> <li>▪ Provide cooling /protection for auxiliary equipment</li> <li>▪ Set up water curtains to protect against gas travel</li> <li>▪ Monitor water runoff for signs of contamination</li> <li>▪ HAZMAT response according to SDS if applicable</li> <li>▪ Provide regular SITREP to IMT</li> <li>▪ Restrict Personnel Access</li> </ul>

Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li><input type="checkbox"/> Update the 1800 Hotline</li> <li><input type="checkbox"/> Secure the incident scene for investigation (tape etc)</li> <li><input type="checkbox"/> Ensure all documentation is recorded</li> <li><input type="checkbox"/> Witness statements, take photos, secure video footage</li> <li><input type="checkbox"/> Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Conduct de-brief – internal and external</li> <li><input type="checkbox"/> Assist with external investigation (WorkSafe, police)</li> <li><input type="checkbox"/> Monitor emotional wellbeing and implement support as required</li> <li><input type="checkbox"/> Reassess work area and re issue permits if safe</li> </ul>

Considerations
<ul style="list-style-type: none"> <li><input type="checkbox"/> High process temperatures</li> <li><input type="checkbox"/> Vapours may travel to source of ignition and flash back</li> <li><input type="checkbox"/> Change in weather conditions (wind direction)</li> <li><input type="checkbox"/> Triage area setup at Medical Centre for multiple IP's</li> </ul>

Emergency Response Guide

IMG Location Information and Equipment Layout



# Emergency Response Guide

ERG # **14** Scenario: **LOC from Propane Refrigeration Circuit Propane(gas/liquid) and/or Methane Gas**

Scenario Information	
Application	Loss of containment or fire at the Propane Module, Propane Accumulator, Propane Fin Fans, Propane refrigeration compressors/turbines
Causation	Flange leak, piping failure, mechanical damage, static discharge, draining of vessels
Detection	Gas detection system, thermal detection systems, personnel notification

Key Substances in Scenario										
Substance	Vol. (m³)	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%VOL)	AIT (°C)	SG	
<b>Propane</b> UN # 1978	Liquid 650	In Area				2YE	4/14	02.1 - 09.5	450	1.55 (air)
<b>Ethylene</b> UN # 1962	Liquid ~20	In Area				2PE	4/14	02.7 - 36.0	490	0.97 (air)
<b>Feed Gas- Methane</b> UN # 1971	~40	In Area				2SE	4	05.3 - 15.0	537	0.55 (air)

SAA/SNZ HB 76:2010 Minimum Evacuation Distance If exposed)			
LOC	800 m (Flam Gas) 300 m (Flam Liquid)	Fire	1500 m (Flam Gas) 500 m (Flam Liquid)

Significant Consequences	
Consequence	Control / Precaution
Flash fire or explosion	No ignition sources, don't extinguish flame - use water to cool exposed structures only
Gas under pressure	Gas detection, stay clear of release streams
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection
Gas release noise	Utilise hearing protection remove persons from area
Asphyxiation	Monitor atmosphere and weather conditions and move to safe location if required.
Vessel shell failure	Use cooling sprays, do not use water jets which spot cool
BLEVE	Adequate cooling of vessels, be aware of identifying characteristics
Cold Surfaces	Surface temperatures down to -90 °C
Increasing vapour rate	Water will rapidly increase the vaporisation due to warming of the liquid
Structural failure	Cryogenic fire impact will weaken structural members
Slipping on ice	Be aware of ice formed from cryogenic spill

Installed Fixed Fire Water/Foam Delivery			Portable Fire Water/Foam Delivery		
	No	Individual / Total		No	Individual / Total
Deluge System	0	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1	400 LPM
FW Monitors	8	2700 LPM / 21600 LPM	Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1	4000 LPM
Oscillating FW Monitors	2	1800 LPM / 3600 LPM	Fire Appliance Foam Trailer Capacity	1	2700 L
FW Hydrants	7	900 LPM / 6300 LPM			
FW Hose Reels	2	20 LPM / 40 LPM			
Fire Water Tank Capacity	1	460000L			
FW Delivery Duration for Incident		145 mins			
Fire Water Pump Pressure		11.8 bar			
Fire Water Pump Rate	2	9467 LPM / 18934 LPM			
Foam Hose Reels					
Foam Application Rate - Solution	1				
Foam Application Time		LPM			
Gaseous Fire Suppression (CO2) – each compressor turbine package					

Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	2	Misting System	No
Fixed Monitors	8	Hi Ex Foam Sys	No
Hydrants	7	Fixed DCP	No
Water Hose Reels	2	Foam Hose Reels	1
Gaseous fire suppression (CO <sub>2</sub> )			Yes

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable.</p> <p><b>IF SAFE:</b> Minimise environmental impact.</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation.</p> <p><b>IF SAFE:</b> Comply with regulatory commitments.</p> <p><b>IF SAFE:</b> Safeguard reputation.</p>	<ul style="list-style-type: none"> <li>Flame impingement on feed gas line</li> <li>Flame impingement on pipes and structures</li> <li>Flame impingement on other vessels in propane module</li> <li>ESDP</li> <li>Flame impingement on mol sieves / mercury removal units</li> <li>Flame impingement on Unit 15 cold box</li> <li>Flame impingement on propane rack</li> <li>BLEVE of exposed process vessels</li> </ul>

Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>Commence ESD if required</li> <li>Initiate site alarm and muster activation procedures</li> <li>CCTV cameras on location as appropriate</li> <li>Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>Reduce flaring rate if appropriate to do so.</li> <li>Isolate and de-pressure inventory as appropriate</li> <li>Identify ERT numbers, assess limitations on response</li> <li>Mobilise OSC and ERT as/if warranted</li> <li>Mobilise Paramedic to forward command post as required</li> <li>Establish local weather conditions and advise OSC</li> <li>Evaluate exposure impacts &amp; initiate control actions</li> <li>Notify:                             <ul style="list-style-type: none"> <li>External emergency services</li> <li>OIM</li> <li>PFSO (Port Facilities Security officer)</li> <li>Operations Section Chief.</li> <li>NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>CCR Operator monitor process and escalate issues.</li> <li>Provide regular status updates to OSC</li> <li>CCR to confirm local automatic deluge systems has activated</li> <li>CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>Muster and confirm individual accountability</li> <li>Minimum PPE requirements for ERT</li> <li>Provide cooling to pipe rack structure if required</li> <li>ERT member to escort ahead with gas detector</li> <li>Establish forward command point and provide SITREP</li> <li>Confirm unnecessary persons are clear from area</li> <li>Undertake casualty recovery if required only if safe to do so</li> <li>Set fixed monitors to protect / cool exposures</li> <li>Set portable monitors to protect / cool exposures</li> <li>Use hand lines to protect / cool exposures if required</li> <li>Provide cooling /protection for auxiliary equipment</li> <li>Set up water curtains to protect against gas travel</li> <li>Monitor water runoff for signs of contamination</li> <li>HAZMAT response according to SDS if applicable</li> <li>Provide regular SITREP to IMT</li> <li>Restrict Personnel Access</li> </ul>

Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li>Update the 1800 Hotline</li> <li>Secure the incident scene for investigation (tape etc)</li> <li>Ensure all documentation is recorded</li> <li>Witness statements, take photos, secure video footage</li> <li>Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li>Conduct de-brief – internal and external</li> <li>Assist with external investigation (WorkSafe, police)</li> <li>Monitor emotional wellbeing and implement support as req</li> <li>Reassess work area and re issue permits if safe</li> </ul>

Considerations
<ul style="list-style-type: none"> <li>Vapours may travel to source of ignition and flash back</li> <li>Change in weather conditions (wind direction)</li> <li>Triage area setup at Medical Centre for multiple IP's</li> <li>Consider spill sumps and containment of spillages.</li> </ul>

Emergency Response Guide



# Emergency Response Guide

**ERG # 15 Scenario: LOC from Ethylene Refrigeration Circuit Ethylene (gas/liquid) and Methane Gas – Unit 15**

Scenario Information									
Application	Loss of containment or fire at the Ethylene Cold Box, Ethylene vessels/pipework outside cold box, Ethylene refrigeration compressors/turbines								
Causation	Flange leak, piping failure, vessel failure, heat exchanger failure, mechanical damage, static discharge								
Detection	Gas detection system, thermal detection systems, personnel notification								
Key Substances in Scenario									
Substance	Vol. (m³)	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%VOL)	AIT (°C)	SG
<b>Ethylene</b> UN # 1962	Liquid ~250	In Area -Unit 15			2PE	4/14	2.7 - 36.0	490	0.97 (air)
<b>Feed Gas- Methane</b> UN # 1971	~400	In Area 15/16			2SE	4	5 - 15.0	537	0.55 (air)
<b>LNG</b> UN# 1972	Liquid ~60	In Area - Unit 16			2SE	14	5 - 15.0 (vapour)	600	0.43 (H₂O)
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)									
LOC	800 m (Flam Gas) 300 m (Flam Liquid)			Fire	1500 m (Flam Gas) 500 m (Flam Liquid)				
Significant Consequences									
Consequence	Control / Precaution								
Flash fire or explosion	No ignition sources, don't extinguish flame - use water to cool exposed structures only								
Gas under pressure	Gas detection, stay clear of release streams								
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection								
Gas release noise	Utilise hearing protection remove persons from area								
Asphyxiation	Monitor atmosphere and weather conditions and move to safe location if required.								
Vessel shell failure	Use cooling sprays, do not use water jets which spot cool								
BLEVE	Adequate cooling of vessels, be aware of identifying characteristics								
Cold Surfaces	Surface temperatures down to -183 °C								
Increasing vapour rate	Water will rapidly increase the vaporisation due to warming the liquid								
Structural failure	Cryogenic a fire impact will both weaken structural members								
Slipping on ice	Be aware of ice formed from cryogenic spill								

Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1		400 LPM
FW Monitors	5	2700 LPM	13500 LPM	Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1		4000 LPM
Oscillating FW Monitors	0	1800 LPM	LPM	Fire Appliance Foam Trailer Capacity	1		2700 L
FW Hydrants	1	900 LPM	90 LPM				
FW Hose Reels	0	20 LPM	LPM				
Fire Water Tank Capacity	1		4600000L				
FW Delivery Duration for Incident			338 mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18934 LPM				
Foam Hose Reels							
Foam Application Rate - Solution							
Foam Application Time		LPM	LPM				
Gaseous Fire Suppression (CO2) – each compressor turbine package							

Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	No	Misting System	No
Fixed Monitors	5	Hi Ex Foam Sys	No
Hydrants	1	Fixed DCP	No
Water Hose Reels	No	Foam Hose Reels	No
Gaseous fire suppression (CO₂)			Yes

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Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>Flame impingement on cryogenic pipe rack piping and structures</li> <li>Flame impingement on adjacent Unit 16 cold box</li> <li>Flame impingement on propane pipe rack</li> <li>Flame impingement on LNG rundown line</li> <li>Radiant heat exposure on propane module</li> <li>Release Ethylene/Nitrogen from Cold Box Vent</li> <li>ESDP</li> </ul>
Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>Commence ESD if required</li> <li>Initiate site alarm and muster activation procedures</li> <li>CCTV cameras on location as appropriate</li> <li>Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>Reduce flaring rate if appropriate to do so.</li> <li>Isolate and de-pressure inventory as appropriate</li> <li>Identify ERT numbers, assess limitations on response</li> <li>Mobilise OSC and ERT as/if warranted</li> <li>Mobilise Paramedic to forward command post as required</li> <li>Establish local weather conditions and advise OSC</li> <li>Evaluate exposure impacts &amp; initiate control actions</li> <li>Notify:                             <ul style="list-style-type: none"> <li>External emergency services</li> <li>OIM</li> <li>PFSO (Port Facilities Security officer)</li> <li>Operations Section Chief.</li> <li>NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>CCR Operator monitor process and escalate issues.</li> <li>Provide regular status updates to OSC</li> <li>CCR to confirm local automatic deluge systems has activated</li> <li>CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>Muster and confirm individual accountability</li> <li>Minimum PPE requirements for ERT</li> <li>Provide cooling to pipe rack structure if required</li> <li>ERT member to escort ahead with gas detector</li> <li>Establish forward command point and provide SITREP</li> <li>Confirm unnecessary persons are clear from area</li> <li>Undertake casualty recovery if required only if safe to do so</li> <li>Set fixed monitors to protect / cool exposures</li> <li>Set portable monitors to protect / cool exposures</li> <li>Use hand lines to protect / cool exposures if required</li> <li>Provide cooling /protection for auxiliary equipment</li> <li>Set up water curtains to protect against gas travel</li> <li>Monitor water runoff for signs of contamination</li> <li>HAZMAT response according to SDS if applicable</li> <li>Provide regular SITREP to IMT</li> <li>Restrict Personnel Access</li> </ul>
Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li>Update the 1800 Hotline</li> <li>Secure the incident scene for investigation (tape etc)</li> <li>Ensure all documentation is recorded</li> <li>Witness statements, take photos, secure video footage</li> <li>Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li>Conduct de-brief – internal and external</li> <li>Assist with external investigation (WorkSafe, police)</li> <li>Monitor emotional wellbeing and implement support as req</li> <li>Reassess work area and re issue permits if safe</li> </ul>
Considerations	
<ul style="list-style-type: none"> <li>Consider spill sumps and containment of spillages.</li> <li>Vapours may travel to source of ignition and flash back</li> <li>Change in weather conditions (wind direction)</li> <li>Triage area setup at Medical Centre for multiple IP's</li> </ul>	

# Emergency Response Guide

## IMG Location Information and Equipment Layout



# Emergency Response Guide

**ERG # 16 Scenario: LOC from Methane Coldbox Circuit Methane Gas and LNG – Unit 16**

Scenario Information										
Application	Loss of containment or fire at the Methane Cold Box, Methane vessels/pipework outside cold box, Methane refrigeration compressors/turbines, LNG rundown line									
Causation	Flange leak, piping failure, vessel failure, heat exchanger failure, mechanical damage, static discharge									
Detection	Gas detection system, thermal detection systems, personnel notification									
Key Substances in Scenario										
Substance	Vol. (m³)	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%VOL)	AIT (°C)	SG	
LNG UN# 1972	Liquid 1100	In Area Unit 16				2SE	4/11	5 -15.0 (vapour)	600	0.43 (H2O)
Ethylene UN # 1962	Liquid ~200	In Area -15/16				2PE	4/11	2.7 - 36.0	490	0.97 (air)
Feed Gas- Methane UN # 1971		In Area 15/16				2SE	4	5 - 15.0	537	0.55 (air)
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)										
LOC	800 m (Flam Gas) 300 m (Flam Liquid)			Fire	1500 m (Flam Gas) 500 m (Flam Liquid)					
Significant Consequences										
Consequence	Control / Precaution									
Flash fire or explosion	No ignition sources, don't extinguish flame - use water to cool exposed structures only									
Gas under pressure	Gas detection, stay clear of release streams									
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection									
Gas release noise	Utilise hearing protection remove persons from area									
Asphyxiation	Monitor atmosphere and weather conditions and move to safe location if required.									
Vessel shell failure	Use cooling sprays, do not use water jets which spot cool									
BLEVE	Adequate cooling of vessels, be aware of identifying characteristics									
Cold Surfaces	Surface temperatures down to -183 °C									
Increasing vapour rate	Water will rapidly increase the vaporisation of LNG due to warming the liquid									
Structural failure	Cryogenic a fire impact will both weaken structural members									
Slipping on ice	Be aware of ice formed from cryogenic spill									

Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1		400 LPM
FW Monitors	6	2700 LPM	16200 LPM	Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1		4000 LPM
Oscillating FW Monitors	0	1800 LPM		Fire Appliance Foam Trailer Capacity			2700 L
FW Hydrants	2	900 LPM	1800 LPM				
FW Hose Reels	2	20 LPM	40 LPM				
Fire Water Tank Capacity	1		4600000L				
FW Delivery Duration for Incident			255 mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18934 LPM				
Foam Hose Reels	1						
Foam Application Rate - Solution							
Foam Application Time		LPM	LPM				
Gaseous Fire Suppression (CO2) – each compressor turbine package							

Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	No	Misting System	No
Fixed Monitors	6	Hi Ex Foam Sys	No
Hydrants	2	Fixed DCP	No
Water Hose Reels	2	Foam Hose Reels	No
Gaseous fire suppression (CO2)	Yes	Foam Monitor	1

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Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>Flame impingement on cryogenic pipe rack piping and structures</li> <li>Flame impingement on adjacent Unit 15 cold box</li> <li>Flame impingement on Unit 17 vessels, heat exchangers and pipework</li> <li>Flame impingement on LNG rundown line</li> <li>Cold liquid in LNG Process Area Spill Containment Sump with potential pool fire</li> <li>Release Methane/Nitrogen from Cold Box Vent</li> <li>ESDP</li> </ul>
Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>Commence ESD if required</li> <li>Initiate site alarm and muster activation procedures</li> <li>CCTV cameras on location as appropriate</li> <li>Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>Reduce flaring rate if appropriate to do so.</li> <li>Isolate and de-pressure inventory as appropriate</li> <li>Identify ERT numbers, assess limitations on response</li> <li>Mobilise OSC and ERT as/if warranted</li> <li>Mobilise Paramedic to forward command post as required</li> <li>Establish local weather conditions and advise OSC</li> <li>Evaluate exposure impacts &amp; initiate control actions</li> <li>Notify:                             <ul style="list-style-type: none"> <li>External emergency services</li> <li>OIM</li> <li>PFSO (Port Facilities Security officer)</li> <li>Operations Section Chief.</li> <li>NT Worksafe (HSE to be contact person if available.</li> </ul> </li> <li>CCR Operator monitor process and escalate issues.</li> <li>Provide regular status updates to OSC</li> <li>CCR to confirm local automatic deluge systems has activated</li> <li>CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>Muster and confirm individual accountability</li> <li>Minimum PPE requirements for ERT</li> <li>Provide cooling to pipe rack structure if required</li> <li>ERT member to escort ahead with gas detector</li> <li>Establish forward command point and provide SITREP</li> <li>Confirm unnecessary persons are clear from area</li> <li>Undertake casualty recovery if required only if safe to do so</li> <li>Set fixed monitors to protect / cool exposures</li> <li>Set portable monitors to protect / cool exposures</li> <li>Use hand lines to protect / cool exposures if required</li> <li>Provide cooling /protection for auxiliary equipment</li> <li>Set up water curtains to protect against gas travel</li> <li>Monitor water runoff for signs of contamination</li> <li>HAZMAT response according to SDS if applicable</li> <li>Provide regular SITREP to IMT</li> <li>Restrict Personnel Access</li> </ul>
Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li>Update the 1800 Hotline</li> <li>Secure the incident scene for investigation (tape etc)</li> <li>Ensure all documentation is recorded</li> <li>Witness statements, take photos, secure video footage</li> <li>Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li>Conduct de-brief – internal and external</li> <li>Assist with external investigation (WorkSafe, police)</li> <li>Monitor emotional wellbeing and implement support as req</li> <li>Reassess work area and re issue permits if safe</li> </ul>
Considerations	
<ul style="list-style-type: none"> <li>Consider spill sumps and containment of spillages.</li> <li>Vapours may travel to source of ignition and flash back</li> <li>Change in weather conditions (wind direction)</li> <li>Triage area setup at Medical Centre for multiple IP's</li> </ul>	



# Emergency Response Guide

Scenario Information										
Application	Loss of containment or fire from heavies removal column / heat exchanger between Unit 15 and 16 cold boxes or natural gas liquids stabiliser and associated pipework and equipment at end of LNG train									
Causation	Flange leak, piping failure, mechanical damage, static discharge, low temperature embrittlement									
Detection	Gas detection system, thermal detection systems, personnel notification									
Key Substances in Scenario										
Substance	Vol. (m <sup>3</sup> )	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (% VOL)	AIT (°C)	SG	
<b>Methane Feed Gas</b>		In Unit			2SE	4	05.3 - 15.0	537	55 (air)	
<b>Natural Gas Liquids</b>		In Unit			3YE	4/14	1 - 10	450	0.5 - 0.7	
<b>Ethylene</b>		In Area			2PE	4/14	2.7 - 36.0	490	0.97 (air)	
<b>LNG</b>		In Area			2SE	4/14	5 - 15.0 (vapour)	600	0.43 (H <sub>2</sub> O)	
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)										
LOC	800 m (Gas) 300 m (Flam Liquid)			Fire	1500 m (Gas) 500 m (Flam Liquid)					
Significant Consequences										
Consequence	Control / Precaution									
Flash fire or explosion	No ignition sources, don't extinguish flame - use water to cool exposed structures									
Gas under pressure	Gas detection, stay clear of release streams									
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection									
Gas release noise	Utilise hearing protection remove persons from area									
Static discharge	Minimise movement of personnel and objects in release cloud									
Cold burns	Avoid contact with liquid substances,									
Asphyxiation	Monitor atmosphere and weather conditions and move to safe location if required									
Vessel shell failure	Use cooling sprays, not use water jets which spot cool									
Structural failure	Cryogenic a fire impact will both weaken structural members									
Slipping on ice	Be aware of ice formed from cryogenic spill									

Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1		400 LPM
FW Monitors	6	2700 LPM	16200 LPM	Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1		4000 LPM
Oscillating FW Monitors	0	1800 LPM		Fire Appliance Foam Trailer Capacity	1		2700 L
FW Hydrants	2	900 LPM	1800 LPM				
FW Hose Reels	1	20 LPM	20 LPM				
Fire Water Tank Capacity			4600000L				
FW Delivery Duration for Incident			255 mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18934 LPM				
Foam Hose Reels							
Foam Application Rate - Solution							
Foam Application Time			LPM				

Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	No	Misting System	No
Fixed Monitors	6	Hi Ex Foam Sys	No
Hydrants	2	Fixed DCP	No
Water Hose Reels	1	Foam Hose Reels	No

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Version: 0.1 / Document Number: DLNG/HSE/ER/002

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel  <b>ALWAYS:</b> Account for all people, treat if required  <b>ALWAYS:</b> Alert emergency response agencies  <b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable  <b>IF SAFE:</b> Minimise environmental impact  <b>IF SAFE:</b> Protect assets and minimise escalation  <b>IF SAFE:</b> Comply with regulatory commitments  <b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>Flame impingement on cryogenic pipe rack piping and structures</li> <li>Flame impingement on adjacent Unit 15 and Unit 16 cold boxes</li> <li>Radiant heat exposure on ethylene / methane modules</li> </ul>
Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>Commence ESD if required.</li> <li>Initiate site alarm and muster activation procedures.</li> <li>CCTV cameras on location as appropriate.</li> <li>Conduct initial briefing (Summary, Potential, Plan, Tasks).</li> <li>Reduce flaring rate if appropriate to do so.</li> <li>Isolate and de-pressure inventory as appropriate.</li> <li>Identify ERT numbers, assess limitations on response.</li> <li>Mobilise OSC and ERT as/if warranted.</li> <li>Mobilise Paramedic to forward command post as required.</li> <li>Establish local weather conditions and advise OSC.</li> <li>Evaluate exposure impacts &amp; initiate control actions.</li> <li>Notify:                             <ul style="list-style-type: none"> <li>External emergency services</li> <li>OIM</li> <li>PFSO (Port Facilities Security officer)</li> <li>Operations Section Chief.</li> <li>NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>CCR Operator monitor process and escalate issues.</li> <li>Provide regular status updates to OSC.</li> <li>CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>Muster and confirm individual accountability.</li> <li>Minimum PPE requirements for ERT.</li> <li>Provide cooling to pipe rack structure if required.</li> <li>ERT member to escort ahead with gas detector.</li> <li>Establish forward command point and provide SITREP.</li> <li>Confirm unnecessary persons are clear from area.</li> <li>Undertake casualty recovery if required only if safe to do so.</li> <li>Set fixed monitors to protect / cool exposures.</li> <li>Set portable monitors to protect / cool exposures.</li> <li>Use hand lines to protect / cool exposures if required.</li> <li>Provide cooling /protection for auxiliary equipment.</li> <li>Set up water curtains to protect against gas travel.</li> <li>Monitor water runoff for signs of contamination.</li> <li>HAZMAT response according to SDS if applicable.</li> <li>Provide regular SITREP to IMT.</li> <li>Restrict Personnel Access.</li> </ul>
Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li>Update the 1800 Hotline</li> <li>Secure the incident scene for investigation (tape etc)</li> <li>Ensure all documentation is recorded</li> <li>Witness statements, take photos, secure video footage</li> <li>Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li>Conduct de-brief – internal and external</li> <li>Assist with external investigation (WorkSafe, police)</li> <li>Monitor emotional wellbeing and implement support as req</li> </ul>
Considerations	
<ul style="list-style-type: none"> <li>Vapours may travel to source of ignition and flash back</li> <li>Change in weather conditions (wind direction)</li> <li>Triage area setup at Medical Centre for multiple IP's</li> </ul>	

IMG Location Information and Equipment Layout



# Emergency Response Guide

**ERG # 19A.1 Scenario: LOC from Ground Flare System - Unit 19**

Scenario Information	
Application	LOC or fire at wet/dry flare knockout drums or flare headers from LNG Train/Refrigerant Storage
Causation	Flange leak, piping failure, mechanical damage, static discharge, flare protection system failure, escalation from a major incident
Detection	Fire & Gas detection system, personnel notification

Key Substances in Scenario									
Substance	Vol. (m³)	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%/VOL)	AIT (°C)	SG
Flare Gas	-	In Area			2YE	4	02.1 - 09.5	450	1.55 (air)
Propane	-	In Area			2YE	4	02.1 - 09.5	450	1.55 (air)
UN # 1978									
Ethylene	-	In Area			2PE	4	02.7 - 36.0	490	0.97 (air)

SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)			
LOC	800 m (Flam Gas) 300 m (Flam Liquid)	Fire	1500 m (Flam Gas) 500 m (Flam Liquid)

Significant Consequences	
Consequence	Control / Precaution
Flash fire/Spray Fire	No ignition sources, don't extinguish flame - use water to cool exposed structures only
Gas under pressure	Gas detection, stay clear of release streams
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection
Gas release noise	Utilise hearing protection remove persons from area
Asphyxiation	Monitor atmosphere and weather conditions and move to safe location if required.
Fire spread	Avoid water in straight hose stream; will scatter and spread fire
High Voltage Electricity	Ensure isolation before initiating rescue or firefighting actions

Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor - High Pressure [HL400 model] (40 bar)	1		400 LPM
FW Monitors	4	2700 LPM	10800 LPM	Fire Appliances FW Monitor - Low Pressure [HL400 model] (10 bar)	1		4000 LPM
Oscillating FW Monitors	0	1800 LPM		Fire Appliance Foam Trailer Capacity	1		2700 L
FW Hydrants	8	900 LPM	7200 LPM				
FW Hose Reels	1	20 LPM	20 LPM				
Fire Water Tank Capacity	1		4600000L				
FW Delivery Duration for Incident			255 mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18934 LPM				
Foam Hose Reels							
Foam Application Rate - Solution							
Foam Application Time		LPM	LPM				

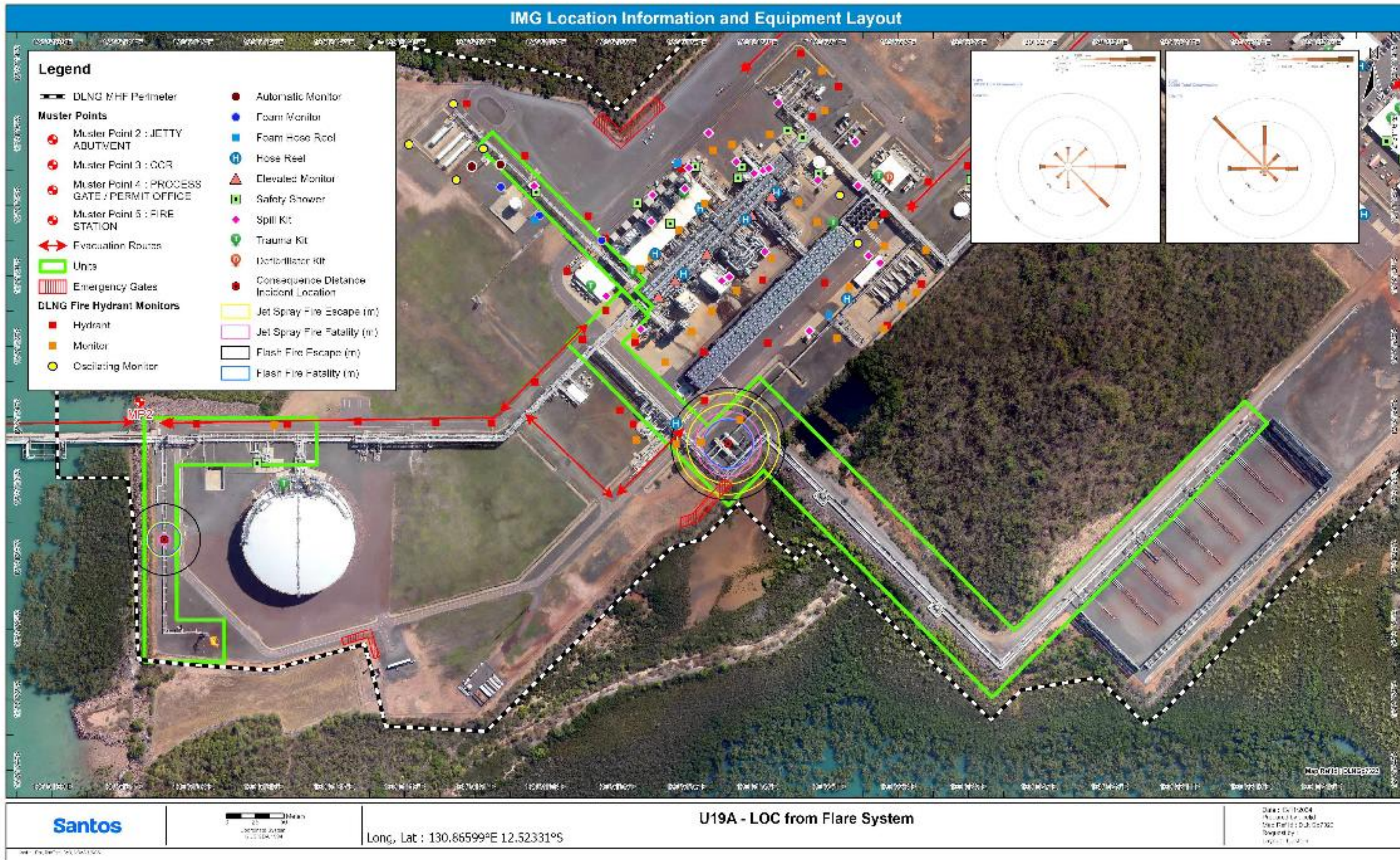
Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	No	Misting System	No
Fixed Monitors	4	Hi Ex Foam Sys	No
Hydrants	8	Fixed DCP	No
Water Hose Reels	1	Foam Hose Reels	No

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>Fire and/or explosion</li> <li>Flame impingement on pipe rack and structures</li> <li>Recovery of persons to grade if required</li> <li>Ignition of vegetation fire</li> <li>ESDP</li> <li>Increase backpressure on sources to flare</li> </ul>

Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>Commence ESD if required</li> <li>Initiate site alarm and muster activation procedures</li> <li>CCTV cameras on location as appropriate</li> <li>Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>Reduce flaring rate if appropriate to do so.</li> <li>Isolate and de-pressure inventory as appropriate</li> <li>Identify ERT numbers, assess limitations on response</li> <li>Mobilise OSC and ERT as/if warranted</li> <li>Mobilise Paramedic to forward command post as required</li> <li>Establish local weather conditions and advise OSC</li> <li>Evaluate exposure impacts &amp; initiate control actions</li> <li>Notify:                             <ul style="list-style-type: none"> <li>External emergency services</li> <li>OIM</li> <li>PFSO (Port Facilities Security officer)</li> <li>Operations Section Chief.</li> <li>NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>CCR Operator monitor process and escalate issues.</li> <li>Provide regular status updates to OSC</li> <li>CCR to confirm local automatic deluge systems has activated</li> <li>CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>Muster and confirm individual accountability</li> <li>Minimum PPE requirements for ERT</li> <li>Provide cooling to pipe rack structure if required</li> <li>ERT member to escort ahead with gas detector</li> <li>Establish forward command point and provide SITREP</li> <li>Confirm unnecessary persons are clear from area</li> <li>Undertake casualty recovery if required only if safe to do so</li> <li>Set fixed monitors to protect / cool exposures</li> <li>Set portable monitors to protect / cool exposures</li> <li>Use hand lines to protect / cool exposures if required</li> <li>Provide cooling /protection for auxiliary equipment</li> <li>Set up water curtains to protect against gas travel</li> <li>Monitor water runoff for signs of contamination</li> <li>HAZMAT response according to SDS if applicable</li> <li>Provide regular SITREP to IMT</li> <li>Restrict Personnel Access</li> </ul>

Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li>Update the 1800 Hotline</li> <li>Secure the incident scene for investigation (tape etc)</li> <li>Ensure all documentation is recorded</li> <li>Witness statements, take photos, secure video footage</li> <li>Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li>Conduct de-brief - internal and external</li> <li>Assist with external investigation (WorkSafe, police)</li> <li>Monitor emotional wellbeing and implement support as required.</li> <li>Reassess work area and re issue permits if safe</li> </ul>

Considerations
<ul style="list-style-type: none"> <li>Vapours may travel to source of ignition and flash back</li> <li>Change in weather conditions (wind direction)</li> <li>Triage area setup at Medical Centre for multiple IP's</li> </ul>



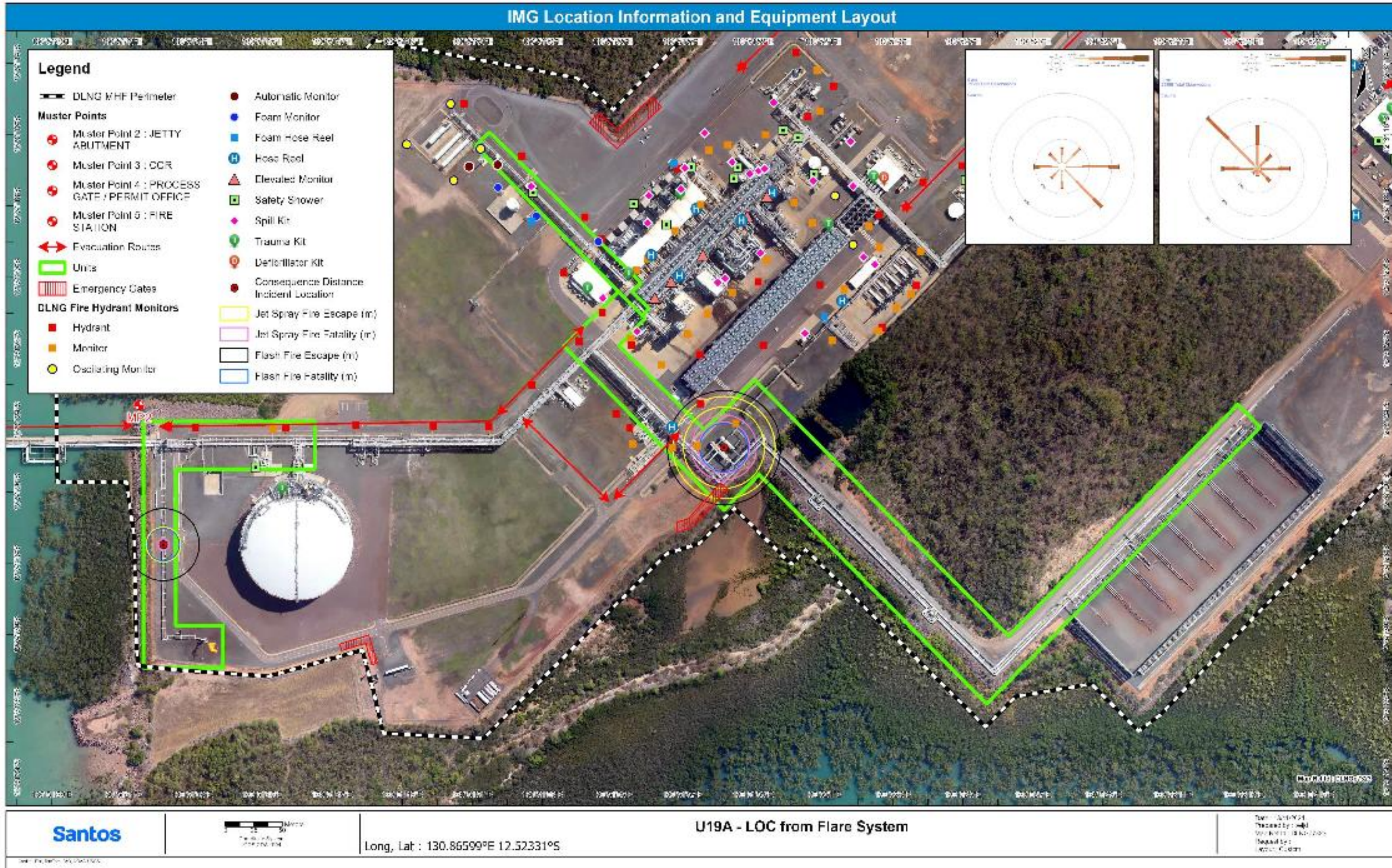
# Emergency Response Guide

**ERG # 19A.2 Scenario: LOC from Marine Flare System - Unit 19**

Scenario Information									
Application	LOC or fire at marine flare header pipework or marine flare stack								
Causation	Flange leak, piping failure, mechanical damage, static discharge, flare protection system failure								
Detection	Fire & Gas detection system, personnel notification								
Key Substances in Scenario									
Substance	Vol. (m³)	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%/VOL)	AIT (°C)	SG
<b>Flare Gas</b>		In Area		 	2YE	4	02.1 - 09.5	450	1.55 (air)
<b>Propane</b> UN # 1978		In Area		 	2YE	4	02.1 - 09.5	450	1.55 (air)
<b>Ethylene</b> UN# 1962		In Area		 	2PE	4	02.7 - 36.0	490	0.97 (air)
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)									
LOC	800 m (Flam Gas)			Fire	1500 m (Flam Liquid)				
Significant Consequences									
Consequence	Control / Precaution								
Flash fire	No ignition sources, don't extinguish flame - use water to cool exposed structures only								
Gas under pressure	Gas detection, stay clear of release streams								
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection								
Gas release noise	Utilise hearing protection remove persons from area								
Asphyxiation	Monitor atmosphere and weather conditions and move to safe location if required.								
Fire spread	Avoid water in straight hose stream; will scatter and spread fire								
High Voltage Electricity	Ensure isolation before initiating rescue or firefighting actions								
Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery					
	No	Individual	Total		No	Individual	Total		
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor - High Pressure (HL400 model) (40 bar)	1		400 LPM		
FW Monitors	1	2700 LPM	2700 LPM	Fire Appliances FW Monitor - Low Pressure (HL400 model) (10 bar)	1		4000 LPM		
Oscillating FW Monitors	0	1800 LPM		Fire Appliance Foam Trailer Capacity			2700 L		
FW Hydrants	2	900 LPM	1800 LPM						
FW Hose Reels	0	20 LPM	LPM						
Fire Water Tank Capacity	1		4600000L						
FW Delivery Duration for Incident			1022 mins						
Fire Water Pump Pressure			11.8 bar						
Fire Water Pump Rate	2	9467 LPM	18394 LPM						
Foam Hose Reels									
Foam Application Rate - Solution									
Foam Application Time		LPM	LPM						
Installed Protection Equipment									
Deluge Activation	No	Sprinkler	No						
Auto Osc Monitor	No	Misting System	No						
Fixed Monitors	1	Hi Ex Foam Sys	No						
Hydrants	2	Fixed DCP	No						
Water Hose Reels	No	Foam Hose Reels	No						

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel  <b>ALWAYS:</b> Account for all people, treat if required  <b>ALWAYS:</b> Alert emergency response agencies  <b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable  <b>IF SAFE:</b> Minimise environmental impact  <b>IF SAFE:</b> Protect assets and minimise escalation  <b>IF SAFE:</b> Comply with regulatory commitments  <b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>▪ Fire and explosion</li> <li>▪ Flame impingement on pipe rack and structures</li> <li>▪ Radiant Heat from Marine Flare</li> <li>▪ Flame Impingement on Marine Flare Structure</li> <li>▪ Recovery of persons to grade if required</li> <li>▪ Ignition of vegetation fire</li> <li>▪ ESDP</li> <li>▪ Increase backpressure on sources to flare</li> </ul>
Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>▪ Commence ESD if required</li> <li>▪ Initiate site alarm and muster activation procedures</li> <li>▪ CCTV cameras on location as appropriate</li> <li>▪ Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>▪ Reduce flaring rate if appropriate to do so.</li> <li>▪ Isolate and de-pressure inventory as appropriate</li> <li>▪ Identify ERT numbers, assess limitations on response</li> <li>▪ Mobilise OSC and ERT as/if warranted</li> <li>▪ Mobilise Paramedic to forward command post as required</li> <li>▪ Establish local weather conditions and advise OSC</li> <li>▪ Evaluate exposure impacts &amp; initiate control actions</li> <li>▪ Notify:                             <ul style="list-style-type: none"> <li>o External emergency services</li> <li>o OIM</li> <li>o PFSO (Port Facilities Security officer)</li> <li>o Operations Section Chief.</li> <li>o NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>▪ CCR Operator monitor process and escalate issues.</li> <li>▪ Provide regular status updates to OSC</li> <li>▪ CCR to confirm local automatic deluge systems has activated</li> <li>▪ CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Muster and confirm individual accountability</li> <li>▪ Minimum PPE requirements for ERT</li> <li>▪ Provide cooling to pipe rack structure if required</li> <li>▪ ERT member to escort ahead with gas detector</li> <li>▪ Establish forward command point and provide SITREP</li> <li>▪ Confirm unnecessary persons are clear from area</li> <li>▪ Undertake casualty recovery if required only if safe to do so</li> <li>▪ Set fixed monitors to protect / cool exposures</li> <li>▪ Set portable monitors to protect / cool exposures</li> <li>▪ Use hand lines to protect / cool exposures if required</li> <li>▪ Provide cooling /protection for auxiliary equipment</li> <li>▪ Set up water curtains to protect against gas travel</li> <li>▪ Monitor water runoff for signs of contamination</li> <li>▪ HAZMAT response according to SDS if applicable</li> <li>▪ Provide regular SITREP to IMT</li> <li>▪ Restrict Personnel Access</li> </ul>
Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li><input type="checkbox"/> Update the 1800 Hotline</li> <li><input type="checkbox"/> Secure the incident scene for investigation (tape etc)</li> <li><input type="checkbox"/> Ensure all documentation is recorded</li> <li><input type="checkbox"/> Witness statements, take photos, secure video footage</li> <li><input type="checkbox"/> Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Conduct de-brief – internal and external</li> <li><input type="checkbox"/> Assist with external investigation (WorkSafe, police)</li> <li><input type="checkbox"/> Monitor emotional wellbeing and implement support as req</li> <li><input type="checkbox"/> Reassess work area and re issue permits if safe</li> </ul>
Considerations	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Vapours may travel to source of ignition and flash back</li> <li><input type="checkbox"/> Change in weather conditions (wind direction)</li> <li><input type="checkbox"/> Triage area setup at Medical Centre for multiple IP's</li> <li><input type="checkbox"/> Consider what to do with ship loading activities if alongside.</li> </ul>	

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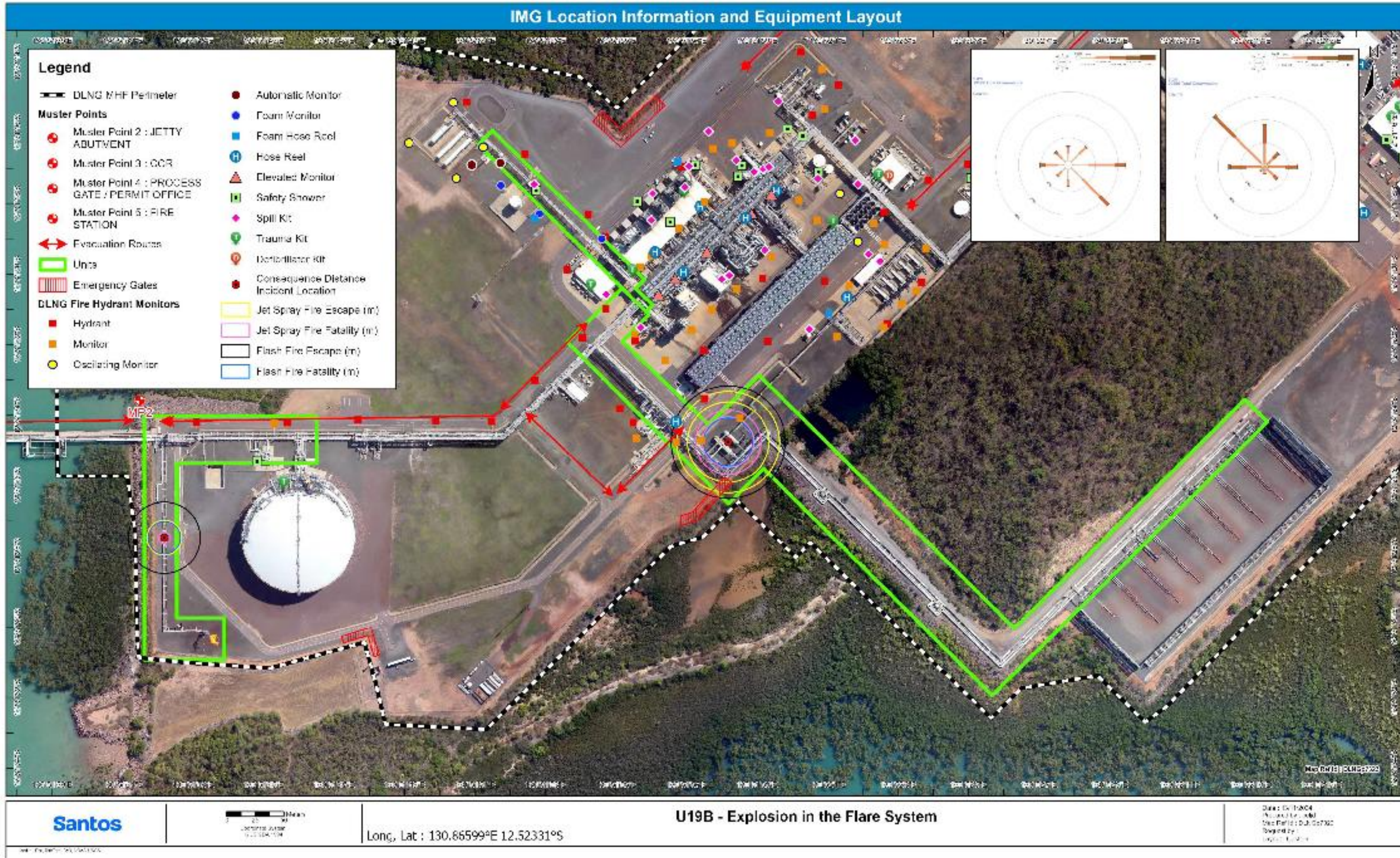
# Emergency Response Guide

**ERG # 19B.1 Scenario: Explosion in the Ground Flare System - Unit 19**

Scenario Information									
Application	LOC or explosion wet/dry flare headers from LNG Train or Refrigerant Storage								
Causation	Flare protection system failure, escalation from a major incident								
Detection	Gas detection system, thermal detection systems, personnel notification								
Key Substances in Scenario									
Substance	Vol. (m³)	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%VOL)	AIT (°C)	SG
Flare Gas		In Area			2YE	4	02.1 - 09.5	450	1.55 (air)
Propane		In Area			2YE	4	02.1 - 09.5	450	1.55 (air)
UN # 1978									
Ethylene		In Area			2PE	4	02.7 - 36.0	490	0.97 (air)
UN # 1962									
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)									
LOC	800 m (Flam Gas)			Fire	1500 m (Flam Gas)				
Significant Consequences									
Consequence	Control / Precaution								
Flash fire (post explosion)	No ignition sources, don't extinguish flame - use water to cool exposed structures only								
Gas under pressure	Gas detection, stay clear of release streams								
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection								
Gas release noise	Utilise hearing protection remove persons from area								
Asphyxiation	Monitor atmosphere and weather conditions and move to safe location if required.								
Fire spread	Avoid water in straight hose stream; will scatter and spread fire								
High Voltage Electricity	Ensure isolation before initiating rescue or firefighting actions								
Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery					
	No	Individual	Total		No	Individual	Total		
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor - High Pressure (HL400 model) (40 bar)	1		400 LPM		
FW Monitors	4	2700 LPM	10800 LPM	Fire Appliances FW Monitor - Low Pressure (HL400 model) (10 bar)	1		4000 LPM		
Oscillating FW Monitors	0	1800 LPM		Fire Appliance Foam Trailer Capacity			2700 L		
FW Hydrants	8	900 LPM	7200 LPM						
FW Hose Reels	1	20 LPM	20 LPM						
Fire Water Tank Capacity	1		4600000L						
FW Delivery Duration for Incident			255 mins						
Fire Water Pump Pressure			11.8 bar						
Fire Water Pump Rate	2	9467 LPM	18934 LPM						
Foam Hose Reels									
Foam Application Rate - Solution									
Foam Application Time		LPM	LPM						
Installed Protection Equipment									
Deluge Activation	No	Sprinkler		No					
Auto Osc Monitor	No	Misting System		No					
Fixed Monitors	4	Hi-Ex Foam Sys		No					
Hydrants	8	Fixed DCP		No					
Water Hose Reels	1	Foam Hose Reels		No					

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel  <b>ALWAYS:</b> Account for all people, treat if required  <b>ALWAYS:</b> Alert emergency response agencies  <b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable  <b>IF SAFE:</b> Minimise environmental impact  <b>IF SAFE:</b> Protect assets and minimise escalation  <b>IF SAFE:</b> Comply with regulatory commitments  <b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>• Flame impingent on flare drums</li> <li>• Flame impingent on pipe rack structure</li> <li>• Flame impingent on other parts of plant</li> <li>• Radiant heat</li> <li>• BLEVE of exposed process vessels</li> <li>• ESDP</li> <li>• Increase backpressure on sources to flare</li> </ul>
Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>• Commence ESD if required</li> <li>• Initiate site alarm and muster activation procedures</li> <li>• CCTV cameras on location as appropriate</li> <li>• Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>• Reduce flaring rate if appropriate to do so.</li> <li>• Isolate and de-pressure inventory as appropriate</li> <li>• Identify ERT numbers, assess limitations on response</li> <li>• Mobilise OSC and ERT as/if warranted</li> <li>• Mobilise Paramedic to forward command post as required</li> <li>• Establish local weather conditions and advise OSC</li> <li>• Evaluate exposure impacts &amp; initiate control actions</li> <li>• Notify:                             <ul style="list-style-type: none"> <li>o External emergency services</li> <li>o OIM</li> <li>o PFSO (Port Facilities Security officer)</li> <li>o Operations Section Chief.</li> <li>o NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>• CCR Operator monitor process and escalate issues.</li> <li>• Provide regular status updates to OSC</li> <li>• CCR to confirm local automatic deluge systems has activated</li> <li>• CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>• Muster and confirm individual accountability</li> <li>• Minimum PPE requirements for ERT</li> <li>• Provide cooling to pipe rack structure if required</li> <li>• ERT member to escort ahead with gas detector</li> <li>• Establish forward command point and provide SITREP</li> <li>• Confirm unnecessary persons are clear from area</li> <li>• Undertake casualty recovery if required only if safe to do so</li> <li>• Set fixed monitors to protect / cool exposures</li> <li>• Set portable monitors to protect / cool exposures</li> <li>• Use hand lines to protect / cool exposures if required</li> <li>• Provide cooling /protection for auxiliary equipment</li> <li>• Set up water curtains to protect against gas travel</li> <li>• Monitor water runoff for signs of contamination</li> <li>• HAZMAT response according to SDS if applicable</li> <li>• Provide regular SITREP to IMT</li> <li>• Restrict Personnel Access</li> </ul>
Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li><input type="checkbox"/> Update the 1800 Hotline</li> <li><input type="checkbox"/> Secure the incident scene for investigation (tape etc)</li> <li><input type="checkbox"/> Ensure all documentation is recorded</li> <li><input type="checkbox"/> Witness statements, take photos, secure video footage</li> <li><input type="checkbox"/> Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Conduct de-brief – internal and external</li> <li><input type="checkbox"/> Assist with external investigation (WorkSafe, police)</li> <li><input type="checkbox"/> Monitor emotional wellbeing and implement support as req</li> <li><input type="checkbox"/> Reassess work area and re issue permits if safe</li> </ul>
Considerations	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Vapours may travel to source of ignition and flash back</li> <li><input type="checkbox"/> Change in weather conditions (wind direction)</li> <li><input type="checkbox"/> Triage area setup at Medical Centre for multiple IP's</li> </ul>	

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# Emergency Response Guide

**ERG # 19B.2 Scenario: Explosion in the Marine Flare System - Unit 19**

Scenario Information									
Application	LOC or explosion marine flare header pipework								
Causation	Flare protection system failure, escalation from major incident								
Detection	Gas detection system, thermal detection systems, personnel notification								
Key Substances in Scenario									
Substance	Vol. (m³)	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%/VOL)	AIT (°C)	SG
Flare Gas		In Area				2YE 4	02.1 - 09.5	450	1.55 (air)
Propane UN # 1978		In Area				2YE 4	02.1 - 09.5	450	1.55 (air)
Ethylene UN # 1962		In Area				2PE 4	02.7 - 36.0	490	0.97 (air)
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)									
LOC	800 m (Flam Gas)			Fire	1500 m (Flam Gas)				
Significant Consequences									
Consequence	Control / Precaution								
Flash fire (post explosion)	No ignition sources, don't extinguish flame - use water to cool exposed structures only								
Gas under pressure	Gas detection, stay clear of release streams								
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection								
Gas release noise	Utilise hearing protection remove persons from area								
Asphyxiation	Monitor atmosphere and weather conditions and move to safe location if required.								
Fire spread	Avoid water in straight hose stream; will scatter and spread fire								
High Voltage Electricity	Ensure isolation before initiating rescue or firefighting actions								

Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1		400 LPM
FW Monitors	1	2700 LPM	2700 LPM				
Oscillating FW Monitors	0	1800 LPM		Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1		4000 LPM
FW Hydrants	2	900 LPM	1800 LPM	Fire Appliance Foam Trailer Capacity			2700 L
FW Hose Reels	0	20 LPM	LPM				
Fire Water Tank Capacity	1		4600000L				
FW Delivery Duration for Incident			1022 mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18394 LPM				
Foam Hose Reels							
Foam Application Rate - Solution							
Foam Application Time		LPM	LPM				

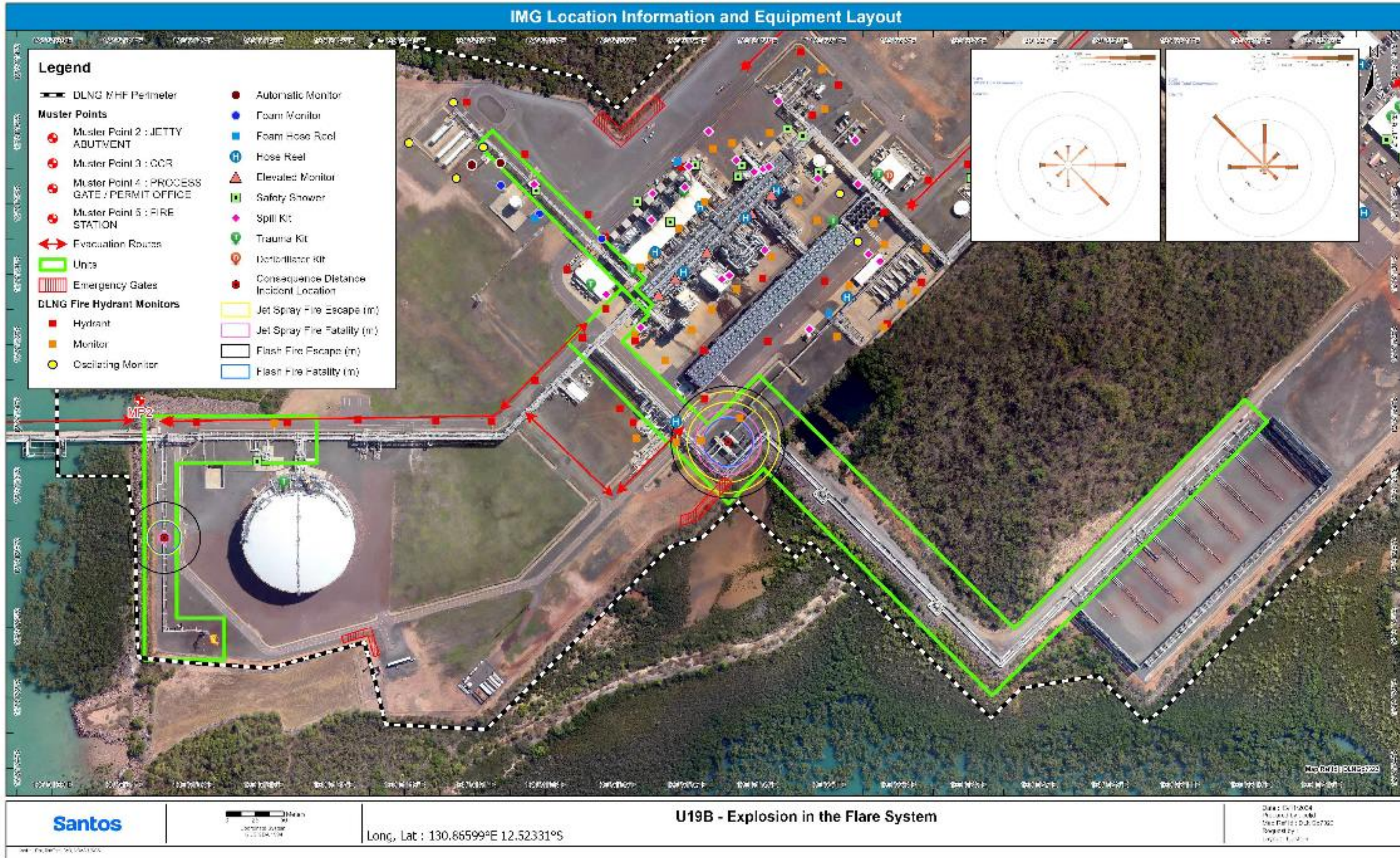
Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	No	Misting System	No
Fixed Monitors	1	HI-Ex Foam Sys	No
Hydrants	2	Fixed DCP	No
Water Hose Reels	No	Foam Hose Reels	No

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>Flame impingement on pipe rack and structures</li> <li>Recovery of persons to grade if required</li> <li>Ignition of vegetation fire</li> <li>ESDP</li> <li>Increase backpressure on sources to flare</li> </ul>

Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>Commence ESD if required</li> <li>Initiate site alarm and muster activation procedures</li> <li>CCTV cameras on location as appropriate</li> <li>Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>Reduce flaring rate if appropriate to do so.</li> <li>Isolate and de-pressure inventory as appropriate</li> <li>Identify ERT numbers, assess limitations on response</li> <li>Mobilise OSC and ERT as/if warranted</li> <li>Mobilise Paramedic to forward command post as required</li> <li>Establish local weather conditions and advise OSC</li> <li>Evaluate exposure impacts &amp; initiate control actions</li> <li>Notify:                             <ul style="list-style-type: none"> <li>External emergency services</li> <li>OIM</li> <li>PFSO (Port Facilities Security officer)</li> <li>Operations Section Chief.</li> <li>NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>CCR Operator monitor process and escalate issues.</li> <li>Provide regular status updates to OSC</li> <li>CCR to confirm local automatic deluge systems has activated</li> <li>CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>Muster and confirm individual accountability</li> <li>Minimum PPE requirements for ERT</li> <li>Provide cooling to pipe rack structure if required</li> <li>ERT member to escort ahead with gas detector</li> <li>Establish forward command point and provide SITREP</li> <li>Confirm unnecessary persons are clear from area</li> <li>Undertake casualty recovery if required only if safe to do so</li> <li>Set fixed monitors to protect / cool exposures</li> <li>Set portable monitors to protect / cool exposures</li> <li>Use hand lines to protect / cool exposures if required</li> <li>Provide cooling /protection for auxiliary equipment</li> <li>Set up water curtains to protect against gas travel</li> <li>Monitor water runoff for signs of contamination</li> <li>HAZMAT response according to SDS if applicable</li> <li>Provide regular SITREP to IMT</li> <li>Restrict Personnel Access</li> </ul>

Control Actions	Recovery Actions
<input type="checkbox"/> Update the 1800 Hotline <input type="checkbox"/> Secure the incident scene for investigation (tape etc) <input type="checkbox"/> Ensure all documentation is recorded <input type="checkbox"/> Witness statements, take photos, secure video footage <input type="checkbox"/> Consider re-activation of suspended maintenance / operational activities	<input type="checkbox"/> Conduct de-brief – internal and external <input type="checkbox"/> Assist with external investigation (WorkSafe, police) <input type="checkbox"/> Monitor emotional wellbeing and implement support as required. <input type="checkbox"/> Reassess work area and re issue permits if safe

Considerations
<input type="checkbox"/> Change in weather conditions (wind direction) <input type="checkbox"/> Triage area setup at Medical Centre for multiple IP's <input type="checkbox"/> Consider what to do with ship loading activities if alongside.



# Emergency Response Guide

ERG # **19D**     
 Scenario: **Explosion in Thermal Oxidiser System - Unit 19**

Scenario Information	
Application	Fire/explosion at Thermal Oxidiser
Causation	Flange leak, piping failure, mechanical damage, static discharge, burner management system failure
Detection	Gas detection system, thermal detection systems, personnel notification

Key Substances in Scenario									
Substance	Vol. (m <sup>3</sup> )	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%VOL)	AIT (°C)	SG
Hydrogen Sulphide Gas (H <sub>2</sub> S)		In Unit			2WE	5	4.3-46	270	-
UN # 1053									
Carbon Dioxide Gas (CO <sub>2</sub> )		In Unit			2T	9	-	-	-
UN # 1013									
Methane Gas		In Unit			2SE	4	05.3 - 15.0	537	55 (air)
UN # 1971									

SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)			
LOC	800 m (Methane/H <sub>2</sub> S) 250m (CO <sub>2</sub> )	Fire	1500 m (Methane/H <sub>2</sub> S) 500m (CO <sub>2</sub> )

Significant Consequences	
Consequence	Control / Precaution
Flash fire or explosion	• No ignition sources, Don't extinguish flame - use water to cool exposed structures
Gas under pressure	• Gas detection, stay clear of release streams
Ignition of gas	• Protection sprays, keep ignition sources away, utilise gas detection, do not extinguish burning gas unless safe to do so Use water spray, fog or vapour-suppressing foam to knock down vapours or divert vapour clouds.
Gas release noise	• Utilise hearing protection remove persons from area
Static discharge	• Minimise movement of personnel and objects in release cloud
Asphyxiation	• Monitor atmosphere and weather conditions. And move to safe location if required
Drains	• Prevent spreading of vapours through drains and ventilation systems
Hot Surfaces	

Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1		400 LPM
FW Monitors	2	2700 LPM	5400 LPM	Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1		4000 LPM
Oscillating FW Monitors	0	1800 LPM		Fire Appliance Foam Trailer Capacity	1		2700 L
FW Hydrants	3	900 LPM	2700 LPM				
FW Hose Reels	0	20 LPM	LPM				
Fire Water Tank Capacity			4600000L				
FW Delivery Duration for Incident			568 mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18934 LPM				
Foam Hose Reels							
Foam Application Rate - Solution							
Foam Application Time			LPM				

Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	No	Misting System	No
Fixed Monitors	2	Hi Ex Foam Sys	No
Hydrants	3	Fixed DCP	No
Water Hose Reels	No	Foam Hose Reels	No

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>• <b>Flame impingement on utility units</b></li> <li>• <b>Flame impingement on structures</b></li> <li>• <b>Environmental atmospheric emissions</b></li> <li>• <b>Diversion acid gas to turbine exhaust stacks</b></li> <li>• <b>ESDP</b></li> <li>• <b>Projectiles</b></li> <li>• <b>H2S – consider hazards</b></li> </ul>

Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>• Commence ESD if required.</li> <li>• Initiate site alarm and muster activation procedures.</li> <li>• CCTV cameras on location as appropriate.</li> <li>• Conduct initial briefing (Summary, Potential, Plan, Tasks).</li> <li>• Reduce flaring rate if appropriate to do so.</li> <li>• Isolate and de-pressure inventory as appropriate.</li> <li>• Identify ERT numbers, assess limitations on response.</li> <li>• Mobilise OSC and ERT as/iff warranted.</li> <li>• Mobilise Paramedic to forward command post as required.</li> <li>• Establish local weather conditions and advise OSC.</li> <li>• Evaluate exposure impacts &amp; initiate control actions.</li> <li>• Notify:                             <ul style="list-style-type: none"> <li>o External emergency services</li> <li>o OIM</li> <li>o PFSO (Port Facilities Security officer)</li> <li>o Operations Section Chief.</li> <li>o NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>• CCR Operator monitor process and escalate issues.</li> <li>• Provide regular status updates to OSC.</li> <li>• CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>• Muster and confirm individual accountability.</li> <li>• Minimum PPE requirements for ERT.</li> <li>• Provide cooling to pipe rack structure if required.</li> <li>• ERT member to escort ahead with gas detector.</li> <li>• Establish forward command point and provide SITREP.</li> <li>• Confirm unnecessary persons are clear from area .</li> <li>• Undertake casualty recovery if required only if safe to do so.</li> <li>• Set fixed monitors to protect / cool exposures.</li> <li>• Set portable monitors to protect / cool exposures.</li> <li>• Use hand lines to protect / cool exposures if required.</li> <li>• Provide cooling /protection for auxiliary equipment.</li> <li>• Set up water curtains to protect against gas travel.</li> <li>• Monitor water runoff for signs of contamination.</li> <li>• HAZMAT response according to SDS if applicable.</li> <li>• Provide regular SITREP to IMT.</li> <li>• Restrict Personnel Access.</li> </ul>

Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li><input type="checkbox"/> Update the 1800 Hotline</li> <li><input type="checkbox"/> Secure the incident scene for investigation (tape etc)</li> <li><input type="checkbox"/> Ensure all documentation is recorded</li> <li><input type="checkbox"/> Witness statements, take photos, secure video footage</li> <li><input type="checkbox"/> Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Conduct de-brief – internal and external</li> <li><input type="checkbox"/> Assist with external investigation (WorkSafe, police)</li> <li><input type="checkbox"/> Monitor emotional wellbeing and implement support as req</li> </ul>

Considerations
<ul style="list-style-type: none"> <li><input type="checkbox"/> Vapours may travel to source of ignition and flash back</li> <li><input type="checkbox"/> Change in weather conditions (wind direction)</li> <li><input type="checkbox"/> Triage area setup at Medical Centre for multiple IP's</li> </ul>

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Version: 0.1 / Document Number: DLNG/HSE/ER/002

# Emergency Response Guide

ERG #

19E

Scenario:

LOC from Marine Flare Pilot Propane Vessel - Unit 19

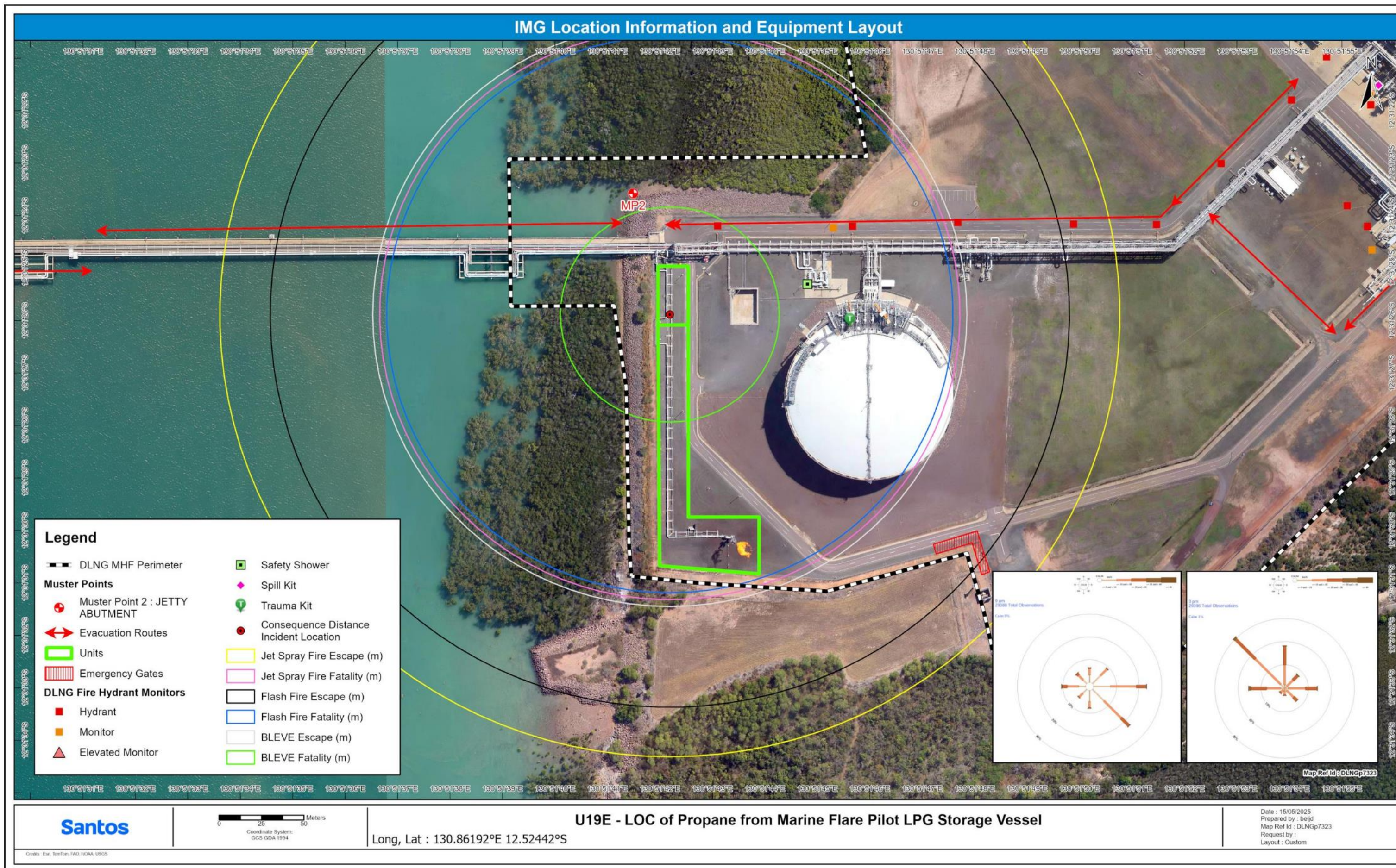
Scenario Information									
Application	Loss of containment or fire/explosion at the marine flare pilot propane storage tank								
Causation	Flange leak, piping failure, vessel failure, mechanical damage, static discharge								
Detection	Gas detection system, IR detection systems, personnel notification								
Key Substances in Scenario									
Substance	Vol. (m³)	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%/VOL)	AIT (°C)	SG
<b>Propane</b> UN # 1978	7.5 Liquid	In Unit			2YE	4/14	02.1 - 09.5	450	1.55 (air)
<b>Methane Gas</b> UN # 1971		In Area			2YE	4	02.1 - 09.5	450	1.55 (air)
<b>LNG</b> UN # 1971		In Area			2SE	4/14	5 - 15.0 (vapour)	600	0.43 (H2 O)
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)									
LOC	800 m (Flam gas) 300m (Flam Liquid)			Fire	1500 m (Flam Gas) 500 m (Flam Liquid)				
Significant Consequences									
Consequence	Control / Precaution								
Flash fire or explosion	No ignition sources, Don't extinguish flame - use water to cool exposed structures								
Gas under pressure	Gas detection, stay clear of release streams								
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection								
Gas release noise	Utilise hearing protection remove persons from area								
Static discharge	Minimise movement of personnel and objects in release cloud								
Cold burns	Avoid contact with liquid substances,								
Asphyxiation	SCBA to be used in case of gas release or fire								
Vessel shell failure	Use cooling sprays, not use water jets which spot cool								
BLEVE	Adequate cooling of vessels, be aware of identifying characteristics								
Installed Fixed Fire Water/Foam Delivery					Portable Fire Water/Foam Delivery				
	No	Individual	Total		No	Individual	Total		
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1		400 LPM		
FW Monitors	0	2700 LPM	LPM	Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1		4000 LPM		
Oscillating FW Monitors	0	1800 LPM	LPM	Fire Appliance Foam Trailer Capacity	1		2700 L		
FW Hydrants	1	900 LPM	900 LPM						
FW Hose Reels	0	20 LPM	LPM						
Fire Water Tank Capacity	1		4600000L						
FW Delivery Duration for Incident			5111 mins						
Fire Water Pump Pressure			11.8 bar						
Fire Water Pump Rate	2	9467 LPM	18394 LPM						
Foam Hose Reels									
Foam Application Rate - Solution			LPM						
Foam Application Time			mins						
Installed Protection Equipment									
Deluge Activation	No	Sprinkler	No						
Auto Osc Monitor	No	Misting System	No						
Fixed Monitors	No	Hi-Ex Foam Sys	No						
Hydrant	1	Fixed DCP	No						
Water Hose Reels	No	Foam Hose Reels	No						

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Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>Flame impingement on Marine Flare Piping/Structure</li> <li>BLEVE</li> <li>Flame Impingement on LNG Storage Tank</li> <li>ESDP</li> <li>Ignition of Vegetation Fires</li> </ul>
Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>Commence ESD if required.</li> <li>Initiate site alarm and muster activation procedures.</li> <li>CCTV cameras on location as appropriate.</li> <li>Conduct initial briefing (Summary, Potential, Plan, Tasks).</li> <li>Reduce flaring rate if appropriate to do so.</li> <li>Isolate and de-pressure inventory as appropriate.</li> <li>Identify ERT numbers, assess limitations on response.</li> <li>Mobilise OSC and ERT as/if warranted.</li> <li>Mobilise Paramedic to forward command post as required.</li> <li>Establish local weather conditions and advise OSC.</li> <li>Evaluate exposure impacts &amp; initiate control actions.</li> <li>Notify:                             <ul style="list-style-type: none"> <li>External emergency services</li> <li>OIM</li> <li>PFSO (Port Facilities Security officer)</li> <li>Operations Section Chief.</li> <li>NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>CCR Operator monitor process and escalate issues.</li> <li>Provide regular status updates to OSC.</li> <li>CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>Muster and confirm individual accountability.</li> <li>Minimum PPE requirements for ERT.</li> <li>Provide cooling to pipe rack structure if required.</li> <li>ERT member to escort ahead with gas detector.</li> <li>Establish forward command point and provide SITREP.</li> <li>Confirm unnecessary persons are clear from area.</li> <li>Undertake casualty recovery if required only if safe to do so.</li> <li>Set fixed monitors to protect / cool exposures.</li> <li>Set portable monitors to protect / cool exposures.</li> <li>Use hand lines to protect / cool exposures if required.</li> <li>Provide cooling /protection for auxiliary equipment.</li> <li>Set up water curtains to protect against gas travel.</li> <li>Monitor water runoff for signs of contamination.</li> <li>HAZMAT response according to SDS if applicable.</li> <li>Provide regular SITREP to IMT.</li> <li>Restrict Personnel Access.</li> </ul>
Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li>Update the 1800 Hotline</li> <li>Secure the incident scene for investigation (tape etc)</li> <li>Ensure all documentation is recorded</li> <li>Witness statements, take photos, secure video footage</li> <li>Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li>Conduct de-brief – internal and external</li> <li>Assist with external investigation (WorkSafe, police)</li> <li>Monitor emotional wellbeing and implement support as required.</li> <li>Reassess work area and re issue permits if safe</li> </ul>
Considerations	
<ul style="list-style-type: none"> <li>Vapours may travel to source of ignition and flash back</li> <li>Change in weather conditions (wind direction)</li> <li>Triage area setup at Medical Centre for multiple IP's</li> </ul>	



# Emergency Response Guide

ERG #

20A

Scenario:

LOC from Propane Refrigerant Storage - Unit 20

### Scenario Information

Application	Loss of containment or fire/explosion at the propane refrigerant storage area/dehydration
Causation	Flange leak, piping failure, vessel failure, mechanical damage, static discharge
Detection	Gas detection system, IR detection systems, personnel notification

### Key Substances in Scenario

Substance	Vol. (m <sup>3</sup> )	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%/VOL)	AIT (°C)	SG
<b>Propane</b> UN # 1978	343 Liquid	In Area			2YE	4/14	02.1 - 09.5	450	1.55 (air)
<b>Ethylene</b> UN # 1962	446 Liquid	In Area			2PE	4/14	02.7 - 36.0	490	0.97 (air)

### SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)

LOC	800 m (Flam gas) 300m (Flam Liquid)	Fire	1500 m (Flam Gas) 500 m (Flam Liquid)
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### Significant Consequences

Consequence	Control / Precaution
Flash fire or explosion	▪ No ignition sources, <b>don't</b> extinguish flame - use water to cool exposed structures
Gas under pressure	▪ Gas detection, stay clear of release streams
Ignition of gas	▪ Protection sprays, keep ignition sources away, utilise gas detection
Gas release noise	▪ Utilise hearing protection remove persons from area
Static discharge	▪ Minimise movement of personnel and objects in release cloud
Cold burns	▪ Avoid contact with liquid substances,
Asphyxiation	▪ SCBA to be used in case of gas release or fire
Vessel shell failure	▪ Use cooling sprays, not use water jets which spot cool
BLEVE	▪ Adequate cooling of vessels, be aware of identifying characteristics

### Installed Fixed Fire Water/Foam Delivery

	Installed Fixed Fire Water/Foam Delivery			Portable Fire Water/Foam Delivery		
	No	Individual	Total	No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1	400 LPM
FW Monitors	2	2700 LPM	5400 LPM	Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1	4000 LPM
Oscillating FW Monitors	4	1800 LPM	7200 LPM	Fire Appliance Foam Trailer Capacity		2700 L
FW Hydrants	2	900 LPM	1800 LPM			
FW Hose Reels	0	20 LPM	LPM			
Fire Water Tank Capacity	1		4600000L			
FW Delivery Duration for Incident			444 mins			
Fire Water Pump Pressure			11.8 bar			
Fire Water Pump Rate	2	9467 LPM	18394 LPM			
Foam Hose Reels						
Foam Application Rate - Solution			LPM			
Foam Application Time			mins			

### Installed Protection Equipment

	No		No
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	4	Misting System	No
Auto monitors	2	Hi-Ex Foam Sys	No
Fixed Monitors	No	Fixed DCP	No
Hydrant	2	Foam Hose Reels	No
Water Hose Reels	No		

### Key Incident Objectives

- ALWAYS:** ESD and evacuate personnel
- ALWAYS:** Account for all people, treat if required
- ALWAYS:** Alert emergency response agencies
- ALWAYS:** Await instruction from the Emergency Commander
- IF SAFE:** Rescue people only if able and capable
- IF SAFE:** Minimise environmental impact
- IF SAFE:** Protect assets and minimise escalation
- IF SAFE:** Comply with regulatory commitments
- IF SAFE:** Safeguard reputation

### Escalation and Exposure Potential

- **Flame impingement on ethylene refrigerant storage vessels**
- **Flame impingement on Propane dehydrator vessels**
- **Flame impingement on Propane Road tanker**
- **Flame impingement on refrigerant storage transfer lines**
- **BLEVE Unit 20 storage vessels (though unlikely)**
- **Flame Impingement on Wet/Dry Flare Lines**
- **ESDP**
- **Vegetation Fires**
- **Recovery of persons to grade if required**

### Initial Actions and Command Awareness

#### Emergency Commander

- Commence ESD if required
- Initiate site alarm and muster activation procedures
- CCTV cameras on location as appropriate
- Conduct initial briefing (Summary, Potential, Plan, Tasks)
- Reduce flaring rate if appropriate to do so.
- Isolate and de-pressure inventory as appropriate
- Identify ERT numbers, assess limitations on response
- Mobilise OSC and ERT as/if warranted
- Mobilise Paramedic to forward command post as required
- Establish local weather conditions and advise OSC
- Evaluate exposure impacts & initiate control actions
- Notify:
  - o External emergency services
  - o OIM
  - o PFSO (Port Facilities Security officer)
  - o Operations Section Chief.
  - o NT Worksafe (HSE to be contact person if available).
- CCR Operator monitor process and escalate issues.
- Provide regular status updates to OSC
- CCR to confirm local automatic deluge systems has activated
- CCR to monitor fixed fire and gas detection for signs of escalation.

#### On Scene Commander / Field Response Team

- Muster and confirm individual accountability
- Minimum PPE requirements for ERT
- Provide cooling to pipe rack structure if required
- ERT member to escort ahead with gas detector
- Establish forward command point and provide SITREP
- Confirm unnecessary persons are clear from area
- Undertake casualty recovery if required only if safe to do so
- Set fixed monitors to protect / cool exposures
- Set portable monitors to protect / cool exposures
- Use hand lines to protect / cool exposures if required
- Provide cooling /protection for auxiliary equipment
- Set up water curtains to protect against gas travel
- Monitor water runoff for signs of contamination
- HAZMAT response according to SDS if applicable
- Provide regular SITREP to IMT
- Restrict Personnel Access

### Control Actions

- Update the 1800 Hotline
- Secure the incident scene for investigation (tape etc)
- Ensure all documentation is recorded
- Witness statements, take photos, secure video footage
- Consider re-activation of suspended maintenance / operational activities

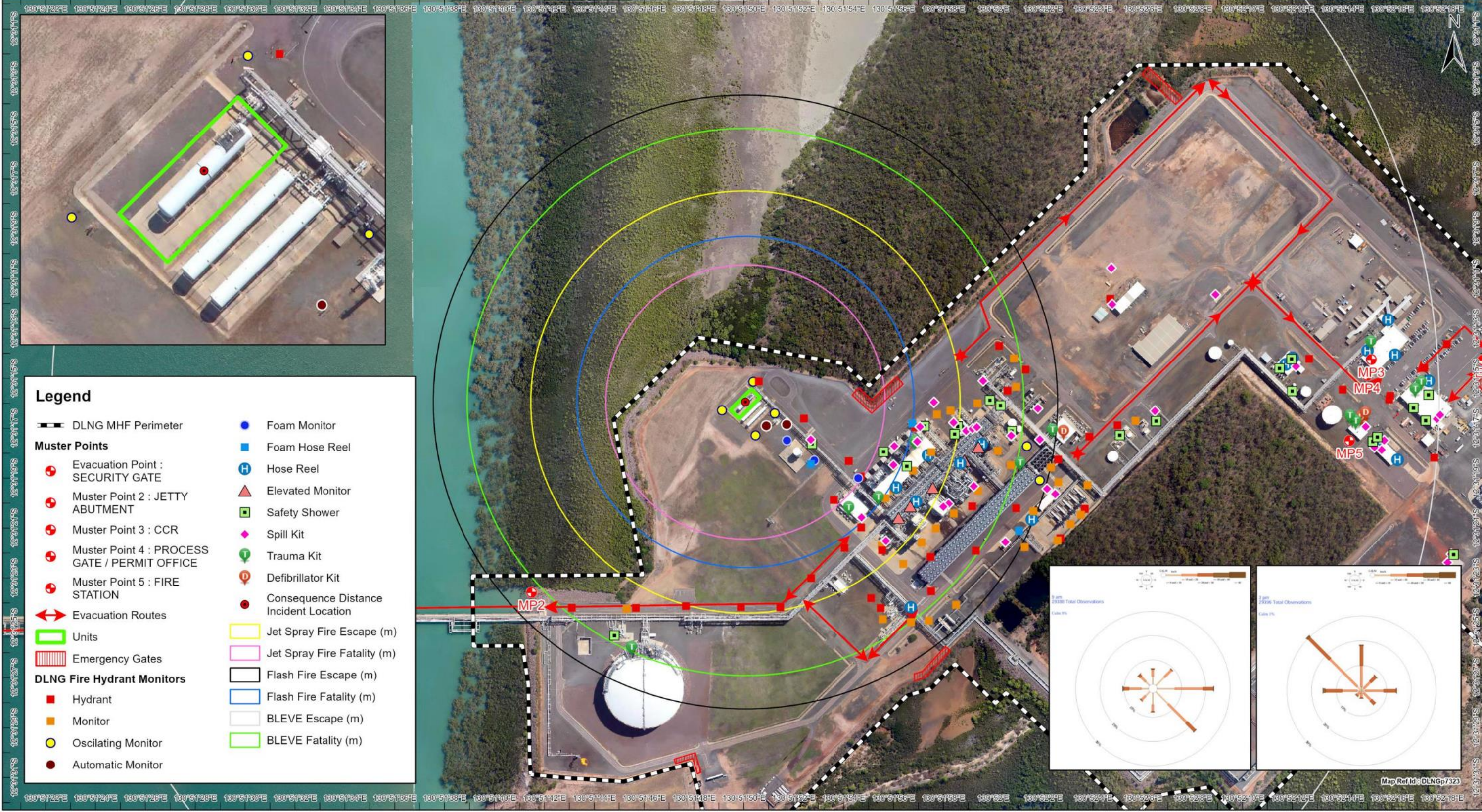
### Recovery Actions

- Conduct de-brief – internal and external
- Assist with external investigation (WorkSafe, police)
- Monitor emotional wellbeing and implement support as required.
- Reassess work area and re issue permits if safe

### Considerations

- Vapours may travel to source of ignition and flash back
- Change in weather conditions (wind direction)
- Triage area setup at Medical Centre for multiple IP's

IMG Location Information and Equipment Layout



- Legend**
- DLNG MHF Perimeter
  - Muster Points**
    - Evacuation Point : SECURITY GATE
    - Muster Point 2 : JETTY ABUTMENT
    - Muster Point 3 : CCR
    - Muster Point 4 : PROCESS GATE / PERMIT OFFICE
    - Muster Point 5 : FIRE STATION
    - Evacuation Routes
  - Units
  - Emergency Gates
  - DLNG Fire Hydrant Monitors**
    - Hydrant
    - Monitor
    - Oscilating Monitor
    - Automatic Monitor
  - Foam Monitor
  - Foam Hose Reel
  - Hose Reel
  - Elevated Monitor
  - Safety Shower
  - Spill Kit
  - Trauma Kit
  - Defibrillator Kit
  - Consequence Distance Incident Location
  - Jet Spray Fire Escape (m)
  - Jet Spray Fire Fatality (m)
  - Flash Fire Escape (m)
  - Flash Fire Fatality (m)
  - BLEVE Escape (m)
  - BLEVE Fatality (m)

# Emergency Response Guide

ERG #

20B

Scenario:

LOC or BLEVE Propane Road Tanker Unloading - Unit 20

Scenario Information									
Application	Loss of containment and fire/BLEVE at a Propane Road Tanker during unloading at the refrigerant storage area/dehydration								
Causation	Flange leak, piping failure, vessel failure, mechanical damage, static discharge								
Detection	Gas detection system, thermal detection systems, personnel notification								
Key Substances in Scenario									
Substance	Vol. (m <sup>3</sup> )	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%/VOL)	AIT (°C)	SG
<b>Propane</b> UN # 1978	380 Liquid	In Area			2YE	4/14	02.1 - 09.5	450	1.55 (air)
<b>Ethylene</b> UN # 1962	446 Liquid	In Area			2PE	4/14	02.7 - 36.0	490	0.97 (air)
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)									
LOC	800 m (Flam Gas) 300 m (Flam Liquid)			Fire	1500 m (Flam Gas) 500 m (Flam Liquid)				
Significant Consequences									
Consequence	Control / Precaution								
Jet Fire or Flash Fire	No ignition sources, Don't extinguish flame - use water to cool exposed structures								
Gas under pressure	Gas detection, stay clear of release streams								
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection								
Gas release noise	Utilise hearing protection remove persons from area								
Static discharge	Minimise movement of personnel and objects in release cloud								
Cold burns	Avoid contact with liquid substances,								
Asphyxiation	SCBA to be used in case of gas release or fire								
Tanker shell failure	Use cooling sprays, not use water jets which spot cool								
BLEVE	Adequate cooling of vessels, be aware of identifying characteristics								

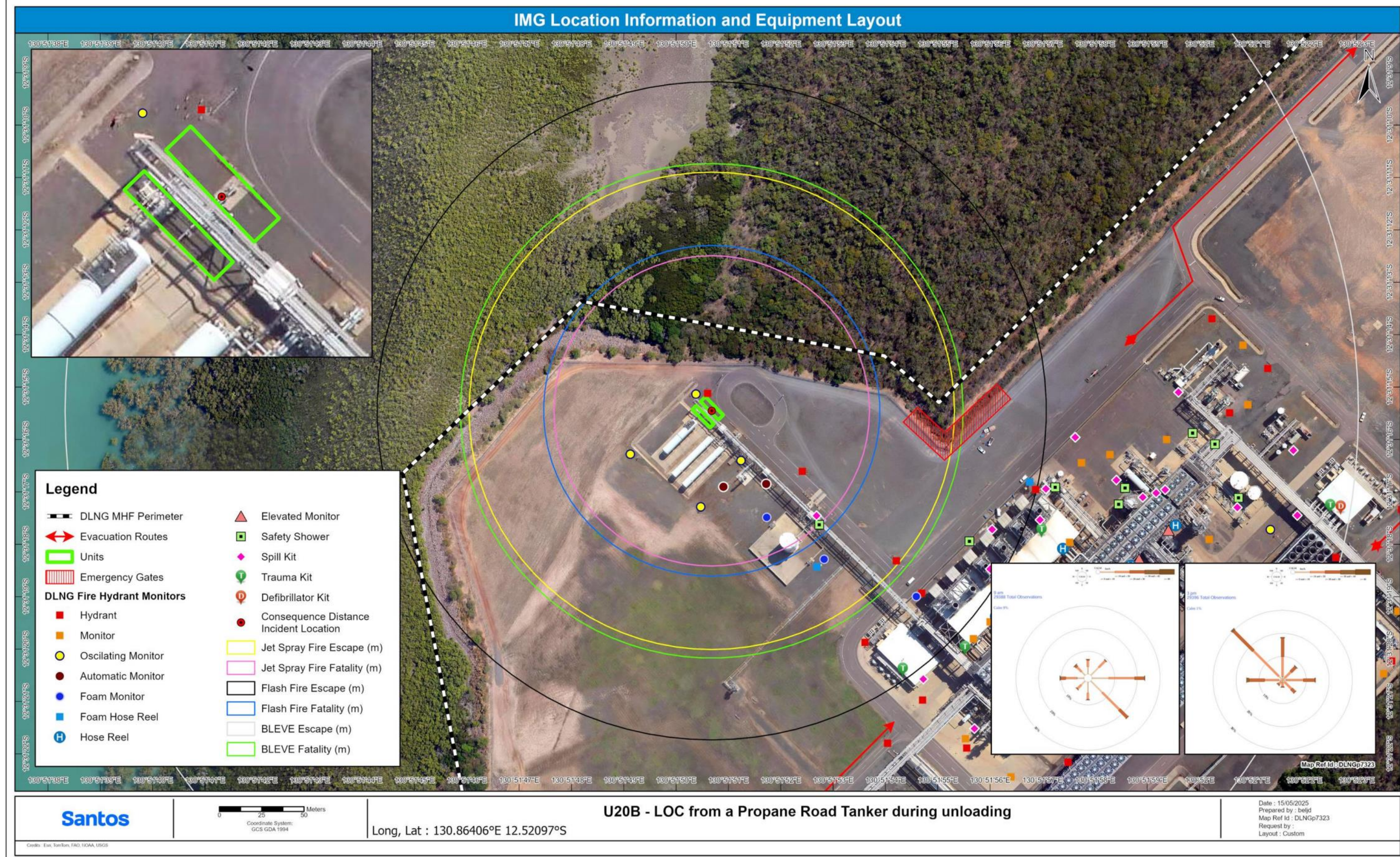
Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor - High Pressure [HL400 model] (40 bar)	1		400 LPM
FW Monitors	0	2700 LPM	5400 LPM	Fire Appliances FW Monitor - Low Pressure [HL400 model] (10 bar)	1		4000 LPM
Oscillating FW Monitors	2	1800 LPM	3600 LPM	Fire Appliance Foam Trailer Capacity	1		2700 L
FW Hydrants	2	900 LPM	1800 LPM				
FW Hose Reels	0	20 LPM	LPM				
Fire Water Tank Capacity	1		4600000L				
FW Delivery Duration for Incident			852 mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18394 LPM				
Foam Hose Reels							
Foam Application Rate - Solution	NA		LPM				
Foam Application Time			mins				
Installed Protection Equipment							
Deluge Activation	No	Sprinkler	No				
Auto Osc Monitor	2	Misting System	No				
Fixed Monitors	No	Hi-Ex Foam Sys	No				
Hydrants	2	Fixed DCP	No				
Water Hose Reels		Foam Hose Reels	No				

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Version: 0.2 / Document Number: DLNG/HSE/ER/002

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>Flame impingement on propane and ethylene refrigerant storage vessels</li> <li>Flame impingement on refrigerant storage transfer lines</li> <li>BLEVE Unit 20 storage vessels (though unlikely)</li> <li>Flame Impingement on Wet/Dry Flare Lines</li> <li>ESDP</li> <li>Ignition of vegetation fire</li> </ul>
Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>Commence ESD if required</li> <li>Initiate site alarm and muster activation procedures</li> <li>CCTV cameras on location as appropriate</li> <li>Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>Reduce flaring rate if appropriate to do so.</li> <li>Isolate and de-pressure inventory as appropriate</li> <li>Identify ERT numbers, assess limitations on response</li> <li>Mobilise OSC and ERT as/if warranted</li> <li>Mobilise Paramedic to forward command post as required</li> <li>Establish local weather conditions and advise OSC</li> <li>Evaluate exposure impacts &amp; initiate control actions</li> <li>Notify:                             <ul style="list-style-type: none"> <li>External emergency services</li> <li>OIM</li> <li>PFSO (Port Facilities Security officer)</li> <li>Operations Section Chief.</li> <li>NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>CCR Operator monitor process and escalate issues.</li> <li>Provide regular status updates to OSC</li> <li>CCR to confirm local automatic deluge systems has activated</li> <li>CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>Muster and confirm individual accountability</li> <li>Minimum PPE requirements for ERT</li> <li>Provide cooling to pipe rack structure if required</li> <li>ERT member to escort ahead with gas detector</li> <li>Establish forward command point and provide SITREP</li> <li>Confirm unnecessary persons are clear from area</li> <li>Undertake casualty recovery if required only if safe to do so</li> <li>Set fixed monitors to protect / cool exposures</li> <li>Set portable monitors to protect / cool exposures</li> <li>Use hand lines to protect / cool exposures if required</li> <li>Provide cooling /protection for auxiliary equipment</li> <li>Set up water curtains to protect against gas travel</li> <li>Monitor water runoff for signs of contamination</li> <li>HAZMAT response according to SDS if applicable</li> <li>Provide regular SITREP to IMT</li> <li>Restrict Personnel Access</li> </ul>
Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li>Update the 1800 Hotline</li> <li>Secure the incident scene for investigation (tape etc)</li> <li>Ensure all documentation is recorded</li> <li>Witness statements, take photos, secure video footage</li> <li>Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li>Conduct de-brief – internal and external</li> <li>Assist with external investigation (WorkSafe, police)</li> <li>Monitor emotional wellbeing and implement support as required.</li> <li>Reassess work area and re issue permits if safe</li> </ul>
Considerations	
<ul style="list-style-type: none"> <li>Vapours may travel to source of ignition and flash back</li> <li>Change in weather conditions (wind direction)</li> <li>Triage area setup at Medical Centre for multiple IP's</li> </ul>	



# Emergency Response Guide - Draft

ERG # **20B2** Scenario: **LOC or BLEVE Propane Road Tanker Unloading First Fill - Unit 20**

Scenario Information	
Application	Loss of containment and fire/BLEVE at a Propane Road Tanker waiting in designated storage area or during unloading at the refrigerant storage area/dehydration
Causation	Flange leak, piping failure, vessel failure, mechanical damage, static discharge
Detection	Gas detection system (fixed and rig rats), thermal detection systems, personnel notification

Key Substances in Scenario									
Substance	Vol. (m <sup>3</sup> )	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%/VOL)	AIT (°C)	SG
<b>Propane</b> UN # 1978	380 Liquid	In Area			2YE	4/14	02.1 - 09.5	450	1.55 (air)
<b>Ethylene</b> UN # 1962	446 Liquid	In Area			2PE	4/14	02.7 - 36.0	490	0.97 (air)

SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)			
LOC	800 m (Flam Gas) 300 m (Flam Liquid)	Fire	1500 m (Flam Gas) 500 m (Flam Liquid)

Significant Consequences	
Consequence	Control / Precaution
Jet Fire or Flash Fire	No ignition sources, Don't extinguish flame - use water to cool exposed structures
Gas under pressure	Gas detection, stay clear of release streams
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection
Gas release noise	Utilise hearing protection remove persons from area
Static discharge	Minimise movement of personnel and objects in release cloud
Cold burns	Avoid contact with liquid substances,
Asphyxiation	SCBA to be used in case of gas release or fire
Tanker shell failure	Use cooling sprays, not use water jets which spot cool
BLEVE	Adequate cooling of vessels, be aware of identifying characteristics

Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1		400 LPM
FW Monitors	0	2700 LPM	5400 LPM	Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1		4000 LPM
Oscillating FW Monitors	2	1800 LPM	3600 LPM	Fire Appliance Foam Trailer Capacity	1		2700 L
FW Hydrants	2	900 LPM	1800 LPM	Mercury 3444 Fire Monitor w/ oscillating nozzle	1		1900 LPM
FW Hose Reels	0	20 LPM	LPM	Mercury 3446 Fire Monitor	1		3800 LPM
Fire Water Tank Capacity	1		4600000L	Skum FJM-80 Fire Monitor	1		3000 LPM
FW Delivery Duration for Incident			852 mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18394 LPM				
Foam Hose Reels							
Foam Application Rate - Solution	NA		LPM				
Foam Application Time			mins				

Pre-Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	1	Misting System	No
Fixed Monitors	2	Hi-Ex Foam Sys	No
Hydrants	2	Fixed DCP	No
Water Hose Reels		Foam Hose Reels	No

Temporary ground firewater monitors (3 off) pre-installed and attached (where practical) to 2 hydrants south of the propane tanker designated storage area. Intent is to initiate firewater when operator is leaving area and if delay in doing so considered safe.

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>Flame source may be                             <ul style="list-style-type: none"> <li>from either ethylene/propane storage tanks, radiating to propane tanker storage area, or</li> <li>propane tanker in storage area, radiating on other propane tankers or ethylene/propane storage or transfer lines</li> </ul> </li> <li>BLEVE of ethylene/propane storage tanks (20A&amp;D), unloading tanker (20B&amp;C) or propane tanker in designated storage area</li> <li>Flame Impingement on Wet/Dry Flare Lines</li> <li>ESDP</li> <li>Ignition of vegetation fire</li> </ul>

Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>Commence ESD if required</li> <li>Initiate site alarm and muster activation procedures</li> <li>CCTV cameras on location as appropriate</li> <li>Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>Reduce flaring rate if appropriate to do so.</li> <li>Isolate and de-pressure inventory as appropriate</li> <li>Identify ERT numbers, assess limitations on response</li> <li>Mobilise OSC and ERT as/if warranted</li> <li>Mobilise Paramedic to forward command post as required</li> <li>Establish local weather conditions and advise OSC</li> <li>Evaluate exposure impacts &amp; initiate control actions</li> <li>Notify:                             <ul style="list-style-type: none"> <li>External emergency services</li> <li>OIM</li> <li>PFSO (Port Facilities Security officer)</li> <li>Operations Section Chief.</li> <li>NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>CCR Operator monitor process and escalate issues.</li> <li>Provide regular status updates to OSC</li> <li>CCR to confirm local automatic deluge systems has activated</li> <li>CCR to confirm temporary set up of portable monitors have been activated</li> <li>CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>Muster and confirm individual accountability</li> <li>Minimum PPE requirements for ERT</li> <li>Provide cooling to pipe rack structure if required</li> <li>ERT member to escort ahead with gas detector</li> <li>Establish forward command point and provide SITREP</li> <li>Confirm unnecessary persons are clear from area</li> <li>Undertake casualty recovery if required only if safe to do so</li> <li>Set fixed monitors to protect / cool exposures</li> <li>Set portable monitors to protect / cool exposures</li> <li>Use hand lines to protect / cool exposures if required</li> <li>Provide cooling /protection for auxiliary equipment</li> <li>Set up water curtains to protect against gas travel</li> <li>Monitor water runoff for signs of contamination</li> <li>HAZMAT response according to SDS if applicable</li> <li>Provide regular SITREP to IMT</li> <li>Restrict Personnel Access</li> </ul>

Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li>Update the 1800 Hotline</li> <li>Secure the incident scene for investigation (tape etc)</li> <li>Ensure all documentation is recorded</li> <li>Witness statements, take photos, secure video footage</li> <li>Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li>Conduct de-brief – internal and external</li> <li>Assist with external investigation (WorkSafe, police)</li> <li>Monitor emotional wellbeing and implement support as required.</li> <li>Reassess work area and re issue permits if safe</li> </ul>

Considerations
<ul style="list-style-type: none"> <li>Vapours may travel to source of ignition and flash back</li> <li>Change in weather conditions (wind direction)</li> <li>Triage area setup at Medical Centre for multiple IP's</li> </ul>

## IMG Location Information and Equipment Layout



# Emergency Response Guide

ERG # **20C** Scenario: **LOC or BLEVE of Ethylene Isotainer Unloading - Unit 20**

Scenario Information									
Application	Loss of containment and fire/BLEVE at an Ethylene Isotainer during unloading at the refrigerant storage area								
Causation	Flange leak, piping failure, vessel failure, mechanical damage, static discharge								
Detection	Gas detection system, thermal detection systems, personnel notification								
Key Substances in Scenario									
Substance	Vol. (m <sup>3</sup> )	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL - UFL (%/VOL)	AIT (°C)	SG
<b>Propane</b> UN # 1978	343 Liquid	In Area			2YE	4/14	02.1 - 09.5	450	1.55 (air)
<b>Ethylene</b> UN # 1962	469.5 Liquid	In Area			2PE	4/14	02.7 - 36.0	490	0.97 (air)
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)									
LOC	800 m (Flam gas) 300 m (Flam Liquid)		Fire	1500 m (Flam Gas) 500 m (Flam Liquid)					
Significant Consequences									
Consequence	Control / Precaution								
Jet Fire or Flash fire	No ignition sources, Don't extinguish flame - use water to cool exposed structures								
Gas under pressure	Gas detection, stay clear of release streams								
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection								
Gas release noise	Utilise hearing protection remove persons from area								
Static discharge	Minimise movement of personnel and objects in release cloud								
Cold burns	Avoid contact with liquid substances,								
Asphyxiation	SCBA to be used in case of gas release or fire								
Isocontainer failure	Use cooling sprays, not use water jets which spot cool								
BLEVE	Adequate cooling of vessels, be aware of identifying characteristics								

Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor - High Pressure [HL400 model] (40 bar)	1		400 LPM
FW Monitors	1	2700 LPM	2700 LPM	Fire Appliances FW Monitor - Low Pressure [HL400 model] (10 bar)	1		4000 LPM
Oscillating FW Monitors	1	1800 LPM	1800 LPM	Fire Appliance Foam Trailer Capacity			2700 L
FW Hydrants	2	900 LPM	7200 LPM				
FW Hose Reels	0	20 LPM	LPM				
Fire Water Tank Capacity	1	4600000L	4600000L				
FW Delivery Duration for Incident			639 mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18394 LPM				
Foam Hose Reels							
Foam Application Rate - Solution		LPM	LPM				
Foam Application Time			mins				

Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	1	Misting System	No
Fixed Monitors	1	Hi-Ex Foam Sys	No
Hydrants	2	Fixed DCP	No
Water Hose Reels	No	Foam Hose Reels	No

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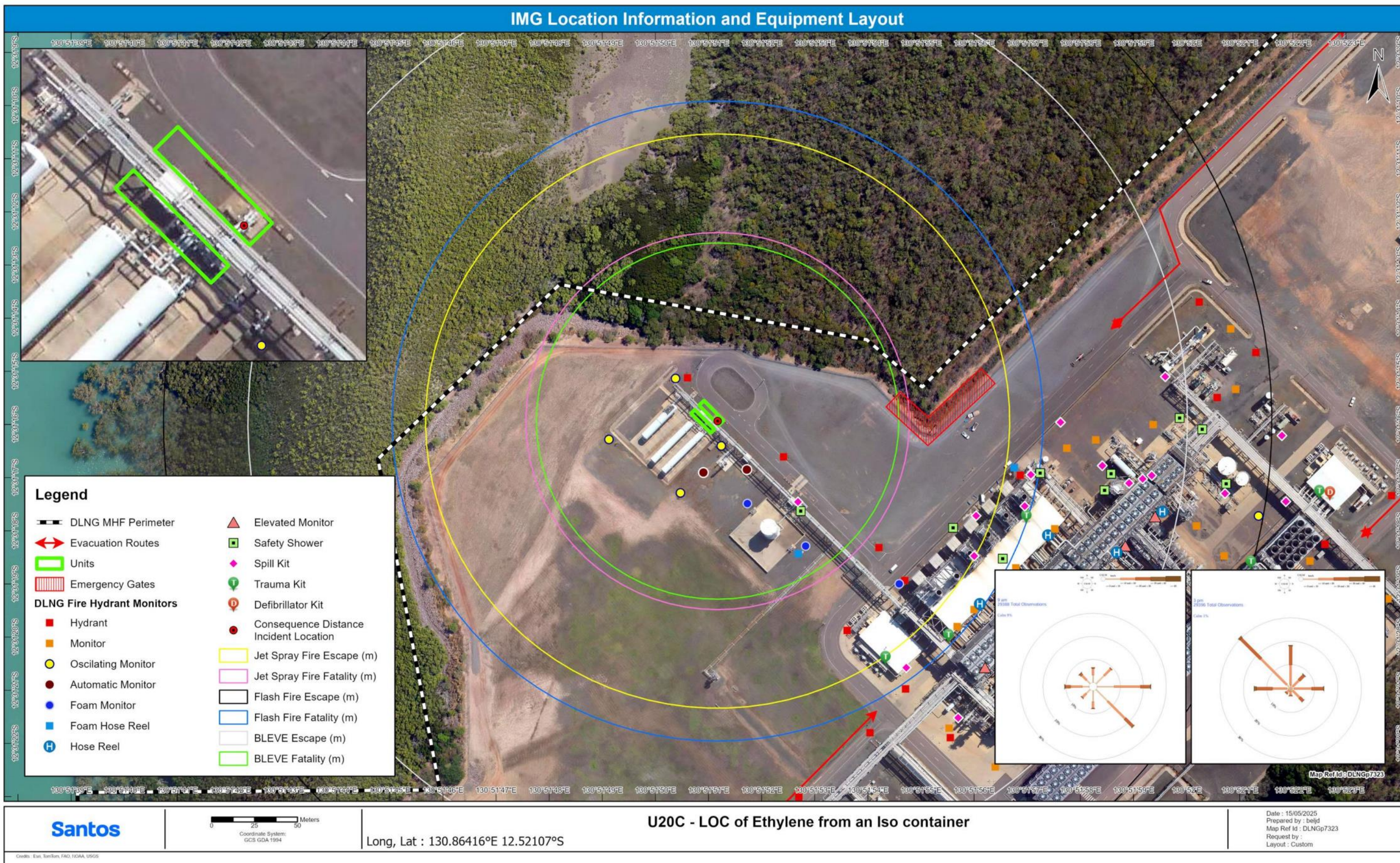
Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>Flame impingement on propane and ethylene refrigerant storage vessels</li> <li>Ignited isotainer pressure relief valve vent</li> <li>Flame impingement on refrigerant storage transfer lines</li> <li>BLEVE Unit 20 storage vessels (though unlikely)</li> <li>Flame Impingement on Wet/Dry Flare Lines</li> <li>ESDP</li> <li>Ignition of vegetation fire</li> </ul>

Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>Commence ESD if required</li> <li>Initiate site alarm and muster activation procedures</li> <li>CCTV cameras on location as appropriate</li> <li>Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>Reduce flaring rate if appropriate to do so.</li> <li>Isolate and de-pressure inventory as appropriate</li> <li>Identify ERT numbers, assess limitations on response</li> <li>Mobilise OSC and ERT as/if warranted</li> <li>Mobilise Paramedic to forward command post as required</li> <li>Establish local weather conditions and advise OSC</li> <li>Evaluate exposure impacts &amp; initiate control actions</li> <li>Notify:                             <ul style="list-style-type: none"> <li>External emergency services</li> <li>OIM</li> <li>PFSO (Port Facilities Security officer)</li> <li>Operations Section Chief.</li> <li>NT Worksafe (HSE to be contact person if available.</li> </ul> </li> <li>CCR Operator monitor process and escalate issues.</li> <li>Provide regular status updates to OSC</li> <li>CCR to confirm local automatic deluge systems has activated</li> <li>CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>Muster and confirm individual accountability</li> <li>Minimum PPE requirements for ERT</li> <li>Provide cooling to pipe rack structure if required</li> <li>ERT member to escort ahead with gas detector</li> <li>Establish forward command point and provide SITREP</li> <li>Confirm unnecessary persons are clear from area</li> <li>Undertake casualty recovery if required only if safe to do so</li> <li>Set fixed monitors to protect / cool exposures</li> <li>Set portable monitors to protect / cool exposures</li> <li>Use hand lines to protect / cool exposures if required</li> <li>Provide cooling /protection for auxiliary equipment</li> <li>Set up water curtains to protect against gas travel</li> <li>Monitor water runoff for signs of contamination</li> <li>HAZMAT response according to SDS if applicable</li> <li>Provide regular SITREP to IMT</li> <li>Restrict Personnel Access</li> </ul>

Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li>Update the 1800 Hotline</li> <li>Secure the incident scene for investigation (tape etc)</li> <li>Ensure all documentation is recorded</li> <li>Witness statements, take photos, secure video footage</li> <li>Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li>Conduct de-brief – internal and external</li> <li>Assist with external investigation (WorkSafe, police)</li> <li>Monitor emotional wellbeing and implement support as required.</li> <li>Reassess work area and re issue permits if safe</li> </ul>

Considerations
<ul style="list-style-type: none"> <li>Vapours may travel to source of ignition and flash back</li> <li>Change in weather conditions (wind direction)</li> <li>Triage area setup at Medical Centre for multiple IP's</li> </ul>

IMG Location Information and Equipment Layout



# Emergency Response Guide

ERG #

20D

Scenario:

LOC from Ethylene Refrigerant Storage - Unit 20

Scenario Information									
Application	Loss of containment or fire/explosion at the ethylene refrigerant storage area								
Causation	Flange leak, piping failure, vessel failure, mechanical damage, static discharge								
Detection	Gas detection system, IR detection systems, personnel notification								
Key Substances in Scenario									
Substance	Vol. (m <sup>3</sup> )	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%/VOL)	AIT (°C)	SG
<b>Propane</b> UN # 1978	343 Liquid	In Area			2YE	4/14	02.1 - 09.5	450	1.55 (air)
<b>Ethylene</b> UN # 1962	446 Liquid	In Area			2PE	4/14	02.7 - 36.0	490	0.97 (air)

SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)			
LOC	800 m (Flam gas) 300m (Flam Liquid)	Fire	1500 m (Flam Gas) 500m (Flam Liquid)

Significant Consequences	
Consequence	Control / Precaution
Flash fire or explosion	No ignition sources, Don't extinguish flame - use water to cool exposed structures
Gas under pressure	Gas detection, stay clear of release streams
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection
Gas release noise	Utilise hearing protection remove persons from area
Static discharge	Minimise movement of personnel and objects in release cloud
Cold burns	Avoid contact with liquid substances,
Asphyxiation	SCBA to be used in case of gas release or fire
Vessel shell failure	Use cooling sprays, not use water jets which spot cool
BLEVE	Adequate cooling of vessels, be aware of identifying characteristics

Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1		400 LPM
FW Monitors	0	2700 LPM	LPM	Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1		4000 LPM
Oscillating FW Monitors	3	1800 LPM	5400 LPM	Fire Appliance Foam Trailer Capacity			2700 L
FW Hydrants	2	900 LPM	1800 LPM				
FW Hose Reels	0	20 LPM	LPM				
Fire Water Tank Capacity	1		4600000L				
FW Delivery Duration for Incident			639 mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18394 LPM				
Foam Hose Reels							
Foam Application Rate - Solution		LPM	LPM				
Foam Application Time			mins				

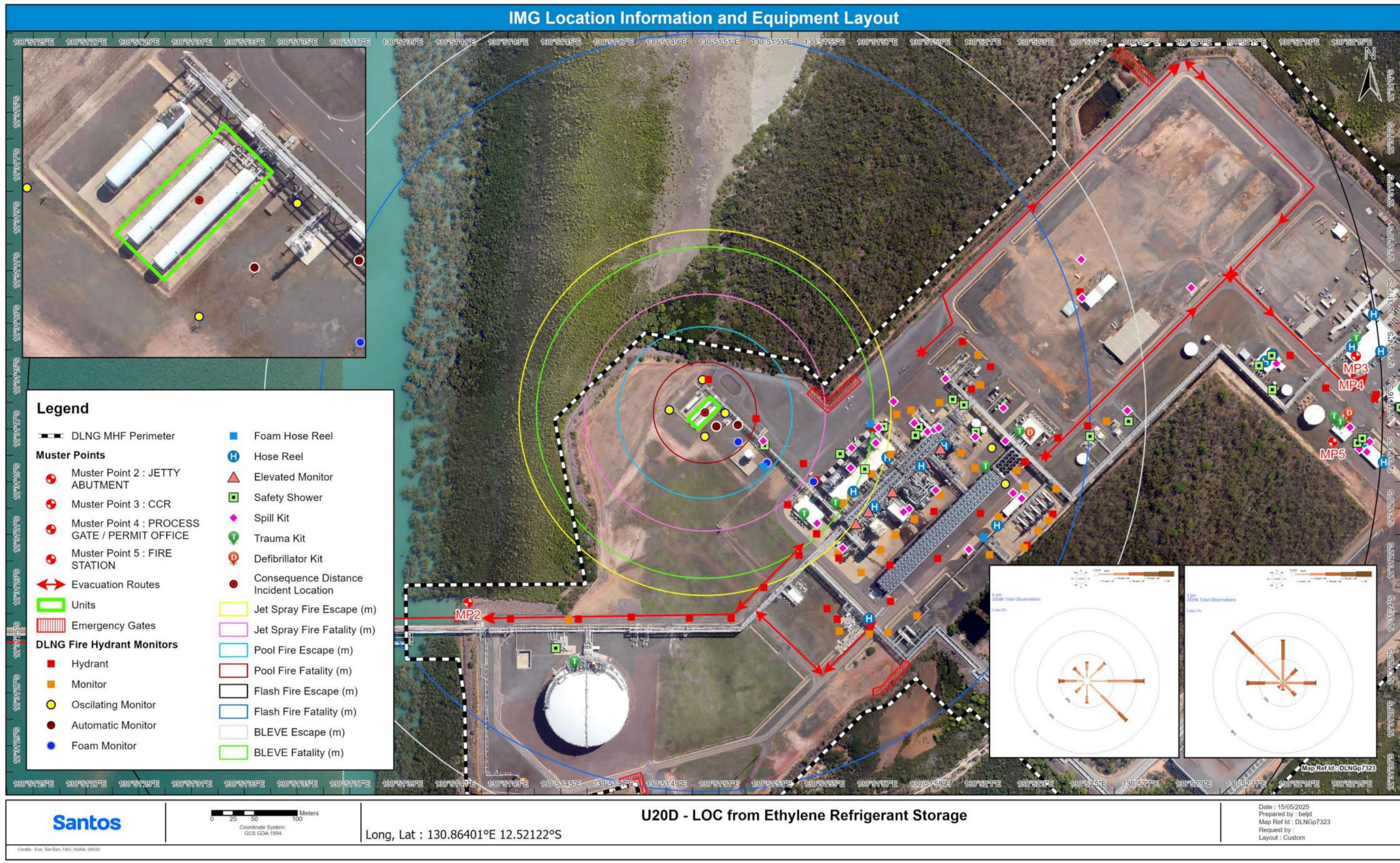
Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	3	Misting System	No
Fixed Monitors	No	Hi-Ex Foam Sys	No
Hydrants	2	Fixed DCP	No
Water Hose Reels	No	Foam Hose Reels	No

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>Flame impingement on propane refrigerant storage vessel</li> <li>Flame impingement on Propane dehydrator vessels</li> <li>Flame impingement on Ethylene ISO container</li> <li>Flame impingement on refrigerant storage transfer lines</li> <li>BLEVE Unit 20 storage vessels (though unlikely)</li> <li>Flame impingement on Wet/Dry Flare Lines</li> <li>ESDP</li> <li>Ignition of vegetation fire</li> </ul>

Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>Commence ESD if required</li> <li>Initiate site alarm and muster activation procedures</li> <li>CCTV cameras on location as appropriate</li> <li>Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>Reduce flaring rate if appropriate to do so.</li> <li>Isolate and de-pressure inventory as appropriate</li> <li>Identify ERT numbers, assess limitations on response</li> <li>Mobilise OSC and ERT as/if warranted</li> <li>Mobilise Paramedic to forward command post as required</li> <li>Establish local weather conditions and advise OSC</li> <li>Evaluate exposure impacts &amp; initiate control actions</li> <li>Notify:                             <ul style="list-style-type: none"> <li>External emergency services</li> <li>OIM</li> <li>PFSO (Port Facilities Security officer)</li> <li>Operations Section Chief.</li> <li>NT Worksafe (HSE to be contact person if available.</li> </ul> </li> <li>CCR Operator monitor process and escalate issues.</li> <li>Provide regular status updates to OSC</li> <li>CCR to confirm local automatic deluge systems has activated</li> <li>CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>Muster and confirm individual accountability</li> <li>Minimum PPE requirements for ERT</li> <li>Provide cooling to pipe rack structure if required</li> <li>ERT member to escort ahead with gas detector</li> <li>Establish forward command point and provide SITREP</li> <li>Confirm unnecessary persons are clear from area</li> <li>Undertake casualty recovery if required only if safe to do so</li> <li>Set fixed monitors to protect / cool exposures</li> <li>Set portable monitors to protect / cool exposures</li> <li>Use hand lines to protect / cool exposures if required</li> <li>Provide cooling /protection for auxiliary equipment</li> <li>Set up water curtains to protect against gas travel</li> <li>Monitor water runoff for signs of contamination</li> <li>HAZMAT response according to SDS if applicable</li> <li>Provide regular SITREP to IMT</li> <li>Restrict Personnel Access</li> </ul>

Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li>Update the 1800 Hotline</li> <li>Secure the incident scene for investigation (tape etc)</li> <li>Ensure all documentation is recorded</li> <li>Witness statements, take photos, secure video footage</li> <li>Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li>Conduct de-brief – internal and external</li> <li>Assist with external investigation (WorkSafe, police)</li> <li>Monitor emotional wellbeing and implement support as required.</li> <li>Reassess work area and re issue permits if safe</li> </ul>

Considerations
<ul style="list-style-type: none"> <li>Vapours may travel to source of ignition and flash back</li> <li>Change in weather conditions (wind direction)</li> <li>Triage area setup at Medical Centre for multiple IP's</li> </ul>



# Emergency Response Guide

ERG # **21A** Scenario: **LOC from NGL Storage and Loading Natural Gas Liquids - Unit 21**

Scenario Information									
Application	Loss of containment or fire at the Natural Gas Liquids Storage Tank/Bund or NGL Tanker								
Causation	Flange leak, piping failure, tank failure, mechanical damage, static discharge, hose failure								
Detection	Gas detection system, thermal detection systems, personnel notification								
Key Substances in Scenario									
Substance	Vol. (m³)	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL-UFL (%VOL)	AIT (°C)	SG
Natural Gas Liquids (not otherwise specified) UN # 3295	795	In Unit			3YE	11	1 - 10	450	0.5 - 0.7
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)									
LOC	300m (Flam Liquid)			Fire	500m (Flam Liquid)				
Significant Consequences									
Consequence	Control / Precaution								
Flash fire or explosion	No ignition sources, Don't extinguish flame - use water to cool exposed structures								
Pool Fire	Use cooling sprays, don't use water jets to prevent rapid boil off								
Liquid under pressure	Gas detection, stay clear of release streams								
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection								
Gas release noise	Utilise hearing protection remove persons from area								
Static discharge	Minimise movement of personnel and objects in release cloud								
Asphyxiation	SCBA to be used in case of gas release or fire								
Tank Failure	Appoint a spotter to observe for signs of failure if suspected. Use cooling sprays, do not use water jets which spot cool. Evacuate area and retreat to CCR if suspected								

Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1		400 LPM
FW Monitors	0	2700 LPM	LPM	Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1		4000 LPM
Oscillating FW Monitors	0	1800 LPM	LPM	Fire Appliance Foam Trailer Capacity	1		2700 L
FW Hydrants	2	900 LPM	1800 LPM				
FW Hose Reels	0	20 LPM	LPM				
Fire Water Tank Capacity	1		4600000L				
FW Delivery Duration for Incident			2455 mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18934 LPM				
Foam Hose Reels	2						
Foam Application Rate - Solution	1						
Foam Application Time		LPM	LPM				

Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	No	Misting System	No
FW Monitors	No	Hi Ex Foam Sys	No
FW Hydrants	2	Fixed DCP	No
Water Hose Reels	No	Foam Hose Reels	1
		Foam Monitors	2

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>▪ Flame impingement on propane/ethylene refrigerant storage vessels</li> <li>▪ Flame impingement on Wet/Dry gas flare line</li> <li>▪ ESDP</li> <li>▪ Vegetation fire</li> </ul>

Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>▪ Commence ESD if required</li> <li>▪ Initiate site alarm and muster activation procedures</li> <li>▪ Adjust CCTV cameras on location as appropriate</li> <li>▪ Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>▪ Reduce flaring rate if appropriate to do so.</li> <li>▪ Isolate and de-pressure inventory as appropriate</li> <li>▪ Identify ERT numbers, assess limitations on response</li> <li>▪ Mobilise OSC and ERT as/if warranted</li> <li>▪ Mobilise Paramedic to forward command post as required</li> <li>▪ Establish local weather conditions and advise OSC</li> <li>▪ Evaluate exposure impacts &amp; initiate control actions</li> <li>▪ Notify:                             <ul style="list-style-type: none"> <li>o External emergency services</li> <li>o OIM</li> <li>o PFSO (Port Facilities Security officer)</li> <li>o Operations Section Chief.</li> <li>o NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>▪ CCR Operator monitor process and escalate issues.</li> <li>▪ Provide regular status updates to OSC</li> <li>▪ CCR to confirm local automatic deluge systems has activated</li> <li>▪ CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Muster and confirm individual accountability</li> <li>▪ Minimum PPE requirements for ERT</li> <li>▪ Provide cooling to pipe rack structure if required</li> <li>▪ ERT member to escort ahead with gas detector</li> <li>▪ Establish forward command point and provide SITREP</li> <li>▪ Confirm unnecessary persons are clear from area</li> <li>▪ Undertake casualty recovery if required only if safe to do so</li> <li>▪ Set fixed monitors to protect / cool exposures</li> <li>▪ Set portable monitors to protect / cool exposures</li> <li>▪ Use hand lines to protect / cool exposures if required</li> <li>▪ Provide cooling /protection for auxiliary equipment</li> <li>▪ Set up water curtains to protect against gas travel</li> <li>▪ Monitor water runoff for signs of contamination</li> <li>▪ HAZMAT response according to SDS if applicable</li> <li>▪ Provide regular SITREP to IMT</li> <li>▪ Restrict Personnel Access</li> </ul>

Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li><input type="checkbox"/> Update the 1800 Hotline</li> <li><input type="checkbox"/> Secure the incident scene for investigation (tape etc)</li> <li><input type="checkbox"/> Ensure all documentation is recorded</li> <li><input type="checkbox"/> Witness statements, take photos, secure video footage</li> <li><input type="checkbox"/> Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Conduct de-brief – internal and external</li> <li><input type="checkbox"/> Assist with external investigation (WorkSafe, police)</li> <li><input type="checkbox"/> Monitor emotional wellbeing and implement support as req</li> <li><input type="checkbox"/> Reassess work area and re issue permits if safe</li> </ul>

Considerations
<ul style="list-style-type: none"> <li><input type="checkbox"/> Vapours may travel to source of ignition and flash back</li> <li><input type="checkbox"/> Change in weather conditions (wind direction)</li> <li><input type="checkbox"/> Consider spill sumps and containment of spillages.</li> <li><input type="checkbox"/> Triage area setup at Medical Centre for multiple IP's</li> </ul>

IMG Location Information and Equipment Layout



# Emergency Response Guide

**IMG # 21B Scenario: Explosion in NGL Storage and Loading Incinerator System - Unit 21**

Scenario Information										
Application	Loss of containment or fire at the NGL Storage/Loading Incinerator System									
Causation	Incinerator protection system failure, flange leak, piping failure, static discharge									
Detection	Gas detection system, thermal detection systems, personnel notification									
Key Substances in Scenario										
Substance	Vol. (m³)	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%VOL)	AIT (°C)	SG	
Natural Gas Liquids (not otherwise specified)	Vapour	In Area						3YE 4	1 - 10 450	0.5 - 0.7
UN #	3295									
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)										
LOC	800 m (Flam Gas)			Fire	1500 m (Flam Gas)					
Significant Consequences										
Consequence	Control / Precaution									
Flash fire or explosion	No ignition sources, don't extinguish flame - use water to cool exposed structures									
Gas under pressure	Gas detection, stay clear of release streams									
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection									
Gas release noise	Utilise hearing protection remove persons from area									
Static discharge	Minimise movement of personnel and objects in release cloud									
Asphyxiation	SCBA to be used in case of gas release or fire									

Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1		400 LPM
FW Monitors	0	2700 LPM	LPM	Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1		4000 LPM
Oscillating FW Monitors	0	1800 LPM		Fire Appliance Foam Trailer Capacity	1		2700 L
FW Hydrants	0	900 LPM	LPM				
FW Hose Reels	0	20 LPM	LPM				
Fire Water Tank Capacity	1		4600000L				
FW Delivery Duration for Incident			mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18934 LPM				
Foam Hose Reels	2						
Foam Application Rate - Solution	1						
Foam Application Time			LPM				

Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	No	Misting System	No
Fixed FW Monitors	No	HI Ex Foam Sys	No
Hydrants	No	Fixed DCP	No
Water Hose Reels	No	Foam Hose Reels	1
		Foam Monitor	2

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>▪ Radiant heat</li> <li>▪ Flame impingent on pipe rack structure</li> <li>▪ ESDP</li> <li>▪ Ignition of vegetation fire</li> </ul>
Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>▪ Commence ESD if required</li> <li>▪ Initiate site alarm and muster activation procedures</li> <li>▪ CCTV cameras on location as appropriate</li> <li>▪ Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>▪ Reduce flaring rate if appropriate to do so.</li> <li>▪ Isolate and de-pressure inventory as appropriate</li> <li>▪ Identify ERT numbers, assess limitations on response</li> <li>▪ Mobilise OSC and ERT as/if warranted</li> <li>▪ Mobilise Paramedic to forward command post as required</li> <li>▪ Establish local weather conditions and advise OSC</li> <li>▪ Evaluate exposure impacts &amp; initiate control actions</li> <li>▪ Notify:                             <ul style="list-style-type: none"> <li>o External emergency services</li> <li>o OIM</li> <li>o PFSO (Port Facilities Security officer)</li> <li>o Operations Section Chief.</li> <li>o NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>▪ CCR Operator monitor process and escalate issues.</li> <li>▪ Provide regular status updates to OSC</li> <li>▪ CCR to confirm local automatic deluge systems has activated</li> <li>▪ CCR to monitor fixed fire and gas detection for signs of escalation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Muster and confirm individual accountability</li> <li>▪ Minimum PPE requirements for ERT</li> <li>▪ Provide cooling to pipe rack structure if required</li> <li>▪ ERT member to escort ahead with gas detector</li> <li>▪ Establish forward command point and provide SITREP</li> <li>▪ Confirm unnecessary persons are clear from area</li> <li>▪ Undertake casualty recovery if required only if safe to do so</li> <li>▪ Set fixed monitors to protect / cool exposures</li> <li>▪ Set portable monitors to protect / cool exposures</li> <li>▪ Use hand lines to protect / cool exposures if required</li> <li>▪ Provide cooling /protection for auxiliary equipment</li> <li>▪ Set up water curtains to protect against gas travel</li> <li>▪ Monitor water runoff for signs of contamination</li> <li>▪ HAZMAT response according to SDS if applicable</li> <li>▪ Provide regular SITREP to IMT</li> <li>▪ Restrict Personnel Access</li> </ul>
Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li><input type="checkbox"/> Update the 1800 Hotline</li> <li><input type="checkbox"/> Secure the incident scene for investigation (tape etc)</li> <li><input type="checkbox"/> Ensure all documentation is recorded</li> <li><input type="checkbox"/> Witness statements, take photos, secure video footage</li> <li><input type="checkbox"/> Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Conduct de-brief – internal and external</li> <li><input type="checkbox"/> Assist with external investigation (WorkSafe, police)</li> <li><input type="checkbox"/> Monitor emotional wellbeing and implement support as req</li> <li><input type="checkbox"/> Reassess work area and re issue permits if safe</li> </ul>
Considerations	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Vapours may travel to source of ignition and flash back</li> <li><input type="checkbox"/> Change in weather conditions (wind direction)</li> <li><input type="checkbox"/> Consider spill sumps and containment of spillages.</li> <li><input type="checkbox"/> Triage area setup at Medical Centre for multiple IP's</li> </ul>	



# Emergency Response Guide

**ERG # 22 Scenario: LOC from Fuel Gas System - Methane Gas- Unit 22**

Scenario Information	
Application	Loss of containment or fire at LP/HP fuel gas vessels, equipment and pipework - Unit 22
Causation	Flange leak, piping failure, mechanical damage, static discharge, defrost operations
Detection	Gas detection system, thermal detection systems, personnel notification

Key Substances in Scenario									
Substance	Vol. (m³)	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%/VOL)	AIT (°C)	SG
<b>Methane - Fuel Gas</b> UN # 1971		In Unit	2.1		2SE	4	05.3 - 15.0	537	55 (air)
<b>Natural Gas Liquids</b> UN # 3295		Adjacent Unit	2.1		3YE	4/14	1 - 10	450	0.5 - 0.7

SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)			
LOC	800 m	Fire	1500 m

Significant Consequences	
Consequence	Control / Precaution
Flash fire or explosion	No ignition sources, Don't extinguish flame use water to cool exposed structures
Gas under pressure	Gas detection, stay clear of release streams
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection
Gas release noise	Utilise hearing protection remove persons from area
Static discharge	Minimise movement of personnel and objects in release cloud
Asphyxiation	Monitor atmosphere and weather conditions. And move to safe location if required.
Vessel shell failure	Use cooling sprays, do not use water jets which spot cool

Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1		400 LPM
FW Monitors	1	2700 LPM	2700 LPM	Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1		4000 LPM
Oscillating FW Monitors	0	1800 LPM		Fire Appliance Foam Trailer Capacity	1		2700 L
FW Hydrants	2	900 LPM	1800 LPM				
FW Hose Reels	0	20 LPM	LPM				
Fire Water Tank Capacity			4600000L				
FW Delivery Duration for Incident			1022 mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18934 LPM				
Foam Hose Reels							
Foam Application Rate - Solution							
Foam Application Time			LPM				

Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	No	Misting System	No
Fixed Monitors	1	Hi Ex Foam Sys	No
Hydrants	2	Fixed DCP	No
Water Hose Reels	No	Foam Hose Reels	No

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>Flame impingement on piperack and structures</li> <li>Flame impingement on wet/dry flare piping</li> <li>Flame impingement on heavies recovery unit</li> <li>Flame impingement on lube oil cooling unit</li> </ul>

Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>Commence ESD if required.</li> <li>Initiate site alarm and muster activation procedures.</li> <li>CCTV cameras on location as appropriate.</li> <li>Conduct initial briefing (Summary, Potential, Plan, Tasks).</li> <li>Reduce flaring rate if appropriate to do so.</li> <li>Isolate and de-pressure inventory as appropriate.</li> <li>Identify ERT numbers, assess limitations on response.</li> <li>Mobilise OSC and ERT as/if warranted.</li> <li>Mobilise Paramedic to forward command post as required.</li> <li>Establish local weather conditions and advise OSC.</li> <li>Evaluate exposure impacts &amp; initiate control actions.</li> <li>Notify:                             <ul style="list-style-type: none"> <li>External emergency services</li> <li>OIM</li> <li>PFSO (Port Facilities Security officer)</li> <li>Operations Section Chief.</li> <li>NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>CCR Operator monitor process and escalate issues.</li> <li>Provide regular status updates to OSC.</li> <li>CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>Muster and confirm individual accountability.</li> <li>Minimum PPE requirements for ERT.</li> <li>Provide cooling to pipe rack structure if required.</li> <li>ERT member to escort ahead with gas detector.</li> <li>Establish forward command point and provide SITREP.</li> <li>Confirm unnecessary persons are clear from area.</li> <li>Undertake casualty recovery if required only if safe to do so.</li> <li>Set fixed monitors to protect / cool exposures.</li> <li>Set portable monitors to protect / cool exposures.</li> <li>Use hand lines to protect / cool exposures if required.</li> <li>Provide cooling /protection for auxiliary equipment.</li> <li>Set up water curtains to protect against gas travel.</li> <li>Monitor water runoff for signs of contamination.</li> <li>HAZMAT response according to SDS if applicable.</li> <li>Provide regular SITREP to IMT.</li> <li>Restrict Personnel Access.</li> </ul>

Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li>Update the 1800 Hotline</li> <li>Secure the incident scene for investigation (tape etc)</li> <li>Ensure all documentation is recorded</li> <li>Witness statements, take photos, secure video footage</li> <li>Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li>Conduct de-brief – internal and external</li> <li>Assist with external investigation (WorkSafe, police)</li> <li>Monitor emotional wellbeing and implement support as req</li> </ul>

Considerations
<ul style="list-style-type: none"> <li>Vapours may travel to source of ignition and flash back</li> <li>Change in weather conditions (wind direction)</li> <li>Triage area setup at Medical Centre for multiple IP's</li> </ul>



# Emergency Response Guide

ERG#

U24A

Scenario:

LOC from LNG Storage Tank System (LNG or Vapour) - Unit 24

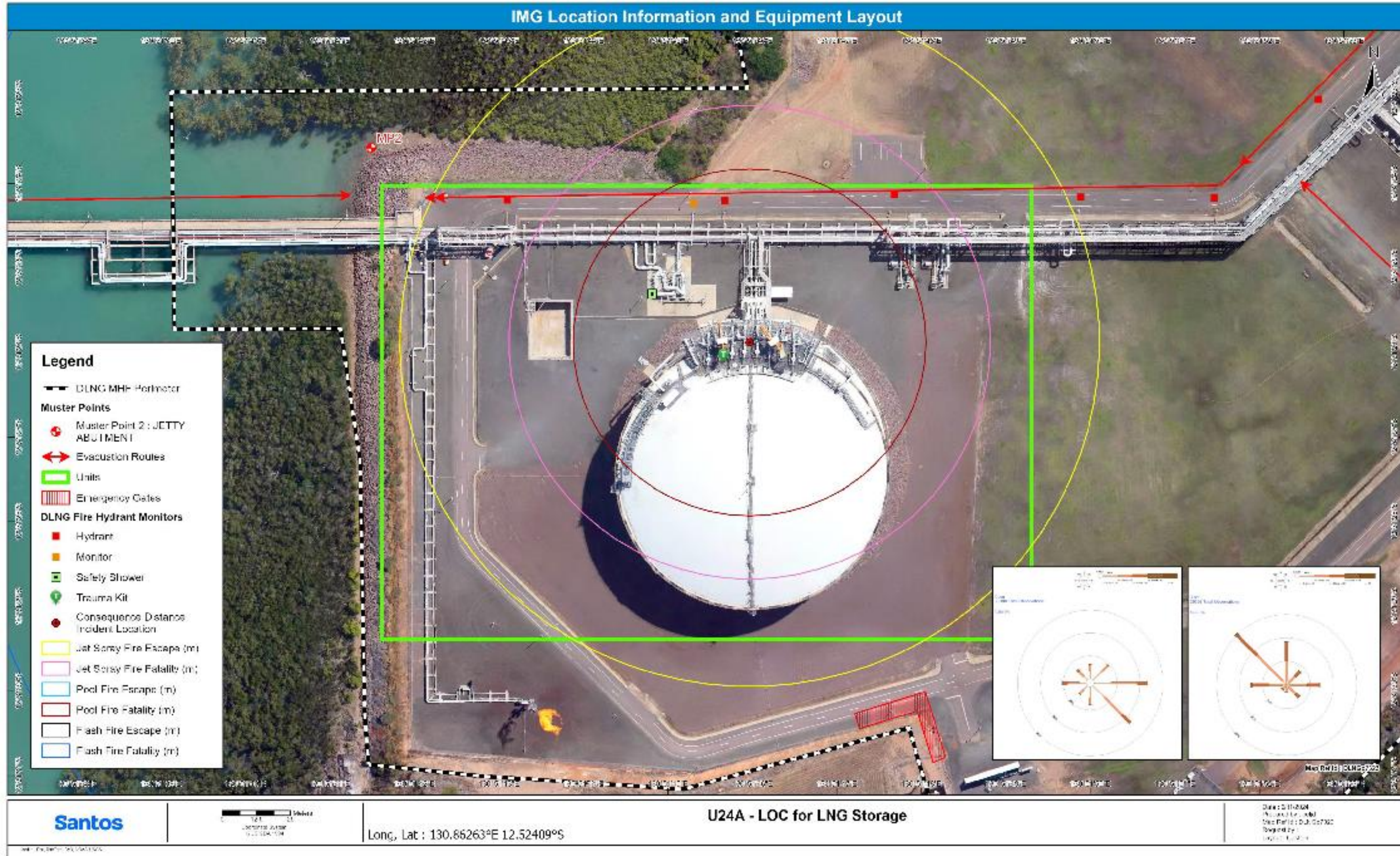
Scenario Information									
Application	Loss of containment or LNG storage tank Fire/Boil-Off Gas Compressor Fire/LNG Tank Sump Fire								
Causation	Flange leak, piping failure, tank failure, mechanical damage, static discharge, vacuum								
Detection	Gas detection system, thermal detection systems, personnel notification								
Key Substances in Scenario									
Substance	Vol. (m <sup>3</sup> )	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%VOL)	AIT (°C)	SG
LNG	1 x	In Area			2SE	4/14	5 - 15.0 (vapour)	600	0.43 (H <sub>2</sub> O)
UN # 1972	188000								
Boil Off Gas (CH <sub>4</sub> / N <sub>2</sub> )		In Area			2SE	4	5 - 15.0	537	0.43 (H <sub>2</sub> O)
UN # 1971									
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)									
LOC	800 m (Flam gas)		Fire		1500 m (Flam Gas)		500 m (Flam Liquid)		
	300 m (Flam Liquid)								
Significant Consequences									
Consequence	Control / Precaution								
Flash fire or explosion	No ignition sources, don't extinguish flame - use water to cool exposed structures only								
Pool Fire Tank Sump	Use cooling sprays, don't use water jets to prevent rapid boil off								
Gas under pressure	Gas detection, stay clear of release streams								
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection								
Gas release noise	Utilise hearing protection remove persons from area								
Asphyxiation	Monitor atmosphere and weather conditions and move to safe location if required.								
Cold burns	Avoid contact with liquid substances								
High Voltage Electricity	Ensure isolation before initiating rescue or firefighting actions								
Steel Embrittlement	Be aware potential of failure points, appoint a spotter to observe for signs of failure								
Falling objects	Clear area below at ratio of 1.5 x Height of structure, Head protection to be worn								
Injury producing fall	Limit equipment carried by individuals up the stairs and use handrail								
Tank shell failure (extremely unlikely)	Appoint a spotter to observe for signs of failure if suspected. Use cooling sprays, do not use water jets which spot cool. Evacuate area and retreat to CCA if suspected								
Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery					
	No	Individual	Total		No	Individual	Total		
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor - High Pressure (HL400 model) (40 bar)	1		400 LPM		
FW Monitors	1	2700 LPM	2700 LPM	Fire Appliances FW Monitor - Low Pressure (HL400 model) (10 bar)	1		4000 LPM		
Oscillating FW Monitors	0	1800 LPM	LPM	Fire Appliance Foam Trailer Capacity			2700 L		
FW Hydrants	4	900 LPM	3600 LPM						
FW Hose Reels	0	20 LPM	LPM						
Fire Water Tank Capacity	1		4600000L						
FW Delivery Duration for Incident			730 mins						
Fire Water Pump Pressure			11.8 bar						
Fire Water Pump Rate	2	9467 LPM	18934 LPM						
Foam Hose Reels									
Foam Application Rate - Solution			LPM						
Foam Application Time			mins						
Installed Protection Equipment									
Deluge Activation	No	Sprinkler	No						
Auto Osc Monitor	No	Misting System	No						
Fixed Monitors	1	Hi-Ex Foam System	No						
Hydrants	4	Fixed DCP	Yes						
Water Hose Reels		Foam Hose Reels	No						

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Version: DLNG/HSE/ER/002

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>Flame impingent on LNG pump platforms</li> <li>Flame impingent on pipe rack and structures</li> <li>Ignited Tank PSV Tail Pipe Jet Fire</li> <li>Radiant heat on BOG Compressors</li> <li>Cryogenic impact on structures</li> <li>Recovery of persons to grade if required</li> <li>Tank top / Tank sump pool fire</li> <li>Tank or platform structural failure</li> <li>ESDP</li> <li>ESDL</li> </ul>
Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>Commence ESD if required</li> <li>Initiate site alarm and muster activation procedures</li> <li>CCTV cameras on location as appropriate</li> <li>Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>Reduce flaring rate if appropriate to do so.</li> <li>Isolate and de-pressure inventory as appropriate</li> <li>Identify ERT numbers, assess limitations on response</li> <li>Mobilise OSC and ERT as/if warranted</li> <li>Mobilise Paramedic to forward command post as required</li> <li>Establish local weather conditions and advise OSC</li> <li>Evaluate exposure impacts &amp; initiate control actions</li> <li>Notify:                             <ul style="list-style-type: none"> <li>External emergency services</li> <li>OIM</li> <li>PFSO (Port Facilities Security officer)</li> <li>Operations Section Chief.</li> <li>NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>CCR Operator monitor process and escalate issues.</li> <li>Provide regular status updates to OSC</li> <li>CCR to confirm local automatic deluge systems has activated</li> <li>CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>Muster and confirm individual accountability</li> <li>Minimum PPE requirements for ERT</li> <li>Provide cooling to pipe rack structure if required</li> <li>ERT member to escort ahead with gas detector</li> <li>Establish forward command point and provide SITREP</li> <li>Confirm unnecessary persons are clear from area</li> <li>Undertake casualty recovery if required only if safe to do so</li> <li>Set fixed monitors to protect / cool exposures</li> <li>Set portable monitors to protect / cool exposures</li> <li>Use hand lines to protect / cool exposures if required</li> <li>Provide cooling /protection for auxiliary equipment</li> <li>Set up water curtains to protect against gas travel</li> <li>Monitor water runoff for signs of contamination</li> <li>HAZMAT response according to SDS if applicable</li> <li>Provide regular SITREP to IMT</li> <li>Restrict Personnel Access</li> </ul>
Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li>Update the 1800 Hotline</li> <li>Secure the incident scene for investigation (tape etc)</li> <li>Ensure all documentation is recorded</li> <li>Witness statements, take photos, secure video footage</li> <li>Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li>Conduct de-brief – internal and external</li> <li>Assist with external investigation (WorkSafe, police)</li> <li>Monitor emotional wellbeing and implement support as req</li> <li>Reassess work area and re issue permits if safe</li> </ul>
Considerations	
<ul style="list-style-type: none"> <li>Trapped LNG in pipework building up pressure. Consider alternate relief or line-up to prevent escalation</li> <li>No hydrant on tank roof – Hose lines required to be run from grade</li> <li>Change in weather conditions (wind direction)</li> <li>Triage area setup at Medical Centre for multiple IP's</li> <li>Consider what to do with ship loading activities if alongside.</li> </ul>	



# Emergency Response Guide

**ERG # 24B.1 Scenario: LOC at LNG Loading Lines (Liquid or Vapour) - Unit 24**

Scenario Information									
Application	LNG Loss of Containment or Fire on Loading Lines (Tank to Jetty)								
Causation	Flange leak, piping failure, mechanical damage, static discharge, surge, thermal bowing								
Detection	Gas detection system, thermal detection systems, personnel notification								
Key Substances in Scenario									
Substance	Vol. (m <sup>3</sup> )	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%VOL)	AIT (°C)	SG
LNG UN# 1972	1100	In Unit			2SE	4/14	05.3 - 15.0 (vapour)	600	0.43 (H <sub>2</sub> O)
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)									
LOC	800 m (Flam gas) 300 m (Flam Liquid)		Fire	1500 m (Flam gas) 500 m (Flam Liquid)					
Significant Consequences									
Consequence	Control / Precaution								
Flash fire	No ignition sources, don't extinguish flame - use water to cool exposed structures								
Pool fire	Use cooling sprays, don't use water jets to prevent rapid boil off								
Liquid under pressure	Gas detection, stay clear of release streams, do not direct water into pooled LNG as this will increase vaporisation rate								
Gas under pressure	Gas detection, stay clear of release streams. Fog clouds do not define the vapour cloud. Vapour can extend past cloud								
Asphyxiation	Monitor atmosphere and weather conditions and move to safe location if required.								
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection								
Static discharge	Minimise movement of personnel and objects in release cloud								
Cold burns	Avoid contact with cryogenic liquid substances,								
Asphyxiation	Monitor atmosphere and weather conditions and move to safe location if required.								
Fall into water	PFD to be worn if working next to water								
Restricted evacuation	Leave area early if decision is to evacuate								
Slipping on ice	Be aware of ice formed from cryogenic spill								

Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor - High Pressure (HL400 model) (40 bar)	1		400 LPM
FW Monitors	0	2700 LPM	LPM	Fire Appliances FW Monitor - Low Pressure (HL400 model) (10 bar)	1		4000 LPM
Oscillating FW Monitors	0	1800 LPM	LPM	Fire Appliance Foam Trailer Capacity	1		2700 L
FW Hydrants	0	900 LPM	LPM				
FW Hose Reels	0	20 LPM	LPM				
Fire Water Tank Capacity	1	4600000L	4600000L				
FW Delivery Duration for Incident			mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18394 LPM				
Foam Hose Reels							
Foam Application Rate - Solution			LPM				
Foam Application Time			mins				

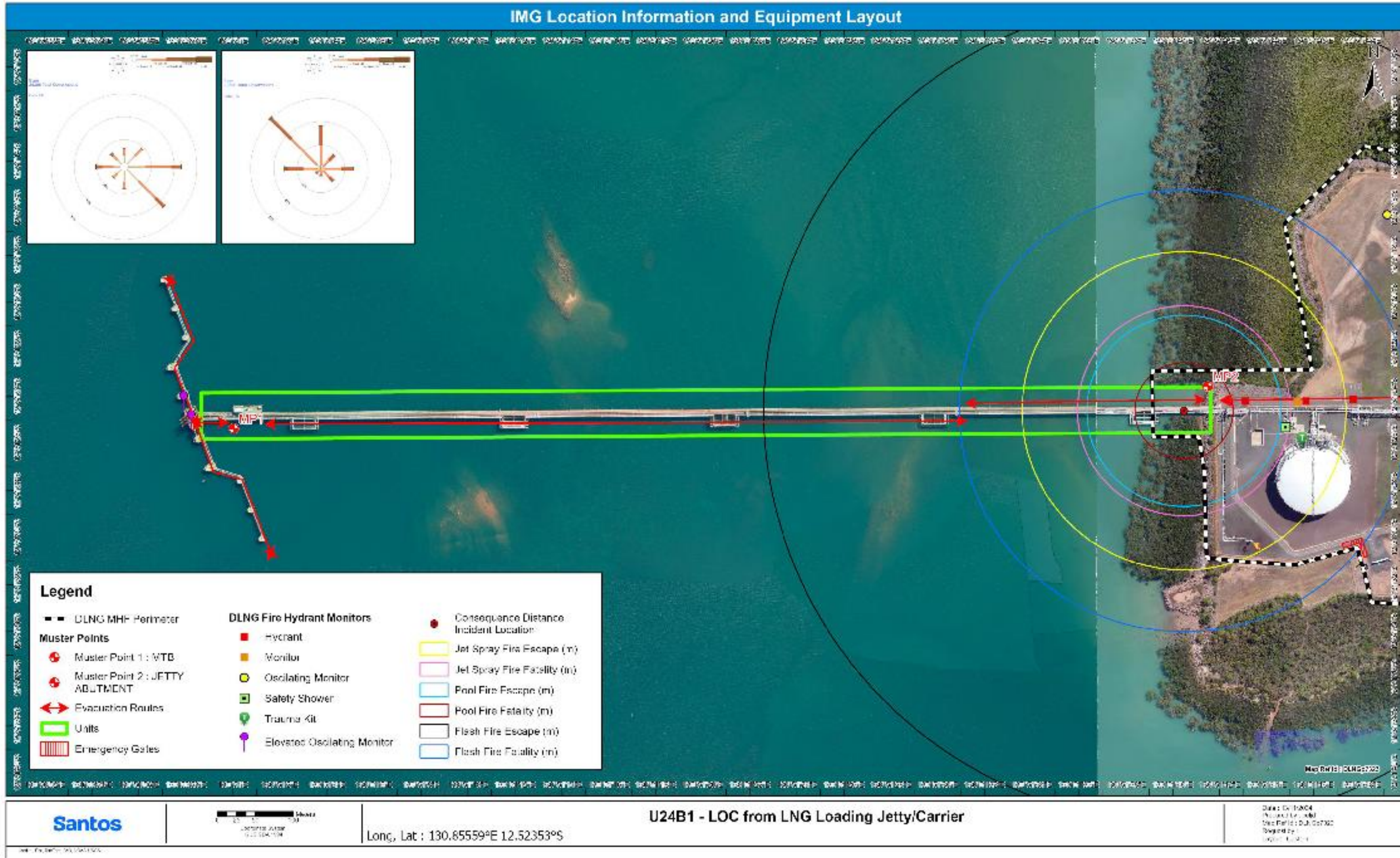
Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	No	Misting System	No
Fixed Monitors	No	Hi-Ex Foam System	No
Hydrants	No	Fixed DCP	No
Water Hose Reels	No	Foam Hose Reels	No

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>▪ Embrittlement of structures due to extreme cold</li> <li>▪ Flame impingement on LNG analyser house</li> <li>▪ Long duration incident due to volumes</li> <li>▪ Flame impingement on structures</li> <li>▪ Radiant Heat on Marine Terminal Building</li> <li>▪ LNG Sea Fire</li> <li>▪ Contaminated firewater runoff into ocean</li> <li>▪ Evacuation of persons stranded on jetty / at loading arms</li> <li>▪ ESDL</li> </ul>

Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>▪ Commence ESD if required</li> <li>▪ Initiate site alarm and muster activation procedures</li> <li>▪ CCTV cameras on location as appropriate</li> <li>▪ Utilise DLNG OPEP (Oil Pollution Emergency Plan) for first initial response actions – ALL/HSE/ER/009</li> <li>▪ Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>▪ Reduce flaring rate if appropriate to do so.</li> <li>▪ Isolate and de-pressure inventory as appropriate</li> <li>▪ Identify ERT numbers, assess limitations on response</li> <li>▪ Mobilise OSC and ERT as/if warranted</li> <li>▪ Mobilise Paramedic to forward command post as required</li> <li>▪ Establish local weather conditions and advise OSC</li> <li>▪ Evaluate exposure impacts &amp; initiate control actions</li> <li>▪ Notify:                             <ul style="list-style-type: none"> <li>o External emergency services</li> <li>o OIM</li> <li>o PFSO (Port Facilities Security officer)</li> <li>o Operations Section Chief.</li> <li>o NT Worksafe (HSE contact person)</li> </ul> </li> <li>▪ CCR Operator monitor process and escalate issues.</li> <li>▪ Provide regular status updates to OSC</li> <li>▪ CCR to confirm local automatic deluge systems has activated</li> <li>▪ CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Muster and confirm individual accountability</li> <li>▪ Minimum PPE requirements for ERT</li> <li>▪ Provide cooling to pipe rack structure if required</li> <li>▪ ERT member to escort ahead with gas detector</li> <li>▪ Establish forward command point and provide SITREP</li> <li>▪ Confirm unnecessary persons are clear from area</li> <li>▪ Undertake casualty recovery if required only if safe to do so</li> <li>▪ Set fixed monitors to protect / cool exposures</li> <li>▪ Set portable monitors to protect / cool exposures</li> <li>▪ Use hand lines to protect / cool exposures if required</li> <li>▪ Provide cooling /protection for auxiliary equipment</li> <li>▪ Set up water curtains to protect against gas travel</li> <li>▪ Monitor water runoff for signs of contamination</li> <li>▪ HAZMAT response according to SDS if applicable</li> <li>▪ Provide regular SITREP to IMT</li> <li>Restrict Personnel Access</li> </ul>

Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li><input type="checkbox"/> Update the 1800 Hotline</li> <li><input type="checkbox"/> Secure the incident scene for investigation (tape etc)</li> <li><input type="checkbox"/> Ensure all documentation is recorded</li> <li><input type="checkbox"/> Witness statements, take photos, secure video footage</li> <li><input type="checkbox"/> Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Conduct de-brief – internal and external</li> <li><input type="checkbox"/> Assist with external investigation (WorkSafe, police)</li> <li><input type="checkbox"/> Monitor emotional wellbeing and implement support as req</li> <li><input type="checkbox"/> Reassess work area and re issue permits if safe</li> </ul>

Considerations
<ul style="list-style-type: none"> <li><input type="checkbox"/> Trapped LNG in pipework building up pressure. Consider alternate relief or line-up to prevent escalation</li> <li><input type="checkbox"/> Emergency vehicle placement on jetty for medical evacuation if required</li> <li><input type="checkbox"/> Change in weather conditions (wind direction)</li> <li><input type="checkbox"/> Triage area setup at Medical Centre for multiple IP's</li> <li><input type="checkbox"/> Consider what to do with ship loading activities if alongside.</li> </ul>

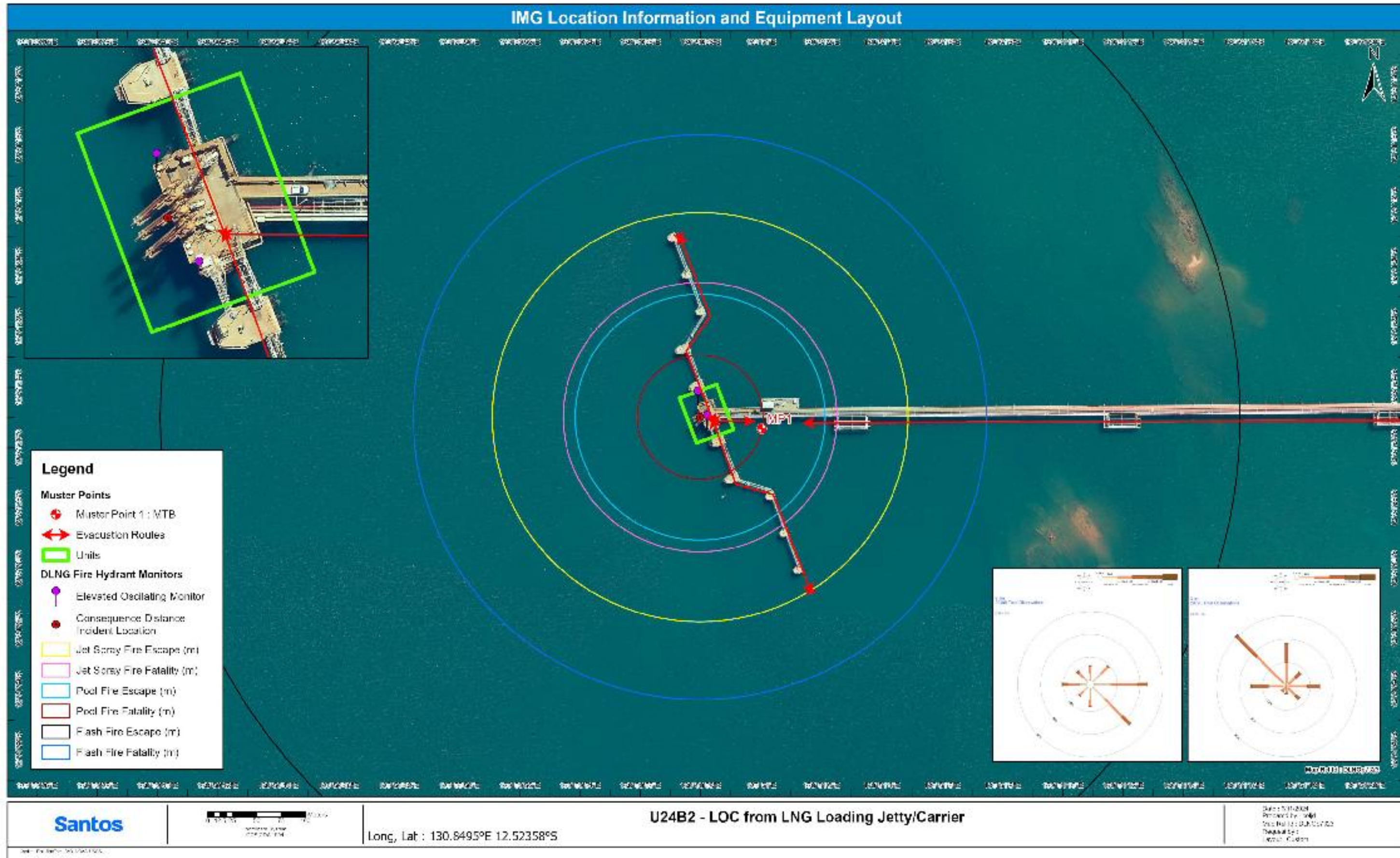


# Emergency Response Guide

**ERG # 24B.2 Scenario: LOC from LNG Loading at Jetty/Ship/Loading Line - Unit 24**

Scenario Information									
Application		LNG pool fire at the Loading Arms or Loading Lines							
Causation		Ship movement, flange leak, piping failure, mechanical damage, static discharge							
Detection		Gas detection system, IR detection systems, personnel notification, thermal detection systems							
Key Substances in Scenario									
Substance	Vol (m <sup>3</sup> )	Exposure	DG Class	GHS	HAZ Code	HB76 guide	LEL-UFL (% Vol)	AIT (°C)	SG
LNG UN # 1972	425	In Loading Arms			2SE	4/14	5 - 15.0 (vapour)	600	0.43 (H2O)
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)									
LOC	800 m (Flam gas) 300 m (Flam Liquid)		Fire	1500 m (Flam gas) 500 m (Flam Liquid)					
Significant Consequences									
Consequence	Control / Precaution								
Flash fire or explosion	No ignition sources, don't extinguish flame - use water to cool exposed structures								
Pool fire	Use cooling sprays, don't use water jets to prevent rapid boil off								
Liquid under pressure	Gas detection, stay clear of release streams, do not direct water into pooled LNG as this will increase vaporisation rate								
Gas under pressure	Gas detection, stay clear of release streams. Fog clouds do not define the vapour cloud. Vapour can extend pass cloud								
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection								
Static discharge	Minimise movement of personnel and objects in release cloud								
Cold burns	Avoid contact with cryogenic liquid substances,								
Asphyxiation	Monitor atmosphere and weather conditions and move to safe location if required.								
Fall into water	PFD to be worn on the breasting and turning dolphins								
Restricted evacuation	Leave area early if decision is to evacuate Back emergency response vehicles down jetty to enable quicker evacuation								
Restricted access	Consider vehicle placement so as not to block Emergency vehicles in								
Slipping on ice	Be aware of ice formed from cryogenic spill								
Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery					
	No	Individual	Total		No	Individual	Total		
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1		400 LPM		
FW Monitors	0	2700 LPM	LPM	Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1		4000 LPM		
Oscillating FW Monitors	2	2700 LPM	5400 LPM	Fire Appliance Foam Trailer Capacity	1		2700 L		
FW Hydrants	0	900 LPM	LPM						
FW Hose Reels	0	20 LPM	LPM						
Fire Water Tank Capacity	1		4600000L						
FW Delivery Duration for Incident			851 mins						
Fire Water Pump Pressure			11.8 bar						
Fire Water Pump Rate	2	9467 LPM	18394 LPM						
Foam Hose Reels									
Foam Application Rate - Solution			LPM						
Foam Application Time			mins						
Installed Protection Equipment									
Deluge Activation	No	Sprinkler	No						
Auto Osc Monitor	2	Misting System	No						
Fixed Monitors	No	Hi Ex Foam Sys	No						
Hydrants	No	Fixed DCP	No						
Water Hose Reels	No	Foam Hose Reels	No						

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>▪ Evacuation of persons stranded on dolphins</li> <li>▪ Flame impingent &amp; involvement of berthed vessel</li> <li>▪ LNG Sea Fire</li> <li>▪ Contaminated firewater runoff into ocean</li> <li>▪ PERC failure to release</li> <li>▪ Embrittlement of structures due to extreme cold</li> <li>▪ Access to dolphins to release vessel</li> <li>▪ Hydraulic oil in harbour from loading arm system</li> <li>▪ ESDL/ESDP</li> </ul>
Initial Actions & Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>• Commence ESD if required</li> <li>• Initiate site alarm and muster activation procedures</li> <li>• CCTV cameras on location as appropriate</li> <li>• Utilise DLNG OPEP (Oil Pollution Emergency Plan) for first initial response actions – ALL/HSE/ER/009</li> <li>• Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>• Reduce flaring rate if appropriate to do so.</li> <li>• Isolate and de-pressure inventory as appropriate</li> <li>• Identify ERT numbers, assess limitations on response</li> <li>• Mobilise OSC and ERT as/if warranted</li> <li>• Mobilise Paramedic to forward command post as required</li> <li>• Establish local weather conditions and advise OSC</li> <li>• Evaluate exposure impacts &amp; initiate control actions</li> <li>• Notify:                             <ul style="list-style-type: none"> <li>o External emergency services</li> <li>o OIM</li> <li>o PFSO (Port Facilities Security officer)</li> <li>o Operations Section Chief.</li> <li>o NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>• CCR Operator monitor process and escalate issues.</li> <li>• Provide regular status updates to OSC</li> <li>• CCR to confirm local automatic deluge systems has activated</li> <li>• CCR to monitor fixed fire and gas detection for signs of escalation./Ambo)</li> </ul>	<ul style="list-style-type: none"> <li>• Muster and confirm individual accountability</li> <li>• Minimum PPE requirements for ERT</li> <li>• Provide cooling to pipe rack structure if required</li> <li>• ERT member to escort ahead with gas detector</li> <li>• Establish forward command point and provide SITREP</li> <li>• Confirm unnecessary persons are clear from area</li> <li>• Undertake casualty recovery if required only if safe to do so</li> <li>• Set fixed monitors to protect / cool exposures</li> <li>• Set portable monitors to protect / cool exposures</li> <li>• Use hand lines to protect / cool exposures if required</li> <li>• Provide cooling /protection for auxiliary equipment</li> <li>• Set up water curtains to protect against gas travel</li> <li>• Monitor water runoff for signs of contamination</li> <li>• HAZMAT response according to SDS if applicable</li> <li>• Provide regular SITREP to IMT</li> <li>• Restrict Personnel Access</li> </ul>
Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li><input type="checkbox"/> Update the 1800 Hotline</li> <li><input type="checkbox"/> Secure the incident scene for investigation (tape etc)</li> <li><input type="checkbox"/> Ensure all documentation is recorded</li> <li><input type="checkbox"/> Witness statements, take photos, secure video footage</li> <li><input type="checkbox"/> Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Conduct de-brief – internal and external</li> <li><input type="checkbox"/> Assist with external investigation (WorkSafe, police)</li> <li><input type="checkbox"/> Monitor emotional wellbeing and implement support as req</li> <li><input type="checkbox"/> Reassess work area and re issue permits if safe</li> </ul>
Considerations	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Trapped LNG in pipework building up pressure. Consider alternate relief or line-up to prevent escalation</li> <li><input type="checkbox"/> Emergency vehicle placement on jetty for medical evacuation if required</li> <li><input type="checkbox"/> Change in weather conditions (wind direction)</li> <li><input type="checkbox"/> Consider what to do with ship loading activities if alongside.</li> <li><input type="checkbox"/> Triage area setup at Medical Centre for multiple IP's</li> </ul>	



# Emergency Response Guide

**ERG # 29 Scenario: LOC from Effluent Treatment - Unit 29**

Scenario Information									
Application	Loss of containment or fire at Effluent(Waste Water) System (Methane Gas)								
Causation	Flange leak, piping failure, mechanical damage, static discharge, Flare knock out drum draining								
Detection	Gas detection system, thermal detection systems, personnel notification								
Key Substances in Scenario									
Substance	Vol. (m³)	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%VOL)	AIT (°C)	SG
Flare Gas		In Unit			2YE	4	02.1 - 09.5	450	1.55 (air)
UN #									
Waste Water		In Unit							
UN #									
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)									
LOC	800 m			Fire	1500 m				
Significant Consequences									
Consequence	Control / Precaution								
Flash fire or explosion	No ignition sources, Don't extinguish flame - use water to cool exposed structures								
Gas under pressure	Gas detection, stay clear of release streams								
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection								
Gas release noise	Utilise hearing protection remove persons from area								
Static discharge	Minimise movement of personnel and objects in release cloud								
Asphyxiation	SCBA to be used in case of gas release or fire								
Vessel shell failure	Use cooling sprays, not use water jets which spot cool								
Fire water run off	Control fire water runoff from entering waterways								

Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1		400 LPM
FW Monitors	1	2700 LPM	2700 LPM	Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1		4000 LPM
Oscillating FW Monitors	0	1800 LPM		Fire Appliance Foam Trailer Capacity	1		2700 L
FW Hydrants	1	900 LPM	900 LPM				
FW Hose Reels	0	20 LPM	LPM				
Fire Water Tank Capacity			4600000L				
FW Delivery Duration for Incident			1277 mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18934 LPM				
Foam Hose Reels							
Foam Application Rate - Solution							
Foam Application Time			LPM				

Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	No	Misting System	No
Fixed Monitors	1	Hi Ex Foam Sys	No
Hydrants	1	Fixed DCP	No
Water Hose Reels	No	Foam Hose Reels	No

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>▪ <b>Flame impingement on Utility Units</b></li> <li>▪ <b>Flame impingement on piperacks and structures</b></li> <li>▪ <b>Environmental emissions</b></li> <li>▪ <b>Ignited PSV vent (methane or propane/ethylene)</b></li> <li>▪ <b>Potentially toxic vapours</b></li> <li>▪ <b>Ignition of vegetation fire</b></li> </ul>

Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>▪ Commence ESD if required.</li> <li>▪ Initiate site alarm and muster activation procedures.</li> <li>▪ CCTV cameras on location as appropriate.</li> <li>▪ Conduct initial briefing (Summary, Potential, Plan, Tasks).</li> <li>▪ Reduce flaring rate if appropriate to do so.</li> <li>▪ Isolate and de-pressure inventory as appropriate.</li> <li>▪ Identify ERT numbers, assess limitations on response.</li> <li>▪ Mobilise OSC and ERT as/if warranted.</li> <li>▪ Mobilise Paramedic to forward command post as required.</li> <li>▪ Establish local weather conditions and advise OSC.</li> <li>▪ Evaluate exposure impacts &amp; initiate control actions.</li> <li>▪ Notify:                             <ul style="list-style-type: none"> <li>o External emergency services</li> <li>o OIM</li> <li>o PFSO (Port Facilities Security officer)</li> <li>o Operations Section Chief.</li> <li>o NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>▪ CCR Operator monitor process and escalate issues.</li> <li>▪ Provide regular status updates to OSC.</li> <li>▪ CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Muster and confirm individual accountability.</li> <li>▪ Minimum PPE requirements for ERT.</li> <li>▪ Provide cooling to pipe rack structure if required.</li> <li>▪ ERT member to escort ahead with gas detector.</li> <li>▪ Establish forward command point and provide SITREP.</li> <li>▪ Confirm unnecessary persons are clear from area.</li> <li>▪ Undertake casualty recovery if required only if safe to do so.</li> <li>▪ Set fixed monitors to protect / cool exposures.</li> <li>▪ Set portable monitors to protect / cool exposures.</li> <li>▪ Use hand lines to protect / cool exposures if required.</li> <li>▪ Provide cooling /protection for auxiliary equipment.</li> <li>▪ Set up water curtains to protect against gas travel.</li> <li>▪ Monitor water runoff for signs of contamination.</li> <li>▪ HAZMAT response according to SDS if applicable.</li> <li>▪ Provide regular SITREP to IMT.</li> <li>▪ Restrict Personnel Access.</li> </ul>

Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li><input type="checkbox"/> Update the 1800 Hotline</li> <li><input type="checkbox"/> Secure the incident scene for investigation (tape etc)</li> <li><input type="checkbox"/> Ensure all documentation is recorded</li> <li><input type="checkbox"/> Witness statements, take photos, secure video footage</li> <li><input type="checkbox"/> Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Conduct de-brief – internal and external</li> <li><input type="checkbox"/> Assist with external investigation (WorkSafe, police)</li> <li><input type="checkbox"/> Monitor emotional wellbeing and implement support as req</li> </ul>

Considerations
<ul style="list-style-type: none"> <li><input type="checkbox"/> Vapours may travel to source of ignition and flash back</li> <li><input type="checkbox"/> Change in weather conditions (wind direction)</li> <li><input type="checkbox"/> Triage area setup at Medical Centre for multiple IP's</li> </ul>

Emergency Response Guide

IMG Location Information and Equipment Layout



- Legend**
- DLNG MHIF Perimeter
  - Evacuation Routes
  - Units
  - DLNG Fire Hydrant Monitors**
    - Hydrant
    - Monitor
    - Oscillating Monitor
    - Foam Hose Reel
    - Hose Reel
    - Elevated Monitor
    - Safety Shower
    - Soil Kit
    - Trauma Kit
    - Defibrillator Kit
    - Consequence Distance
    - Incident Location
    - Jet Spray Fire Escape (m)

# Emergency Response Guide

**ERG # 31 Scenario: LOC from Fuel Supply in Power Generation Methane Gas- Unit 31**

Scenario Information	
Application	Loss of containment or fire from the power generation fuel gas pipework at inlet valve shelter Unit 11 and from piping, vessels and equipment – Unit 31
Causation	Flange leak, piping failure, mechanical damage, static discharge
Detection	Gas detection system, thermal detection systems, personnel notification

Key Substances in Scenario									
Substance	Vol. (m³)	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%/VOL)	AIT (°C)	SG
<b>Methane – Fuel Gas</b> UN # 1971		In Unit			2SE	4	05.3 - 15.0	537	.55 (air)
<b>Diesel</b> UN # 1202		Adjacent – Diesel Generator	N/A Combustible		N/A	15	N/A	>250	0.84 (H₂O)

SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)			
LOC	800 m	Fire	1500 m

Significant Consequences	
Consequence	Control / Precaution
Flash fire or explosion	No ignition sources, don't extinguish flame - use water to cool exposed structures only
Gas under pressure	Gas detection, stay clear of release streams
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection
Gas release noise	Utilise hearing protection remove persons from area
Asphyxiation	Monitor atmosphere and weather conditions and move to safe location if required.
Vessel shell failure	Use cooling sprays, do not use water jets which spot cool
Hot surfaces	Keep clear of exhaust ducting and use caution if removing lagging
High voltage electricity	Ensure HV electricity is isolated prior to fire fighting

Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1		400 LPM
FW Monitors	10	2700 LPM	27000 LPM	Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1		4000 LPM
Oscillating FW Monitors	1	1800 LPM	1800 LPM	Fire Appliance Foam Trailer Capacity	1		2700 L
FW Hydrants	4	900 LPM	3600 LPM				
FW Hose Reels	1	20 LPM	20 LPM				
Fire Water Tank Capacity			4600000L				
FW Delivery Duration for Incident			142 mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18934 LPM				
Foam Hose Reels							
Foam Application Rate - Solution	1						
Foam Application Time			LPM				
Gaseous Fire Suppression (CO2) – each power generation turbine package							

Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	1	Misting System	No
Fixed Monitors	10	Hi Ex Foam Sys	No
Hydrants	4	Fixed DCP	No
Water Hose Reels	1	Foam Hose Reels	1
Gaseous fire suppression (CO₂)	Yes		

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable.</p> <p><b>IF SAFE:</b> Minimise environmental impact.</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation.</p> <p><b>IF SAFE:</b> Comply with regulatory commitments.</p> <p><b>IF SAFE:</b> Safeguard reputation.</p>	<ul style="list-style-type: none"> <li>• Fire/Explosion of Substations</li> <li>• Flame impingement on additional GTG units</li> <li>• Flame impingement on propane fin fans</li> <li>• Flame impingement on Utility Units</li> <li>• Radiant heat on inlet valve shelter</li> <li>• Flame impingement on piping and structures</li> <li>• ESDG and ESDP</li> <li>• Potential power loss to facility and black start conditions</li> </ul>

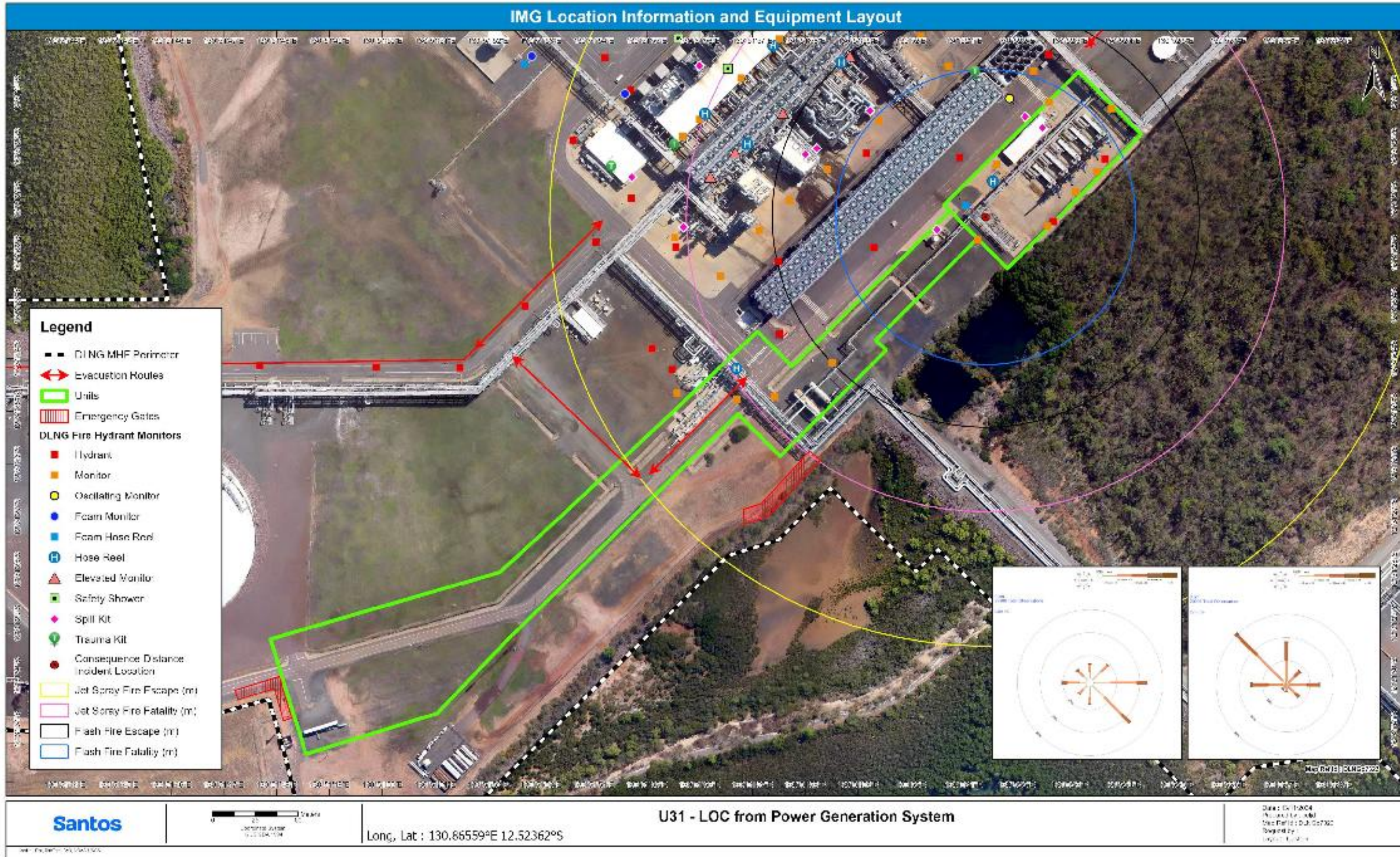
Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>• Commence ESD if required.</li> <li>• Initiate site alarm and muster activation procedures.</li> <li>• CCTV cameras on location as appropriate.</li> <li>• CCR to confirm local automatic deluge/fire suppression systems have activated.</li> <li>• Conduct initial briefing (Summary, Potential, Plan, Tasks).</li> <li>• Reduce flaring rate if appropriate to do so.</li> <li>• Isolate and de-pressure inventory as appropriate.</li> <li>• Identify ERT numbers, assess limitations on response.</li> <li>• Mobilise OSC and ERT as/if warranted.</li> <li>• Mobilise Paramedic to forward command post as required.</li> <li>• Establish local weather conditions and advise OSC.</li> <li>• Evaluate exposure impacts &amp; initiate control actions.</li> <li>• Notify:                             <ul style="list-style-type: none"> <li>o External emergency services</li> <li>o OIM</li> <li>o PFSO (Port Facilities Security officer)</li> <li>o Operations Section Chief.</li> <li>o NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>• CCR Operator monitor process and escalate issues.</li> <li>• Provide regular status updates to OSC.</li> <li>• CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>• Muster and confirm individual accountability.</li> <li>• Minimum PPE requirements for ERT.</li> <li>• Provide cooling to pipe rack structure if required.</li> <li>• ERT member to escort ahead with gas detector.</li> <li>• Establish forward command point and provide SITREP.</li> <li>• Confirm unnecessary persons are clear from area.</li> <li>• Undertake casualty recovery if required only if safe to do so.</li> <li>• Set fixed monitors to protect / cool exposures.</li> <li>• Set portable monitors to protect / cool exposures.</li> <li>• Use hand lines to protect / cool exposures if required.</li> <li>• Provide cooling /protection for auxiliary equipment.</li> <li>• Set up water curtains to protect against gas travel.</li> <li>• Monitor water runoff for signs of contamination.</li> <li>• HAZMAT response according to SDS if applicable.</li> <li>• Provide regular SITREP to IMT.</li> <li>• Restrict Personnel Access.</li> </ul>

Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li><input type="checkbox"/> Update the 1800 Hotline</li> <li><input type="checkbox"/> Secure the incident scene for investigation (tape etc)</li> <li><input type="checkbox"/> Ensure all documentation is recorded</li> <li><input type="checkbox"/> Witness statements, take photos, secure video footage</li> <li><input type="checkbox"/> Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Conduct de-brief – internal and external</li> <li><input type="checkbox"/> Assist with external investigation (WorkSafe, police)</li> <li><input type="checkbox"/> Monitor emotional wellbeing and implement support as req</li> </ul>

Considerations
<ul style="list-style-type: none"> <li><input type="checkbox"/> Vapours may travel to source of ignition and flash back</li> <li><input type="checkbox"/> Change in weather conditions (wind direction)</li> <li><input type="checkbox"/> Consider spill sumps and containment of spillages</li> <li><input type="checkbox"/> Triage area setup at Medical Centre for multiple IP's</li> </ul>




Emergency Response Guide

IMG Location Information and Equipment Layout



# Emergency Response Guide

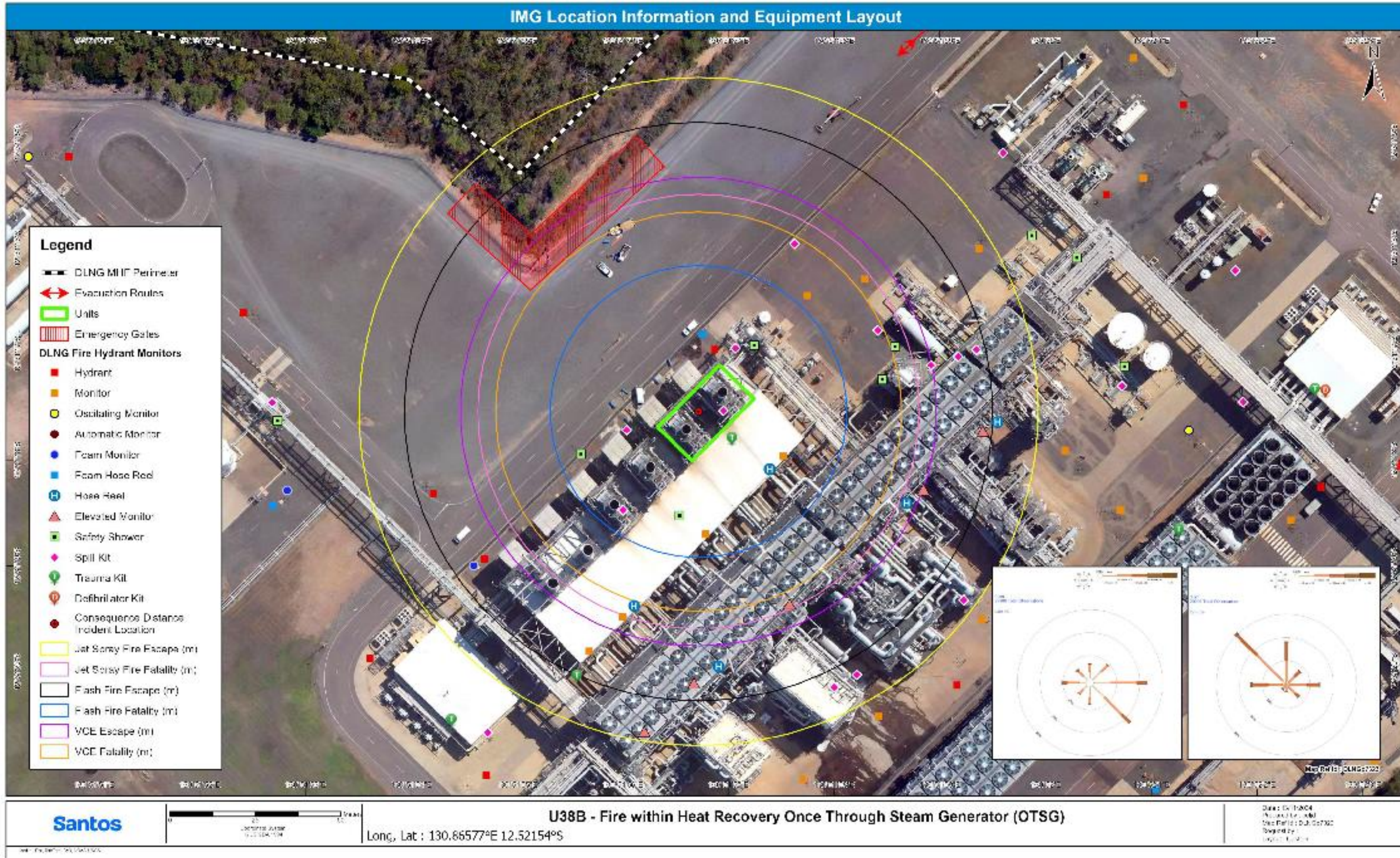
**ERG # 38B Scenario: Fire or Explosion in Regen OTSG Methane Gas - Unit 38**

Scenario Information										
Application	Loss of containment or fire/explosion at the Once Through Steam Generation Regen Gas Units (U14 turbine stacks)									
Causation	Heater protection system failure, Flange leak, piping failure, mechanical damage, static discharge									
Detection	Gas detection system, thermal detection systems, personnel notification									
Key Substances in Scenario										
Substance	Vol. (m³)	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%VOL)	AIT (°C)	SG	
Methane - Regen Gas UN # 1971	~5	In Unit				2SE	4	5 - 15.0	537	0.55 (air)
Steam (H <sub>2</sub> O)		In Area	N/A	N/A	N/A	N/A				
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)										
LOC	800 m (Flam Gas)			Fire			1500 m (Flam Gas)			
Significant Consequences										
Consequence	Control / Precaution									
Flash fire (post explosion)	No ignition sources, Don't extinguish flame - use water to cool exposed structures									
Gas under pressure	Gas detection, stay clear of release streams									
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection									
Gas release noise	Utilise hearing protection remove persons from area									
Static discharge	Minimise movement of personnel and objects in release cloud									
Asphyxiation	SCBA to be used in case of gas release or fire									
Hot Surfaces	Equipment service temp could be up to 315°C									

Installed Fixed Fire Water/Foam Delivery				Portable Fire Water/Foam Delivery			
	No	Individual	Total		No	Individual	Total
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1		400 LPM
FW Monitors	1	2700 LPM	2700 LPM	Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1		4000 LPM
Oscillating FW Monitors	0	1800 LPM		Fire Appliance Foam Trailer Capacity	1		2700 L
FW Hydrants	1	900 LPM	900 LPM				
FW Hose Reels	0	20 LPM	LPM				
Fire Water Tank Capacity	1		4600000L				
FW Delivery Duration for Incident			1278 mins				
Fire Water Pump Pressure			11.8 bar				
Fire Water Pump Rate	2	9467 LPM	18934 LPM				
Foam Hose Reels							
Foam Application Rate - Solution							
Foam Application Time		LPM	LPM				

Installed Protection Equipment			
Deluge Activation	No	Sprinkler	No
Auto Osc Monitor	No	Misting System	No
Fixed Monitors	1	Hi Ex Foam Sys	No
Hydrants	1	Fixed DCP	No
Water Hose Reels	No	Foam Hose Reels	No

Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel</p> <p><b>ALWAYS:</b> Account for all people, treat if required</p> <p><b>ALWAYS:</b> Alert emergency response agencies</p> <p><b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable</p> <p><b>IF SAFE:</b> Minimise environmental impact</p> <p><b>IF SAFE:</b> Protect assets and minimise escalation</p> <p><b>IF SAFE:</b> Comply with regulatory commitments</p> <p><b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>▪ Flame impingement on Unit 14 refrigeration turbine</li> <li>▪ Steam losses</li> <li>▪ Flame impingement on propane pipework/structures</li> <li>▪ Projectiles from explosion</li> <li>▪ ESDP</li> <li>▪ Vegetation fire</li> </ul>
Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>▪ Commence ESD if required</li> <li>▪ Initiate site alarm and muster activation procedures</li> <li>▪ CCTV cameras on location as appropriate</li> <li>▪ Conduct initial briefing (Summary, Potential, Plan, Tasks)</li> <li>▪ Reduce flaring rate if appropriate to do so.</li> <li>▪ Isolate and de-pressure inventory as appropriate</li> <li>▪ Identify ERT numbers, assess limitations on response</li> <li>▪ Mobilise OSC and ERT as/if warranted</li> <li>▪ Mobilise Paramedic to forward command post as required</li> <li>▪ Establish local weather conditions and advise OSC</li> <li>▪ Evaluate exposure impacts &amp; initiate control actions</li> <li>▪ Notify:                             <ul style="list-style-type: none"> <li>○ External emergency services</li> <li>○ OIM</li> <li>○ PFSO (Port Facilities Security officer)</li> <li>○ Operations Section Chief.</li> <li>○ NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>▪ CCR Operator monitor process and escalate issues.</li> <li>▪ Provide regular status updates to OSC</li> <li>▪ CCR to confirm local automatic deluge systems has activated</li> <li>▪ CCR to monitor fixed fire and gas detection for signs of escalation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Muster and confirm individual accountability</li> <li>▪ Minimum PPE requirements for ERT</li> <li>▪ Provide cooling to pipe rack structure if required</li> <li>▪ ERT member to escort ahead with gas detector</li> <li>▪ Establish forward command point and provide SITREP</li> <li>▪ Confirm unnecessary persons are clear from area</li> <li>▪ Undertake casualty recovery if required only if safe to do so</li> <li>▪ Set fixed monitors to protect / cool exposures</li> <li>▪ Set portable monitors to protect / cool exposures</li> <li>▪ Use hand lines to protect / cool exposures if required</li> <li>▪ Provide cooling /protection for auxiliary equipment</li> <li>▪ Set up water curtains to protect against gas travel</li> <li>▪ Monitor water runoff for signs of contamination</li> <li>▪ HAZMAT response according to SDS if applicable</li> <li>▪ Provide regular SITREP to IMT</li> <li>▪ Restrict Personnel Access</li> </ul>
Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li><input type="checkbox"/> Update the 1800 Hotline</li> <li><input type="checkbox"/> Secure the incident scene for investigation (tape etc)</li> <li><input type="checkbox"/> Ensure all documentation is recorded</li> <li><input type="checkbox"/> Witness statements, take photos, secure video footage</li> <li><input type="checkbox"/> Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Conduct de-brief – internal and external</li> <li><input type="checkbox"/> Assist with external investigation (WorkSafe, police)</li> <li><input type="checkbox"/> Monitor emotional wellbeing and implement support as req</li> <li><input type="checkbox"/> Reassess work area and re issue permits if safe</li> </ul>
Considerations	
<ul style="list-style-type: none"> <li><input type="checkbox"/> High process temperatures</li> <li><input type="checkbox"/> Vapours may travel to source of ignition and flash back</li> <li><input type="checkbox"/> Change in weather conditions (wind direction)</li> <li><input type="checkbox"/> Triage area setup at Medical Centre for multiple IP's</li> </ul>	



# Emergency Response Guide

**ERG # 40 Scenario: Explosion or fire within plant substations and analyser shelters - Unit 40**

Scenario Information									
Application	Fire/Explosion within plant substations and analyser shelters								
Causation	Flammable gas ingress into buildings or equipment outside buildings following LOC incident								
Detection	Gas detection system, thermal detection systems, personnel notification								
Key Substances in Scenario									
Substance	Vol. (m³)	Exposure	DG Class	GHS	HAZ Code	HB76 Guide	LEL- UFL (%/VOL)	AIT (°C)	SG
<b>Methane</b> UN # 1971		In Area			2SE	4	05.3 - 15.0	537	55 (air)
<b>Propane</b> UN # 1978		In Area			2YE	4	02.1 - 09.5	450	1.55 (air)
<b>Ethylene</b> UN # 1962		IN Area			2PE	4	2.7 - 36.0	490	0.97 (air)
SAA/SNZ HB 76:2010 Minimum Evacuation Distance (if exposed)									
LOC	800 m			Fire	1500 m				
Significant Consequences									
Consequence	Control / Precaution								
Flash fire or explosion	No ignition sources, don't extinguish flame - use water to cool exposed structures								
Gas under pressure	Gas detection, stay clear of release streams								
Ignition of gas	Protection sprays, keep ignition sources away, utilise gas detection								
Gas release noise	Utilise hearing protection remove persons from area								
Static discharge	Minimise movement of personnel and objects in release cloud								
Asphyxiation	SCBA to be used in case of gas release or fire								
Installed Fixed Fire Water/Foam Delivery					Portable Fire Water/Foam Delivery				
	No	Individual	Total		No	Individual	Total		
Deluge System	0	LPM	LPM	Fire Appliances FW Monitor – High Pressure [HL400 model] (40 bar)	1		400 LPM		
FW Monitors	N/A	2700 LPM	LPM	Fire Appliances FW Monitor – Low Pressure [HL400 model] (10 bar)	1		4000 LPM		
Oscillating FW Monitors	N/A	1800 LPM	LPM	Fire Appliance Foam Trailer Capacity	1		2700 L		
FW Hydrants	N/A	900 LPM	LPM						
FW Hose Reels	N/A	20 LPM	LPM						
Fire Water Tank Capacity			4600000L						
FW Delivery Duration for Incident			mins						
Fire Water Pump Pressure			11.8 bar						
Fire Water Pump Rate	2	9467 LPM	18934 LPM						
Foam Hose Reels	0								
Foam Application Rate - Solution	0								
Foam Application Time			LPM						
Gaseous Fire Suppression (FM 200)	Gaseous suppression at propane substation and at generator substation. No gaseous suppression at loading substation and compressor control substation								
Installed Protection Equipment									
Deluge Activation	No	Sprinkler	No						
Auto Osc Monitor	No	Misting System	No						
Fixed Monitors	No	Hi Ex Foam Sys	No						
Hydrants	No	Fixed DCP	No						
Water Hose Reels	No	Foam Hose Reels	No						

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Key Incident Objectives	Escalation and Exposure Potential
<p><b>ALWAYS:</b> ESD and evacuate personnel  <b>ALWAYS:</b> Account for all people, treat if required  <b>ALWAYS:</b> Alert emergency response agencies  <b>ALWAYS:</b> Await instruction from the Emergency Commander</p> <p><b>IF SAFE:</b> Rescue people only if able and capable  <b>IF SAFE:</b> Minimise environmental impact  <b>IF SAFE:</b> Protect assets and minimise escalation  <b>IF SAFE:</b> Comply with regulatory commitments  <b>IF SAFE:</b> Safeguard reputation</p>	<ul style="list-style-type: none"> <li>• <b>ESDP</b></li> <li>• <b>Fire and Gas shutdown of electrical equipment</b></li> <li>• <b>Unavailability of impacted equipment</b></li> <li>• <b>Ignition of vegetation fire</b></li> </ul>
Initial Actions and Command Awareness	
Emergency Commander	On Scene Commander / Field Response Team
<ul style="list-style-type: none"> <li>• Commence ESD if required.</li> <li>• Initiate site alarm and muster activation procedures.</li> <li>• CCTV cameras on location as appropriate.</li> <li>• CCR to confirm local automatic deluge/fire suppression has activated.</li> <li>• Conduct initial briefing (Summary, Potential, Plan, Tasks).</li> <li>• Reduce flaring rate if appropriate to do so.</li> <li>• Isolate and de-pressure inventory as appropriate.</li> <li>• Identify ERT numbers, assess limitations on response.</li> <li>• Mobilise OSC and ERT as/if warranted.</li> <li>• Mobilise Paramedic to forward command post as required.</li> <li>• Establish local weather conditions and advise OSC.</li> <li>• Evaluate exposure impacts &amp; initiate control actions.</li> <li>• Notify:                             <ul style="list-style-type: none"> <li>o External emergency services</li> <li>o OIM</li> <li>o PFSO (Port Facilities Security officer)</li> <li>o Operations Section Chief.</li> <li>o NT Worksafe (HSE to be contact person if available).</li> </ul> </li> <li>• CCR Operator monitor process and escalate issues.</li> <li>• Provide regular status updates to OSC.</li> <li>• CCR to monitor fixed fire and gas detection for signs of escalation.</li> </ul>	<ul style="list-style-type: none"> <li>• Muster and confirm individual accountability.</li> <li>• Minimum PPE requirements for ERT.</li> <li>• Provide cooling to pipe rack structure if required.</li> <li>• ERT member to escort ahead with gas detector.</li> <li>• Establish forward command point and provide SITREP.</li> <li>• Confirm unnecessary persons are clear from area.</li> <li>• Undertake casualty recovery if required only if safe to do so.</li> <li>• Set fixed monitors to protect / cool exposures.</li> <li>• Set portable monitors to protect / cool exposures.</li> <li>• Use hand lines to protect / cool exposures if required.</li> <li>• Provide cooling /protection for auxiliary equipment.</li> <li>• Set up water curtains to protect against gas travel.</li> <li>• Monitor water runoff for signs of contamination.</li> <li>• HAZMAT response according to SDS if applicable.</li> <li>• Provide regular SITREP to IMT.</li> <li>• Restrict Personnel Access.</li> </ul>
Control Actions	Recovery Actions
<ul style="list-style-type: none"> <li><input type="checkbox"/> Update the 1800 Hotline</li> <li><input type="checkbox"/> Secure the incident scene for investigation (tape etc)</li> <li><input type="checkbox"/> Ensure all documentation is recorded</li> <li><input type="checkbox"/> Witness statements, take photos, secure video footage</li> <li><input type="checkbox"/> Consider re-activation of suspended maintenance / operational activities</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Conduct de-brief – internal and external</li> <li><input type="checkbox"/> Assist with external investigation (WorkSafe, police)</li> <li><input type="checkbox"/> Monitor emotional wellbeing and implement support as req</li> </ul>
Considerations	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Vapours may travel to source of ignition and flash back</li> <li><input type="checkbox"/> Change in weather conditions (wind direction)</li> <li><input type="checkbox"/> Triage area setup at Medical Centre for multiple IP's</li> </ul>	

IMG Location Information and Equipment Layout



# Appendix O – WHS NUL Regulations Reconciliation Table

## Reconciliation Table, MHF Regulations Sections. 557 & Schedule 16.

Reg	Requirement	Section in this Document
<b>Site &amp; Hazard Detail</b>		
1.1	The location of the facility.	Appendix A
1.2	A detailed map showing site of the MHF, land use and occupancy surrounding the facility.	Appendix A
1.3	An inventory of all hazardous chemicals on site, or likely to be on site, and their location.	1.2, Appendix B
1.4	A description of the nature of the facility and its operations.	1.1, Appendix A
1.5	Maximum number of persons, including workers, likely to be present at the facility on a normal working day.	Appendix A
1.6	The emergency planning assumptions, including emergency measures planned for identified incidents and likely areas affected.	6, Appendices E & N.
1.7	The protective resources available to control an incident.	2.4, Appendix I.
1.8	The emergency response procedures.	3.4
1.9	The infrastructure likely to be affected by a major incident.	Appendix N.
<b>Command structure and site personnel</b>		
2.1	The command philosophy and structure to be activated in an emergency, so that it is clear what actions will be taken, who will take these and how, when and where they will be taken.	3
2.2	Details of the person who can clarify the content of the emergency plan if necessary.	Document Control Section (page 2)
2.3	The contact details of, and the means of contacting, the persons at the facility responsible for liaising with emergency service organisations.	Appendices A & H
2.4	A list of 24-hour contacts.	2.3.7, Appendix A
2.5	Arrangements for assisting emergency service organisations and nearby facilities with control actions taken in the surrounding area.	2.5, 2.6
<b>Notifications</b>		
3.1	In the event of the occurrence of a major incident or an event that could reasonably be expected to lead to a major incident, procedures for notifying the emergency service organisations with which the emergency plan was prepared under section 567.	2.6, 3.4.4
3.2	After a major incident has occurred, procedures for providing the local community and the local authority area in which the facility and the surrounding area are located with information and the major incident under section 573.	4.2, Appendix K

3.3	On-site and off-site warning systems.	2.3.1, 2.3.6, 2.3.8, 2.3.9, Appendix H
3.4	Contact details for emergency services and other support services that can assist in providing resources and implementing evacuation plans in the event of a major incident.	2.6
3.5	On-site communication systems.	Appendix H.
<b>Resources and Equipment</b>		
4.1	On-site emergency resources, including emergency equipment, personnel, gas detectors, wind velocity detectors, sand, lime, neutralising agents, absorbents, spill bins and decontamination equipment.	2.4, 3.2, Appendices G & N.
4.2	Off-site emergency resources, including arrangements for obtaining additional external resources (specific to the likely major incidents) to assist the control of major incidents and major incident hazards.	2.6
<b>Procedures</b>		
5.1	Procedures for the safe evacuation of, and accounting for, all personnel on site.	2.3.3, 2.3.4, Appendices D & E.
5.2	Procedures and control points for utilities, including gas, water and electricity.	3.4, Appendix N.
5.3	Procedures for the control of any incident involving Schedule 15 chemicals.	3.4, Appendices C, J & N.
5.4	Procedures for decontamination following an incident involving Schedule 15 chemicals.	3.4, Appendices J & N.