RISK ASSESSMENT

in terms of

THE MAJOR HAZARD INSTALLATION REGULATIONS

prepared as per SANS 1461:2018 for

triplo4 sustainable solutions

for the EIA Application for

Karpowership Gas to Power Operations at

The Port of Richards Bay

by

MHR Consultants

Major Hazard Risk Consultants

Nominated Representative	C C Thackwray
Technical Signatory	C C Thackwray

27 September 2022

GOVERNMENT APPROVED INSPECTION AUTHORITY No MHI 0007

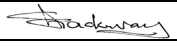
sanas Inspection Body

MHI 0017

DETAILS AND CONTROL PAGE

TYPE OF ASSESSMENT							
New Installation	**X**	**Changes to Existing Installation**		**5 Year Renewal**		**Other**	

Name	Triplo4		
Address	Port of Richards Bay Richards Bay GPS Coordinates: 28° 49′ 4.8″ S and 32° 3′ 7.2″ E		
Contact Person	Shanice Singh Tel: 032 946 3213		
Date of Assessment	31 August 2020		
Date of Report	27 September 2022		
Dates of Previous Assessments	**Date**	**Reference**	**AIA**
	1 Feb 2021	PORBT001	MHR
Assessor	C C Thackwray		
Technical Signatory	C C Thackwray 13 Slade Street Parklands North Tel: 083 746 8933		
Reference Number	PORB22001		
Revision	002		

Action	Date	Checked By	Sign
Report Checked	04 March 2022	T C Thackwray	

This is to verify that an MHI Risk Assessment has been completed in accordance with the Major Hazard Installation Regulations. The risks associated with the MHI were found to be acceptable.

This Risk Assessment is valid for the duration of 5 years from the above date, unless:

- Changes have been made to the plant that can alter the risks on the facility;
- The emergency plan was invoked or there was a near miss;
- The changing neighbourhood could result in offsite risks;
- There is reason to suspect that the current Assessment is no longer valid.

Signed

C C THACKWRAY
TECNICAL MANAGER

A QUANTITATIVE RISK ASSESSMENT OF THE KARPOWERSHIP GAS TO POWER OPERATIONS FOR THE EIA BEING CONDUCTED IN THE PORT OF RICHARDS BAY

EXECUTIVE SUMMARY

1. INTRODUCTION

The Port of Richards Bay is a deep-water port on the east coast of South Africa.

The Port has been identified as a suitable location for the Karpowership Gas to Power Operations.

Major Hazard Risk Consultants cc was commissioned to conduct this Risk Assessment as a specialist report for the EIA to determine the suitability of the Port for the importation, storage, and use of liquid natural gas (LNG) as a fuel for the Karpowership to generate electricity.

As LNG has the potential to cause onsite and offsite incidents, this Risk Assessment was done in accordance with the MHI Regulations and SANS 1461:2018 to determine the impact of the operations on the surrounding area.

This investigation would also serve as a basis for the notification of the facility in accordance with the Major Hazard Installation Regulations. The purpose of this report is to convey the essential details, including a short description of the hazards, the receiving environment, the design, the risks, and consequences of an accident.

The main aim of the investigation was to quantify the risks to employees and neighbours regarding the operations in the Port of Richards Bay. Risk is the severity of the consequence of a hazardous event and the probability of the event occurring.

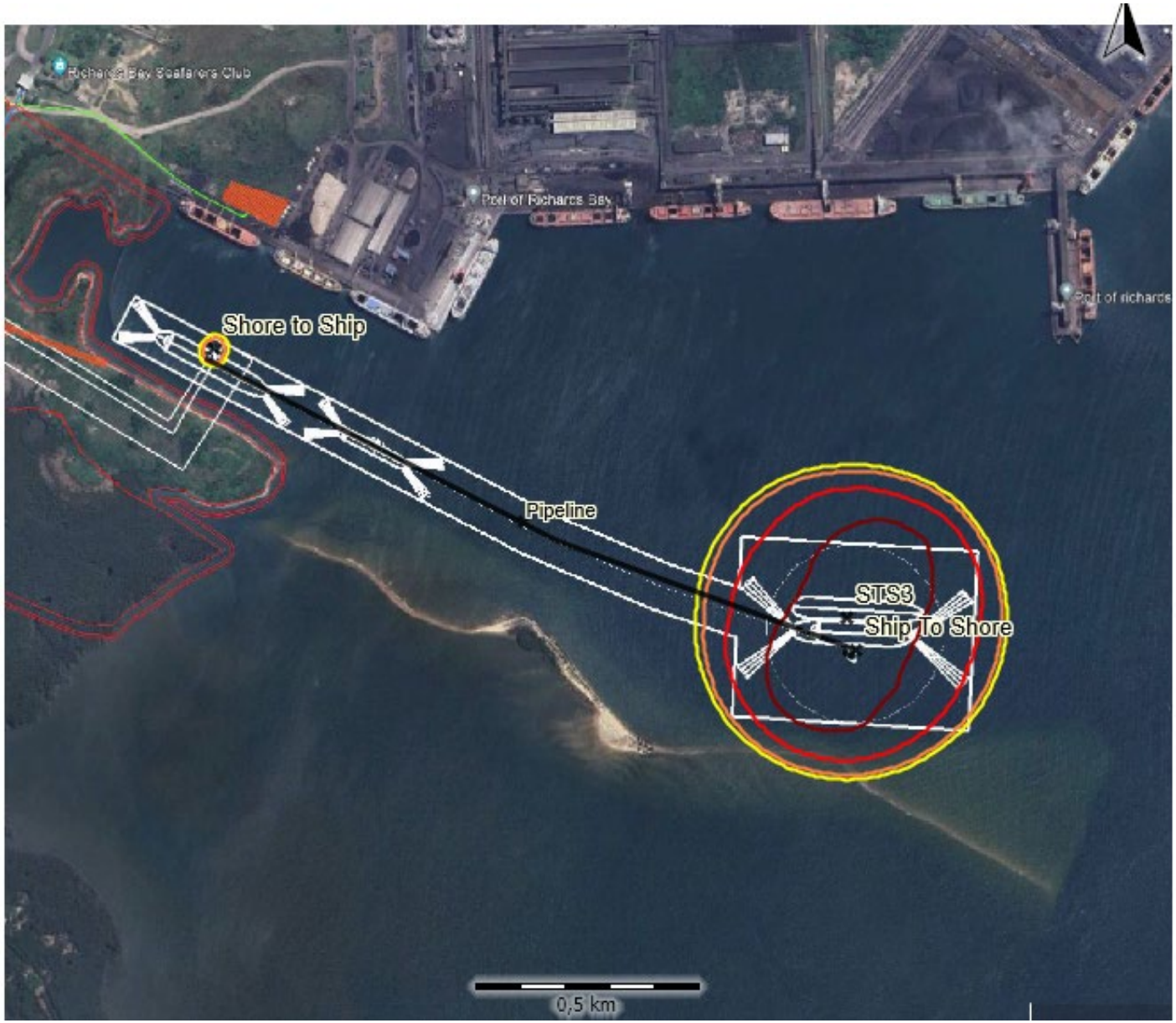
This Risk Assessment was conducted in accordance with the Major Hazard Installation Regulations and SANS 1461:2018 and could be used as notification of the facility. The Risk Assessment includes the following:

- Identifying likely hazards associated with the processes of the installations including the causes, consequences and their effects;
- Quantifying the likely hazards in terms of their magnitude;
- Quantifying the consequences for each hazard (thermal radiation, domino effect, toxic cloud formation, etc.);
- Determining the lethality of the effects of the consequences;
- Determining the frequency of all the hazardous events;
- Calculating the individual risk values considering all accidents, meteorological conditions and lethality;
- Using the population density around the facility to determine the societal risk posed by the facility;
- Reporting on the risks in terms of internationally acceptable criteria;
- Providing an assessment of the adequacy of emergency response programmes, fire prevention and fire-fighting measures;
- Proposing measures to reduce or eliminate the risks.

2. CONCLUSIONS

In this Assessment, the proposed LNG and powership operations were modelled. The results were as follows:

- The 1.0e-4 (one in a ten thousand) red contour, is confined to the two ships and 160m around the hose connections;
- The 1.0e-5 (one in a hundred thousand) orange contour, is confined to the two ships and 230m around the hose connections;
- The 1.0e-6 (one-in-a-million) yellow contour, stretches for a maximum distance of 295m from the generator barge hose;
- The 3.0e-7 (one-in-thirty million) green contour, does not reach any sensitive populations. The contour stretches for a maximum distance of 310m from the generator barge hose connection.



Individual Risk

3. RECOMMENDATIONS

The main risk contributing part of the operation is the possible rupture of one of the transfer hoses.

The risks were found to be acceptable for the Port and normal port operations can continue at the other berths while LNG is being offloaded at the facility.

Recommendations are as follows:

- There must be an Operations Manual for the transfer process;
- The operations site must be considered an MHI;
- The Emergency Plan must be approved by the Port Authorities. The risks will not impact on any other neighbouring flammable installations;
- Only suitably qualified people must be used for all operations;
- Visiting Ship Captains must provide Port Management with detailed STS Operations Manual before offloading;
- All equipment, including radios used within the operations area, must be intrinsically safe;
- Service Logbooks must be kept for all hoses and pipelines and checked regularly;
- Karpowership, together with the Port Fire Department will handle all firefighting and emergencies as per the approved procedures.

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DEFINITIONS

As Low as Reasonably Practicable (ALARP)

Risks in this range are risks that the public are generally prepared to tolerate to secure certain benefits. A risk in the ALARP range risk means that for new installations or modifications/ expansions to existing installations, the risk assessment shall not advise against the development. For existing installations (without modifications/ expansions) a broadly acceptable risk means that risk should continue to be monitored and all reasonably practicable risk reduction measures shall be implemented. A level of risk that is tolerable and cannot be reduced further without expenditure at costs that are disproportionate to the benefit gained, or where the solution is impractical to implement.

Broadly Acceptable

Risks which are broadly acceptable are generally regarded as insignificant and adequately controlled. Risk in the region would usually not require further action to reduce risks unless reasonably practicable measures are available. A broadly acceptable risk means that for new installations or modifications/ expansions to existing installations the risk assessment shall not advise against the development. For existing installations (without modifications/ expansions) a broadly acceptable risk means that risk should continue to be monitored and reduction implemented if necessary. For either new or existing installations, if reasonably practicable risk reduction measures are available, then these should be implemented.

BLEVE

Boiling liquid expanding vapour explosion.

Containment System

One or several devices, any parts of which are continuously in open contact with one another and are intended to contain one or several substances.

Critical Scenarios

Intended to mean:

- The scenarios that when added together define at least 90% of the location-specific risk for the 1.0e-6 contour (i.e. the ‘remainder’ that has not been defined in detail is added together as < 10%);
- The scenarios that are added together define at least 90% of the societal risk in the intervals 10 – 100 and 100 – 1000.

Informal Residential Area

A residential area where the structures are not formally approved.

Inspection

An examination or measurement to verify whether an item or activity conforms to specified requirements.

Intolerable

Risks in this range are generally regarded as unacceptable whatever the level of benefits associated with the activity. An intolerable risk means that for new installations or modifications/ expansions to existing installations the risk assessment shall advise against

the development. For existing installations (without modifications/ expansions) an intolerable risk means that risk reduction shall be implemented until the risks fall within the ALARP range or the broadly acceptable range.

Location Specific Individual Risk

The probability that during a period of one year a person will become the victim of an accident, in which case this person is in a particular location permanently and without protection and without means of escape.

Major Hazard Installation

The Operational Health and Safety Act 85 of 1993 defines a Major Hazard Installation as the following:

- where more than the prescribed quantity of any substance is or may be kept, whether permanently or temporarily; or
- where any substance is produced, used, handled or stored in such a form and quantity that it has the potential to cause a major incident.

Maximum Capacity

For equipment this is the total amount of material that can be accommodated in that equipment in the absence of equipment inventory control. For example, the volume of a cube vessel would be the product of the width, length and height of the vessel.

Occupied Building

Permanent or temporary structures/ buildings within a major hazard installation that are occupied by employees and/or contractors or that contain critical process control equipment (e.g. control rooms).

Procedure

Description of how to perform an activity, usually in the form of a document.

Recommendations

Suggestions put forward by the AIA, within the scope of the accreditation of the AIA, for consideration by the owner/ user of an MHE/ MHI.

Regulations

Regulations promulgated under the Occupational Health & Safety Act (85 Of 1993)

Regulatory Authority

Body authorised to make Regulations or to control the application of such Regulations, in the field of Major Hazard Installations (see 3.1.22) which includes the Occupational Health and Safety Act, 1993 (Act 85 of 1993) and the South African National Accreditation System.

Restricted Development Distance

The maximum distance from an MHI/ MHE where land use planning restrictions should be considered. This is defined as the 3.0e-7 fatalities / person / year location specific individual risk contour.

Safety Report

A report which addresses major incident prevention and safety management systems at the installation/ establishments.

Sensitivity Level

The sensitivity levels of a proposed development take into consideration the structure of the development and the characteristics of the population occupying the development. The larger the development and the more vulnerable the occupying population, the higher the level of sensitivity.

Societal Risk (F-N Curve)

Societal risk is a measure of the risk posed on a society and an F-N Curve is a tool to indicate societal risk. They are plots of the cumulative frequency (F) of various accident scenarios against the number (N) of fatalities associated with the modelled incidents. The plot is cumulative in the sense that, for each frequency, N is the number of fatalities that could be equalled or exceeded.

Verification

The act of reviewing, inspecting, testing, checking, auditing or otherwise determining and documenting whether items, processes, services or documents conform to specified requirements.

Vulnerable Groups/ Populations

The elderly, children, persons in hospitals/ clinics and people with certain disabilities are considered particularly vulnerable and may need special attention. In the South African context, concentrations of homeless persons and persons occupying informal settlements should also be considered vulnerable.

ABBREVIATIONS

The following are key abbreviations used in this document:

ACDS	Advisory Committee on Dangerous Substances
AIA	Approved Inspection Authority
ALARP	As Low As Reasonably Practicable
API	American Petroleum Institute
BEVI	Besluit Externe Veiligheid Inrichtingen (Dutch safety legislation)
BLEVE	Boiling Liquid Expanding Vapour Explosion
BP	Boiling Point (usually at 101.325 kPa)
CAS	Chemical Abstracts Service
CASRN	Chemical Abstracts Service Registry Number
RDD	Restricted Development Distance
CFD	Computational Fluid Dynamics
CIA	Chemical Industries Association
DTL	Dangerous Toxic Load
ERPG	Emergency Response Planning Guideline
FSRU	Floating Storage Regasification Unit
F – N (cumulative)	Frequency - Number
FMECA	Failure Mode Effect and Criticality Analysis
FP	Flash Point
HAZID	HAZard IDentification
HAZAN	HAZard ANalysis
HEL	Higher Explosive Limits
IBC	Intermediate Bulk Container (typically $1m^3$ capacity)
IDLH	Immediately Dangerous to Life and Health
IEC	International Electro-technical Commission
ISO	International Standards Organisation
IZ	Inner Zone
kPa	Kilopascal
kW/m^2	Kilowatts Per Square Meter
L/D	Length/ Diameter
LEL	Lower Explosive Limits
LFL	Lower Flammable Limit
LNG	Liquified Natural Gas
LNGC	Liquified Natural Gas Carrier (Sea Vessel)

LOC	Loss Of Containment
LOPA	Layer Of Protection Analysis
LPG	Liquefied Petroleum Gas
MAHPs	Major Accident Hazard Pipelines
MAPP	Major Accident Prevention Policy
mg/m^3	Milligram Per Cubic Meter
MHI	Major Hazard Installation
MZ	Middle Zone
OHS	Occupational Health and Safety
OZ	Outer Zone
PAC	Protective Action Criteria
PAHDI	Planning Advice for Developments near Hazardous Installations
PFD	Process Flow Diagram
P&ID	Piping and Instrumentation Diagram
ppm	Parts-per-million (volume basis)
PSM	Process Safety Management
QRA	Quantitative Risk Assessment
STS	Ship to Ship Cargo Transfer
UFL	Upper Flammable Limit

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The main aim of the investigation was to quantify the risks to employees and neighbours regarding the operations in the Port of Richards Bay.

Risk is the severity of the consequence of a hazardous event and the probability of the event occurring.

This report summarises the results of the Risk Assessment conducted by MHR Consultants.

This Assessment is based on the best possible information and expertise and MHR Consultants cannot be held liable for any incident which may occur at this facility which directly or indirectly relates to the work in this report.

1.1. Legal Framework

The Occupational Health and Safety Act (OHS Act) defines an Approved Inspection Authority (AIA) in Section 1(1)(i) as *“An inspection authority approved by the Chief Inspector: Provided that an inspection authority approved by the Chief Inspector with respect to any particular service shall be an approved inspection authority with respect to that service only.”*

The Major Hazard Installation Regulations (MHI Regulations), which were promulgated under the OHS Act provides more specifically for an AIA in terms of MHI Regulation 5 (5)(a) as *“An employer, self-employed person and a user shall ensure that the assessment contemplated in Sub-regulation (1), shall be carried out by an Approved Inspection Authority which is competent to express an opinion as to the risks associated with the major hazard installation.”*

- This Risk Assessment was conducted as per SANS 1461:2018 Codes of Practice.
- The report includes the Regulations according to the Local By-laws.
- The report includes the Port Rules of the National Ports Act No.12 of 2005 Part C.

1.2. Purpose and Scope of Investigation

The purpose of this investigation was to quantify the risks to employees and neighbours regarding the operations in the Port of Richards Bay.

This Risk Assessment was conducted in accordance with the Major Hazard Installation Regulations and could be used as notification of the facility. The Risk Assessment includes the following:

- Identifying likely hazards associated with the processes of the installations including the causes, consequences and their effects;
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1.3. Methodologies

Methodologies and techniques used for this Assessment are as follows.

- Site visits and meetings were conducted to collect as much technical information to accurately determine all the processes, materials, etc.;
- It was accepted that the process and storage installations were designed using the correct codes of practice and design specifications, and that the installations were built by qualified professionals;
- For this report the public refers to all people outside the boundaries of the facility, including neighbouring facilities and everyone inside the facility is regarded as employees, including visitors;
- The hazards were identified at the site visits and meetings and analysed using international reference publications;
- The consequences were calculated using the computer software *'Effects'* by TNO in the Netherlands;
- The risk calculations were made using the computer software *'Risk Curves'* by TNO in the Netherlands.

2. COMPANY, SITE, AND INSTALLATION DESCRIPTION

2.1. Main Activity

The main activity of the Port of Richards Bay is the export and import of goods.

Current facilities at the Port of Richards Bay:

BERTH		CARGO TYPE	LENGTH	DEPTH
DIE DUINE				
	208	Bulk Liquids	250m	-14.0m
	209	Bulk Liquids	300m	-14.0m
	301	Coal	350m	-19.0m
	302	Coal	350m	-19.0m
	303	Coal	350m	-19.0m
	304	Coal	350m	-19.0m
	305	Coal	184m	-19.0m
	306	Coal	280m	-19.0m
UMHLATUZI				
	606	General	220m	-14.5m
	607	General	220m	-14.5m
	608	General	204m	-14.5m
	609	Bulk	300m	-14.5m
BAYVUE				
	701	Bulk	240m	-14.5m
	702	Bulk	300m	-19.0m
	703	Bulk	240m	-19.0m
	704	Bulk	240m	-19.0m
	705	General	280m	-19.0m
	706	General	200m	-14.7m
	707	General	200m	-14.7m
	708	General	200m	-14.7m
	801	Bulk	260m	-19.0m
	802	Bulk	260m	-19.0m
SMALL CRAFT PORT				
	Repair berth		300m	-8.0m
	Dredger berth		150m	-7.0m
	Tug berths		180m	-7.0m
	Work boat berths		165m	-4.0m
	Port Craft berths		150m	-4.0m
	Launch Jetty		170m	-4.0m

Other than the berths above there are:

- Storage areas;
- Buildings;
- Cranes, hoppers, forklift trucks, trucks and other vehicles;
- Offices, ablutions and smoking area;
- R O plant;
- Electrical sub-stations;
- Fire hydrants;
- Weighbridges.

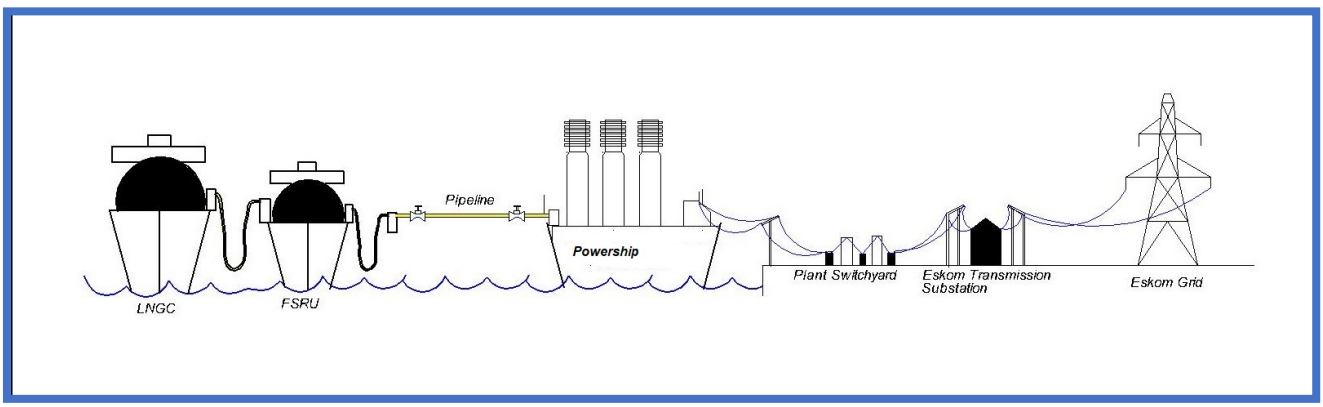
(See the site layout in the Appendices.)

2.2. Site Address

The Port of Richards Bay
Richards Bay

2.3. Process Flow

A ship (LNGC) offloads LNG into the LNG storage ship (FSRU) using flexible hoses connected to steel manifolds. Natural gas is pumped to the power ship that generates power to supply to the Eskom grid.



Process Flow Diagram

2.4. Operations Installations

2.4.1. Liquid Natural Gas Carrier (LNGC)

An LNG carrier is a tank ship designed for transporting liquefied natural gas. The cargo (LNG) is refrigerated at -163°C.

A typical LNG carrier has four to six tanks located along the centreline of the vessel. Surrounding the tanks is a combination of ballast tanks, cofferdams, and voids; in effect, this gives the vessel a double-hull type design.

Inside each tank there are typically three submerged pumps. There are two main cargo pumps which are used in cargo discharge operations and a much smaller pump which is referred to as the spray pump. The spray pump is used for either pumping out liquid LNG to be used as fuel (via a vaporiser), or for cooling down cargo tanks. It can also be used for 'stripping' out the last of the cargo in discharge operations. All these pumps are contained within what is known as the pump tower which hangs from the top of the tank and runs the entire depth of the tank. The pump tower also contains the tank gauging system and the tank filling line, all of which are located near the bottom of the tank.

Once it is tied up alongside the FSRU and hoses are connected, the cargo is pumped into the FSRU's tanks using the cargo pumps. As the tank empties, the vapour space is filled by vaporising some cargo in the cargo vaporiser. Some cargo will be retained on board as a 'heel'. (It is normal practice to keep onboard 5% to 10% of the cargo after discharge in one tank.)

2.4.2. Floating Storage Regasification Unit (FSRU)

Floating storage and regasification units (FSRUs) act, in all aspects, similar to a land-based LNG terminal. In addition to transporting LNG, purpose-built FSRUs have the onboard capability to vaporise LNG and deliver natural gas through specially designed offshore and near-shore receiving facilities. FSRUs can deliver regasified LNG at pipeline pressures, providing quick and convenient access to incremental gas supplies.

The FSRU to be used here will be a 300m unit with a capacity of 170 000m^3 of LNG at -163^{o}C.

2.4.3. Pipeline

The regasified LNG is exported from the FSRU in two 300mm diameter hoses connected to a PLEM (Pipeline End Manifold), which delivers the gas through a 600mm diameter pipeline to an offshore Khan Class Power Ship moored next to the Shark Class Power Barge. (See layout below.)

The vapour pressure in the pipeline will be 10 bar.

2.4.4. Power Ship

The electricity is generated by high-power alternators in the hull of the power ship, driven by reciprocating engines which run on natural gas.

Two 300mm hoses are connected to the PLEM at the pipeline from the power ship that will piped to the engines.

2.4.5. Assumptions

The following assumptions were made for the proposed project:

- The installations are to be installed by a suitably qualified and experienced company
- The installations are designed to comply with the applicable International Codes of Practice, SANS Standards and Municipal By-laws
- All safety systems are checked and serviced as per manufacturers requirements
- It is assumed that all equipment is in good working order

The annual LNG through-put for the project is anticipated to be about 2 000 000m^3 annually.

2.5. Receiving Environment

The Port has been fully developed as a typical busy national port operating 24 hours per day.

2.5.1. Topography of the Surrounding Area

The area surrounding the facility is typically that of a national port. There are no sensitive areas close to the port. The topography flat with no hills.

2.5.2. Population Information

Area	Daytime Persons/Hectare	Night-time Persons/Hectare
High Density Industrial	80	60

There are no sensitive population groups close to the site.

2.5.3. Surrounding Facilities and Other MHIs

The surrounding area consists of developed port industrial land. There are no other MHIs close by.

(See Port layout below.)

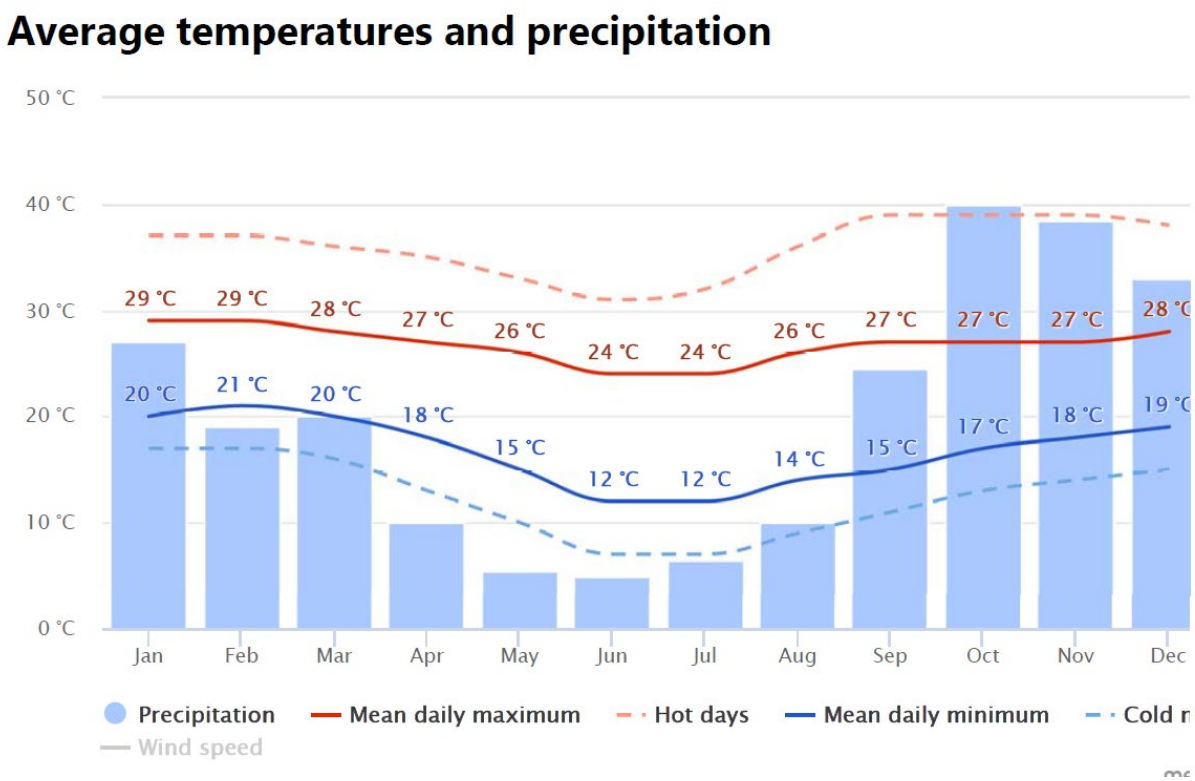

A1
DO NOT SCALE - IF IN DOUBT ASK
KHAN POWERSHIP
SHARK POWERSHIP
SUBSEA PIPELINE
ASSESSMENT AREA
LNGC VESSEL
FSRU VESSEL
LOCATION PLAN
SCALE 1:50'000
FOR INFORMATION ONLY

Port Layout

2.6. Meteorological Information

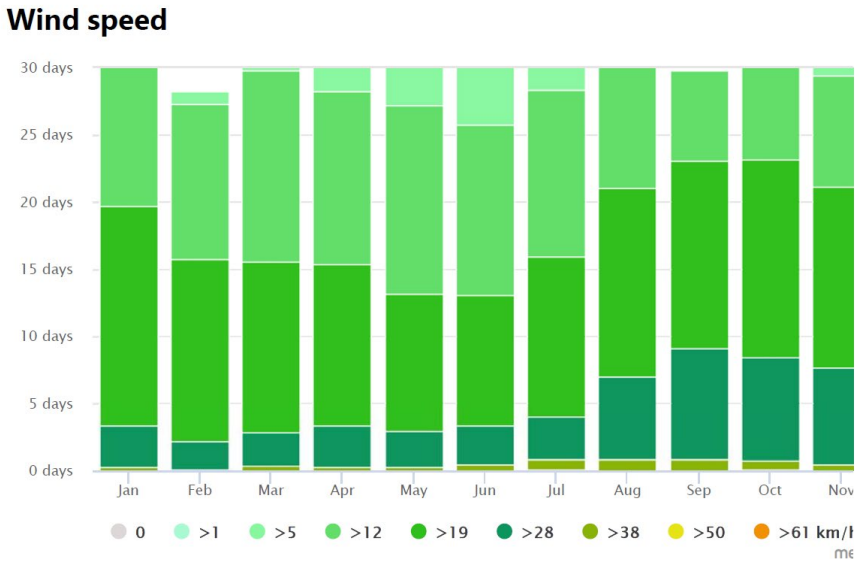
Richards Bay is characterised by a subtropical climate with warm wet summers and mild moist to dry winters, which are frost-free.

The average annual temperature is 21.5°C, with daytime maxima peaking from January to March at 29°C, and the minimum is 21°C, dropping to daytime highs from June to August of 23°C and a minimum of 12°C.



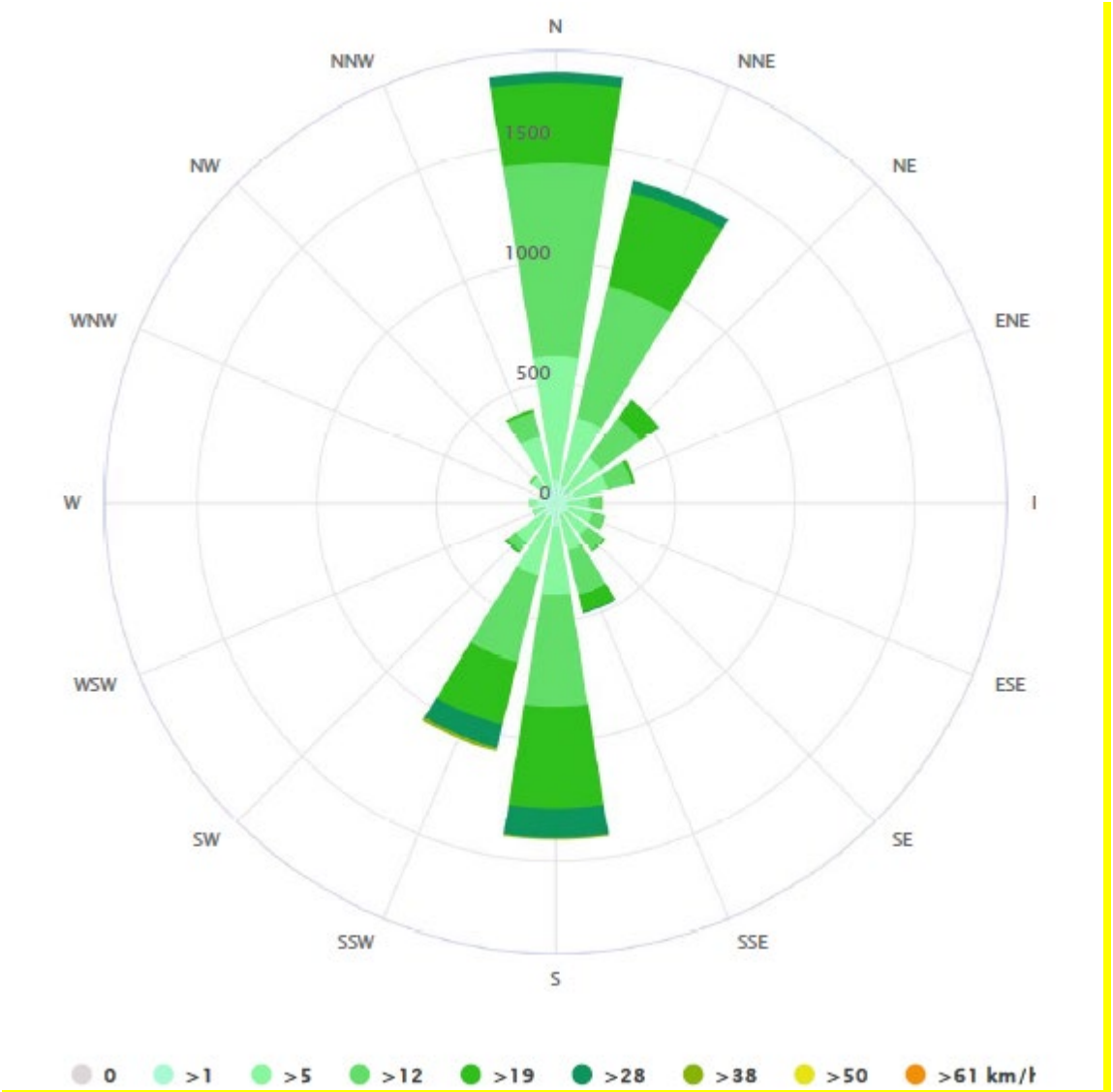
2.6.1. Wind Directions

During the winter months (April to September) north and north-west winds backing to the South-west are frequent. Westerly gales can cause heavy range action at berths; in the summer (October to March) the prevailing wind is from the south-east popularly known as the Cape Doctor, which can reach gale force at times.



2.6.2. Wind Rose

The annual wind rose for the area are as follows:



Joint Frequency Distribution

Dispersion models also require the atmospheric condition to be categorised into one of six stability classes, namely:

Stability Category	Meteorological Conditions	Occurrence
A	Very Unstable	Hot daytime conditions, clear skies, calm wind
B	Unstable	Daytime conditions, clear skies
C	Slightly Unstable	Daytime conditions, moderate winds, slightly overcast
D	Neutral	Day and night, high winds or cloudy conditions
E	Stable	Night-time, moderate winds, slightly overcast conditions
F	Very Stable	Night-time, low winds, clear skies, cold conditions

2.6.3. Climate Change

Climate change will not affect any of the results of this report. The worst-case weather condition was used to model all the consequence scenarios and the meteorological data for the past five years was obtained by S A Weather to model the individual risks.

2.6.4. Summary

Based on the above information the meteorological information extracted for the modelling of scenarios was as follows:

- Wind and stability information:
    - B 1.5m/s meaning a stability class of B (moderately unstable conditions) where the wind speed is 1.5m/s.
    - D 5m/s meaning stability class of D (neutral conditions) where the wind speed is greater than 5m/s. D 5 gives a conservative daytime weather condition.
    - F 2m/s meaning a stability class of F (moderately stable) where the wind speed is less than or equal to 2m/s. This class is often used by the US Environmental Protection Agency for determining worst case scenarios for vapour cloud dispersion consequence analysis.
- The atmospheric temperature was set to be 21^{o}C, a typical summer temperature.
- The relative humidity was set to be 79.1%
- The *Pasquill Stability* was selected instead of the mixing layer height.

3. HAZARD IDENTIFICATION

This is the process of examining each work area and work task for the purpose of identifying all the hazards which are inherent to the job.

Hazard analysis is used as the first step in a process used to assess risk. The result of a hazard analysis is the identification of different types of hazards. A hazard is a potential condition and exists or not (probability is one or zero). It may be in single existence or in combination with other hazards (sometimes called events) and conditions become an actual Functional Failure or Accident (mishap). Once a hazard has been identified, it is necessary to evaluate it in terms of the risk it presents to the employees and the neighbouring community. In principle, both probability and consequence should be considered, but there are occasions where if either the probability or the consequence can be shown to be sufficiently low or sufficiently high, decisions can be made on just one factor.

During the hazard identification process the complete system of assets, materials, human activities and process operations within the boundaries of the site should be clearly defined and understood, taking account of the original design, subsequent changes and current conditions. Typically, the system should be divided into distinct separate components or sections to enable manageable quantities of information to be handled at each stage.

Some key questions and issues could be:

- What is the design intent, what are the broad ranges of activities to be conducted, what is the condition of equipment, and what limitations apply to activities and operations?
- What are the critical operating parameters? What process operations occur, and how could they deviate from the design intent or critical operating parameters? This should consider routine and abnormal operations, start-up, shutdown and process upsets.
- What materials are present? Are they a potential source of major accidents in their own right? Could they cause an accident involving another material? Could two or more materials interact with each other to create additional hazards?
- What operations, construction or maintenance activities occur that could cause or contribute towards hazards or accidents? How could these activities go wrong? Could other hazardous activities be introduced into this section by error or by work in neighbouring sections of the facility?
- Could other materials, not normally or not intended to be present, be introduced into the process?
- What equipment within the section could fail or be impacted by internal or external hazardous events? What are the possible events?
- What could happen in this section to create additional hazards, e.g. temporary storage or road tankers?
- Could a section of the facility interact with other sections (e.g. adjacent equipment, an upstream or downstream process, or something sharing a service) in such a way as to cause an accident?

3.1. Site Layout Details

The Site Plan and Berth Details are attached in the Appendices.

3.2. Significant Incidents at the Site and Related Sites

This procedure is a proposed operation and there have been no incidents.

3.3. Preventative Measures

An STS Procedures Manual must be compiled, and all equipment must be in good working order.

3.4. Hazard Details

3.4.1. Hazardous Materials

The materials were categorised as per SANS 10228:2003 classes of dangerous substance as per the table below:

Class	Description
1	Explosives (Not included in MHI Regulations)
2	Gases (Flammable or Toxic gases only)
3	Flammable Liquids
4	Flammable Solids
5	Oxidising Substances and Peroxides
6	Toxic and Infectious Substances
7	Radioactive Materials (Not included in MHI Regulations)
8	Corrosives
9	Combustible Materials

3.4.2. Hazardous Materials on Site

The processes will be handling hazardous product on site, categorised as per the table below:

Substance	Gases	Flammable Liquids	Flammable Solids	Potential for an MHI
Class	**2**	**3**	**4**	
LNG	Yes			Yes

This Assessment deals only with LNG, the detailed properties of which are included in the Appendices.

3.5. Containment and Safety Systems in Design

As per the STS Transfer Procedures Manual see Sample Safety / Security Regulations & Requirements for STS transfer of LNG in the Appendices. All the procedures, hoses and couplings will be as per MEPC 186(59) Annex I and Chapter 8 of MARPOL 73/78.
The ships will all have systems that are integrated with a SIL 2 rated PCMS, SCADA monitoring with segregated emergency shut-down systems.

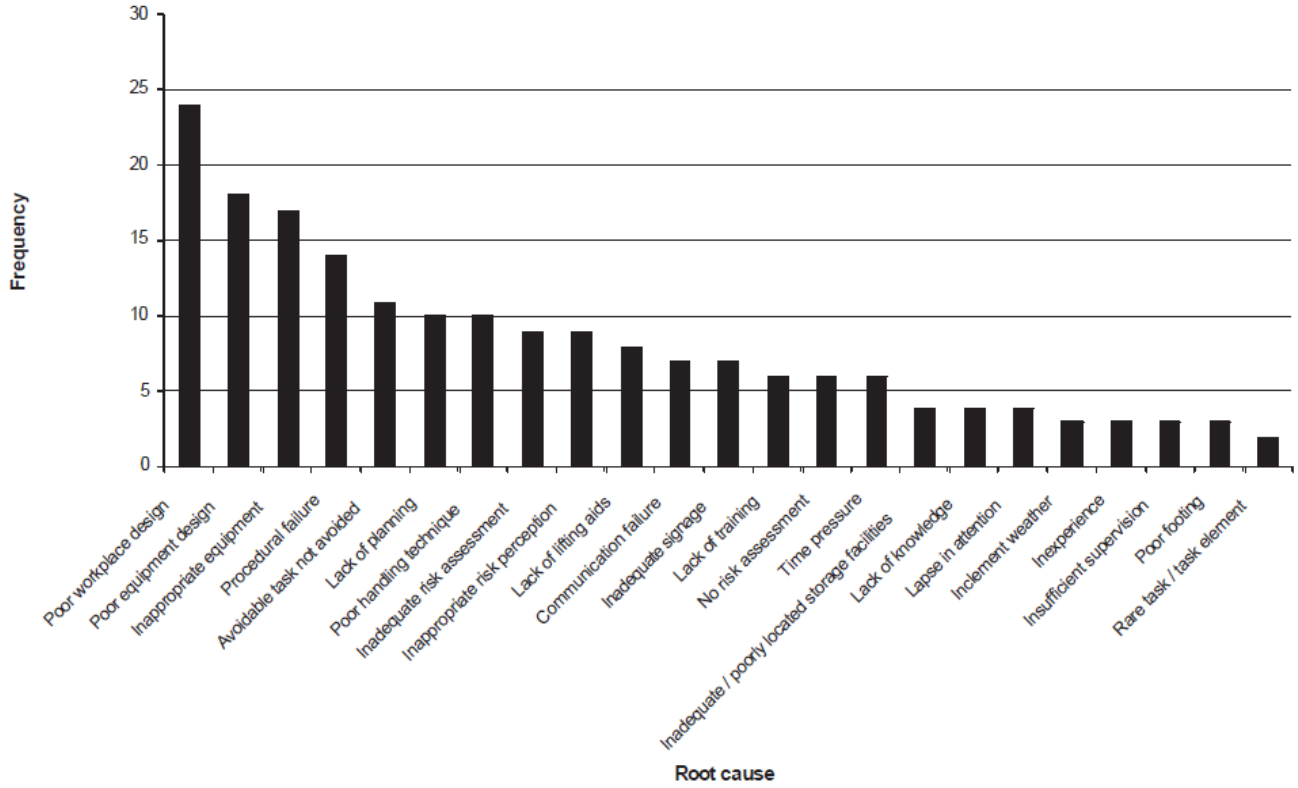
3.6. Environmental Hazards

Environmental Hazards are not included in the MHI Regulations and were not included in this report.

4. HAZARD ANALYSIS

4.1. Incident Root Causes

One hundred and twenty-six incidents were recorded an HSE report database in the UK. A greater number were reviewed but were not taken forward for analysis. The graph below shows the frequency with which each root cause was identified for the 126 incidents analysed.



The most common causes shown above are linked to the workplace and equipment available:

- Poor workplace design (representing 13%);
- Poor equipment design (10%);
- Inappropriate equipment (9%);
- Procedural failure (7%).

The next most commonly found issues are more closely linked with day-to-day organisation and management:

- Avoidable task not avoided (6%);
- Lack of planning (5%);
- Poor handling technique (5%);
- Inadequate risk assessment (5%);
- Inappropriate risk perception (5%).

The report mentions more than one root cause could be present in the same incident. In the sample analysed, 78 incidents were attributed to a single root cause; the remaining 48 had two or more root causes.

Most incidents are due to a mismatch between the operators' requirements or expectations and workplace or equipment design. If the root causes were principally to do with training or risk assessment (i.e., linked to risk perception and avoidance), it would imply that personnel were failing to use their experience and prior training to predict and avoid manual handling risks. Where an individual has unintentionally harmed themselves or others, it follows that the task carried risks which the operator(s) had to avoid by using safe working procedures and their skill and knowledge. The root cause in fact lies with one or more risky elements of the task that the operator then has to deal with. Training and experience help only to avoid the background risks.

The findings suggest that operators are mostly being injured because of poor equipment, task or workplace design, and to a lesser extent misunderstanding the level of risk. Failure to avoid an avoidable task is similar to a lack of planning as both indicate that an overview of the work was not held that could have highlighted alternatives to risky manual handling. 'Procedural failure' is linked to planning and overview too as this root cause indicates that agreed procedures inadvertently placed operators at risk of injury.

4.2. Events Following a Loss of Containment

Where no Boiling Liquid Expanding Vapour Explosion (BLEVE) and fireball occur following an instantaneous release with direct ignition, a liquid pool is formed, and a vapour cloud will expand to atmospheric pressure. The direct ignition of the vapour cloud is modelled as a flash fire (probability 0.6) and explosion (probability 0.4).

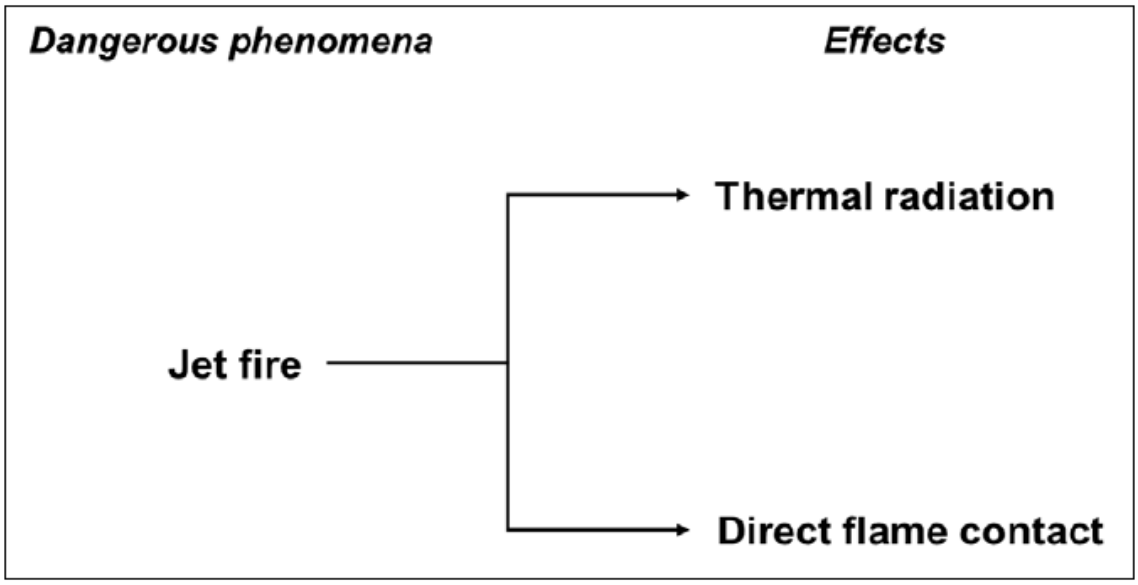
For an above-ground storage vessel (or road tanker), a BLEVE or fireball may occur. A BLEVE can occur when a flame impinges on a vessel containing a material that is a gas at atmospheric pressure and temperature but is a liquid at storage temperature and pressure. It is assumed that a BLEVE occurs when the vessel or road/ rail tanker is full. While BLEVEs are possible because of catastrophic vessel failure and localised vessel failure, they typically occur outside of these two events. Should this not occur, a vapour cloud may form. The ignition of the vapour cloud is modelled as a flash fire and explosion.

The flash fire is modelled through simulating the expansion of the initial cloud to the lower flammability limit (LFL) with air entrainment. The damage area then corresponds to the LFL cloud footprint. The explosion is modelled using the total mass subject to the lower flammability limit (LFL).

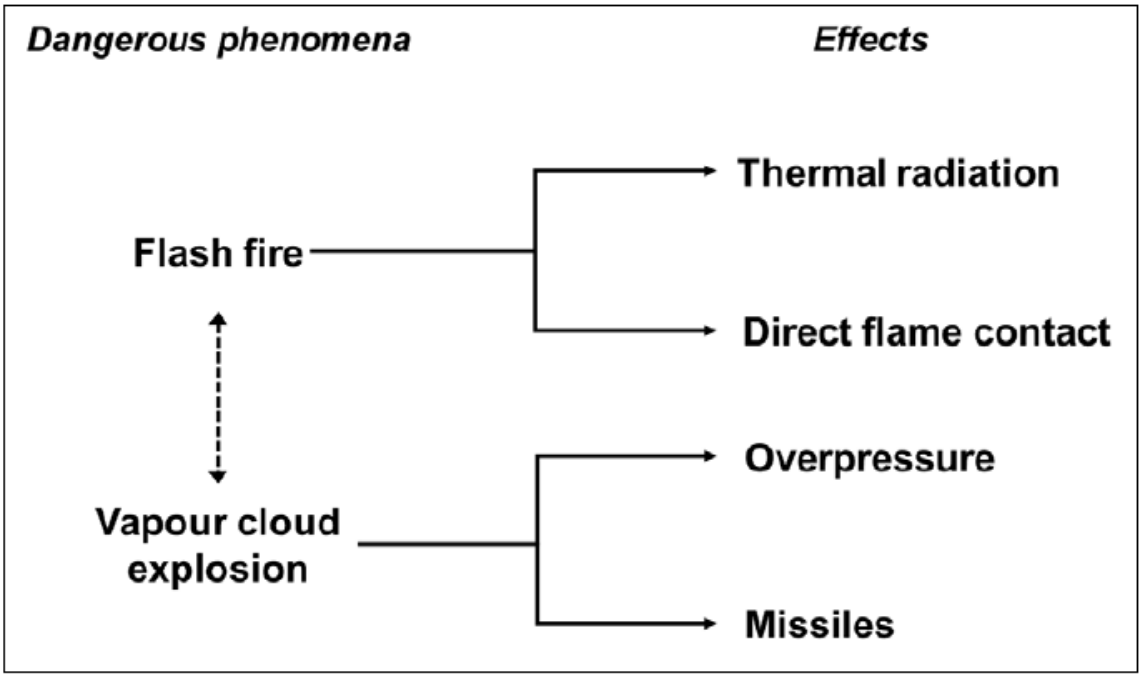
Accidental high velocity releases of ignited flashing liquids of pressurised flammable material at ambient temperature are classed as liquid jet fires. Jet fires occur when the jet of hydrocarbon can entrain air and burn at its edge. The jet remains ignited because the burning of the flame is greater than the velocity of the hydrocarbon jet, i.e., the flame can burn back towards the source of the jet. As a worst-case scenario, it is assumed that all failures occur in a horizontal position, i.e., the flame is orientated horizontally.

4.2.1. Event Trees

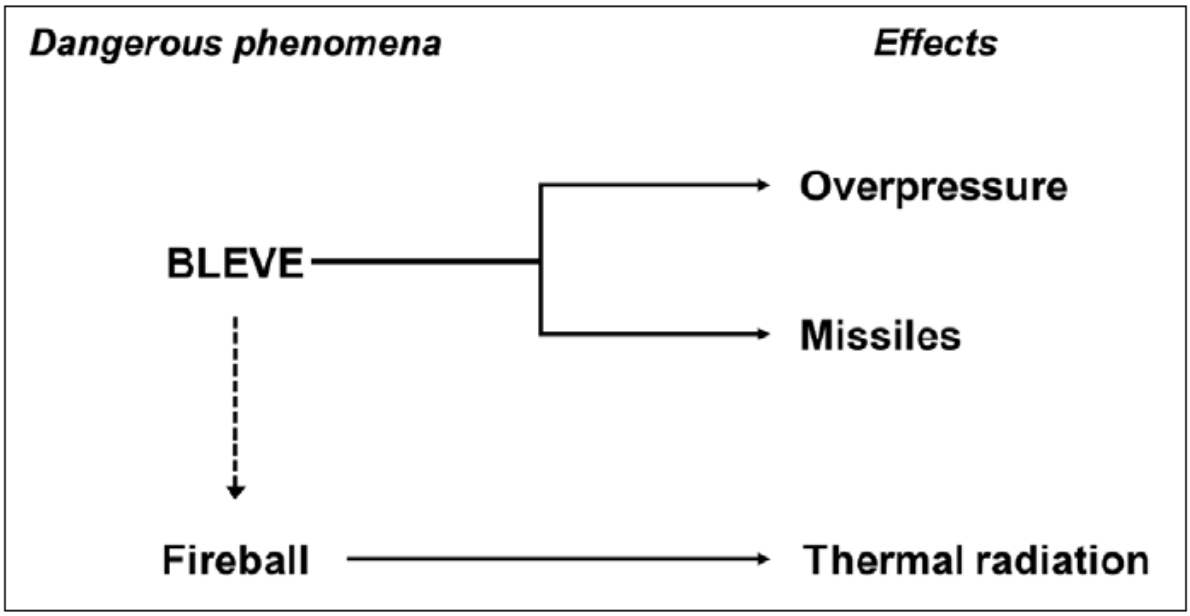
The probability of the flammable gas/ liquid release scenario identified above is represented as *event trees* for working daytime periods in the following diagrams.



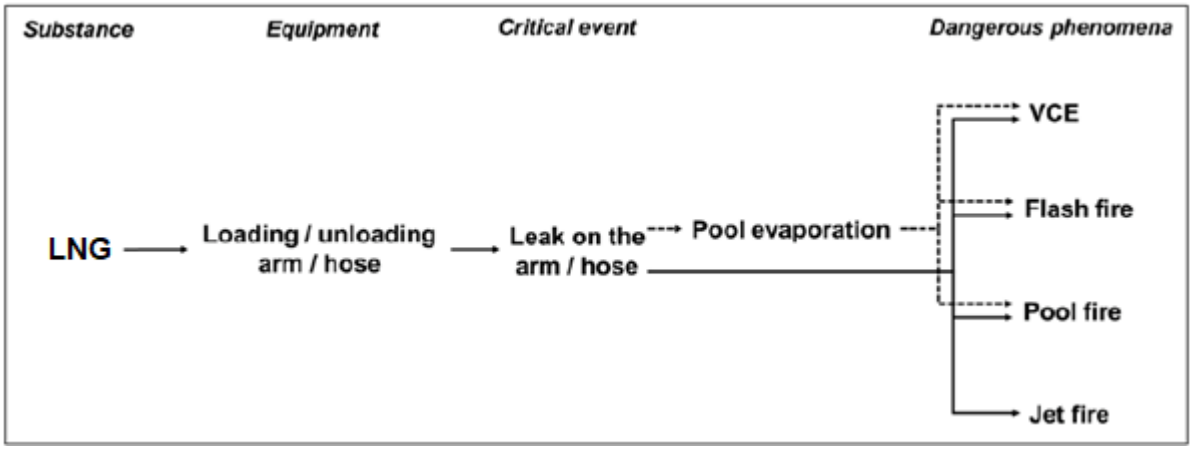
Physical Effects of a Jet Fire



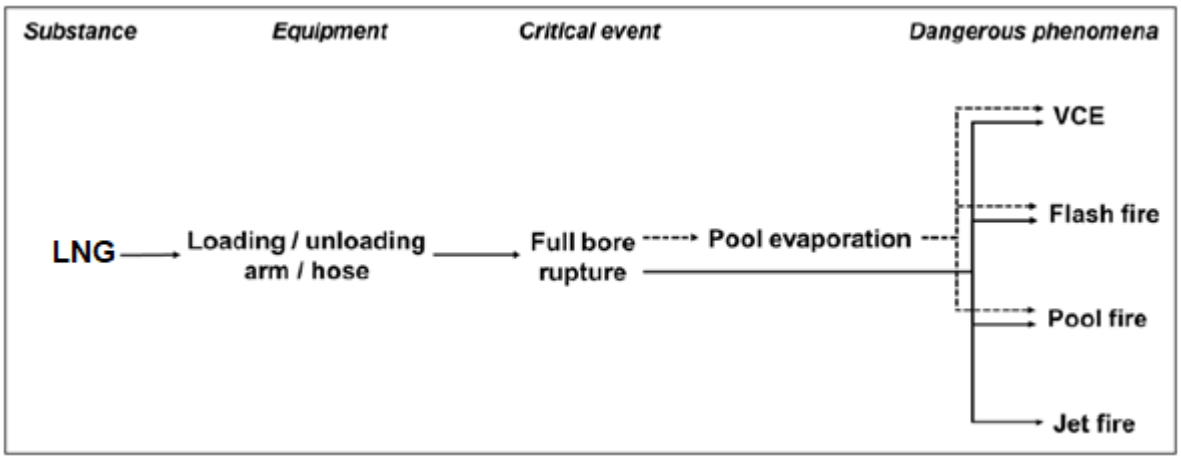
Physical Effects of a Flash Fire and Vapour Cloud Explosion



Physical Effects of a Fireball and BLEVE



Event Tree of LNG Loading Hose/ Vapour Return Leak



Event Tree of LNG Loading Hose/ Vapour Return Rupture

4.3. Scenarios Modelled

This report was done in terms of SANS 1461 and this standard refers to *'BEVI'* as the preferred reference to be used. All modelling was conducted according to Bevi and stipulates the following:

There are no scenarios for intrinsic failure for ships. It is assumed that loading takes place for most of the time that a ship is present, and the loading scenarios are dominant compared to intrinsic failure.

The only scenarios that are relevant in addition to loading, are external damage as a result of ship collisions. These are very much determined by the local situation. In the case that a ship is in a port outside the transport routes, the probability of a collision that leads to an outflow is so small that it does not need to be taken into consideration.

The following scenarios were modelled for this Risk Assessment:

Fire Scenarios

- Pool fire as the result of a liquid loading hose shear;
- Jet fire as the result of a liquid loading hose shear;
- Jet fire as the result of a 1-inch hole in a liquid loading hose;
- Jet fire as the result of a vapour return hose shear;
- Jet fire as the result of a 1-inch hole in a vapour return hose;
- Jet fire as the result of a FSRU manifold hose return hose shear;
- Jet fire as the result of a 1-inch hole in a FSRU manifold hose;
- Jet fire as the result of a Power Ship manifold hose return hose shear;
- Jet fire as the result of a 1-inch hole in a Power Ship manifold hose;
- Jet fire as the result of venting;
- Jet fire as the result of a pipeline shear;
- Jet fire as the result of a pipeline 1-inch leak;
- Flash fire as the result of a loading hose failure.

Explosion Scenarios

- VCE as the result of a loading hose failure;

4.4. Hazard Analysis Breakdown

Hazard Breakdown					
Equipment	**Failures and Causes**	**Preventative Measures**	**Hazardous Event**	**Protective Measures**	**Final Consequence**
Ship Manifolds	- Leak - Catastrophic Rupture	- Installation will comply with relevant Standards - Suitably qualified companies to do installations/maintenance/ repairs	- Pipe leak/ rupture resulting in jet fire - Gas cloud release that could lead to a flash fire or unconfined vapour cloud explosion	- Fire-fighting equipment will be installed - Emergency Plan to be implemented - Regular maintenance to be done as per the pressure vessel regulation and SANS Standards - Shut off valves will be installed	- Possible employee injuries or fatalities - Possible public injuries or fatalities
Ship to Ship LNG Transfers	- Hose Leak - Hose Rupture	- Installation will comply with relevant Standards - Only trained staff and driver to exercise transfer operations	- Hose leak/ rupture resulting in jet fire - Gas cloud release that could lead to a pool fire, flash fire or unconfined vapour cloud explosion	- Loading hose to be inspected and maintained as per Regulations - Fire-fighting equipment installed - Emergency Plan is implemented - Operators to be suitably trained in offloading procedure and emergency procedure - Shut off valves will be installed	- Possible employee injuries or fatalities - Possible public injuries or fatalities - Possible domino effects on ships causing jet fires or catastrophic failure
Pipeline	- Leak - Catastrophic Rupture	- Installation will comply with relevant Standards	- Pipe leak/ rupture resulting in jet fire	- Fire-fighting equipment installed	- Possible employee injuries or fatalities

		- Suitably qualified companies to do installations/maintenance/ repairs	- Gas cloud release that could lead to a flash fire or unconfined vapour cloud explosion	- Emergency Plan to be implemented - Regular maintenance to be done as per the Pressure Vessel Regulations and SANS Standards	- Possible public injuries or fatalities - Possible domino effects on ships causing jet fires or catastrophic failure

5. CONSEQUENCE ANALYSIS

5.1. Background

The consequence analysis describes the extent of impacts from major events. The results of this analysis are used as input to the risk analysis section as well as providing guidance to emergency planning.

In order to establish the impact following an accident, it is necessary to first estimate the physical process of the spill (i.e., rate and size), spreading of the spill, the evaporation from the spill and the subsequent atmospheric dispersion of the airborne cloud or, in the case of ignition, the burning rate, the resulting thermal radiation or the overpressures from an explosion.

The second step is to estimate the consequences of a spill on humans and structures. For humans this is normally expressed as a probability of fatality at distances from the release point.

The consequence analysis as documented in the Risk Assessment report is to provide enough process data, calculations etc. to allow for a reasonable verification of key consequence modelling results.

5.2. Source Term Analysis

When determining the amount of materials possibly released or involved in an incident, the following aspects should be considered:

- The amount of material available for release from each item should be at least the full inventory of the piece of equipment when it is filled to its maximum capacity. The maximum capacity of equipment is the total amount of fluid that can be accommodated in that equipment in the absence of equipment inventory control. For example, the volume of a cube vessel would be the product of the width, length and height of the vessel.
- When a component fails, such as a vessel, subsequent delivery of other system components which relate to the vessel may take place. If the quantity that is subsequently delivered is significant, the combined volume/flows need to be taken into consideration.
- If in the case of an on-site pipeline failure an increased pumping rate occurs, this is modelled by increasing the flow rate to that of 1.5 times the pumping rate.
- The effects of measures affecting outflow, such as shutting off valves can be considered.
- In the case of a ‘long pipeline’ rupture scenario the outflow is calculated based upon the content of the pipeline and a pumping rate. This means that the outflow from a reservoir that may be connected is not included. The ‘long pipeline’ scenario can therefore only be used when the pumping rate and the content of the transport pipeline is critical for the outflow. It is also important that the condition that L/D > 1000 is complied with, where L is the (total) length of the pipeline and D is the diameter of the pipeline.
- In the case of a line rupture, outflow occurs from both ends of the rupture. There are several possibilities:

- If the outflow mainly takes place from one end, the scenario can be modelled as a rupture of one pipeline (‘line rupture’).
- If the rupture occurs in a long transport pipeline, the various contributions from both ends of the rupture are included in the calculation of the outflow.
- If the contributions from both ends of the line rupture are relevant to the outflow, one effective pipeline diameter must be used in the calculation, for which the outflow rate matches the outflow rate from both ends added together.

5.3. Site Specific Consequence Analysis

At the LNG loading area, the impacts of a loss of containment have been calculated without taking the probability of it occurring into account. This is done to show the consequence of the incident and how it will impact on the site and the surrounding area. Domino effects are also investigated in this section.

In the following sections various scenarios were calculated for the Gas to Power Operations.

5.4. Fires

Flammable liquids and gases may ignite and burn if ignited. This normally occurs as a result of a loss of containment and ignition. Fires include pool fires, jet fires and flash fires.

The consequence of a fire will be thermal radiation.

It is expected that an individual either in pain from a thermal dose received or suffering from first degree burns should escape rapidly as the injury should not be sufficient to impede movement, yet the pain will be too uncomfortable to bear standing still.

An individual with second degree burns will have even greater motivation to escape, commonly referred to as the fight or flight response. However, at this level of injury, any exposed skin will be very uncomfortable and difficult to use in contact with another surface. Simple tasks, such as turning door handles or dressing in survival equipment will take longer, if possible. Depending on the location and extent of injury, more difficult tasks such as operating control panels or turning valves may be impossible.

With third degree burns an individual will be in severe pain and will realise that they are in immediate danger of losing their life. Individual response is hard to predict. Fine control of injured extremities will be impossible and other functions will be severely impaired. Escape will probably incur further injury as skin may fall away from the wound. Individuals with third degree burns should be considered as casualties who cannot evacuate unaided.

Thermal radiation levels used in this report are as follows:

- 4.5 kW/m^2 is the radiation that would cause pain and second degree burns within 20 seconds (Yellow Contour).
- 12.5 kW/m^2 represents a 1% fatality for people exposed to the fire for 20 seconds (Orange Contour).
- 37.5 kW/m^2 indicates the lower limit of damage to steel equipment and represents a 100% fatality for people exposed to the flame (Red Contour).

5.4.1. Thermal Radiation

The effect of thermal radiation is dependent on the type of fire and duration exposed to the thermal radiation. Codes such as API 520 and 2000 suggest the maximum heat absorbed on vessel for adequate relief designs to prevent the vessel from failure due to overpressure. Other codes such as API 510 and BS 5980 give guidelines for the maximum thermal radiation intensity as a guide to equipment layout.

The effect of thermal radiation on human health has been widely studied and it has been found that injuries developed due to the exposure and intensity of the radiation. Two values normally quoted are 1.5kW/m^2 or 'safe' value where people can be exposed for a long period of time and 5kW/m^2 for people performing an emergency operation for short periods of time.

Thermal Radiation Guidelines (BS 5980-1990)

Thermal Radiation Intensity (kW/m^2)	Limit
1.5	Will cause no discomfort for long exposure
2.1	Sufficient to cause pain if unable to reach cover within 40 seconds
4.5	Sufficient to cause pain if unable to reach cover within 20 seconds
12.5	Minimum energy required for piloted ignition of wood and melting of plastic tubing
25	Minimum energy required to ignite wood at indefinitely long exposures
37.5	Sufficient to cause serious damage to process equipment

5.4.2. Pool Fires

Ignited releases of flammable liquids tend to give rise to pool fires. Ignition of the liquid pool may occur soon after the release begins or may occur as a result of flashback from a remote ignition source, if the liquid is sufficiently volatile to generate a cloud of flammable vapour.

If LNG is spilt on water, it usually forms a boiling pool on the water surface. However, under certain circumstances, LNG released onto water can change from liquid to vapour virtually instantaneously. A Rapid Phase Transition (RPT) can generate overpressure and a 'puff' of dispersing vapour. Any damage from the overpressure generated tends to be quite localised. Rapid phase changes have not resulted in any known major incidents involving LNG.

The only area where a leak could result in a pool fire is with the transfer of LNG from the LNGC to the FSRU.

The following mitigation can be implemented to reduce the consequences of a pool fire during the transfer of LNG from the LNGC to the FSRU:

- Service Logbooks to be kept for all hoses and pipelines and checked regularly;
- There must be an Operations Manual for the transfer process;
- All equipment, including radios used within the operations area, must be intrinsically
- safe.;
- Visiting Ship Captains must provide Port Management with detailed STS Operations Manual before offloading;
- Only suitably qualified people must be used for all operations;

- Install a fixed gas detection system on the FSRU, with audio and visual indication to cover the area on deck adjacent to the hose connections.

The consequences of a pool fire are as follows:

Ship to Ship LNG Transfer Hose Shear				
Product	**Radiation Contour 37.5kW/m^2**	**Radiation Contour 12kW/m^2**	**Radiation Contour 4.5kW/m^2**	**1% Lethality Contour**
LNG	50m	98m	154m	110m

Thermal radiation from a pool fire as the result of a hose shear is shown below.

- 4.5 kW/m^2 is the radiation that would cause pain and second degree burns within 20 seconds. (Yellow Contour)
- 12.5 kW/m^2 is the energy required for pilot ignition of wood. (Orange Contour)
- 37.5 kW/m^2 indicates the lower limit of damage to steel equipment and represents a 100% fatality for people exposed to the flame. (Red Contour)
- 1% Lethality contour represents a 1% fatality for people exposed to the fire for 20 seconds. (Blue Contour)
- The flame area is represented by the purple contour.

Pool Fire as the Result of a Hose Rupture

5.4.3. Jet Fires

Jet fires occur when flammable material of a high exit velocity ignites. Ejection of flammable material from a vessel, pipe or pipe flange may give rise to a jet fire and in some instances the jet flame could have substantial 'reach'. Depending on wind speed, the flame may tilt and impinge on pipelines, equipment or structures. The thermal radiation from these fires may cause injury to people or damage equipment some distance from the source of the flame.

For this Assessment, jet fires from a 1-inch leak and a shear in a transfer hose was assumed. The worst-case scenario of the jet fire being horizontal and in the same direction of the wind was assumed.

The following mitigation will be implemented to reduce the consequences of a jet fire during the transfer of LNG from the LNGC to the FSRU:

- Service Logbooks will be kept for all hoses and pipelines and checked regularly;
- There will be an Operations Manual for the transfer process;
- All equipment, including radios and CCTV used within the operations area, will be intrinsically safe;
- Visiting Ship Captains must provide Port Management with detailed STS Operations Manual before offloading;
- Only suitably qualified people will be used for all operations;
- A fixed gas detection system will be installed on the FSRU, with audio and visual indication to cover the area on deck adjacent to the hose connections.
- Shut off valves will be fitted.

The consequences of a jet fire from a 1-inch hole in the transfer hose are as follows:

10 Inch LNG Transfer Hose				
Flame Length	**Radiation Contour 37.5kW/m^2**	**Radiation Contour 12kW/m^2**	**Radiation Contour 4.5kW/m^2**	**1% Lethality Contour**
149m	183m	209m	248m	217m

The flame length for a 1-inch hole in the transfer hose was calculated at 149m with a wind speed of 1.5m/s. The effects from a jet fire could not extend beyond the ships. A jet fire could not reach and impact on other activities at any of the berths.

Thermal radiation from jet fires as the result of a 1-inch hole is shown below.

- 4.5 kW/m^2 is the radiation that would cause pain and second degree burns within 20 seconds. (Yellow Contour)
- 12.5 kW/m^2 represents a 1% fatality for people exposed to the fire for 20 seconds. (Orange Contour)
- 37.5 kW/m^2 indicates the lower limit of damage to steel equipment and represents a 100% fatality for people exposed to the flame. (Red Contour)
- The flame is represented by the purple contour.

Typical 1-inch Jet Fire at the STS Transfer Hose

The consequences of a jet fire from a hose shear in the transfer hose are as follows:

10 Inch LNG Transfer Hose				
Flame Length	**Radiation Contour 37.5kW/m^2**	**Radiation Contour 12kW/m^2**	**Radiation Contour 4.5kW/m^2**	**1% Lethality Contour**
255m	305m	354m	422m	368m

For an STS transfer hose shear, the subsequent jet fire the flame length was calculated at 255m with a wind speed of 1.5m/s. The effects from a jet fire from an 10inch hose shear could extend beyond the berth area and neighbouring berths. The effects from a jet fire could impact on staff and equipment beyond the berth area and neighbouring berths.

Thermal radiation from jet fires as the result of a hose shear is shown below:

- 4.5 kW/m^2 is the radiation that would cause pain and second degree burns within 20 seconds. (Yellow Contour)
- 12.5 kW/m^2 represents a 1% fatality for people exposed to the fire for 20 seconds. (Orange Contour)
- 37.5 kW/m^2 indicates the lower limit of damage to steel equipment and represents a

100% fatality for people exposed to the flame. (Red Contour)

- The flame is represented by the purple contour.

Transfer Hose Shear Jet Fire

The consequences of a jet fire from a 1-inch hole in the vapour transfer hose are as follows:

10 Inch LNG Transfer Hose				
Flame Length	**Radiation Contour 37.5kW/m^2**	**Radiation Contour 12kW/m^2**	**Radiation Contour 4.5kW/m^2**	**1% Lethality Contour**
11m	14m	16m	18m	17m

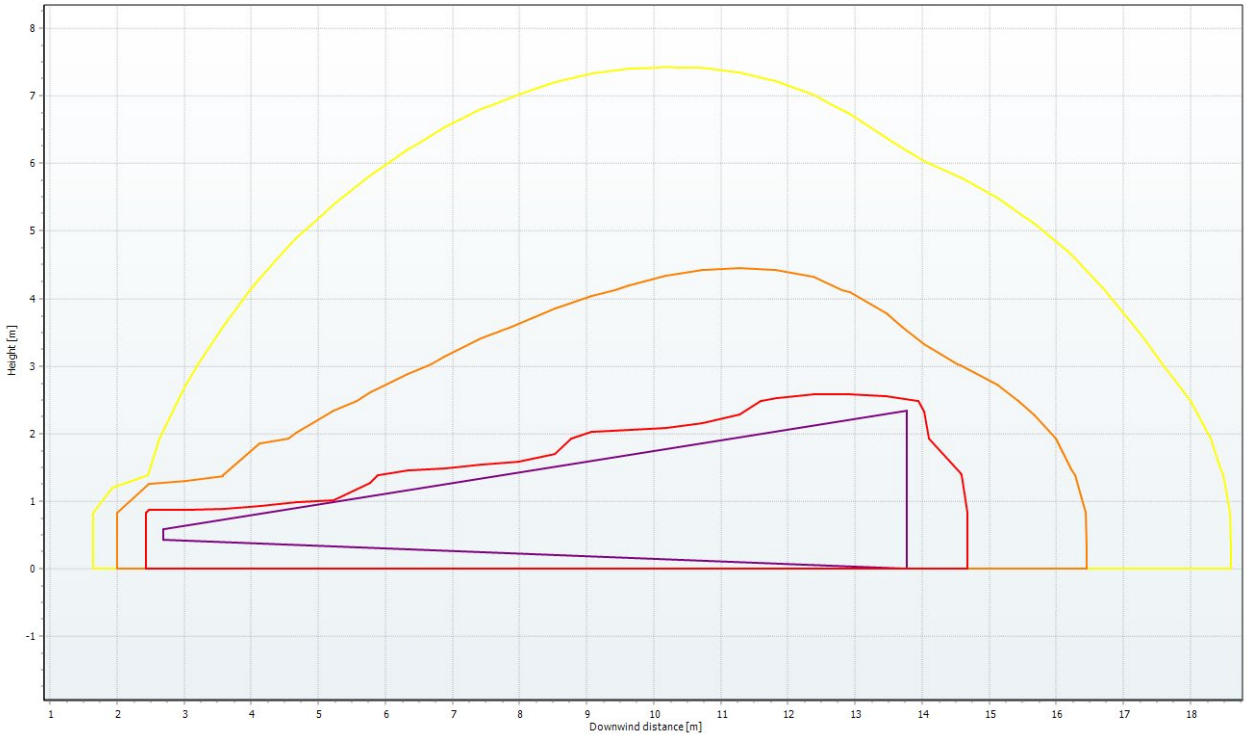
The flame length for a 1-inch hole at the vapour transfer hose was calculated at 11m with a wind speed of 1.5m/s. The effects from a jet fire from a 1-inch hole could not extend beyond the transfer area.

The side view of the thermal radiation from a jet fire is shown below.

- 4.5 kW/m^2 is the radiation that would cause pain and second degree burns within 20 seconds. (Yellow Contour)
- 12.5 kW/m^2 represents a 1% fatality for people exposed to the fire for 20 seconds. (Orange Contour)
- 37.5 kW/m^2 indicates the lower limit of damage to steel equipment and represents a

100% fatality for people exposed to the flame. (Red Contour)

- The flame is represented by the purple contour.



Vapour Transfer Hose 1-inch Jet Fire Side View

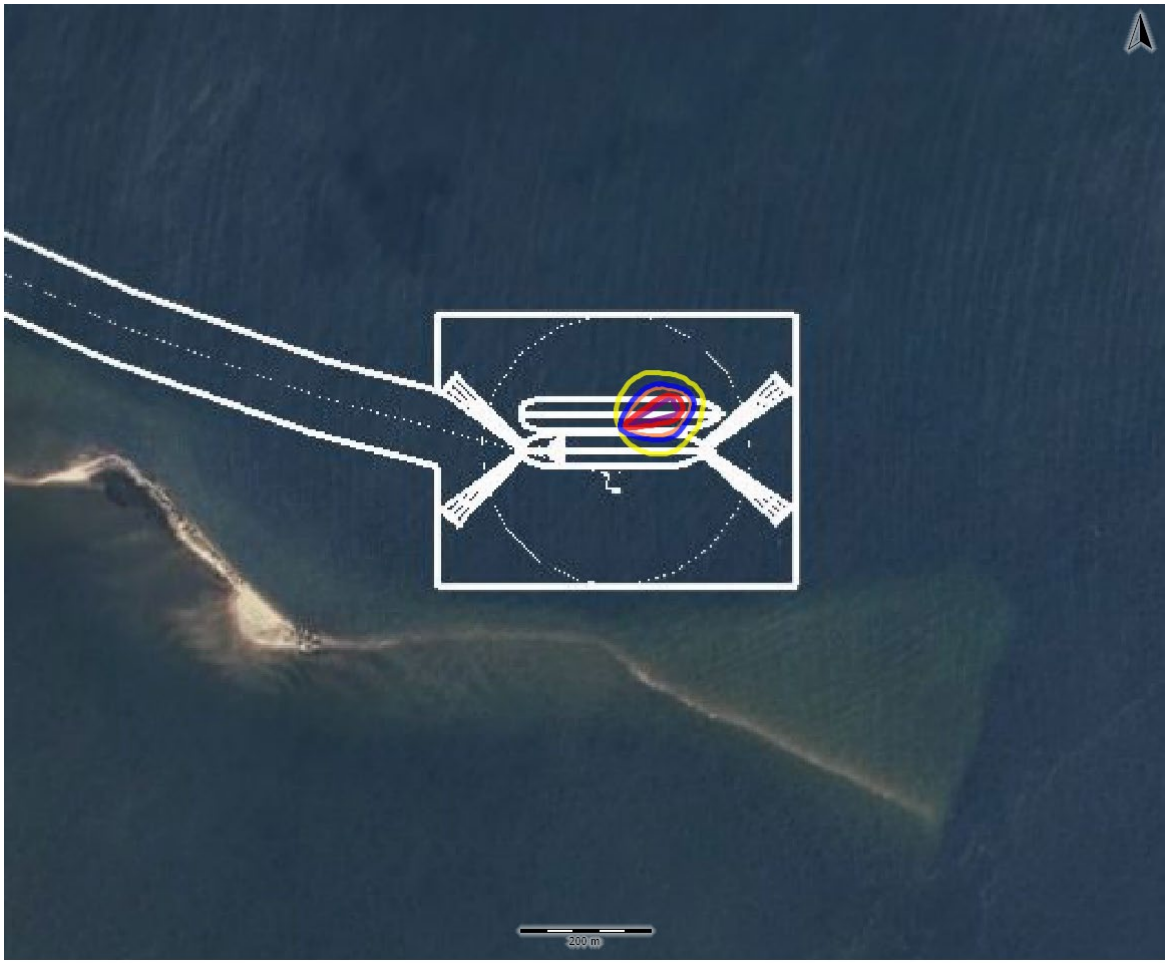
The consequences of a jet fire from a hose shear in the vapour transfer hose are as follows:

10 Inch LNG transfer Hose				
Flame Length	**Radiation Contour 37.5kW/m^2**	**Radiation Contour 12kW/m^2**	**Radiation Contour 4.5kW/m^2**	**1% Lethality Contour**
83m	115m	128m	147m	133m

For a vapour hose shear, the subsequent jet fire the flame length was calculated at 83m with a wind speed of 1.5m/s. The effects from a jet fire from a 10-inch hose shear could not extend beyond the transfer area.

Thermal radiation from jet fires is shown below:

- 4.5 kW/m^2 is the radiation that would cause pain and second degree burns within 20 seconds. (Yellow Contour)
- 12.5 kW/m^2 represents a 1% fatality for people exposed to the fire for 20 seconds. (Orange Contour)
- 37.5 kW/m^2 indicates the lower limit of damage to steel equipment and represents a 100% fatality for people exposed to the flame. (Red Contour)
- The flame is represented by the purple contour.



Vapour Transfer Hose Shear Jet Fire

Jet Fires at the FSRU manifold connection to the PLEM are as follows:

The following mitigation will be implemented to reduce the consequences of a jet fire at the FSRU manifold connection to the PLEM are as follows:

- Service Logbooks will be kept for all hoses and pipelines and checked regularly;
- All equipment, including radios used within the operations area, must be intrinsically safe.;
- Only suitably qualified people will be used for all operations;
- A fixed gas detection system will be installed on the FSRU, with audio and visual indication to cover the area on deck adjacent to the hose connections.
- Shut off valves will be fitted.

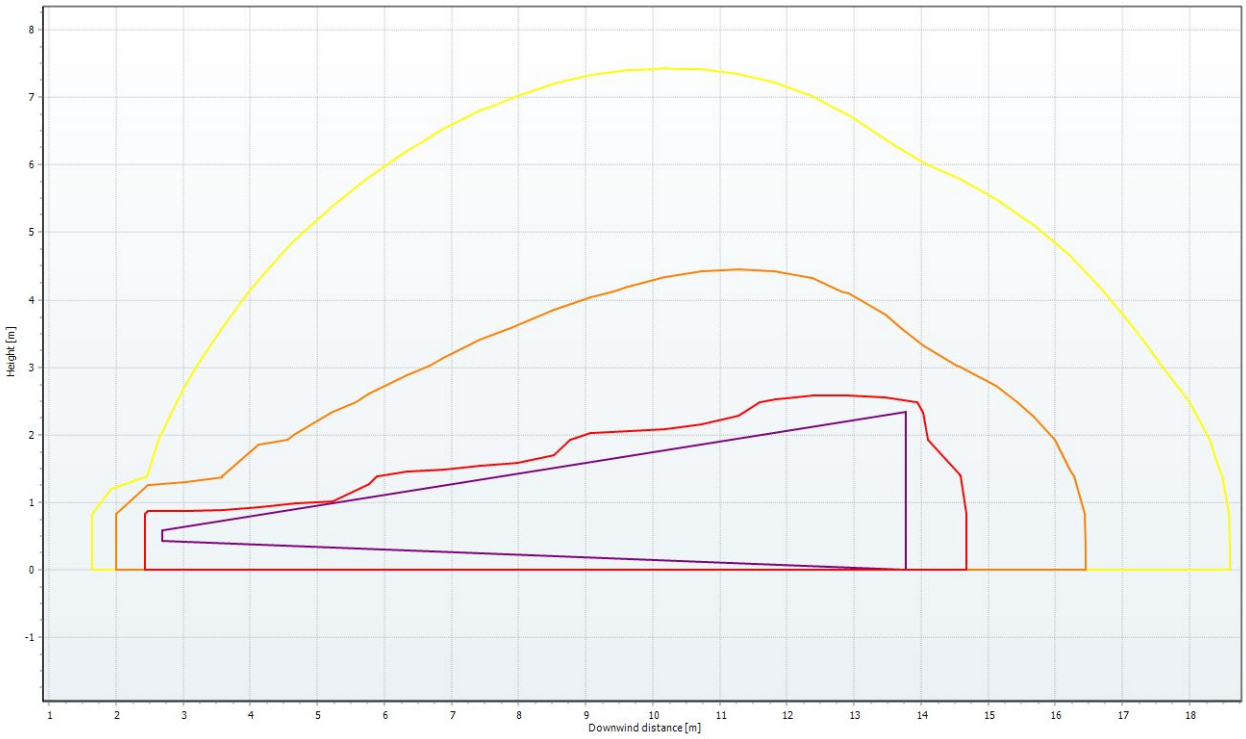
The consequences of a jet fire from a 1-inch hole in the vapour transfer hose are as follows:

24 Inch LNG Transfer Hose				
Flame Length	**Radiation Contour 37.5kW/m^2**	**Radiation Contour 12kW/m^2**	**Radiation Contour 4.5kW/m^2**	**1% Lethality Contour**
11m	14m	16m	18m	17m

The flame length for a 1-inch hole at the FSRU manifold connection to the PLEM was calculated at 11m with a wind speed of 1.5m/s. The effects from a jet fire from a 1-inch hole could not extend beyond the transfer area.

The side view of the thermal radiation from a jet fire is shown below.

- 4.5 kW/m^2 is the radiation that would cause pain and second degree burns within 20 seconds. (Yellow Contour)
- 12.5 kW/m^2 represents a 1% fatality for people exposed to the fire for 20 seconds. (Orange Contour)
- 37.5 kW/m^2 indicates the lower limit of damage to steel equipment and represents a 100% fatality for people exposed to the flame. (Red Contour)
- The flame is represented by the purple contour.



Vapour Transfer FSRU Manifold Hose 1-inch Jet Fire Side View

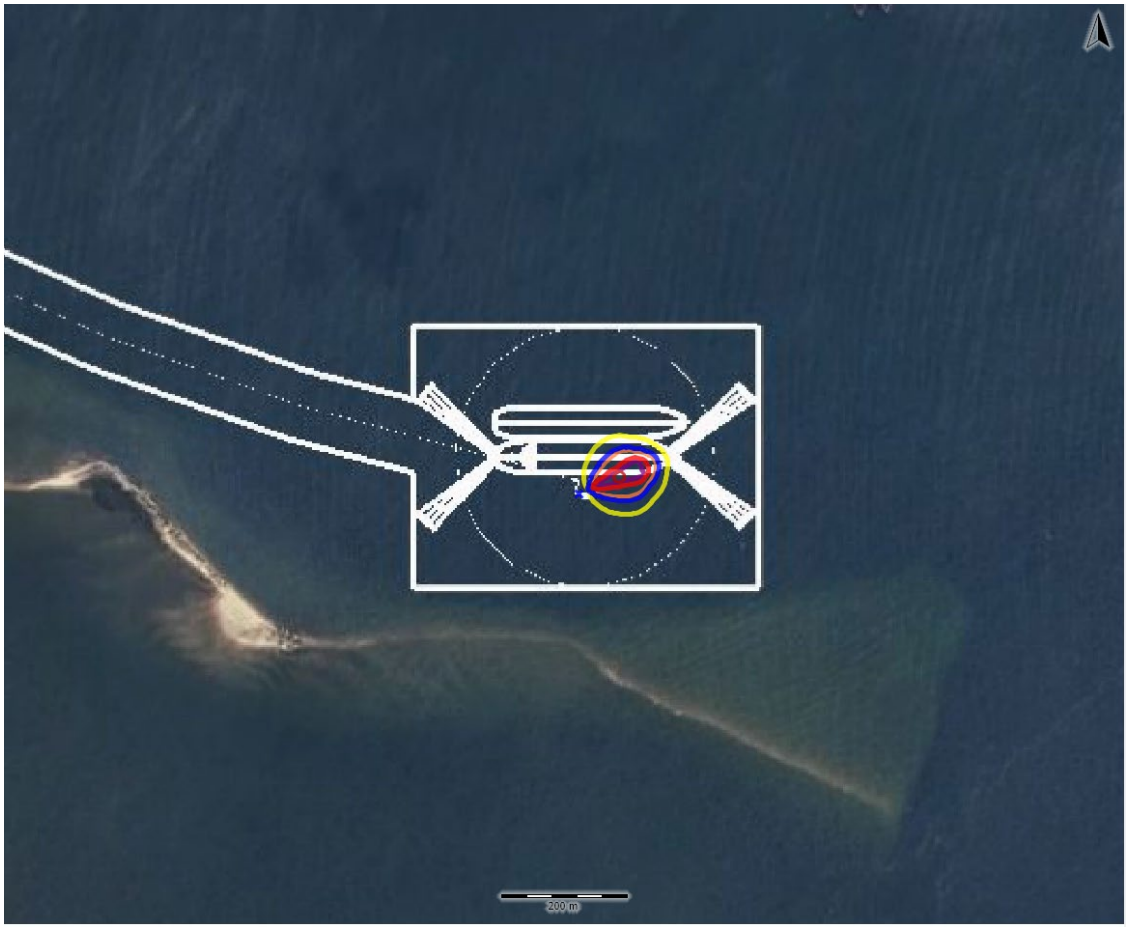
The consequences of a jet fire from a hose shear at the FSRU manifold connection to the PLEM are as follows:

10 Inch LNG Transfer Hose				
Flame Length	**Radiation Contour 37.5kW/m^2**	**Radiation Contour 12kW/m^2**	**Radiation Contour 4.5kW/m^2**	**1% Lethality Contour**
83m	115m	128m	147m	133m

For a vapour hose shear, the subsequent jet fire the flame length was calculated at 83m with a wind speed of 1.5m/s. The effects from a jet fire from a 10-inch hose shear could not extend beyond the transfer area.

Thermal radiation from jet fires is shown below:

- 4.5 kW/m^2 is the radiation that would cause pain and second degree burns within 20 seconds. (Yellow Contour)
- 12.5 kW/m^2 represents a 1% fatality for people exposed to the fire for 20 seconds. (Orange Contour)
- 37.5 kW/m^2 indicates the lower limit of damage to steel equipment and represents a 100% fatality for people exposed to the flame. (Red Contour)
- The flame is represented by the purple contour.



Vapour Transfer Hose Shear Jet Fire

Jet Fires at the Power Ship manifold connection to the PLEM are as follows:

The following mitigation will be implemented to reduce the consequences of a jet fire at the Power Ship manifold connection to the PLEM are as follows:

- Service Logbooks will be kept for all hoses and pipelines and checked regularly;
- All equipment, including radios used within the operations area, will be intrinsically safe.;
- Only suitably qualified people will be used for all operations;
- A fixed gas detection system will be installed on the FSRU, with audio and visual indication to cover the area on deck adjacent to the hose connections.
- Shut off valves will be fitted.

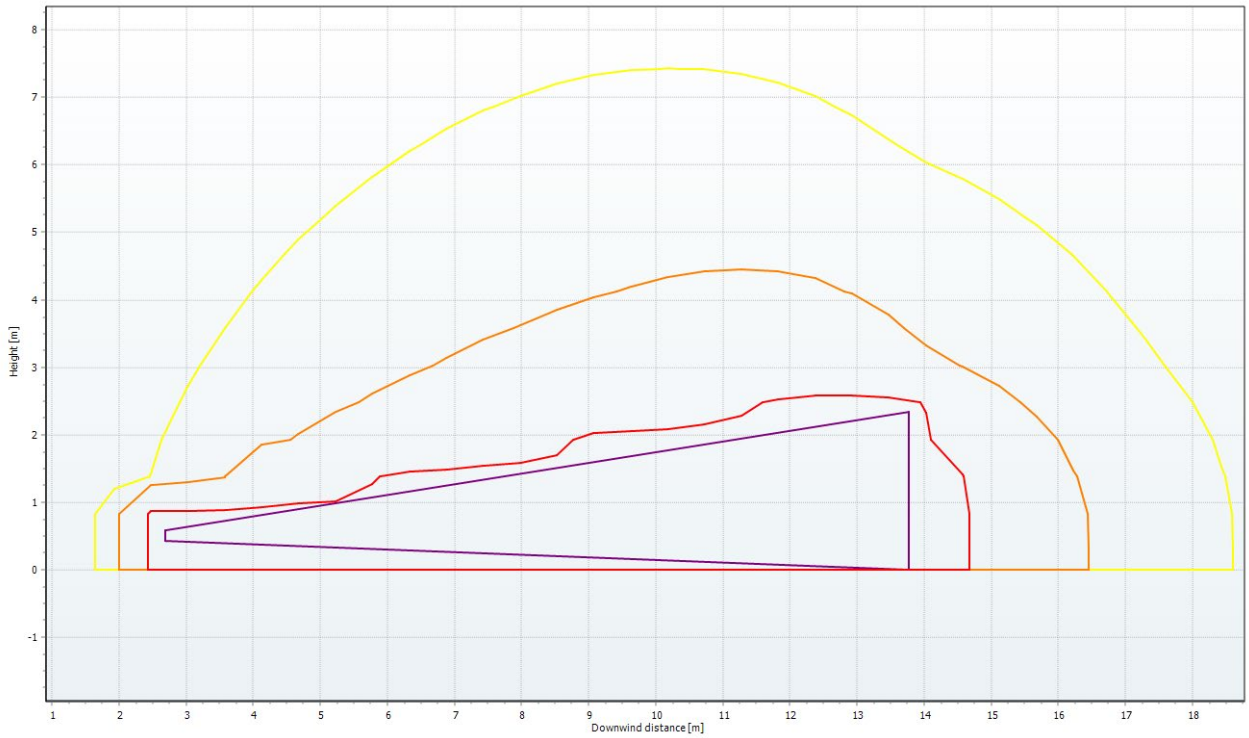
The consequences of a jet fire from a 1-inch hole in the Power Ship manifold connection to the PLEM are as follows:

24 Inch LNG Transfer Hose				
Flame Length	**Radiation Contour 37.5kW/m^2**	**Radiation Contour 12kW/m^2**	**Radiation Contour 4.5kW/m^2**	**1% Lethality Contour**
11,078m	14m	16m	18m	17m

The flame length for a 1-inch hole at the Power Ship manifold connection to the PLEM was calculated at 11,078m with a wind speed of 1.5m/s. The effects from a jet fire from a 1-inch hole could not extend beyond the transfer area.

Thermal radiation from a jet fire is shown below.

- 4.5 kW/m^2 is the radiation that would cause pain and second degree burns within 20 seconds. (Yellow Contour)
- 12.5 kW/m^2 represents a 1% fatality for people exposed to the fire for 20 seconds. (Orange Contour)
- 37.5 kW/m^2 indicates the lower limit of damage to steel equipment and represents a 100% fatality for people exposed to the flame. (Red Contour)
- The flame is represented by the purple contour.



Vapour Transfer Power Ship Manifold Hose 1-inch Jet Fire Side View

The consequences of a jet fire from a hose shear at the Power Ship manifold connection to the PLEM are as follows:

10 Inch LNG Transfer Hose				
Flame Length	**Radiation Contour 37.5kW/m^2**	**Radiation Contour 12kW/m^2**	**Radiation Contour 4.5kW/m^2**	**1% Lethality Contour**
83m	115m	128m	147m	133m

For a vapour hose shear, the subsequent jet fire the flame length was calculated at 83m with a wind speed of 1.5m/s. The effects from a jet fire from a 10-inch hose shear could not extend beyond the transfer area.

Thermal radiation from jet fires is shown below:

- 4.5 kW/m^2 is the radiation that would cause pain and second degree burns within 20 seconds. (Yellow Contour)
- 12.5 kW/m^2 represents a 1% fatality for people exposed to the fire for 20 seconds. (Orange Contour)
- 37.5 kW/m^2 indicates the lower limit of damage to steel equipment and represents a 100% fatality for people exposed to the flame. (Red Contour)
- The flame is represented by the purple contour.

Vapour Transfer Hose Shear Jet Fire

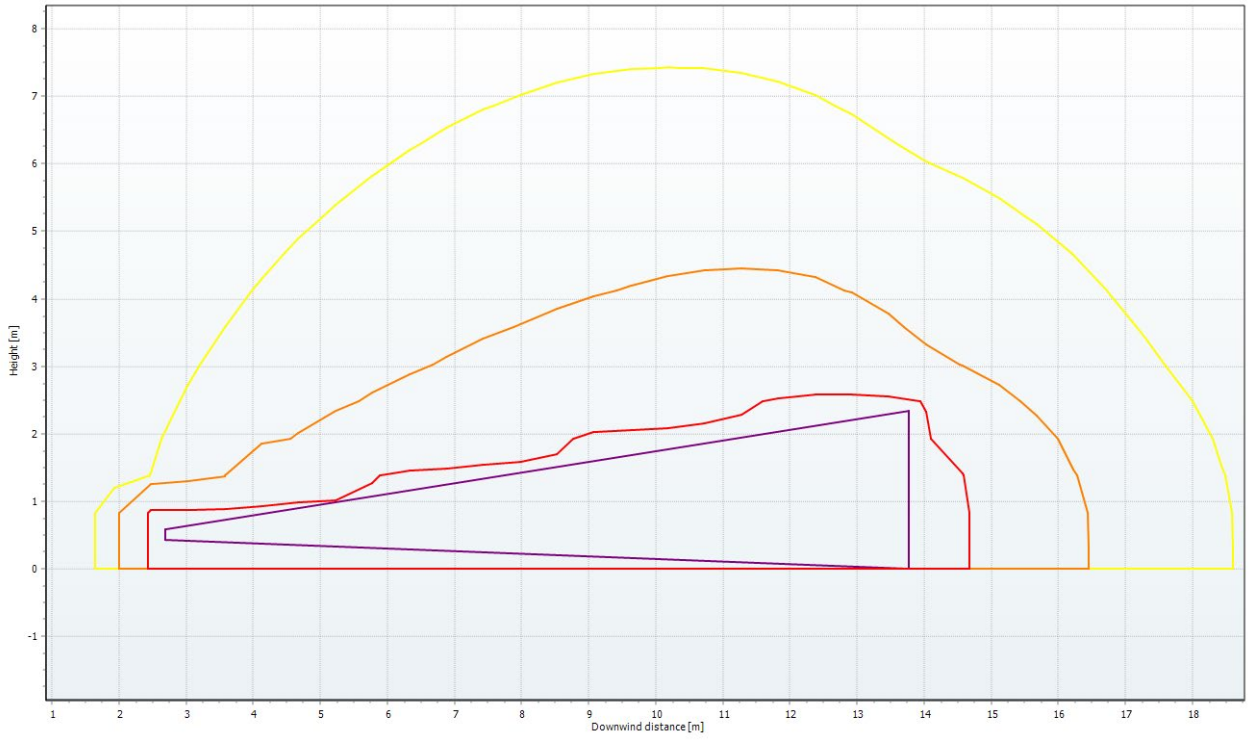
The consequences of a jet fire from a 1-inch hole in the pipeline between the FSRU and the Power Ship are as follows:

24 Inch LNG Transfer Hose				
Flame Length	**Radiation Contour 37.5kW/m²**	**Radiation Contour 12kW/m²**	**Radiation Contour 4.5kW/m²**	**1% Lethality Contour**
11m	14m	16m	18m	17m

The flame length for a 1-inch hole in the pipeline was calculated at 11m with a wind speed of 1.5m/s. The effects from a jet fire from a 1-inch hole could not extend beyond the transfer area.

The side view of the thermal radiation from a jet fire is shown below.

- 4.5 kW/m^2 is the radiation that would cause pain and second degree burns within 20 seconds. (Yellow Contour)
- 12.5 kW/m^2 represents a 1% fatality for people exposed to the fire for 20 seconds. (Orange Contour)
- 37.5 kW/m^2 indicates the lower limit of damage to steel equipment and represents a 100% fatality for people exposed to the flame. (Red Contour)
- The flame is represented by the purple contour.



Pipeline 1-inch Jet Fire Side View

The following mitigation will be implemented to reduce the consequences of a jet fire at the pipeline between the FSRU and the Power Ship:

- Service Logbooks will be kept for the pipelines and checked regularly;

- Accessibility of the pipeline to the workers and / or public will be secure;
- A fixed gas detection system will be installed on the FSRU, with audio and visual indication to cover the area on deck adjacent to the hose connections.
- Shut off valves will be fitted.
- Good leak detection and isolation systems of the pipeline from the FSRU and the Power Ship will be installed;
- Only suitably qualified people must be used for all operations.

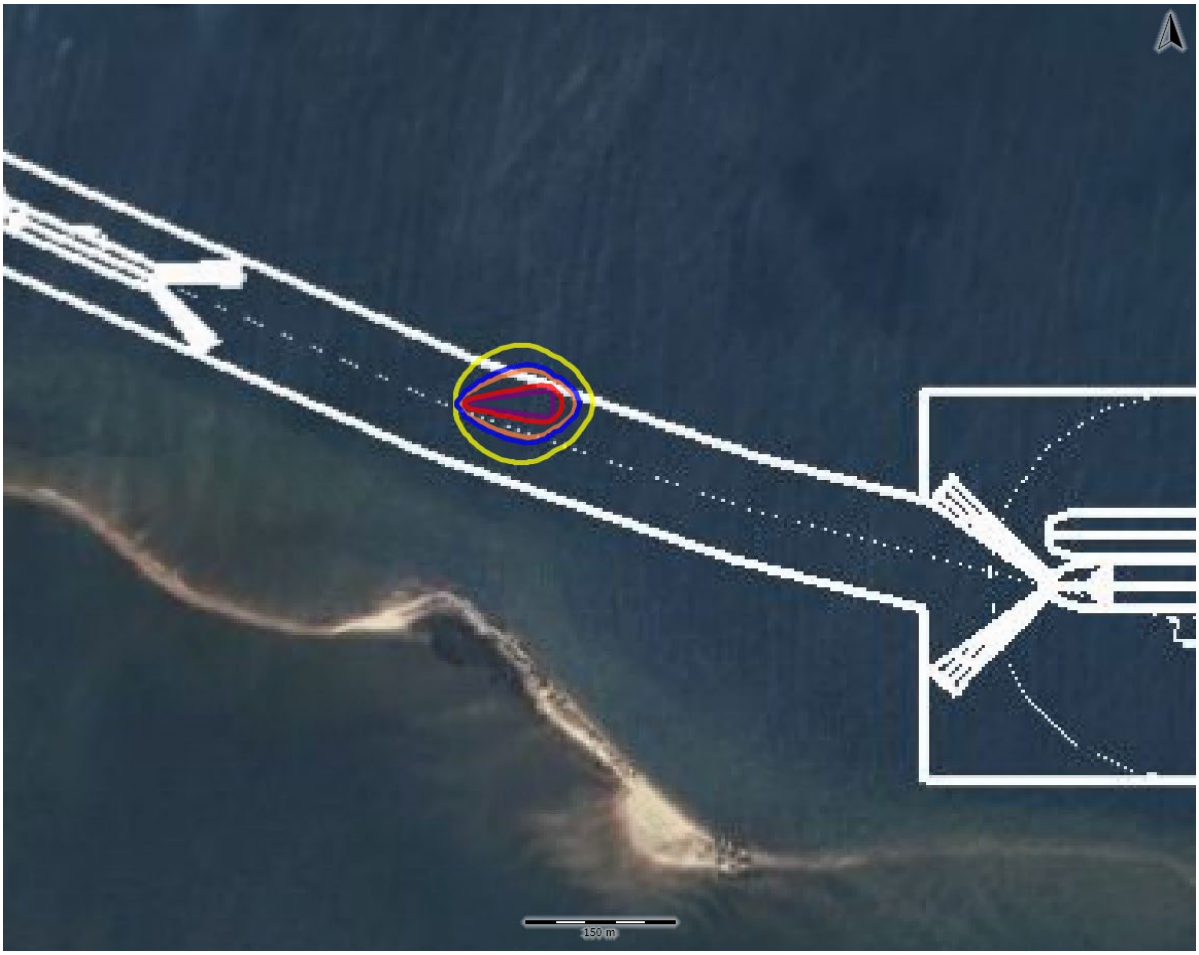
The consequences of a jet fire from a pipeline shear are as follows:

24 Inch LNG Pipeline				
Flame Length	**Radiation Contour 37.5kW/m^2**	**Radiation Contour 12kW/m^2**	**Radiation Contour 4.5kW/m^2**	**1% Lethality Contour**
59m	250m	280m	320m	171m

For a pipeline shear, the subsequent jet fire the flame length was calculated at 59m with a wind speed of 1.5m/s. The effects from a jet fire from a 24 Inch pipeline shear could not extend beyond the transfer area.

Thermal radiation from jet fires is shown below:

- 4.5 kW/m^2 is the radiation that would cause pain and second degree burns within 20 seconds. (Yellow Contour)
- 12.5 kW/m^2 represents a 1% fatality for people exposed to the fire for 20 seconds. (Orange Contour)
- 37.5 kW/m^2 indicates the lower limit of damage to steel equipment and represents a 100% fatality for people exposed to the flame. (Red Contour)
- The flame is represented by the purple contour.



Pipeline Shear

Jet fires during venting at the FSRU are as follows:

The following mitigation will be implemented to reduce the consequences of a jet fire at the FSRU when venting occurs:

- Service Logbooks will be kept for all the PRVs and checked regularly;
- All equipment on the FSRU including radios and CCTV used within the operations area, will be intrinsically safe;
- Good leak detection and isolation systems on the FSRU will be installed;
- Only suitably qualified people will be used for all operations.

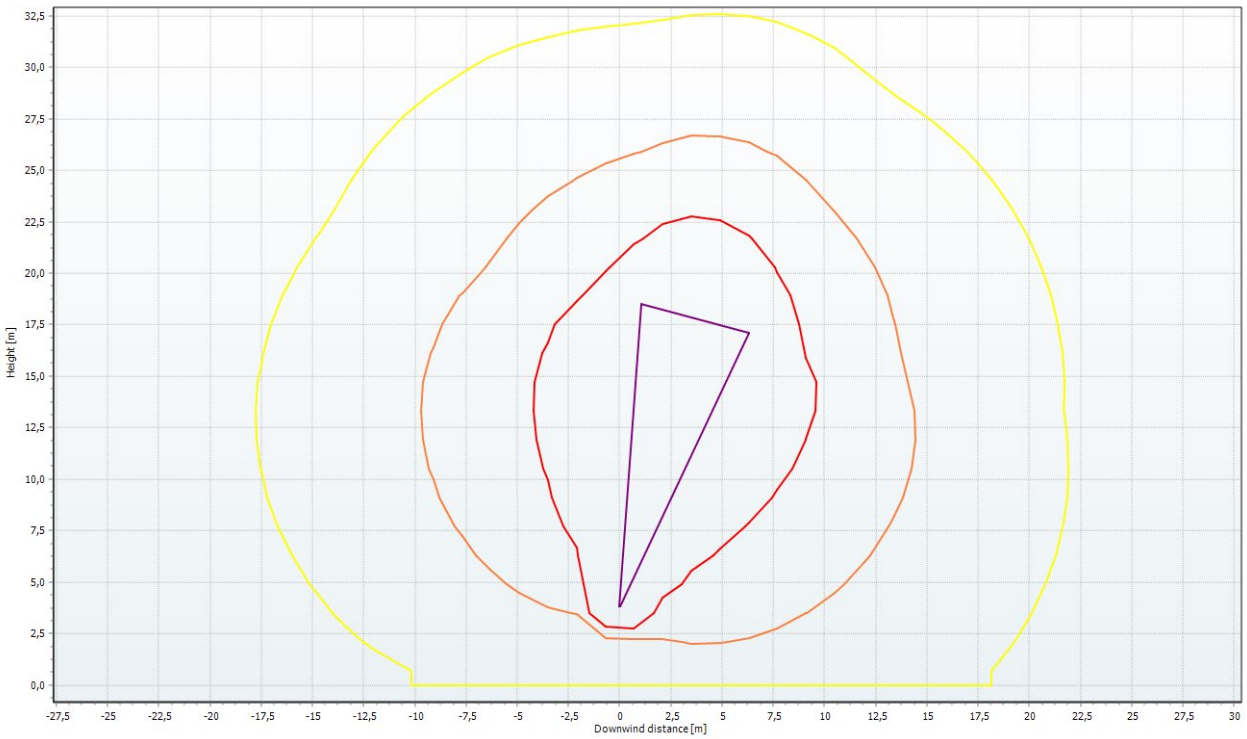
The consequences of a jet fire from venting are as follows:

12 Inch Vent				
Flame Length	**Radiation Contour 37.5kW/m^2**	**Radiation Contour 12kW/m^2**	**Radiation Contour 4.5kW/m^2**	**1% Lethality Contour**
14m	0m	0m	19m	8m

For a tank venting during LNG transfer, the subsequent jet fire the flame length was calculated at 14m with a wind speed of 1.5m/s. The effects from a jet fire from a 12 inch hose shear could not extend beyond the transfer area.

Thermal radiation from jet fires is shown below:

- 4.5 kW/m^2 is the radiation that would cause pain and second degree burns within 20 seconds. (Yellow Contour)
- 12.5 kW/m^2 represents a 1% fatality for people exposed to the fire for 20 seconds. (Orange Contour)
- 37.5 kW/m^2 indicates the lower limit of damage to steel equipment and represents a 100% fatality for people exposed to the flame. (Red Contour)
- The flame is represented by the purple contour.



- ***Venting Jet Fire Side View***

5.4.4. Flash Fires

A loss of containment of flammable materials if not immediately ignited, would mix with air and form a flammable cloud. This cloud could drift and if ignited could result in a flash fire or vapour cloud explosion. In this case, the flammable cloud may be generated by:

- A release of pressurised natural gas; or,
- Vaporisation of a pool of liquified natural gas

Typically, a flash fire occurs as the result of delayed ignition, once the flammable cloud has had time to grow and reach an ignition source. In the absence of confinement or congestion, burning within the cloud takes place relatively slowly, without significant over-pressure. It is assumed that thermal effects are limited to within the flame envelope where there is a very high probability of death.

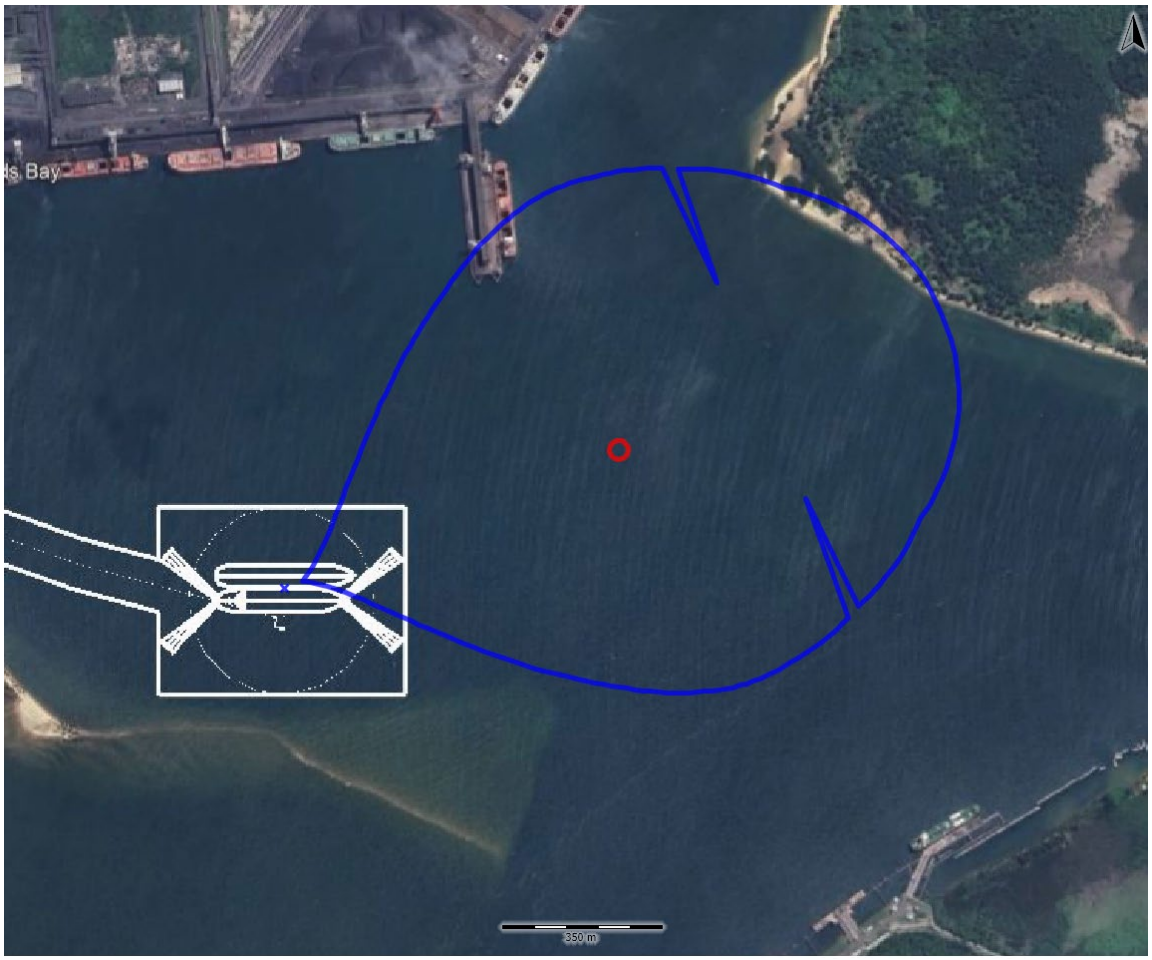
It must be noted that in this case the probability of ignition around the ships is low (0.7) and in the typical weather conditions the natural gas would disperse quickly, making the possibility of a vapour cloud extremely low.

The cloud of flammable material would be defined by the lower flammable limit (LFL) and the upper flammable limit (UFL). An ignition within a flammable cloud can result in an explosion if the front is propagated by pressure. If the front is propagated by heat, the fire moves across the flammable cloud at the flame velocity and is called a flash fire. In some instances, pockets of flammable clouds may extend beyond the LFL due to localised conditions. The ½ LFL endpoint assumes there are no isolated pockets, and that ignition would not occur beyond this point.

A flash fire from a catastrophic leak (hose shear and overfill) from the ship is shown below. Flash fires could have impacts beyond the berths.

The flammable cloud will extend past the berth for a distance for about 350m. This release can also extend onto the next berth depending on angle of release and wind direction.

The flammable cloud from a transfer hose shear will extend past the berth area for a maximum distance of about 300m. This release could impact on people and equipment on the next berth. The figure below shows the flammable cloud contour in blue and the 1% lethality contour in red.



Flash Fire from a Transfer Hose Shear

5.5. Explosions

An explosion is a rapid increase in volume and release of energy in an extreme manner, usually with the generation of high temperatures and the release of gases. Supersonic explosions created by high explosives are known as detonations and travel via supersonic shock waves. Subsonic explosions are created by low explosives through a slower burning

process known as deflagration.

Explosions associated with flammable gas installations are vapour cloud explosions (subsonic explosions), confined vapour cloud explosions (supersonic explosions) and boiling liquid expanding vapour explosions (BLEVE).

5.5.1. Vapour Cloud Explosion Consequences

A vapour cloud is formed by the release and mixing of a flammable vapour, gas or spray from an installation. The concentration of the material mixture within the vapour cloud must be in the explosive range to ignite and cause an overpressure. The rate of acceleration of the flames within the vapour cloud will lead to significant overpressure. Should the rate of ignition in the vapour cloud be instantaneous an explosion will occur. The rate of ignition will be influenced by the confinement of the vapour cloud. This will lead to a higher concentration of the flammable mixture. The results of a vapour cloud can be extensive property damage and injury or loss of life.

5.5.2. Unconfined Gas Explosions

An unconfined gas explosion is a flammable gas cloud that detonates within an area that is uncluttered and the expanding gases can easily escape. The maximum overpressure from an unconfined gas explosion is much lower than that of a confined explosion and hence the overpressure distance to safety is lower.

5.5.3. Confined Gas Explosions

Vapour cloud explosions are one of the most devastating events which can occur in the process industries. It was recognised that a facility design should include limiting explosion damage. The determination of peak overpressures from gas explosions and development of design criteria for structural support become more complex due to high pressure inventories in congested areas.

There are four key factors in an explosion. These are related to the overpressure which is the pressure rise above normal atmospheric pressure, the positive phase duration which is the time during which the pressure is above atmospheric pressure, the degree of confinement of the flammable mixture which causes turbulence and acceleration of the flame front and influences the overpressure, and the impulse (area under the pressure-time profile).

It is well established that it is not the size of the vapour cloud that matters when it comes to blast strength, but the degree of confinement of the vapour cloud and congestion in the path of the flame front. The energy of ignition source (e.g. naked flame) plays a dominant role in determining the blast strength, although a well-designed facility with strict implementation of hazardous area classification requirements in terms of hardware and safety management system can reduce the strength of a potential ignition source significantly.

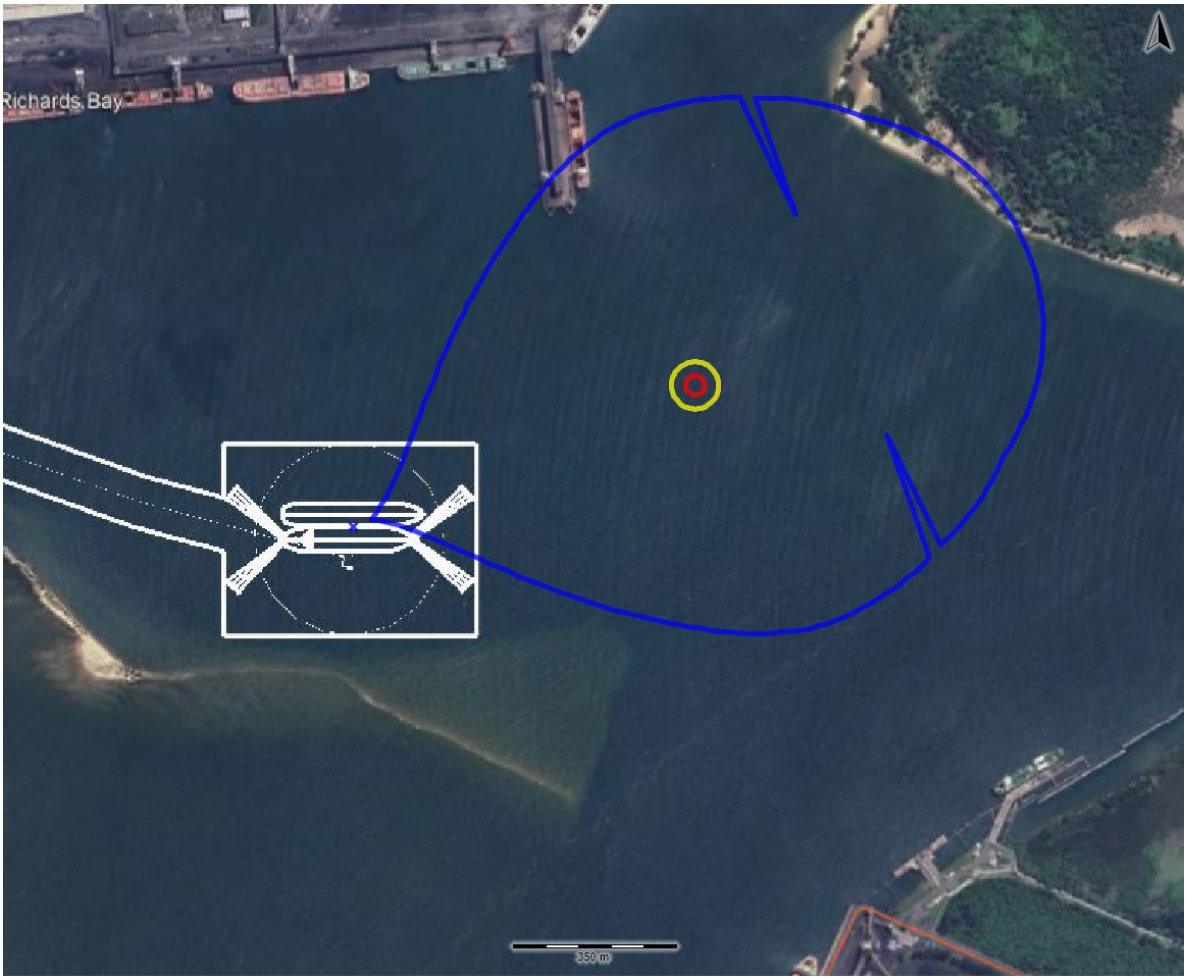
The Multi-Energy Model (MEM) for rapid assessment of explosion overpressure has been developed by TNO (1997). It is based on the concept that significant overpressures can be generated by the ignition of a vapour cloud only in the presence of partial confinement or obstacles in the path of the flame front. This model, however, requires assumptions on the initial blast strength, which significantly influences the predictions. CFD models used in offshore modules have shown that rapid assessment models can underestimate the blast overpressures.

There are confined areas at the port such as the service chambers and buildings.

The figure below shows the vapour cloud result of a cloud drifting across an ignition point (delayed ignition).

The 0.1bar (10kPa) overpressure contour in blue would typically severely damage 10% of buildings and a probability of death indoors equal to 0.025. No lethal effects are expected below 0.1 bar overpressure for people in the open.

The flammable cloud contour is shown below in blue, the 1%fatality contour in red and the 10-bar overpressure contour in yellow (as the result of a transfer hose shear).



VCE as the Result of a Transfer Hose Shear

5.5.4. Potential Onsite and Offsite Domino Effects

Potential offsite domino effects are not possible. Onsite domino effects are as follows:

During STS operations the LNGC and the FSRU could have domino effects on each other.

These domino effects have been included in the calculations.

6. FREQUENCY ANALYSIS

6.1. Site Specific (Final) Frequencies

The principal source of frequency values was the UK Health and Safety Executive (HSE) Failure Rate and Event Data (FRED) and generic frequencies as specified in *BEVI*. Site specific frequencies are calculated utilising these generic frequencies as a base.

6.2. Generic Equipment Failure Scenarios

The main hazard when storing toxics and flammables is the loss of containment, which when/if ignited may result in a fire or an explosion. In the absence of ignition, the flammable vapour cloud would move with the wind until the effects of dispersion dilute the vapours below the flammable concentration. A loss of containment of flammables may occur during delivery, storage or distribution. The possible hazards are to be identified, together with the failure modes and the possible initiating events that may cause such a failure. Failure rates were obtained from *'RIVM - Reference Manual Bevi Risk Assessments'.*

6.3. Blocking Systems

Blocking systems are used to limit the released quantity following a loss of containment. A blocking system consists of a detection system, for example gas detection, combined with shut-off valves. The shut-off valves can be closed automatically or manually. The effectiveness of a blocking system is determined by various factors, such as the position of gas detection monitors and their distribution throughout the various wind directions. Furthermore, the detection limit and the response time of the system as well as the operator's intervention time are also relevant.

1. Automatic blocking system

An automatic blocking system is a system in which the detection of the leak and the closing of the blocking valves take place automatically. Action by an operator is not necessary.

2. Semi-automatic blocking system

A semi-automatic blocking system is a system in which the detection of the leak takes place automatically and leads to an alarm signal. After validation of the signal the operator closes the blocking valves by actuating a switch. The probability of failure per operation is equal to 0.01, the time required for closing the blocking valves is equal to 10 minutes.

3. Non-automated blocking system

A non-automated blocking system is a system in which the detection of the leak takes place automatically and leads to an alarm signal. The operator does not have the facilities to shut off the blocking valves by actuating a switch in the control room but must physically close the valve. For such a system the time required to effectively perform the required actions is so long that there is no effect on the QRA, given the maximum duration of an outflow of 30 minutes that is generally applied.

For this Assessment, automatic blocking systems were modelled.

6.4. Transfer Hoses

Loading takes place from a LNGC to a FSRU using transfer hoses. Factors that have been identified as influencing the integrity of hoses are related to design, inspection, maintenance, and corrosion.

The failure frequencies are as follows:

	Frequency (per year)
Rupture of a loading hose	7,6 x 1.0e-4
Leak in a loading hose	7,6 x 1.0e-3

6.5. Pipe Manifolds

For flexible pipelines (gas, 2-phase, and liquid), the scenarios and frequencies in the following apply. Rupture in the pipeline is based on a hole the size of the internal diameter. The leak is a hole with an effective diameter of 10% of the nominal diameter of the pipe, with a maximum of 50 mm. For the manifolds the pipe length was calculated for a 18m long pipeline.

	Frequency (per meter)
Rupture of a loading hose	5 x 1.0e-7
Leak in a loading hose	2,5 x 1.0e-6

6.6. Pipeline

The scenarios and failure frequencies for a pipeline apply to the pipeline with connections, such as flanges, welds, and valves.

	Frequency (per meter)
Rupture of a Pipeline	1 x 1.0e-7
Leak in a Pipeline	5 x 1.0e-7

6.7. Ignition Probability of Flammable Gases

6.7.1. Direct Ignition

The probability of direct ignition depends on the type of installation (stationary installation or transport unit), the substance category and the outflow quantity.

- Values for stationary installations are given in the table below;
- Values for transport units are given in the next table;
- Definition of the substance category is given in the third table.

Substance Category	Source Term Continuous	Source Term Instantaneous	Probability of Direct Ignition
Category 0 Average/High reactivity	<10 kg/s 10 – 100 kg/s >100 kg/s	<1000 kg 1000 – 10000 kg >10000 kg	0.2 0.5 0.7
Category 0 Low reactivity	<10 kg/s 10 – 100 kg/s >100 kg/s	<1000 kg 1000 – 10000 kg >10000 kg	0.2 0.4 0.9
Category 1	All flow rates	All quantities	0.065
Category 2	All flow rates	All quantities	0.01
Category 3, 4	All flow rates	All quantities	0

Substance Category	Transport Unit	Scenario	Probability of Direct Ignition
Category 0	Road tanker	Continuous	0.1
	Road tanker	Instantaneous	0.4
	Tank wagon	Continuous	0.1
	Tank wagon	Instantaneous	0.8
	Ships – gas tankers	Continuous, 180m^3	0.7
	Ships – gas tankers	Continuous, 90m^3	0.5
	Ships – semi gas tankers	Continuous	0.7
Category 1	Road tanker, tank Ships	Continuous, instantaneous	0.065
Category 2	Road tanker, tank ships	Continuous, instantaneous	0.01
Category 3, 4	Road tanker, tank ships	Continuous, instantaneous	0

Category	WMS Category	Limits
Category 0	Extremely flammable	Liquid substances and preparations with a flash point lower than 0°C and a boiling point (or the start of a boiling range) less than or equal to 35°C. Gaseous substances and preparations which may ignite at normal temperature and pressure when exposed to air.
Category 1	Highly flammable	Liquid substances and preparations with a flash point below 21°C, which are not however, extremely flammable
Category 2	Flammable	Liquid substances and preparations with a flash point greater than or equal to 21°C and less than or equal to 55°C.
Category 3	Flammable	Liquid substances and preparations with a flash point greater than 55°C and less than or equal to 100°C.
Category 4	Flammable	Liquid substances and preparations with a flash point greater than 100°C.

For this Assessment the probability of direct ignition would be 0.09.

6.7.2. Delayed Ignition

The probability of delayed ignition depends on the end of the calculation. In the calculation of the location-specific risk only ignition sources on the site of the establishment are considered. Ignition sources outside the establishment are ignored: it is assumed that if the cloud does not ignite on site and a flammable cloud forms outside the establishment, ignition always occurs at the biggest cloud size. In the calculation of societal risk, all ignition sources are considered, including population. If ignition sources are absent, it is possible in the societal risk calculation that the flammable cloud does not ignite (see the table below).

Substance Category	Probability of Delayed Ignition for the Biggest Cloud Size, PRm	Probability of Delayed Ignition, GR
Category 0	$1 - P_{direct\ ignition}$	Ignition sources
Category 1	$1 - P_{direct\ ignition}$	Ignition sources
Category 2	0	0
Category 3	0	0
Category 4	0	0

For this Assessment the probability of delayed ignition would be 0.5.

7. RISK CALCULATIONS

Consequence analysis has been the focus of the report up to now while the consideration of probability has not been discussed. Risk is defined as consequence times probability.

Probability is defined as the risk of an event happening and impacting on the individual and society at large.

7.1. Specific Individual Risk Levels

The likelihood that a person in some fixed relation to a hazard (e.g. at a location, level of vulnerability, protection and escape) might sustain a specific level of harm.

The frequency at which an individual may be expected to sustain a given level of harm from the realisation of specified hazards. For example, there may be an individual risk of one-in-a-million that a person would be killed by an explosion at a major hazard near their home for every year that a person lives at that address. *[HSE Societal Risk: Initial briefing to Societal Risk Technical Advisory Group: p60].*

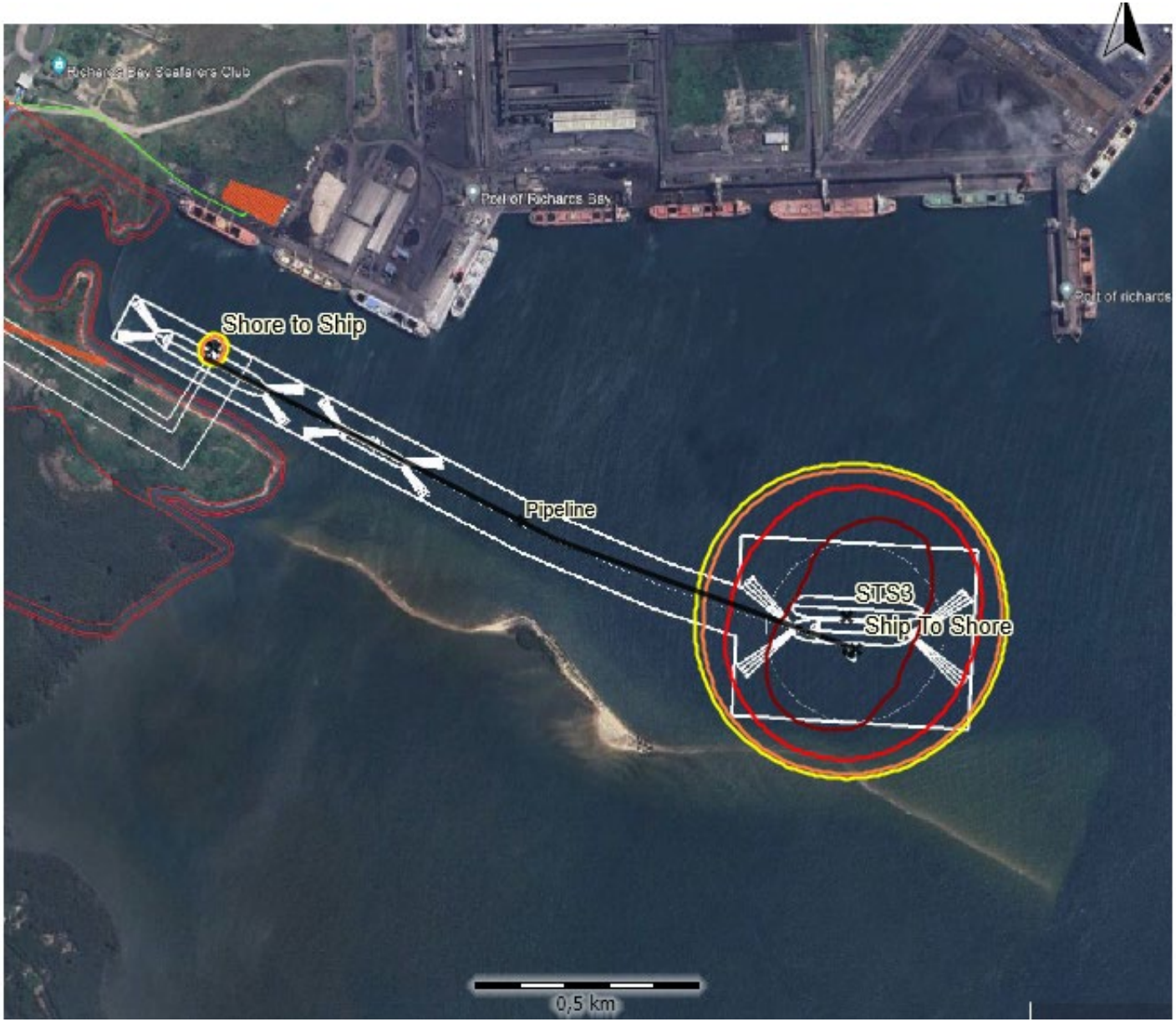
7.2. Employee Risk

Scenarios considered regarding risk to employees are toxic vapour clouds from Ammonia and chlorine plant failures, vapour cloud explosions and BLEVEs from gas vessel failures, and pool fires from fuel installations. Employees and the public are indoors and outdoors during the day and major events associated with these installations would occur outside of the building near the installation areas. When exposed to hazards such as toxic clouds, people who are indoors (sheltered) will generally be less vulnerable than those outdoors (unsheltered). The risks should not be more than one-in-a-thousand (1.0e-3 per year).

7.3. Individual Risk

In this Assessment, the proposed LNG operations were modelled. The results were as follows:

- The 1.0e-4 (one in a ten thousand) red contour, is confined to the two ships and 160m around the hose connections;
- The 1.0e-5 (one in a hundred thousand) orange contour, is confined to the two ships and 230m around the hose connections;
- The 1.0e-6 (one-in-a-million) yellow contour, stretches for a maximum distance of 295m from the generator barge hose;
- The 3.0e-7 (one-in-thirty million) green contour, does not reach any sensitive populations. The contour stretches for a maximum distance of 310m from the generator barge hose connection.



Individual Risk

7.4. Risk Levels and Ranking

Individual risk levels at several important points around the operations at the Port:

Risks on the Break Bulk Quay

No Risks

Risks at Closest Quay

No Risks

Risks at Closest Shoreline

No Risks

Risk Ranking

No	Scenario	Contribution %	Risk Value
1.	Pipe Leak (STS3)	18.9	2.17e-04
2.	Pipe Leak (STS1)	18.9	2.17e-04
3.	Pipe Leak (STS2)	18.9	2.17e-04
4.	Pipe Leak (STS4)	18.7	2.15e-04
5.	Pipe Rupture (STS4)	6.17	7.10e-05
6.	Pipe Rupture (STS1)	6.17	7.10e-05
7.	Pipe Rupture (STS2)	6.17	7.10e-05
8.	Pipe Rupture (STS3)	6.17	7.10e-05
9.	Leak (Venting)	0.00273	3.14e-08

7.5. Societal Risk

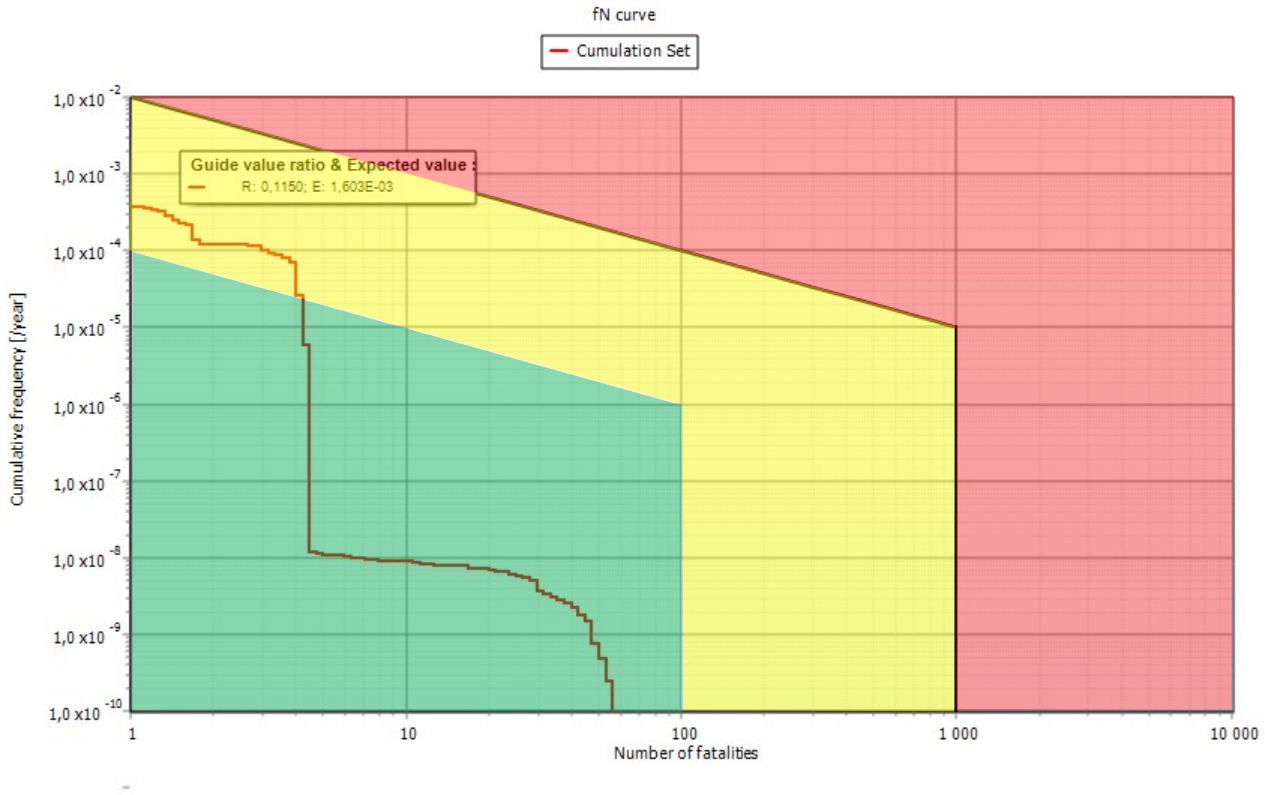
Societal risk is defined as the relationship between frequency and the number of people suffering from a specified level of harm in each population from the realisation of specified hazards *[Jones, 1985].* Societal risk evaluation is concerned with estimation of the chances of more than one individual being harmed simultaneously by an incident. The likelihood of the primary event (an accident at a major hazard installation) is still a factor, but the consequences are assessed in terms of level of harm and the numbers affected (severity), to provide an idea of the scale of an accident in terms of numbers killed or harmed.

Societal risk is dependent on the risks from the substances and processes located on a major hazard installation. A key factor in estimating societal risk is the population around the site, its location and density. For example, the more (occupied) buildings in any area, the more people could be harmed by a flammable gas cloud passing through that area. For an installation with a population located in a specific compass direction, the chance of a flammable gas release would depend on the probability of drift in that direction.

Generally, scenarios to be included in a risk assessment can be characterised as having a frequency (F) and a consequence (N, number of casualties). *F* is used to denote the sum of the frequencies of all the individual events that could lead to *N* or more fatalities (hence the reference to *FN curves*).

Societal risk can be represented by FN curves, which are plots of the cumulative frequency (F) of various accident scenarios against the number (N) of casualties associated with the modelled incidents. The plot is cumulative in the sense that, for each frequency, N is the

number of casualties that could be equalled or exceeded. Often ‘casualties’ are defined in a risk assessment as fatal injuries, in which case N is the number of people that could be killed by the incident.



FN Curves

As can be seen on the graph above, the societal risks are less than 1.0e-6 of one fatality and are therefore acceptable.

8. RISK JUDGEMENT

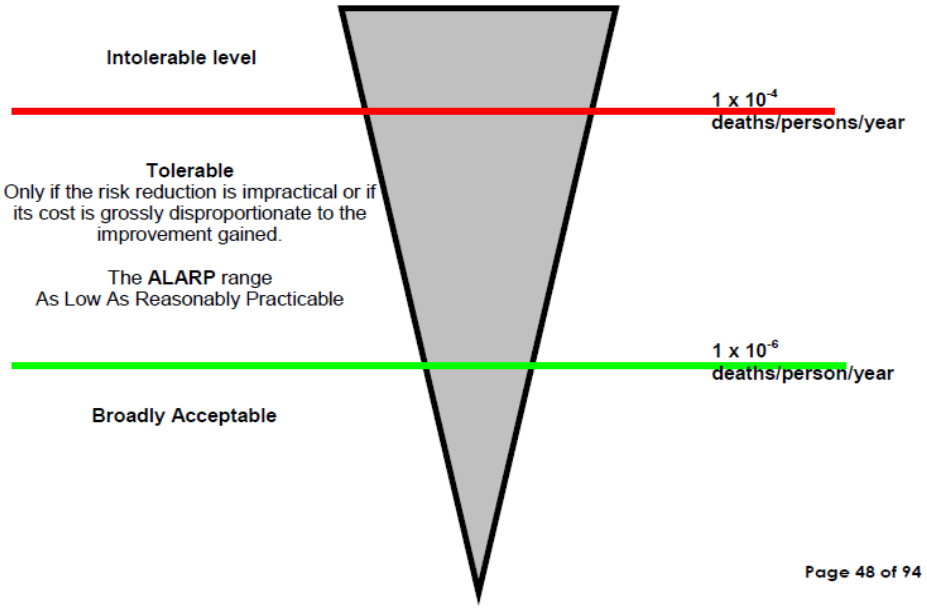
8.1. Risk Judgement Criteria

This Assessment indicates in a clear statement whether the risks or aspects of the risks are intolerably high, tolerable provided ALARP or broadly acceptable, both in terms of location specific individual risk and societal risk.

The risk evaluation criteria are set out as follows:

- A risk of death for members of the public greater than 1.0e-4 (one-in-ten thousand) per year is considered intolerable.
- A risk of death below 1.0e-6 (one-in-a-million) per year for members of the public is considered broadly acceptable provided sensitive or vulnerable receptors in the vicinity have been considered.
- Risks between 1.0e-6 per year and 1.0e-4 per year for members of the public can be considered tolerable provided the risks have been reduced so far as is reasonably practicable, i.e. this is referred to as the ALARP region.

Figure 1 - The public ALARP risk decision making framework



The individual risks at the Gas to Power facility are ‘Tolerable’ as they fall within the ALARP range. The risks off site are ‘Broadly Acceptable’.

9. RISK TREATMENT

9.1. Major Hazard Installation

The main risk contributing part of the operation is the possible rupture of one of the transfer hoses.

The risks were found to be acceptable for the Gas to Power Operations.

9.2. Risk Reduction

Recommendations are as follows:

- There must be an Operations Manual for the transfer process;
- The Emergency Plan must be approved by the Port Authorities. The risks will not impact on any other neighbouring flammable installations;
- Only suitably qualified people must be used for all operations;
- Visiting Ship Captains must provide Port Management with detailed STS Operations Manual before offloading;
- All equipment, including radios used within the operations area, must be intrinsically safe;
- Service Logbooks must be kept for all hoses and pipelines and checked regularly;
- Karpowership, together with the Port Fire Department will handle all firefighting and emergencies as per the approved procedures.

9.3. ALARP Conclusions

If the Gas to Power Project is carried out as per plan with all the designed safety equipment in place, together with good maintenance and trained personnel, the risks imposed by the Gas to Power Operations will always be acceptable.

10. EMERGENCY RESPONSE DATA

10.1. Emergency Plan

A generic emergency response plan has been drafted by Karpowership. Once the approvals have been obtained for the project a final emergency response plan needs to be finalised together with the Ports Authorities as well as the Local Authority as per SANS 1514: 2018 Major hazard installation: Emergency response planning.

Document Name	KARPOWERSHIP Emergency Response Plan
Date of Document	7 June 2018
Fire Fighting Addressed	To be finalised
Emergency Evacuation Addressed	To be finalised
Statutory Requirements	To be finalised
Document complies with SANS 1514:2018	To be finalised

11. CONCLUSION

11.1. Major Hazard Installation

This Assessment established that an incident involving the Gas to Power Project at the Port of Richards Bay could impact on the neighbouring berths.

The risks associated with this MHI were found to be acceptable.

A site is deemed to be an MHI if more than the prescribed quantity is stored as per the General Machinery Act or if a product is stored, handled or produced which has the potential to cause a major incident as per the Major Hazard Installation Regulations.

11.2. 1% Consequence Lethality Distances

Scenario	Maximum Distance
Transfer Hose Rupture Flash Fire	499m
Transfer Hose Rupture Jet Fire	188m
Transfer Hose Leak Jet fire	204m
Vapour Hose Rupture	108m
Vapour Hose Leak	18m
Ship Venting Jet Fire	15m
Pipeline Leak Jet Fire	18m
Pipeline Rupture Jet Fire	134m

11.3. Risk Level Posed to Various Populations

Individual risk levels at several important points around the operations at the Port:

Risks on the Break Bulk Quay

No Risks

Risks at Closest Quay

No Risks

Risks at Closest Shoreline

No Risks

Risk Ranking

No	Scenario	Contribution %	Risk Value
1.	Pipe Leak (STS3)	18.9	2.17e-04
2.	Pipe Leak (STS1)	18.9	2.17e-04
3.	Pipe Leak (STS2)	18.9	2.17e-04
4.	Pipe Leak (STS4)	18.7	2.15e-04
5.	Pipe Rupture (STS4)	6.17	7.10e-05
6.	Pipe Rupture (STS1)	6.17	7.10e-05
7.	Pipe Rupture (STS2)	6.17	7.10e-05
8.	Pipe Rupture (STS3)	6.17	7.10e-05
9.	Leak (Venting)	0.00273	3.14e-08

No one within the port area is exposed to a risk greater than 1.0e-06 (one in a million) and ship staff is exposed to a risk of no more than 1.0e-04 (one in a ten thousand). These risks are acceptable for persons operating in a national port.

11.4. Risk Reduction Recommendations

The following is recommended to reduce the risks associated with the installations at the site:

- Good housekeeping must always be observed on site;
- Only suitably qualified people must be used for all installation work;
- An accredited installer must conduct a pressure test and provide the relevant compliance certificates;
- There must be an operational manual for each operation.

11.5. Emergency Plan

It is recommended that an Emergency Plan be developed and sent to the City Disaster Management for them to comment and formulate action plans.

11.6. Review of Risk Assessment

This Risk Assessment is valid for the duration of 5 years from the above date unless:

- Changes have been made to the plant that can alter the risks on the facility;
- The emergency plan was invoked or there was a near miss;
- The changing neighbourhood could result in offsite risks;
- There is reason to suspect that the current Assessment is no longer valid.

11.7. Risk Reduction Programmes

Risk reduction programmes should continually be investigated to reduce the impact from accidental fires and explosions on surrounding communities.

11.8. Uncertainties and Sensitivities

The information provided by the client was sufficient so that there are no technical uncertainties or sensitivities. The information supplied included process descriptions, site operations, product storage and throughput, etc**.**

11.9. Surrounding Land Development

The development of land surrounding the site should be done with caution as not to pose unnecessary risks onto the surrounding communities. This caution is aimed at ensuring the adjacent developments are suitable for the risk imposed.

12. PROOF OF COMPETENCY

sanas
South African National Accreditation System

CERTIFICATE OF ACCREDITATION

In terms of section 22(2)(b) of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act 19 of 2006), read with sections 23(1), (2) and (3) of the said Act, I hereby certify that:-

MAJOR HAZARD RISK CONSULTANTS CC
Co. Reg. No.: 2007/079078/23
CAPE TOWN

Accreditation Number: **MHI0017**

is a South African National Accreditation System Accredited Inspection Body to undertake **TYPE A** Inspection provided that all SANAS conditions and requirements are complied with

This certificate is valid as per the scope as stated in the accompanying scope of accreditation, Annexure "A", bearing the above accreditation number for

THE ASSESSMENT OF RISK ON MAJOR HAZARD INSTALLATIONS

The facility is accredited in accordance with the recognised International and National Standard

ISO/IEC 17020:2012 and SANS 1461:2018

The accreditation demonstrates technical competency for a defined scope and the operation of a management system

While this certificate remains valid, the Accredited Facility named above is authorised to use the relevant SANAS accreditation symbol to issue facility reports and/or certificates

Mr M Phaloane
Acting Chief Executive Officer

Effective Date: 21 January 2021
Certificate Expires: 20 January 2025

This certificate does not on its own confer authority to act as an Approved Inspection Authority as contemplated in the Major Hazard Installation Regulations. Approval to inspect within the regulatory domain is granted by the Department of Employment and Labour.

ANNEXURE A

SCOPE OF ACCREDITATION

Accreditation Number: MHI0017

TYPE A

Permanent Address: MHR Consultants CC 13 Slade Street Parklands Tableview 7441 Tel: (021) 426-5688 Fax: 086 520-4872 E-mail: claude@petrostruct.co.za	**Postal Address:** 13 Slade Street Parklands Tableview 7441 Issue No.: 08 Date of Issue: 19 January 2021 Expiry Date: 20 January 2025

Nominated Representative:	Technical Manager:	Technical Signatories
Mr CC Thackwray **Quality Manager:** Mr CC Thackwray	Mr SA Stevens	Mr TC Thackwray Mr SA Stevens

Field of Inspection	Type and Range of Inspection	Standards and Specifications
Regulatory: The supply of services as an Inspection Authority for Major Hazard Risk Installation as defined in the Major Hazard Risk Installation Regulations, Government Notice No. R 692 of 30 July 2001	Major Hazard Installation Risk Assessments for the following material categories: 1) Explosive chemicals 2) Gases: i) Flammable Gases ii) Non-flammable, non-toxic gases (asphyxiants) iii) Toxic gases 3) Flammable liquids 4) Flammable solids, substances liable to spontaneous combustion, substances that on contact with water release flammable gases 5) Oxidizing substances and organic peroxides 6) Toxic liquids and solids	MHI regulation par. **5 (5) (b)** i) Frequency/Probability Analysis ii) Consequence Modelling iii) Hazard Identification and Analysis iv) Emergency planning reviews SANS 31000 SANS 31010 SANS1461:2018 CPR 14 E. Methods for the Calculation of Physical Effects ("Yellow Book"), 3rd Edition, TNO, Apeldoorn. Guideline for Quantitative Risk Assessment ("Purple Book") CPR 18E, First Ed. 1999 A Guide for the Control of Major Accident Hazard Regulations 1999, UK HSE.

Original Date of Accreditation: 21 January 2009

Page 1 of 1

ISSUED BY THE SOUTH AFRICAN NATIONAL ACCREDITATION SYSTEM

Accreditation Manager

employment & labour

Department:
Employment and Labour
REPUBLIC OF SOUTH AFRICA

National Department of Employment and Labour
Republic of South Africa

APPROVED INSPECTION AUTHORITY

Registered in accordance with the provisions of the Occupational Health and Safety Act, Act 85 of 1993, as amended and the Major Hazard Installation Regulations.

THIS IS TO CERTIFY THAT:

MAJOR HAZARD RISK CONSULTANTS CC

has been registered by the Department of Employment and Labour as an Approved Inspection Authority: Type A, to conduct Major Hazard Installation Risk Assessment, in terms of Regulation 5(5)(a), of the Major Hazard Installation Regulations.

CONDITIONS OF REGISTRATION:

- *The AIA must at all time comply with the requirements of the Occupational Health and Safety Act, Act 85 of 1993, as amended.*
- *This registration certificate is not transferable.*
- *This registration will lapse if there is a name change of the AIA or change in ownership.*

CHIEF INSPECTOR

Valid from: 21 January 2021
Expires: 20 January 2025
Certificate Number: CI MHI 0007

13. REFERENCES

Ale B J M (1991). 'Risk Analysis and Risk Policy in the Netherlands and the EEC'. J. Loss. Prev. Process Ind.. 4(1). 58

CPR 12 E (1997). 'Methods for Determining and Processing Probabilities' ("Red Book") First Edition. TNO. Apeldoorn

CPR 14 E (1997). 'Methods for the Calculation of Physical Effects' ("Yellow Book"). Third Edition. TNO. Apeldoorn.

CPR 16 E (1992). 'Methods for the Determination of Possible Damage' ("Green Book"). First Edition. TNO. Apeldoorn.

CPR 18 E (1999). 'Guidelines for Quantitative Risk Assessment. ("Purple Book"). First Edition. TNO. Apeldoorn.

EPA (1993). 'Offsite Consequence Analysis: Risk Management Programme Guidance'. May 1996.

HSE (1989). 'Risk Criteria for Land Use Planning in the Vicinity of Major Hazards'. Health and Safety Executive. HMSO

Schulze (1986). 'Climate of South Africa: Climate Statistics up to 1984'. WB 40. South African Weather Bureau. Pretoria. 474 pp.

'Reference Manual Bevi Risk Assessments Version 3.2'

SANS 1461:2018

HSE "*Planning advice for developments near hazardous installations (PADHI)*"

SANS 1514:2018

14. APPENDICES

14.1. Material Safety Data Sheets

SAFETY DATA SHEET
LNG

1. IDENTIFICATION: PRODUCT IDENTIFIER AND CHEMICAL IDENTITY

Product Name	LNG
Proper Shipping Name	NATURAL GAS, REFRIGERATED LIQUID with high methane content
Other Names	Liquefied Natural Gas
Recommended Use	Fuel
Supplier Name	Wesfarmers LNG Pty Ltd (ABN 66 096 080 205)
Address	Campus Drive (off Murdoch Drive) Murdoch, Western Australia, 6150
Telephone No.	13 21 80
Australian Emergency Contact No.	1800 093 336 (24 hours, 7 days)

2. HAZARDS IDENTIFICATION

GHS Classification

Physical Hazards

Flammable Gas – Category 1
Refrigerated Liquefied Gas

Hazard Statements

DANGER – Extremely Flammable Gas
Contains refrigerated gas; may cause cryogenic burns or injury

Precautionary Statements

No Smoking.
Keep away from heat, sparks, open flames and hot surfaces.
Store in a well-ventilated place.

Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
Eliminate all ignition sources if safe to do so.

Wear cold insulating gloves and eye protection.
Thaw frosted parts with lukewarm water.
Do not rub affected area.
Get immediate medical attention.

SAFETY DATA SHEET
LNG

3. COMPOSITION AND INFORMATION ON INGREDIENTS

LNG supplied by Evol LNG has typical composition as below.

Chemical Identity of Ingredient	Proportion (Mole %)	CAS Number
Methane (CH_4)	> 90 %	74-82-8
Ethane (C_2H_6)	1 - 5 %	74-84-0
Nitrogen (N_2)	1 - 5 %	7727-37-9

4. FIRST AID MEASURES

Inhalation Move patient to fresh air.
Administer high flow oxygen and assist ventilation as required.
If difficulty breathing persists or oxygen has been administered, seek medical attention.

Skin Contact

Cryogenic burns and Frostbite - Minor Injuries:

Ensure that clothing around the affected area is loose and does not restrict blood flow.
Do not attempt to remove clothing which has frozen onto the skin until flushing has allowed it to thaw completely.
Gently flush or immerse the affected areas with lukewarm water (30°C) for at least 15 minutes or longer as required for skin colour to change from waxy white / pale yellow through blue to pink or red.
Apply non-stick sterile dressing and treat as for a thermal burn.
DO NOT use hot water or apply any form of direct heat.
DO NOT RUB.
Seek immediate medical attention if the burn is large, blistered or deep, or if tissue freezing or frostbite has occurred.

Cryogenic burns and Frostbite - Major Injuries:

Send for Ambulance.
Follow minor injury procedure as far as possible.
Manage for shock.

Eye Contact Treatment for cold burns: Immediately flush with lukewarm water or with sterile saline solution. Hold eyelids apart and irrigate for at least 15 minutes.
Seek immediate medical attention.

Ingestion Due to product form and application, ingestion is considered extremely unlikely.

Symptoms caused by exposure

Direct contact with eyes or skin may cause severe frostbite.
Symptoms of exposure are directly related to displacement of oxygen from air.
As the amount of oxygen inhaled is reduced from 21 - 14% volume, the pulse rate will accelerate and the rate and volume of breathing will increase. The ability to maintain attention and think clearly is diminished, muscular co-ordination is somewhat disturbed.
As oxygen decreases from 14 - 10% volume, judgement becomes faulty, severe injuries may cause no pain. Muscular effort will lead to rapid fatigue.
Further reduction to 6% may cause nausea and vomiting. Ability to move may be lost.
Permanent brain damage may result even after resuscitation from exposure to this low level of oxygen.
Below 6% breathing is in gasps and convulsions may occur.
Inhalation of a mixture containing no oxygen may result in unconsciousness from the first breath and death will follow in minutes.

Medical attention and special treatment

Treatment is symptomatic and supportive.

SAFETY DATA SHEET
LNG

5. FIREFIGHTING MEASURES

Suitable extinguishing equipment

Isolation is the preferred method of extinguishment. Do not attempt to extinguish but stop gas flow at the source if safe to do so and allow to burn out.

Evacuate area and contact emergency services.

High expansion foam is recommended for fire fighting suppression.

Water may be used to assist with cooling of cylinders and to disperse vapours.

Caution: Do not use water near electrical items.

Do not spray water or foam onto spilled pools of LNG as the fire water will heat the cryogenic liquid and result in a larger vapour cloud

Specific hazards

Highly flammable.

Natural gas fires create intense radiant heat.

Heating to decomposition produces acrid smoke and irritating fumes.

May also evolve carbon oxides when heated to decomposition.

Product will add fuel to a fire.

Temperatures in a fire may cause pressure relief devices to be activated and cylinders to rupture.

Special protective equipment and precautions for fire fighters

Evacuate area and contact emergency services.

Liquid leaks generate large volumes of flammable vapour which is heavier than air when first released and may collect in low lying areas and travel downwind and/or downhill to sources of ignition. As the vapour warms it becomes less dense than air and will dissipate upwards. The vapour can then travel trapped beneath overhead structures.

The explosive zone may extend beyond the limits of the visible vapour cloud.

Remain upwind and notify those downwind of hazard.

Breathing apparatus is required in confined spaces.

Do not approach vessels suspected of being hot.

Immediately withdraw from fire area if vessel venting noise begins to cycle or the container becomes distorted.

Pressure relief valves from exposed cylinders may operate which will increase fire in localised areas.

Use water mist to cool intact containers and nearby storage areas.

Cooling fire water spray may need to be used on exposures, due to high radiant heat from an LNG fire.

Do not spray water or foam onto spilled pools of LNG.

Hazchem Code

2YE

SAFETY DATA SHEET
LNG

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Wear long sleeves and trousers made of non-static producing fibres and close fitting safety glasses with side shields. Wear liquid impervious, thermally insulating gloves if contact with liquid is a possibility.

LNG will ignite easily under all normal Australian weather conditions.

Any spillage or leak creates a severe fire and/or explosion hazard.

Liquid leaks generate large volumes of flammable vapour which is heavier than air when first released and may collect in low lying areas and travel downwind and/or downhill to sources of ignition. As the vapour warms it becomes less dense than air and will dissipate upwards. The vapour can then travel trapped beneath overhead structures.

The explosive zone may extend beyond the limits of the visible vapour cloud.

Vapour may collect in any confined space.

If a leak has not ignited:

- Evacuate the area of all unnecessary personnel
- Eliminate all sources of ignition.
- Stop the gas flow at the source if safe to do so.
- Do not enter a vapour cloud except for rescue; self-contained breathing apparatus must be worn.

Environmental precautions

LNG will evaporate rapidly on release.

It is unlikely to contaminate soil or waterways.

Methods and materials for containment and cleaning up

Isolate immediate area from pedestrian and vehicle traffic.

Eliminate other sources of ignition.

Monitor visible vapour cloud.

The absence of a visible vapour cloud does not mean that an explosive atmosphere is not present.

Consider alerting personnel downwind of hazard to evacuate and eliminate sources of ignition.

Contact emergency services and supplier.

Approach from upwind.

Isolate and shut off fuel where able.

Use water sprays to disperse vapours.

Do not spray water or foam onto spilled pools of LNG.

The liquid and vapour are highly flammable and precautions should be taken to prevent ignition until the vapours have dissipated.

After it is believed that the vapours have dissipated, gas test the area before entering to ensure that the area is safe.

SAFETY DATA SHEET
LNG

7. HANDLING AND STORAGE

Precautions for safe handling

Risk of RPT (Rapid Phase Transition): A significant difference in temperature between LNG and a warmer liquid may cause almost instantaneous vaporisation of the LNG. The sudden increase in total volume occupied by the LNG may generate a 'cold explosion' shock wave (sudden generation of overpressure but without combustion).

Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, heaters, naked lights, pilot lights, vehicles and mobile phones.

Where appropriate ensure equipment is electrically bonded and earthed to prevent static accumulation.

Use safe work practices to avoid eye or skin contact and inhalation.

Observe good personal hygiene, including washing hands before eating.

Conditions for safe storage

The Australian Standard AS 3961-2005; The Storage and Handling of Liquefied Natural Gas details the requirements for safe storage and handling of LNG.

In Western Australia storage must conform to the Dangerous Goods Safety Act 2004 and relevant Regulations under the Act.

Refer to local regulations for other states - see Section 15 Regulatory Information.

Store in a well-ventilated area away from oxidising agents (eg pool chlorine), acids, alkalis, direct sunlight, heat or ignition sources and protected from physical damage.

Store and use only in vessels designed for use with this product.

Check regularly for leaks.

Large storage areas should be bunded and have appropriate fire protection and ventilation systems.

SAFETY DATA SHEET
LNG

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure control measures

Workplace Exposure Standards

Name	CAS	TWA
Ethane	74-84-0	Simple asphyxiant - may present an explosion hazard
Methane	74-82-8	Simple asphyxiant - may present an explosion hazard
Nitrogen	7727-37-9	Simple asphyxiant

Engineering controls

Do not inhale vapours.

Use in well ventilated areas.

In poorly ventilated areas, mechanical explosion proof extraction ventilation is recommended

Individual protection measures

Eye and face protection

Wear close fitting safety glasses with side protection.

Where contact with liquid is possible double eye protection such as safety glasses or goggles and a face shield is recommended.

Skin protection

Wear long sleeves and trousers or overalls made from specifically designed non-static producing or natural fibres when handling LNG.

Wear liquid impervious, thermally insulating gloves when handling liquid or transfer hoses and connections. Aprons and gauntlets may also be appropriate in these situations.

Insulating gloves should also be worn where contact with pipework chilled by vaporising liquid is a possibility.

Respiratory protection

In the event that personnel are required to work in areas where vapour concentration presents an asphyxiation risk, supplied air respirators or self-contained breathing apparatus should be used.

Ensure that personnel are suitably trained in the use of the equipment and that all manufacturers' instructions are adhered to.

The possibility of an explosive atmosphere should be considered when assessing the need for personnel to enter areas where respiratory protection is required.

SAFETY DATA SHEET
LNG

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Clear, colourless liquid at supply temperature. Colourless gas at ambient temperature.
Odour	Odourless
Odour threshold	Not detectible by smell
pH	Not applicable.
Freezing point	-183°C
Initial boiling point	-161°C
Boiling range	-161°C to -88°C
Flash point	-188°C
Evaporation rate	Not Available (Rapid)
Flammability	Extremely flammable
Upper explosive limit	14.8 vol% in air
Lower explosive limit	4.6 vol% in air
Vapour pressure	34,000 kPa (absolute) @ 40°C
Liquid Density	0.308 kg/l @ 15°C (0.414 kg/l @ -146.8°C and 250 kPag)
Vapour density	0.694 kg/m^3 @ 15°C (1.6 kg/ m^3 @ -146°C)
Relative vapour density	0.567 @ 15°C (relative to air)
Solubility	very low; < 60 mg/l in water Soluble in ethanol and hydrocarbons
Partition coefficient: n-octanol/water	log Kow = 1.09 (Methane)
Auto-ignition temperature	537°C (Methane)
Decomposition temperature	Not available

10. STABILITY AND REACTIVITY

Reactivity Extremely flammable liquid and vapour.
Reacts violently with oxidising agents, oxygen, halogens and metal halides

Chemical stability
LNG is stable under recommended conditions of storage.

Conditions to avoid
Avoid heat, sparks, open flames and other ignition sources

Incompatible materials
LNG is incompatible with oxidising agents, acids, heat and ignition sources.
It is also incompatible with oxygen, halogens and metal halides.
Do not use natural rubber flexible hoses.

Decomposition Products
Heating to decomposition produces acrid smoke and irritating fumes.
May also evolve carbon oxides when heated to decomposition.

SAFETY DATA SHEET
LNG

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Non-toxic – simple asphyxiant.
Effects are proportional to oxygen displacement.
No LD50 data available for components of this product**.**

Skin corrosion/irritation

Vapour is non-irritating.
Contact with liquid, cold vessels or pipes containing low pressure liquid, may result in cold burns or frost-bite with severe tissue damage

Serious eye damage/irritation

Vapour is non-irritating.
Contact with liquid may result in severe cold burns with possible permanent damage.

Respiratory or skin sensitisation

Not known to cause sensitization.

Germ cell mutagenicity

Not known to cause germ cell mutations.

Carcinogenicity

Components not listed by the International Agency for Research on Cancer (IARC).

Reproductive toxicity

Not known to cause reproductive toxicity.

Specific Target Organ Toxicity (STOT) – single exposure

Non-toxic – simple asphyxiant.

Specific Target Organ Toxicity (STOT) – repeated exposure

Non-toxic – simple asphyxiant.

Aspiration hazard

Not an aspiration hazard.

12. ECOLOGICAL INFORMATION

Ecotoxicity LNG is not expected to be toxic to the environment.

Persistence and degradability

LNG will be in the vapour phase at normal atmospheric conditions. Ethane is degraded in the atmosphere by photochemically-produced hydroxyl radicals. Methane degrades very slowly in the atmosphere by reaction with photochemically-produced hydroxyl radicals. The half-life of this reaction is 6 years.

Bioaccumulative potential

The potential for LNG to bioaccumulate is low.

Mobility in soil

LNG is not expected to remain in soil; it will evaporate rapidly and completely to atmosphere.

Other adverse effects

Liquid spills of LNG are likely to cause frost damage to vegetation.
LNG contains more than 80% methane which is a greenhouse gas.

SAFETY DATA SHEET
LNG

13. DISPOSAL CONSIDERATIONS

Disposal Methods

Any unused product and storage vessels should be returned to the supplier when no longer required.

14. TRANSPORT INFORMATION

UN number	1972
Proper shipping name	NATURAL GAS, REFRIGERATED LIQUID with high methane content
Transport hazard class	Class 2.1, Flammable gas
Packing Group	None Allocated

Environmental hazards for Transport Purposes

No specific considerations; see Section 6.

Special Precautions for user

Do not transport with chemicals of class;
1 (Explosives),
3 (Flammable liquids),
4.1 (Flammable solids),
4.2 (Spontaneously combustibles),
4.3 (Dangerous when wet),
5.1 (Oxidising agents),
5.2 (Organic Peroxides),
7 (Radioactives) and foodstuffs.

Additional Information

Transport of LNG is controlled in accordance with the requirements of the Australian Dangerous Goods Code.

See Section 15 for further information on transport legislation.

Hazchem Code 2YE

15. REGULATORY INFORMATION

Safety, health and environmental regulations

Storage and Transport is subject to state based legislation. The applicable legislation in Western Australia is the Dangerous Goods Safety Act 2004 and relevant regulations under the Act.

Not classified using the criteria in the Standard Uniform Scheduling of Drugs and Poisons in the Poisons Standard 2012.

Individual components are listed as High Volume Industrial Chemicals in the Australian Inventory of Chemical Substances under the Industrial Chemicals (Notification and Assessment) Act 1989 (Commonwealth), but not the mixture. Methane and Ethane are listed as Hazardous Substances.

SAFETY DATA SHEET
LNG

16. OTHER INFORMATION

1. To the best of our knowledge this document complies with the Code of Practice for the Preparation of Safety Data Sheets for Hazardous Chemicals, Safe Work Australia, 2011
2. This Safety Data Sheet summarises our best knowledge of the health and safety hazard information of the product and how to safely handle and use the product in the workplace. Each user should read this Safety Data Sheet and consider the information in the context of how the product will be handled and used in the workplace, including in conjunction with other products.
3. If clarification or further information is needed to ensure that an appropriate risk assessment can be made, the user should contact the Wesfarmers Chemicals, Energy and Fertilisers (WesCEF) Health, Safety and Environment Department by calling the switchboard on (08) 9312 9222 during normal business hours. In the event of an emergency please contact 1800 093 336.
4. Kleenheat reserves the right to make change to safety data sheets without notice.

References

Preparation of Safety Data Sheets for Hazardous Chemicals – Code of Practice, Safe Work Australia (2011).

Globally Harmonized System of Classification and Labelling of Chemicals (GHS), 3rd revised edition, United Nations, 2009, http://www.unece.org/trans/danger/publi/ghs/ghs_rev03/03files_e.html

NOHSC – Approved Criteria for Classifying Hazardous Substances [NOHSC:1008 (2004)] 3rd Edition.

Hazardous Substances Information System (HSIS), http://hsis.safeworkaustralia.gov.au/

Hazardous Substances Data Bank (HSDB), http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB

Australian Dangerous Goods Transport code – 7th Edition

END OF SDS

Document Revision Table		
Version	**Details**	**Publication Date**
6.0	Minor changes to first aid section and composition. Removed information related to interstate supply	Mar 2017
5.0	Logo update, Supplier name updated.	Jan 2016
4.0	Page footer modified.	Jun 2014
3.0	Hazchem code changed from 2WE to 2YE.	Jun 2014
2.0	Major review. Renamed, reformatted and updated to 2011 Code of Practice and GHS.	Sep 2013
1.0	Initial release of document	Apr 2012

14.2. Generic Emergency Response Plan

	KARPOWERSHIP EMERGENCY RESPONSE PLAN		
		Sayfa No / Page No	**1 / 48**
		Doküman No / Doc. No	**KH-KPS-PL-038**
		Yayın Tarihi / Issue Date	**7.6.2018**
		Revizyon No / Rev. No	**2**
		Rev. Tarihi / Rev. Date	**01.06.2020**

1. PURPOSE

The purpose of this plan is to define the competencies and responsibilities to ensure the planning of teams and actions that would provide the most immediate effective emergency response and reducing the loss of life and property before, during and after emergencies that may occur at Karadeniz Powership Osman Khan plant.

2. SCOPE

This plan includes/ covers facilities, goods and supplies belonging to Karadeniz Powership Osman Khan and temporary and / or permanent staff, subcontractors, visitors, interns, customers, establishments working in their fields.

3. RESPONSIBILITIES

Country Manager / Coordinator: Approves the emergency plan. Provides the resources. Executes the emergency coordinator task.

Plant Manager: Responsible for coordinating all the requirements for Emergency Response. In the absence of the plant manager, the plant manager assistant takes over the task. Emergency coordinator assistant executes the task out.

Deck Office Management: Delivery of the plan, including new staff - informing the staff about the emergency situations and the ways of response,

Responsible for the identification, updating, control, maintenance and procurement of emergency documents and equipment.

Plant OHS Department: OHS Department and Deck Office are responsible together for monitoring the fulfilment of the requirements of the Emergency Plan and informing the facility management of any inconsistencies / incidents, and for initiating corrective actions and monitoring their results.

Headquarter OHSE Department: The HQ OHSE Department is responsible for the control and coordination the implementations of this plan by Karadeniz Powership Osman Khan Plant. Audits the Emergency Response Plan prepared by the plant is functional and updated.

Plant Employees:

All plant employees are responsible;

- To follow the precautions taken within the particulars specified in the contingency plan,
- To notify immediately the nearest responsible supervisor or employee's representative when they encounter an emergency situation that would harm the health and safety of themselves and other persons in the machinery, equipment, vehicles, equipment, facilities and buildings,
- To comply with the instructions of the emergency team from the plant management and from out site team in order to rectify the emergency.
- To act in a way that does not put in a risk the lives of himself and his friends during emergencies,
- To act in such a way as not to block access to the emergency area and equipment during the period of the plant works,
- If there is a role of him/ her in the emergency response organization, he/she is responsible to perform the task in according with the theoretical and practical trainings taken.

4. RELATED PROCESSES

BB-040 KPS Business Management

İSG-010 Occupational Safety

İSG-020 Occupational Health

İSG-030 Environment Management

5. TERMS

Emergency: The event which is unplanned and may require emergency response or evacuation that causes injury or death of people include employees, client, visitors, such as fire, oil/fuel pollution, rescue from confined space, work accident, adverse weather conditions, civil war, terror attack, epidemic-pandemic diseases .

Emergency coordinator / assistant: Responsible for managing the emergency response teams and provides all coordination in case of emergency and/ or after.

Emergency Teams: Assigned by Emergency Coordinator and responsible for managing in case of emergency. Responsibilities. Roles and responsibilities and teams are defined in Emergency Response Instruction.

Emergency Management: It is a management model for preparing the plant for actions to be taken, identifying risks for emergencies, intervene and mitigating the damages that may occur.

Emergency Plan: The plant that includes information about the task and operations to be carried out in case of an emergency, which may lead to response, as well as actions for response.

Risk Assessment: Determination of the hazards that may exist in the workplace or that may arise from outside, the analysis of the factors that cause to be risky, the risks arising from the hazards, and the determination of the control measures.

Accident: An event that causes injury or death in the workplace or during working, or brings the body to a state of being spiritually disabled or physically disabled.

Plant/ Facility: Karadeniz Powership Osman Khan.

Plant Work Places: Warehouse, social life area, office, cafeteria, accommodation, etc., workplace extensions established outside the facility to support facility operations.

Evacuation: The process of leaving from the areas in a series and cool manner after mechanical, automatic or human voice warning or without warning.

Evacuation Escape Route: The route/ road used for the evacuation process, which is free from the sources of hazards and marked with the warning signs.

Muster Point: The place where the personnel to be evacuated in a safe area identified before and away from the hazards.

OHSE: Occupational Health& Safety, Environment

Employee: Personnel located in Karadeniz Holding or sub-contractor payroll who is responsible for ensuring/ maintaining the plant operations.

Visitor: Person visiting for procurement, inspection, training, interview subject and who are not directly involved to plant operations.

6. EXECUTION PRINCIPALS

This emergency response plan to be prepared/reviewed and submitted to country management for each facility.

The emergency plan will be partly or completely reviewed and renewed if there is a situation which may affect the existing emergencies or cause new emergencies.

6.1. Preparing the Emergency Plan

It is the basic principle to see the possible emergencies in advance and manage to handle the emergencies with minimum damages while preparing the emergency response plan.

Emergency plans are created out to minimize and control damages that may occur during and after defined emergency situations.

The following points are taken into account in the preparation of the Emergency Plans;

- The measures to be taken in relation to the hazards within the scope of emergency shall be determined in the emergency plan,
- Determination of the most common type or size of an emergency or event by risk assessment studies,
- Determination of the most suitable response methods to be done in case of accidents and/ or emergencies,
- Determining the methods of providing internal and external communication (such as neighbours, local people, governmental organizations, private organizations) in possible emergency situations,
- Identification of the activity or activities to be carried out in order to reduce the impact for identified emergency situations and to response,
- Performing incident investigations after emergencies / accidents, initiating corrective actions and monitoring the results,
- Emergency practices, awareness of employees within framework of their actions, the implementation of exercises to measure the preparation processes and competences,
- Planning and implementation of emergency trainings,
- Identification of necessary communication information for internal and external communication,
- Identification of areas such as Evacuation Routes, Muster Points, Warning Signs, Exit Doors,
- Determining possibilities for emergencies or accidents that may occurred in the neighbourhood or around of plant,
- Establishing mutual protocols for taking support from neighbour organizations,

Emergency plans are prepared by Deck Office Management and Plant OHS Department by taking the opinions of units and personnel related the above mentioned topics and announced to all employees by e-mail, announcement, communication panels and training after passing Head Quarter OHSE Department, Country and Plant Management approval.

6.2. Emergency Response Teams and Trainings

Authorized personnel for '' Searching, rescuing (Maritime Support Team), Fire Fighting, Extinguishing (Fire Team), First Aid (First Aid Team), Electrical and Mechanical System Security (Technical Team) 'teams established within national and international legal requirements, and the staff who have received training related with their duties from institutions and organizations. When the training is given, "KH-KPS-FR-007-00 Training Form given by the authorized company person" will be used.

6.3. Communication in case of Emergencies

The Emergency Contact List which is provided by the Deck Office Management, to be updated when necessary and posted to appropriate locations which shows all phone numbers and related personnel in case of an emergency.

Within the boundaries of the plant and in case of emergencies in neighbors, emergency calls shall be made by the radio, alarm ring, telephone or voice, depending on where the person location who saw emergency.

Detailed information such as the exact place of the incident, what has burned at the time of the fire, the size of the event, the number of person effected, and their status are reported.

In case of emergency, a long continuous siren is played in everywhere of the plant. It is informed about the type and content of the emergency by the general announcement circuit and the radios.

Teams and response/ intervention methods in according with the content of the emergency are explained in the Role Chart and Emergency Instructions.

The information required for external communication is defined in the Emergency Contact List. This information may include local support where emergency assistance is available; all local public and private organizations (epidemic prevention centers, World Health Organization local authorities, etc.) foreseen to receive support, police units, fire departments, hospitals, ambulance services, emergency contact information of the establishment to which the facility is connected, contact center, private establishment fire station, etc.) are added to the list. The relavent central units of the Karadeniz Holding (HQ OHSE Departmant, KH operation, fuel fleet, etc.) should be included in this list.

6.4. Drills

In order to ensure that the emergency plan can be followed and implemented on a regular basis, implementation exercises are carried out on possible emergency situations identified in the plan. These implementations are coordinated by the Plant management. Exercise topics and times are detailed in "KH-KPS-PL" Training Plans. The exercises to be carried out during the year include, but are not limited to, the following subjects;

- Emergency - abandon the Plant / evacuation
- Emergency - medical response
- Fire Fighting
- Man over board
- Combating with chemical spill

- Confined/ enclosed space rescue
- Work at height rescue
- Natural disasters
- Flooding in Plant
- Sabotage / terrorism
- Heavy Weather Conditions / Tsunami

The drills are evaluated and registered to the **"KH-KPS-FR-023"** Role Drill Registration Form and shared with the Headquarters HRD department by the way of QDMS.

Following the exercise; if there are deficiencies in the behaviour of the persons, the trainings are given again, if there are deficiencies in the environment, necessary corrections are made and if there is a deficiency in the procedure, plan and / or instructions, the methods of the Emergency Coordinator (Country Coordinator / Country Manager / Facility Manager) are revised in accordance with the recommendations, the related documents are updated when necessary, corrective and preventive actions are implemented in according with the "KH-KPS-PR-003'' Corrective Actions Procedures.

Drill intervals are determined to meet minimum requirements of international standards (SOLAS, ISPS Code, IMO, MARPOL etc.) Thus, fire and evacuation drills are performed at least once in every month. (SOLAS, Chapter III, Part B, Regulation 19)

Security drill is performed once in every 3 months and/or 25% of total crew replacement. (ISPS Code, Section 13)

Confined space entry and rescue drill is performed once in 2 months. (SOLAS, Chapter III, Part B, Regulation 19)

6.5. Post-Incident Investigation Reporting

Incident Investigation and Reporting to be prepared after the emergency event is conducted analysed and reported according to the KH-HSE-PR-025 Incident Investigation and Reporting Procedure.

6.6. Identification of Incidents within scope of Emergency Situation

6.6.1. Emergency Preparations

- Preparing the emergency plan, testing it and updating it as needed at specific time periods
- To be successful in case of emergencies, the organization is well structured and responsible are determined
- Supplying necessary tools and equipment for providing the fire safety for fires that may be caused by flammable and combustible materials used in the Plant,
- Establishing an alarm system that can be heard from all side of the plant so that personnel can receive immediate information in case of an emergency
- Training and certification of employees by authorized person/ personnel for the implementation of emergency plans,

- Providing first aid cabinets and kits in Plant and the use at appropriate located places.
- Determination of escape routes and Muster Points and making markings. Markings are selected and placed in accordance with the IMO regulation and "regulation of health and safety signs".
- Ensuring all the emergency equipments and fire extinguishers, escape routes, stairway entrances and exits are clear at all times and provide clear route to escape and response.

6.6.2. Emergency Response Resources and Equipments

- Announcement of the names, titles and telephone numbers of the personnel related in the emergency plan, placing to appropriate locations, the announcement of the contact details of the security forces, the fire department, hospital, Emergency Service and nearby health facilities etc.
- Determination of the number and location of emergency equipment (portable and stationary fire extinguishing systems, fire fighting equipment, escape air cylinders, life rafts, etc.) in accordance with the SOLAS and NFPA criteria,
- Risk assessments are made on dangerous subjects, all kinds of work tools, materials and ground, initiating preventive measures for them and taking precautions.
- Taking all kinds of precautions for fire fighting, making periodic inspections of fire fighting equipments and maintenance of them without interruption,
- Ensuring that periodic inspections of electrical and grounding installations are carried out on time
- Regular maintenance of fire pumps, generator, sailboat, machinery and equipment,
- Emergency lighting controls are done and they are in sufficient condition for operation,

6.6.3. Determined Emergency Situations

Emergency situations that may occur in the Plant or around Plant determined within the scope of the Plant activities, in the work places (warehouse, workshop, social area, etc.) in Plant are not limited with the following points but their results are listed;

- Fire and Explosion
- Oil / Fuel and Chemical Pollution (more than 500 lt)
- Man Overboard
- Confined/ enclosed Space Rescue
- Death or heavy injured incidents
- Terror Attack
- Internal and External War Situations

- Strong Wind-Storm (8 in the Bofor Scale and above)
- Earthquake
- Leakage of Gas and Poisining
- Collision
- Epidemic-pandemic diseases

6.7. Inspection and Review

Emergency drill results, emergency situations and measures taken are annually examined out with the Internal Audits, "**KH-CD-PR-002 Internal Audit Procedure**" in according with the ISO 14001 Environmental Management System and OHSAS 18001 Occupational Health and Safety Management System Standards, corrective actions are carried out within the scope of **"KH-KPS-PR-003 Corrective Action Procedure"** if deficiency / impropriety is detected.

Emergency drill results, emergencies and precautions are also periodically reviewed and evaluated under the **"KH-KPS-PR-001 Communication Procedure"** as follows below.

- In the Plants, the Plant is evaluated and corrective actions are taken at the OHSE and Security Committee meetings held with the participation of the OSH Department, Plant Manager, Assistant Plant Manager, Shift Supervisors, Maintenance Supervisors, Deck Officers, Health Officer / Doctor and Employee Representative. These meetings are recorded with **"KH-KPS-FR-013 OHSAS, Safety, Security and Environment Committee Meeting Report".**
- It is evaluated and corrective actions are determined and followed up annually at the Executive Committee meetings held with the participation of the Country Top Management, Plant Manager / Assistant Plant Manager, Integrated Management Representatives and relevant departmental representatives.

6.8. Risk Evaluation Review

Risk analysis of each plant is reviewed after any emergency incident identified within this procedure and the framework of the relevant standard, rule, local/international regulations has taken place. Risk analyzes are revised according to "**KH-KPS-PR-004 Risk Analysis Procedure**" according to need for revison.

7. PROCEDURAL STEPS

Temporary and / or permanent staff, subcontractors, visitors, trainees and customers working in the Karadeniz Powership Osman Khan and areas defined in the scope are obligated to comply with this plan. Necessary actions will be taken for employees who do not comply with this plan.

7.1. General Emergency Action

In case of an emergency, the general actions to be taken by the employee on the Plant or at the Plant units are shown in the flow chart below.

When an emergency situation is detected;

- The employee who detect the emergency activates the alarm by pressing the nearest alarm button,
- Inform his/her supervisor or the responsible he/she can reach about the emergency

When the emergency alarm is heard;

- Employees secure the work area and the equipment they use and leave the work place in such a way as not to create an additional hazard,
- The visitors will follow the employee who is responible for them or introduce themselfves to the nearest person and follow the person.
- Move to the nearest or primarily selected Muster Point with calm but fast steps,
- Employees and the visitors assemble to the dedicated muster point and informs the responsible supervisor
- Employee who is not an emergency response team member waits for the responsible supervisors instructions.
- The personnel who are members of an emergency team waits for the instructions of the team supervisors.

7.2. Duty of the team and task to be performed

Duty of the team and task to be performed is explained in the Role Chart and Role Cards, and information given to all employees about the Emergency Response plan with training/drills.

7.2.1. Emergency Coordinator / Assistant

- Determine the adequacy of existing controls and check their functionality.
- Ensure that staff are trained for emergency situations and make sure training is reinforced by drills.

- Coordination and cooperation with the official authorities.
- Ensuring that emergency material requirements are identified.
- To approve the prepared plans and measures, to ensure that they are updated annually.
- Coordinate all teams in case of emergencies.
- To provide contact with external agencies such as police / law enforcement, hospitals, fire brigades when necessary.
- Providing abandonment of the Plant when necessary, and ensuring that the CO_2 system is activated.

Note: In the times when the emergency coordinator is not available, the emergency coordinator assistant performs the task requirements.

7.2.2. Muster Point Supervisor

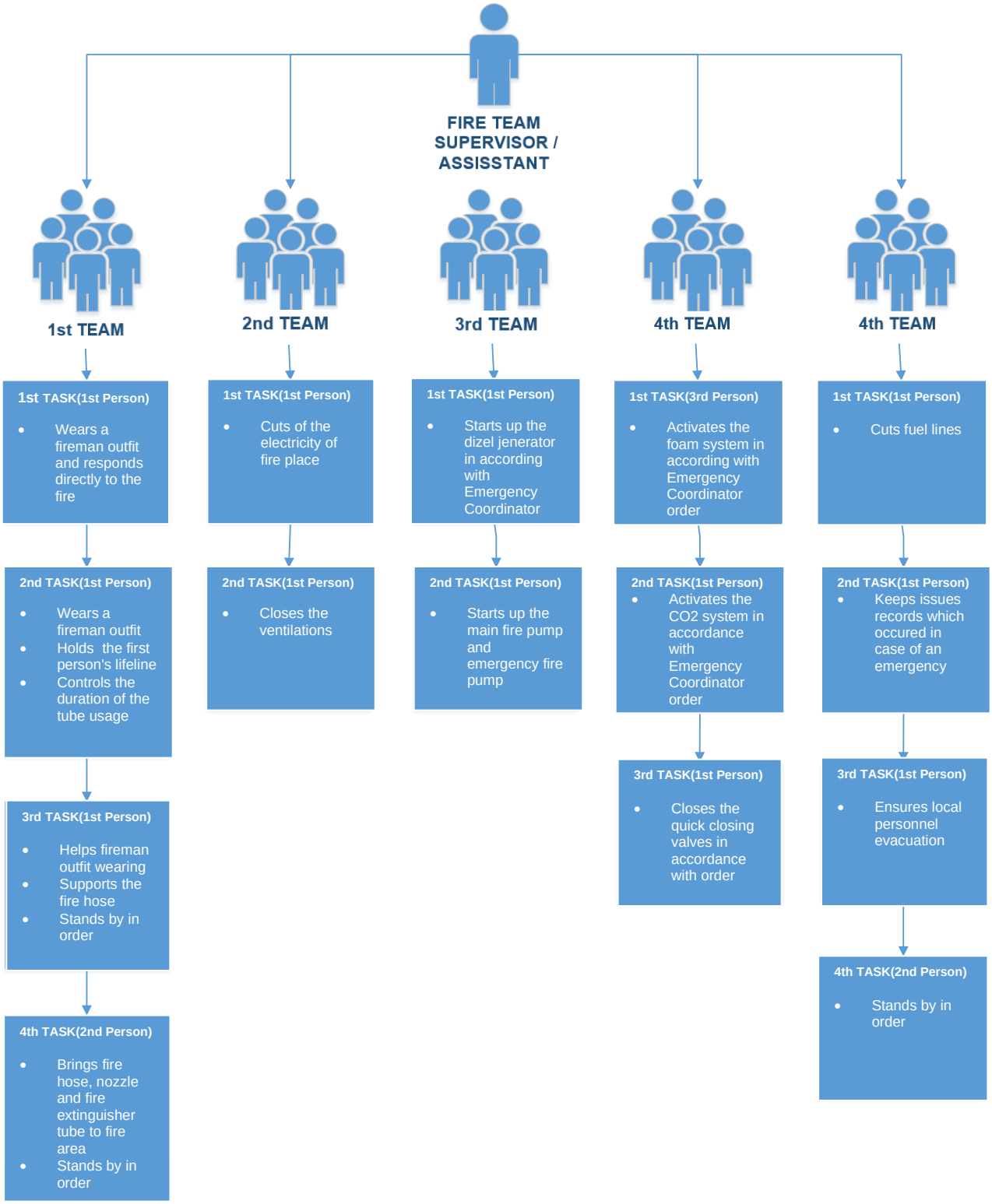
- Works under emergency coordinator and reports to him,
- Provide hierarchy and discipline the muster point.
- Ensure that all employee and visitors are in the muster point,
- Counts in according to current staff and visitor list,
- Ensuring the number and control of emergency response teams,
- Communicate the emergency coordinator which is requested from outside
- Gives the right information to the security gate for access of outside teams.

7.2.3. Fire Fighting Team

Team Supervisor: Assisstant Plant Manager or Shift Supervisor undertakes this role. Stays in contact, directs his team in according to the instructions given from the emergency coordinator, coordinates in the incident place, takes the counting of employees.

Team Assistant Supervisor: Keeps in contact with the supervisor, manage the team according to instructions, coordinates the incident scene/ place, controls the using of fire fighting clothes and performs team supervisor task when he is not available.

Task chart of fire teams;



Other Teams;

The team which is ready responds the fire, the second team responds such as cooling to prevent the growth of fire, the third team waits to be ready as a replacement for the other teams. At the same time, the First Aid, Sea Support and Technical Team personnel are ready at the muster point to fulfil the tasks specified in the plan in case of a possible needs.

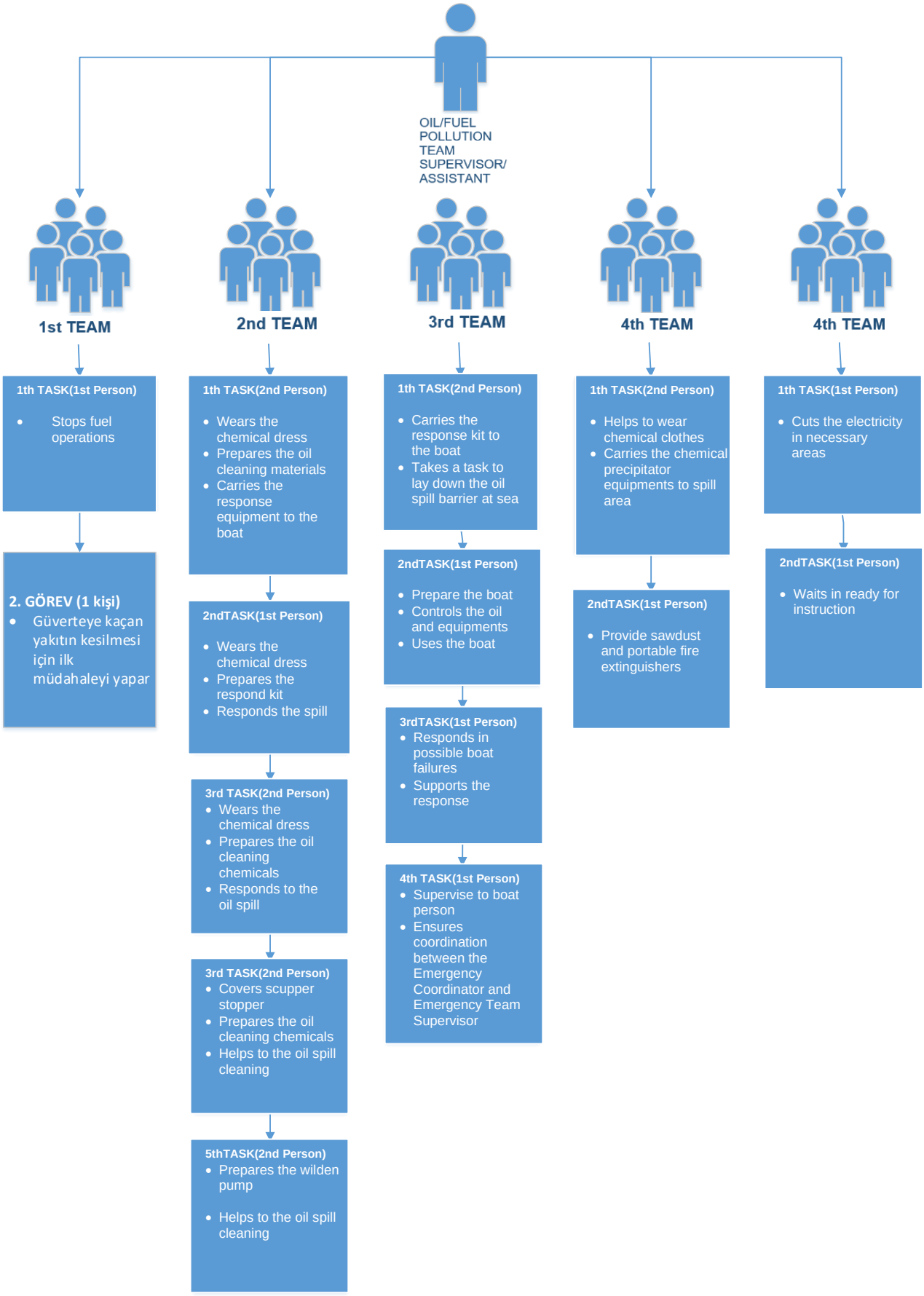
7.2.3.1. Fires that can Happen in the Environment or in Neighbors organizations

- The person who sees the fire in case of explosions or fire that may occur from neighbour establishment shall inform to the facility management and deck office by phone, radio, etc. methods.
- The Emergency Coordinator ensures that relevant teams and officials gathered in muster point.
- If necessary energy, fuel and gas flows to be cut in case of plants influence.
- In accordance with the Emergency Coordinator directives, the deck office communicates with the nearest health facility, fire department and other necessary institution and organizations.
- If there is a fire in the vicinity of the plant, the Fire Team responds to the fire by shielding with water.
- Contacting with the neighbour institutions and provide co-ordination to help each other.
- If/when emergency teams of neighboring organizations reached to fire area, firefighting continue until fire area and environment safety is provided.

7.2.4. Oil/Fuel Pollution/Spill Response Team

Team Supervisor: Deck office management undertakes this duty. He keeps in constant contact with the emergency coordinator, directs his team according to the instructions emergency coordinator, coordinates the incident place, takes the counting of employee.

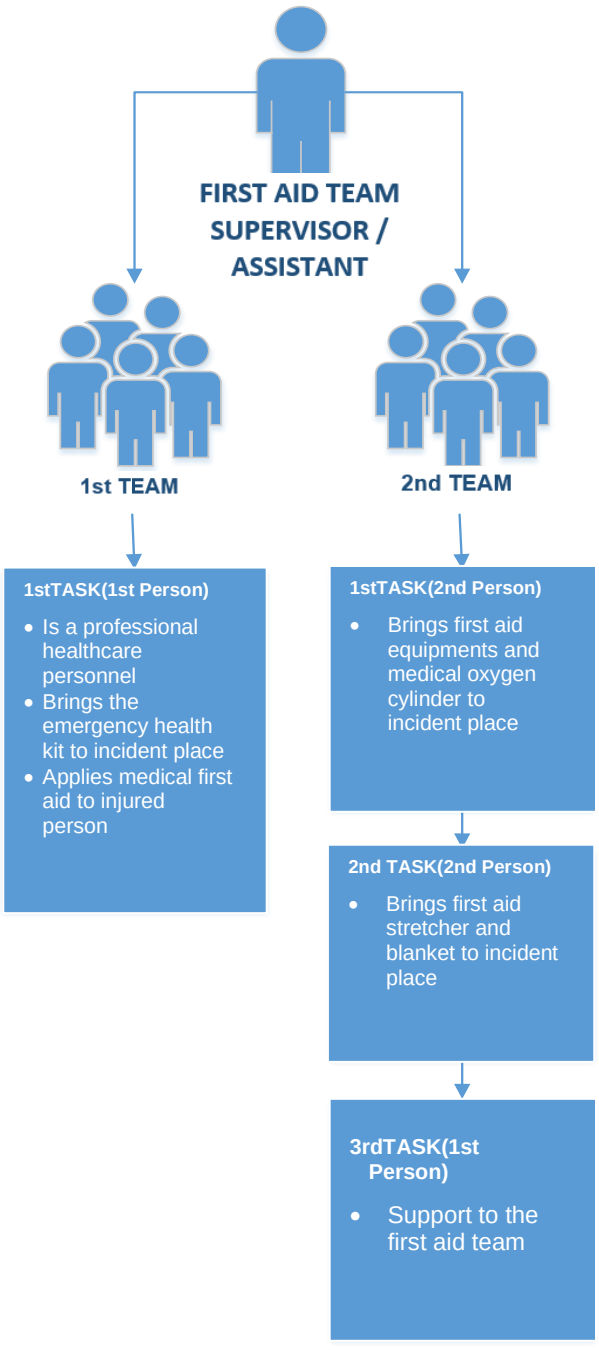
Team Assistant Supervisor: Keeps in constant contact with the supervisor, directs the team within the instructions given, supervises the housekeeping process at the area and perform his duties when the team manager is not available.


OIL/FUEL POLLUTION TEAM SUPERVISOR/ ASSISTANT
1st TEAM
2nd TEAM
3rd TEAM
4th TEAM
4th TEAM
1th TASK(1st Person)
Stops fuel operations
2. GÖREV (1 kişi)
Güverteye kaçan yakıtın kesilmesi için ilk müdahaleyi yapar
1th TASK(2nd Person)
Wears the chemical dress
Prepares the oil cleaning materials
Carries the response equipment to the boat
2ndTASK(1st Person)
Wears the chemical dress
Prepares the respond kit
Responds the spill
3rd TASK(2nd Person)
Wears the chemical dress
Prepares the oil cleaning chemicals
Responds to the oil spill
3rd TASK(2nd Person)
Covers scupper stopper
Prepares the oil cleaning chemicals
Helps to the oil spill cleaning
5thTASK(2nd Person)
Prepares the wilden pump
Helps to the oil spill cleaning
1th TASK(2nd Person)
Carries the response kit to the boat
Takes a task to lay down the oil spill barrier at sea
2ndTASK(1st Person)
Prepare the boat
Controls the oil and equipments
Uses the boat
3rdTASK(1st Person)
Responds in possible boat failures
Supports the response
4th TASK(1st Person)
Supervise to boat person
Ensures coordination between the Emergency Coordinator and Emergency Team Supervisor
1th TASK(2nd Person)
Helps to wear chemical clothes
Carries the chemical precipitator equipments to spill area
2ndTASK(1st Person)
Provide sawdust and portable fire extinguishers
1th TASK(1st Person)
Cuts the electricity in necessary areas
2ndTASK(1st Person)
Waits in ready for instruction

7.2.5. First Aid Team

Team Supervisor: Facility Health Officer carries out this duty. The Deck Officer performs this duty in the absence of a certified health officer. He keeps in constant contact with the Emergency Coordinator, directs his team in accordance with instructions, coordinates the incident place,

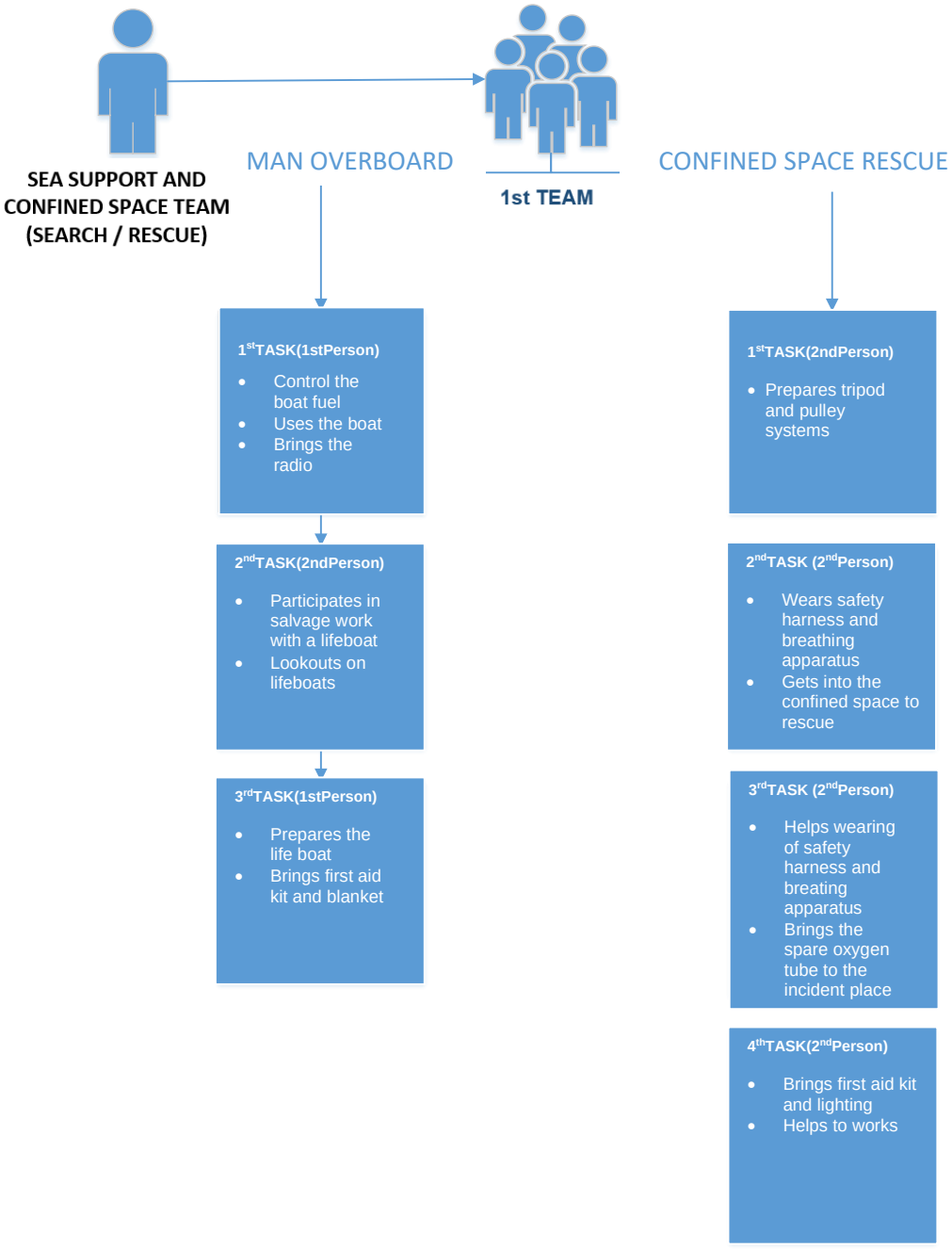
Team Assistant Supervisor: Team Supervisor Assistant: Keeps in constant contact with the team supervisor, directs the team in accordance with instructions, provides coordination at the incident place, provides first aid equipment such as first aid kit, stretcher, blanket, oxygen therapy device to the place of the incident,



7.2.6. Sea Support and Confined Space Team (Search / Rescue)

Team Supervisor: Deck office management carries out this task. It keeps constant communication with the Emergency Coordinator, directs the team within the instructions given, coordinates the incident site, makes gas testing with multi-gas measuring device in front of confined/enclosed space, count the employee, prepares and uses rescue boat when necessary.

Team Assistant Supervisor: Keeps in constant contact with the team supervisor, directs the team within the instructions given, coordinates the incident place, provides tripod, respirator, gas detector, life raft, portable lighting, lifeboat, life buoy, fulfills his duties at times when the team supervisor is not available.



7.3. Death and Severely Injured Conditions

7.3.1. Precautions to be Taken for prevention of occurring the incident

- Risk analysis should be carried out for all kinds of machines, materials and applications that may cause hazard within the physical structure and contents of the plant and preventive actions should be started up and precautions should be taken.
- Maintenance and inspection of all machines and equipments used in the Plant should be done regularly.
- Personal protectors to be used in for all activities must be provided to the employees
- In order to avoid work accidents, the personnel should not use the parts of the equipment and tools which are not belong to themselves and should not do any work except their responsibility
- Employment of qualified personnel should be provided for all jobs, especially electrical and mechanical works.
- All personnel who attendant in the plant should be informed about the plant physical structure and production processes.
- Trainings should be carried out on Occupational Health and Safety issues such as work accidents, situations that can cause work accidents and prevention of work accidents.

7.3.2. Actions to Minimize the Incident with Minimal Damage

- If the person who sees the incident is a first aider, he may apply first aid, if not he may call first aider to apply first aid to the injured person.
- Informs the plant management, deck office and plant OHS Department after first intervention,
- Take everyone out from the area except the authorized person.
- Take protective and warning precautions around the incident area.
- Factors which may cause fire, explosion or other additional hazards in the incident area to be observed and removed. If not injured person will be taken from the area in a controlled manner.
- Injured person is taken to the muster point by First Aid and Sea Support team members if it is necessary to be transported him/her out of the plant after first aid
- According to the health status of the injured person, external health institutions to be contacted within the information of the Emergency Coordinator.
- If the injured person is dispatched to the hospital, the health status of the injured person is followed by assigned staff within the information of the Emergency Coordinator / Assistant.

7.4. Terror and Sabotage / Internal and External War Situation

7.4.1. Measures to be Taken and Actions to be Done

Attacks and possible sabotages targeted by person outside of the plant or personnel targeted at the plant or threats to be created by persons inside or outside the plant are treated as an emergency. Dangers in these situations; attacking dangerous areas, direct attack on human beings, attacking the goods, and resulting in major injury, death or material damage.

Precautions taken against such situations in the plant are listed below.

- The plant inside the area is surrounded by wire fences and walls.
- Entrance and exit points to the plant boundaries are determined and controlled by security forces.
- Security cameras showing dangerous situations and other dangerous areas that may come from the sea are observed by security teams 24/7.
- The actions that can occur inside are seen / followed up with closed circuit camera system.
- Records of visitors from outside are kept by the Security Officers, the controls are carried out at the entry points and accompanied by the security personnel to the person or department to be interviewed.
- In case of any suspicious situation or suspicious person, the security officers inform the plant management and deck office and will act in accordance with instructions to be received.
- All employee's criminal records are questioned before becoming employment.
- In case of civil/foreign wars, the Country Coordinator / Country Manager will act in accordance with the instructions sent by the company.
- All details regarding the topic should be considered within the Powership Security Plan.

7.5. Strong Wind-Storm

7.5.1. Precautions to be Taken

- Local weather forecast reports followed by the deck office regularly during the day.
- The plant has been connected to the main chain zone with a chain and ropes at a safe level, taking into consideration the adverse weather conditions that may have been experienced.
- Connection ropes and chains are checked regularly. Tthe ropes and chains that are deformed due to timeout shall replaced with the new ones.
- Periodic checks and maintenance of ship anchors and moving maneuvering equipment are carried out regularly and recorded with **"KH-KPS-FR-061 Connection Equipment Check List" and "KH-KPS-FR-174 Connection Capstan Control List"**.
- Fender, ropes and yokohama fender to be back up in case of sudden problems.

7.5.2. Operations to be Done

- Inform the emergency coordinator and his/her assistant about the situation
- Materials that can be moved all over the decks, under the decks, in the boilers, especially in the engine room, in the galley and in the stores, shall be secured properly
- All the portholes and blind covers at accommodation places of plant / ship are closed,
- All openings which are going to the deck are closed,
- Production is set or stopped as required,
- The employee is warned about avoiding ropes and surrounding areas, decks and bollard areas that become dangerous due to the weather,
- Safety ropes / hand ropes are installed where required,

- Balance Water Tank covers and tank manholes are checked for leakage,
- Weather reports are followed at 4 hour intervals and reported to the Emergency Coordinator,
- Rails, chains, windlasses, bollards, emergency connection control is made, these areas shall be observed by the deck personnel,
- The port authorities shall be informed about the situation,
- Ropes are installed where necessary for emergency,
- All the sea fenders are checked that they are secured or no,
- Illumination of lighting areas and areas where bollards are located is provided / checked at lighting level.
- The connection points and steel wires of chimneys are checked out in every four (4) hours.
- Weather shall be observed until it is clear.
- Heavy Air and Severe Wind conditions are recorded in the **"KH-KPS-FR-177 Heavy Air or Severe Wind Emergency Check List"** by performing the necessary checks described above.

7.5.3. Tsunami

Please refer to **"Tsunami Evacuation Plan KH-KPS-PR-008-00"** steps to check the course of action in case of a tsunami.

7.5.4. Emergency Disconnection mooring, power cables and fuel supply connections

With the "Stop" order of Plant Manager (PM)/Plant Manager Assistant (PMA), the plant stops the generation and takes main switches open position. Electrical Shift Boss and operator gives information to onshore grid line responsible contractors and order to cut RST line energy. Electrical Shift Boss starts earthing process for the RST line after the contractor takes switches open position. Control RST Line after earthing process by an operator and feed back to PM/PMA. Team 1 starts cutting line cables (using the handsaw for metal cable) by the order of PM/PMA.

Team 2 starts cutting earthing plates cables and hanging wires (using saw or electrical cutting tools) around the Plant by the order of PM/PMA, after earthing process.

Team 3 starts cutting chains on the deck (with O2 and Acetylene (oxy-acetylene) cutting torch) and cuts chains on strong points (hanging oxy-acetylene torch from the deck side). At the same time team 3 pulls ship stb/port anchores by anchor mooring winches.

Team 3 prepares Bridge for departing.

Team 4 organizes black out procedure of ship side.

Team 4 prepares propulsion and aux systems.

If applicable, Fire fighting Team 4 disconnects the external fuel connetion of the ship.

7.6. Pandemic (Epidemic Disease)

Pandemic: Pandemics or pandemic diseases, are the common name given to epidemics that spread and take effect over a wide area, such as a continent or even the entire surface of the world. The diagnosis of Epidemic Disease can be made by the health authority of the country concerned if it is regional, and by the World Health Organization (WHO) if it is global. The cases of this potential are followed by the H&S unit.

5 risk steps are determined in the Pandemic Response Plan. In the event of a pandemic, these risk steps may occur in this order, or for various reasons, the presence of the pandemic may also occur with future risk steps. The risk steps in the Pandemic Response Plan are complementary to each other. That is, no matter what risk step, the measures described in the previous risk steps are also applied on the basis of all workplaces or locations and the continuity of the practices is ensured.

7.6.1. Risk Matrix

Risk Level	Description
1.Risk Step	The emergence of a pandemic potential case in any region of the Earth
2.Risk Step	Declaration of an outbreak by the WHO and the emergence of the outbreak in the country of operation
3.Risk Step	Outbreak of the disease at the location/city of operations being carried out
4.Risk Step	The emergence of epidemic pathogen in any workplace employee
5.Risk Step	The emergence of epidemic pathogen in large numbers of workplace employees

7.6.1.1. First Risk Step

The first risk step is the emergence of a pandemic potential case in any region of the earth.

- An emergency team is established including participants of HR, H&S, Administrative Affairs (AA), IT and other necessary department managers and also top management of the company, and they coordinate the actions to be taken for the possible outbreak and make general briefing announcements by taking decisions,
- When the presence of the pathogen is revealed, all company employees are informed about the pathogen by e-mail,
- The pathogen's spread routes, symptoms it causes, known general characteristics and prevention measures constitute the contents of this e-mail,
- In accordance with the decision of the management, regional or total restrictions are imposed on abroad travel related to the company, considering the spread of the pathogen,

- Employees travelling abroad or returning from travel are subjected to the control and monitoring of the headquarters health unit. Additional measures to be taken for these persons (quarantine, administrative leave, etc.) are coordinated by the established emergency team and the headquarters health unit,
- Information section about pathogen is established in Karportal and kept up-to-date according to the latest developments and is presented to the employees,
- In addition to the information about pathogen, protection ways and personal hygiene related toolboxes and visual posters are prepared and delivered to employees with the help of health officers/administrative personnel. The prepared information sheets are sent to all domestic establishments by AA. The information areas are determined by AA and H&S depending on the nature of the workplace, the status of the social areas and the cause of the pandemic. This way, it is ensured that employees to gain awareness,
- The pathogen's spread path is evaluated and the necessary material/equipment inventory control is carried out for the location or all workplaces and the necessary work is done to complete the deficiencies, if any.

7.6.1.2. Second Risk Step

The disease caused by the pathogen being declared as an epidemic (pandemic) by the WHO and the epidemic disease to arise in the country of operation is called the second risk step.

- With the emergence of the pathogen, the spread path is evaluated and all travels to or from that specific location (including intercity) is stopped as soon as possible, considering the continuity of the operation. If the spread is too fast, it may be considered to review the travel globally and to stop the travel by making changes (leave, return from leave) of the employees as soon as possible.
- All internal and external meetings, trainings, etc. where people meet face to face are reduced to the minimum by determining the measure of social distance or cancelled totally. Instead, digital communication ways are preferred using technological means. Also in social areas where people gather (dining hall, service vehicles, rest rooms, smoking areas, etc.) measures are taken to protect social distance. (Reducing the number of seats, increasing the gaps between seats, reducing the number of people, etc.)
- Planning for procurement and improvement actions is carried out by IT unit taking the variety of technological facilities and material/equipment stock situation ant other risk ratings into account,
- All employees are prohibited to be in crowded places (sports competitions, gyms, shopping centers, concerts, fairgrounds, etc.) except for the supply of basic needs. Employees are informed about this issue through announcements,
- All employees keep being informed about the pathogen by health officers in the workplace,
- In addition to the routine cleanings, additional disinfection deemed appropriate are performed in coordination with the H&S unit. Normal cleaning service is made more frequent, additional disinfection service can be applied according to the decisions taken,

- Flight and ticket organizations for critical trips are made subject to the approval of C level managers. Furthermore, travel principals inform the Pandemic Coordination Team about the travels. The Corporate Travel Team delivers travel kits provided by the health unit to travellers for this purpose,
- An evaluation for a new work order (home office, arrangement of shift hours, reduction of working hours, working in shifts, etc.) is made for all employees working in the workplace considering the social distance and personnel planning is made on the basis of carrying out activities with minimum employees as possible,
- Depending on the condition of pathogen, additional measures can be taken to prevent employees from gathering (periodizing dinner hours and break times, and shifting to working in shifts etc.),
- The entrances to the workplace are taken under control and all personnel, guests and 3. persons to enter are controlled for the symptoms of epidemic disease and persons with symptoms or suspicion are not allowed into the workplace. All suspicious cases in the process are reported to the health unit,
- For all material to come from outside to the workplace such as food, cargo, equipment etc., necessary precautions are taken according to the contamination properties of the pathogen. The goal here is to minimize contact of employees and 3rd parties and to reduce the risks of transmission from outside,
- If there are specific age groups or other risk groups affected by the epidemic, special measures are taken for these people,
- Disinfecting materials and protective equipment suitable for pathogen properties are placed by AA (in coordination with the health unit) to the common areas (toilets, meeting rooms, turnstiles, reception desks, etc.). The consumption of the materials is followed and renewed when necessary.

7.6.1.3. Third Risk Step

The occurrence of the epidemic in the location/city of the operations is considered as the third risk step.

- In case of any workplace personnel to develop the disease, the research of the appropriate health care provider for the necessary treatment is carried out by the headquarters health unit on the basis of workplace locations and listed,
- In order to increase the perception and awareness of the personnel, information on the measures to be taken towards the pathogen is continued,
- Disinfection procedures for all workplaces are carried out without any waste of time. Period of application, material to be used, etc. issues are evaluated by the Pandemic Coordination Team, taking into account the pathogen's spread and transmission ways. If necessary, disinfection application can be made by specially trained personnel,
- Environments in workplaces are ventilated frequently,
- Entrances and exits of the workplace are closed or planned to be reduced to the minimum possible level,

- Minimum number of employees and competent persons are determined to provide basic services. Procedure is developed to determine and evaluate the situation of employees in an emergency,
- Entry of service providers and suppliers to workplaces is restricted, controlled entry is provided in mandatory cases,
- The supply of food (store) in the workplaces of the ongoing operations is tried to be carried out in a packed manner to minimize contact. Measures are taken to prevent contact at the food distribution. Food can be served with closed containers as far as possible. Forks, spoons and knives are distributed in packs or disposable plastic products can be used. Furnitures on tables can be removed (can be replaced with packed cruets). Breads are served in bags, and disposable carton cups can be used instead of glass cups. Depending on the condition of pathogen, the seating capacity in the dining hall can be reduced and the seating order can be redesigned. The above-mentioned measures are put into practice by evaluating the connection of the workplace with the external environment, pathogen transmission ways, spread rate and available facilities,
- The transmission ways of the epidemic disease are evaluated and all personnel are provided with appropriate personal protective equipment and additional materials (hand sanitizer, mask, etc.) and their use is controlled,
- Service vehicles carrying personnel are disinfected after each use. Necessary measures are taken for disinfection of company vehicles. Daily disinfection plans are made for the company vehicles that are in mutual use by different people every day. Protective equipment and disinfectant are provided to service vehicles according to the evaluations to be made. The period of disinfection application is determined by AA and H&S unit depending on the material used.
- By taking into account the transmission routes and precautions of pathogens that cause epidemics, materials to reduce the risk of contamination and personal protective equipment are placed at social areas and public areas (toilets, meeting rooms, etc.) and necessary renewals are made by following the expenses of materials,
- The use of digital and online documentation is supported to minimize contact with paper in workplace document tracking, control and handling. By making arrangements for meals, working hours and the collective meetings of employees are reduced to minimum,
- Employment plans are made in case of the possibility of increasing the number of employees who suffer pathogen-related disease in the workplace. Quarantine-control application is made for employment during the required time according to the transmission characteristics of the pathogen. The entrance of these people to the workplace is possible after quarantine.

7.6.1.4. Precautions to be Taken During Dinner Preparation and Presentation and Rules to be Followed

- All personnel working during the preparation of meals and entering the dining hall, wear all necessary PPE such as overshoes, gloves, bonnets and masks before entering the work area and renew and use them when necessary during the work period,

- Any additional food that may be exposed to the risk of transmission (cold cuts, salad, etc.) are started to be supplied in ready plates,
- Food distribution zones are closed and isolated from staff,
- Common used food and materials on the dining table (jugs, sauces, bottles, forks, knives, bread, etc.) are removed, and personnel are given these individually according to the need and packaged products are used,
- Meals with open menus are temporarily removed,
- Disposable pet bottles or carton cups are used for personnel's need for water,
- All dishes are washed in the dishwasher above 60 degrees Celsius.

7.6.1.5. Fourth Risk Step

Emergence of pathogen in any workplace employee constitutes our 4. risk step.

- The employee who has the disease is referred to the hospital under the control of the health officer and is quarantined in a suitable place to be organized in hospital or outside the workplace in accordance with the response of the hospital. The employee who is understood to be infected with the disease is not allowed back into the workplace whatsoever,
- The authorities who are required to be notified about the infected employee are investigated by the workplace management and, if any, notifications are made,
- The contacts of the infected employee are identified and listed together with the workplace health unit, Administrative Affairs and workplace management (filiation) and additional measures for these persons (quarantine, monitoring, follow-up, etc.) are taken,
- Detailed disinfection work is renewed in the workplace,
- The necessary controls are carried out remotely by telephone to the sick person by the health officer at the workplace. After evaluating the vital signs, if the patient stays outside of the hospital, it may be considered to be referred to the hospital again or to a country having better health service conditions by considering the rules of the country,
- If it is a topic for the patient to be transferred to Turkey or another nearby country, necessary organization is made by the H&S, HR, country management/workplace management and Corporate Travel team coordination through 3rd party companies (ISOS, P&I Club etc.). If one of the employees loses his life, the same organization is made with the same units and the paths to be followed are determined,
- The personnel working in the same workplace are subjected to the necessary health checks and the measures taken against the disease can be expanded under the supervision of the health personnel or partial or total quarantine can be carried out,
- Necessary organizations are made by the Corporate Travel team for the transfer operations when a need arises for a personnel working abroad to return back to his/her country in cases such as having cases related to the pandemic in their family and the severity of their course, natural disasters and death of a first degree family member. These organizations can be made to the extent that conditions make it possible to obtain flight permits by communicating with

embassies/consulates in the related countries, taking into account country conditions and restrictions,

- Employees inform the headquarters health unit about the issue if the pathogen is positive for themselves or in family members. The headquarters health unit follows and monitors the health status of these people and provides support for their requirements when needed.

7.6.1.6. Fifth Risk Step

The emergence of the pathogen causing the epidemic in a large number of workplace personnel is evaluated as the 5. risk step.

- The workplace is completely quarantined by cutting off contact with the outside world,
- Healthcare providers are contacted about this situation,
- Following the evaluation made with the local health organization, all personnel in the workplace are kept under control and monitored,
- Additional actions are kept taken after the instruction of the authorized local health organization of the workplace,
- In case of closure of workplaces due to quarantine practices, if the need arises for accommodation of healthy staff in the respective countries, the Corporate Travel team will coordinate with HR, H&S and country management to put the appropriate hotel, etc. accommodation facilities into use,
- In case of transfers of all personnel in any workplace to their countries, the procedure is carried out in coordination with the consulates/embassies and in accordance with the travel restrictions in the country by organizing with the competent authorities to obtain permits if necessary and under the leadership of the Corporate Travel unit.

** Continuous communication with the headquarters H&S unit is provided for each of the above risk steps and the exchange of information is provided continuously.*

Pandemic Coordination Team	
Title	**Role In The Team**
Pandemic Coordinator	✓ Selected by the committee in workplaces where there is a committee of health and safety, ✓ Selected by the employer/employer representative in the workplaces where the committee is not present, ✓ The pandemic coordinator is preferred to be a senior manager,

Tasks	✓ Leads the works of implementing the pandemic response plan, identifying and implementing additional measures to be taken at workplaces, revising the plan, ✓ Makes the assignments of the pandemic coordination team and determines their task, authority and responsibilities, ✓ Makes/have somebody make a supply plan for the materials that employees will need such as materials, equipment, personal protective equipment, ✓ Takes decisions on cancellations and postponements in the production of goods and services in the workplace during the pandemic, ✓ Determines internal and external communication channels and follow up/have somebody follow up the updated news of the World Health Organization and the competent local health authority. Coordinates the delivery of information to the pandemic team about the updates. ✓ Determines the risk group that must be protected first during the pandemic and takes/have somebody take action for this group, ✓ Plans/have somebody plan training activities in order to raise awareness of employees on issues such as personal hygiene, social distance etc. ✓ Provides/have somebody provide daily monitoring of employees' health conditions, ✓ Provides/have somebody provide coordination of health condition of employees caught in pandemic and referral routes to health organizations, ✓ Organize to inform the staff about the implementation of the pandemic response plan in the workplace and to publish the instructions in social areas, ✓ Monitors the spread of the pandemic on a national and international scale, ensures/have somebody ensure the determination and implementation of additional measures to be taken in the light of the current information released by the World Health Organization and the competent local health authority, ✓ Follows up/have somebody follow up the use of the determined materials, equipment and personal protective equipment in the workplace, ✓ Coordinates the monitoring of the psychosocial status of employees and, if necessary, the provision of psychosocial support,
Team Members	✓ ***Workplace physician / Other medical personnel / First-Aid team / Health Officer*** ✓ ***Safety Specialist / Safety Asst. Manager / Deck Officer***
Tasks	✓ Conducts work in accordance with the directives of the pandemic coordinator and the recommendations of the WHO or the national health authority, ✓ Provides support to the pandemic coordination team headed by the pandemic coordinator and records the data in the works of detection, implementation and follow-up of measures to be taken in the workplace according to the pandemic action plan, ✓ Determines the risk rates according to the risk groups of workplaces and employees and makes recommendations to the pandemic coordinator and coordination team for additional measures to be taken, ✓ Prepares lists of employees within the risk group during the pandemic, checks their currentness and informs the pandemic coordinator, ✓ Provides support to the pandemic coordinator in preparing information materials about the pandemic, presenting them to workplaces and managing

	awareness-raising training, meetings and sharing, ✓ Follows the currentness of the pandemic response plan and makes recommendation and suggestions, ✓ Establishes communication channels in the workplace, monitors the international and national rates of pandemic spread and follows current information released by the World Health Organization and the competent local health authority and informs the pandemic coordinator, ✓ Evaluates and anticipate the risks of the pandemic in the workplace and provides feedback to the pandemic coordinator on additional measures for employees with symptoms of disease, ✓ Provides support to the pandemic coordinator during the decision making, implementation and development stages of personnel protection strategies against disease, ✓ Supports the pandemic coordinator in identifying personal protective equipment which employees should use, ✓ Provides control of isolation, cleaning and disinfection works and informs the pandemic coordinator, ✓ Follow-ups the psychosocial status of the employees and informs the pandemic coordinator by conducting research to provide psychosocial support if necessary, ✓ Participates in the activities of informing the employees, provides information to the pandemic coordination team at the point of problems on the implementation of the measures by the employees, ✓ Provides information to the pandemic coordination team on feedbacks from employees during the implementation phase of risk management strategy within the workplace, ✓ Participates and supports the works necessary to determine the effects of the pandemic on the workplace.

7.7. Communication in Case of Emergency

The communication information that will be required in case of Emergency is given in the table below and posted on the plant panels by using "**KH-KPS-FR-175 Emergency Contact List Form"**.

EMERGENCY CONTACT INFORMATIONS

Task-Name Surname	Location	Office Number	Mobile Number
Emergency Coordinator (Tesis Müdürü-Ali Kuş)	Plant 9900 Level Deck	122	+90 533 462 06 84
West & South Affrica Region Coordinator- Erkut Ateş	Turkey Head Quarters	-	+90 530 149 5047
Plant Manager- Ali Kuş	Plant 9900 Level Deck	122	+90 533 462 0684
Assistant Plant Manager- Emre Koçak	Plant 9900 Level Deck	122	+90 535 888 2282
Assistant Plant Manager - Semih Şahin	Plant 9900 Level Deck	122	+90 534 983 0512

Shift Supervisor – Oktay Yıldız	Control Room	171	+90 535 568 5467
Shift Supervisor – Engin Özcan		171	+90 539 317 1009
Plant Security Officer - Ersin Kandemir	Plant 9900 Level Deck	180	+233 50 151 7919
Deck Office – Erdi Sakallı	Plant 9900 Level Deck	180	+233 50 151 7919
HSE Office – Mevlüt Yurtseven	Plant 9900 Level Deck	180	+233 50 154 8268
Clinic – Merdan SAPAROV	Accommodation 21400 Level Deck	119	+233 50 391 78 33
Health Officer- Fahrettin Bulut	Accommodation 21400 Level Deck	119	+90 516 165 5623
Health Officer- Ali ÇELİK	Accommodation 21400 Level Deck	119	+90 538 304 5439
Security	Entrance Gate	-	+233 50 154 5923
Fire Team Leader - Erdi Sakallı	Plant 9900 Level Deck	180	+233 50 151 7919
Rescue Team Leader - Erdi Sakallı	Plant 9900 Level Deck	180	+233 50 151 7919
Pollution Response Team Leader- Erdi Sakallı	Plant 9900 Level Deck	180	+233 50 151 7919
KH Head Quarters HSE Department	İstanbul	+90 212 295 47 37	-
MOC SEKONDI NAVAL BASE	Takoradi /Ghana	+233 54 886 63 83	+233 29 910 10 66
POLICE OPS	Takoradi /Ghana	+233 20 666 93 37	+233 29 920 44 58
GH. FIRE SERVICE	Takoradi /Ghana	+23350 200 86 88	
NAVAL CLINIC, SEKONDI (AMBULANCE)	Takoradi /Ghana	+233 24 883 78 78	-
SYCAMORE HOSPITAL,TAKORADI	Takoradi /Ghana	+233 20 890 72 75	+233 24 657 25 92

7.8. Plant Role Chart/Table

Role Chart of Karadeniz Powership Osman Khan Plant is given below.

	GENEL TALİMATLAR (GENERAL INSTRUCTIONS)
1	Tesis müdürü olmadığında, genel amir Tesis müdür yardımcısıdır eger oda olmaz ise emniyet zabiti 1 veya emniyet zabiti 2 görevi devir alır. If p.m not on board second commander p.m.a and thirth safety off 1 and fourth safety off 2
2	Bir acil durum olduğunda, gemi ana elektrik devresinden veya acil durum elektrik güç kaynağından beslenen elektrikle çalışır zil veya klakson veya eşdeğer bir uyarı sistemi gemi düdüğü veya siren ile kesintisiz sürekli çalan sesten oluşan genel acil durum alarm işareti verilecektir. In case of emergency, alarm shall be sound consisting following continous alarm on an electrically operated bell or klaxon or other equivalent warning system which shall be powered from to ship's main power supply and the emergency.
3	Acil durum alarmı duyulduğunda tüm personel görevli oldukları toplanma noktalarına donanımlı olarak gidecektir. On hearing the emergency signal, all person will proceed to their assignated Muster Station with their rigging.
4	Vardiyacılar nöbet yerlerini teslim edene kadar veya amirinden terket emiri alıncaya kadar terketmeyeceklerdir. Watch keepers remain at their post until they are relieved or receive the order to leave it from head of operators.
5	Acil durumun tipi gemi anons sistemlerinden sözlü olarak anons edilecek ve herkes görevine göre olaya müdahale edecektir. Type of emergency situation shall be announced verbally from the ship's public adressor system and every personnel will interfere according their duties in muster list
6	Yangın durumunda , vardiyacılar yangın mahalinin kaportalarını içeride kimsenin olmadığından emin olduktan sonra kapatacaklar. In the event of fire, the personnel on watch will immediately close all automatic and manual fire doors. Must be sure nobody inside
7	Her türlü yangın,duman,su sızması veya başka türlü bir tehlikenin mutlaka Kontrol odası veya nöbetçi vardı mühendisine bildirilmesi zorunludur. Any fire, smoke, inrush of water or any danger has to be reported with out delay to Engine Control Room or the person on watch
8	Makine dairesi CO2 alarmı duyduğunda içerdeki personel derhal makine dairesini terk ederek toplanma istasyonuna gitmelidirler. In the CO2 alarm sounds in engine room the personnel shall be leave immediately and go to Master Station.
9	Tüm personel , solunum cihazlarını, yangınla mücadele ekipmanlarını kullanma eğitimi almış olmalıdır, All vrewmembers should be trained for the use of fire figting equipments, breathing apparatus.
10	Bir acil durum olduğunda, yabancı uyruklu tüm personel toplanma alanında toplanacak ve Güvenlik Zabiti talimatıyla hareket edeceklerdir. In case of emergency ,all foreign national personnel shall be go to Muster Station and theinstructions of Officers will act in
11	Haberleşme telsiz kanalı 14 dir. Emergency Comminication Radio Channel is 14.
12	Eğer yangın çalışma saatleri dışında olursa vardiya mühendisleri derhal ekip amirlerini ve tesis yönetimini durumdan haberdar edecek If the fire is out of working hours, the shift engineers will immediately inform the supervisors of team and the plant management

YANGIN (FIRE)

ROLE NO	GÖREVİ (RANK)	ACİL DURUM GÖREVİ (EMERGENCY DUTY)	EKİBİ (TEAM)
		KUMANDA EKİBİ **COMMAND TEAM**	
1	ALİ KUŞ (PLANT MANAGER)	Genel Kumanda. General Command	KUMANDA EKİBİ COMMAND TEAM
2	EMRE KOÇAK (ASST.PLANT MANAGER)	Genel Kumanda. General Command	KUMANDA EKİBİ COMMAND TEAM
3	SEMİH ŞAHİN (ASST.PLANT MANAGER))	Genel Kumanda. General Command	KUMANDA EKİBİ COMMAND TEAM
		YANGIN EKIBI (1. EKIP) **FIRE TEAM (1st. TEAM)**	
4	ERDI SAKALLI (ADM.AFF.ASST.MANAGER)	Yangın ekibine Amirlik Eder, olay mahalinde koordine sağlar .Tesis müdürüyle haberleşme sağlar. Tesis müdürünün onayıyla Navy Base den destek ister. 2. Yangın ekip amiri olmadığında her iki yangın ekibine de liderlik eder. (1 ST.team leader. Coordinates action taken and communicates with plant manager,request supports from Navy Base approval of the plant manager.) if there is not 2 TH. Team fire leader, he becomes fire team leader for first and second fire teams at the same time.	YANGIN EKIBI FIRE TEAM
5	ARKIN YÜKSELEN(BOSUN)	Yangın elbisesi giyer.Takım amiri emri ile olay mahaline hareket eder. (Wear fireman outfit. Wait for instruction team leader.)	YANGIN EKİBİ FIRE TEAM
6	TEVFİK KAR (A/B)	Yangın elbisesi giyer.Takım amiri emri ile olay mahaline hareket eder. (Wear fireman outfit. Wait for instruction team leader.)	YANGIN EKİBİ FIRE TEAM
7	YAŞAR ERDOĞAN (A/B)	Yangın elbisesi giyer.Takım amiri emri ile olay mahaline hareket eder. (YEDEK) (Wear fireman outfit. Wait for instruction team leader.) (SPARE)	YANGIN EKİBİ FIRE TEAM
8	OSMAN ÖZGÜR ÇİÇEK (SENIOR MECHANICAL TECH.)	Yangın elbisesi giyiminde yardım eder. Can halatını kumanda eder. Assist to wearing fireman outfit and control to life line.	YANGIN EKİBİ FIRE TEAM
9	SEMİR ARACI (MECH.MAINT.TECH.)	Yangın elbisesi giyiminde yardım eder. Can halatını kumanda eder. Assist to wearing fireman outfit and control to life line.	YANGIN EKİBİ FIRE TEAM
10	MEHMET BOZAN (MECH.MAINT.TECH.)	Yangın elbisesi giyiminde yardım eder. Can halatını kumanda eder. Assist to wearing fireman outfit and control to life line.	YANGIN EKİBİ FIRE TEAM
11	GÜROL ERGİN (MECH.MAINT.TECH.)	Yangın elbisesi giyiminde yardım eder. Can halatını kumanda eder. Assist to wearing fireman outfit and control to life line.	YANGIN EKİBİ FIRE TEAM
12	FATİH KARAGÖZ (MECH.MAINT.TECH.)	Olay mahaline yangın hortumu ve minimax getirir. Ekip amirinin talimatı ile yangın olan bölgenin yangın kapısını kapatır. Bring fire hose and portable fire extinguisher . In order of Team leader Closed to fire door in which fire area.	YANGIN EKİBİ FIRE TEAM
13	TURGUT KAYA (MAINT.TECH.)	Olay mahaline yangın hortumu ve minimax getirir. Ekip amirinin talimatı ile yangın olan bölgenin yangın kapısını kapatır. Bring fire hose and portable fire extinguisher . In order of Team leader Closed to fire door in which fire area.	YANGIN EKİBİ FIRE TEAM
14	GÖKSEL SİMSAR (OILER)	Olay mahaline yangın hortumu ve minimax getirir. Ekip amirinin talimatı ile yangın olan bölgenin yangın kapısını kapatır. Bring fire hose and portable fire extinguisher . In order of Team leader Closed to fire door in which fire area.	YANGIN EKİBİ FIRE TEAM
15	ÖMER ZEKİ KALYONCU (OILER)	Olay mahaline yangın hortumu ve minimax getirir. Ekip amirinin talimatı ile yangın olan bölgenin yangın kapısını kapatır. Bring fire hose and portable fire extinguisher . In order of Team leader Closed to fire door in which fire area.	YANGIN EKİBİ FIRE TEAM
16	TAYFUN ESENDERE (MECH.MAINT.TECH.)	Yangın bölgesinin kontrolünü yapar yaralı olup olmadığının teyidini ekip amirine verir. Gerektiğinde foam applicatorü hazırlar. It controls the fire zone and gives the team leader the confirmation of whether he's injured or not. If necessary prepare to Foam applicator.	YANGIN EKİBİ FIRE TEAM
17	SEDAT ORDU (OILER)	Yangın bölgesinin kontrolünü yapar yaralı olup olmadığının teyidini ekip amirine verir. Gerektiğinde foam applicatorü hazırlar. It controls the fire zone and gives the team leader the confirmation of whether he's injured or not. If necessary prepare to Foam applicator.	YANGIN EKİBİ FIRE TEAM
18	TANJU KUTLU (OILER)	Yangın bölgesinin kontrolünü yapar yaralı olup olmadığının teyidini ekip amirine verir. Gerektiğinde foam applicatorü hazırlar. It controls the fire zone and gives the team leader the confirmation of whether he's injured or not. If necessary prepare to Foam applicator.	YANGIN EKİBİ FIRE TEAM

YANGIN EKIBI (2. EKIP) FIRE TEAM (2 nd. TEAM)			
19	ERSIN KANDEMIR (DECK OFFICER)	Yangın ekibine Amirlik Eder, olay mahalinde koordine sağlar .Tesis müdürüyle haberleşme sağlar. Tesis müdürünün onayıyla Naval Base den destek ister. 1.Yangın ekip amiri olmadığında her iki yangın ekibine de liderlik eder. (1 ST.team leader. Coordinates action taken and communicates with plant manager,request supports from Naval Base approval of the plant manager. If there is not 2 TH. Team fire leader, he becomes fire team leader for first and second fire teams at the same time.	YANGIN EKİBİ FIRE TEAM
20	MUSTAFA TAŞÇI (USTA GEMİCİ)	Yangın elbisesi giyer.Takım amiri emri ile olay mahaline hareket eder. (Wear fireman outfit. Wait for instruction team leader.)	YANGIN EKİBİ FIRE TEAM
21	RAMAZAN ŞEN (MECH.MAINT.TECH.)	Yangın elbisesi giyer.Takım amiri emri ile olay mahaline hareket eder. (Wear fireman outfit. Wait for instruction team leader.)	YANGIN EKİBİ FIRE TEAM
22	KADER KAR (OILER)	Yangın elbisesi giyer.Takım amiri emri ile olay mahaline hareket eder. (YEDEK) (Wear fireman outfit. Wait for instruction team leader.) (SPARE)	YANGIN EKİBİ FIRE TEAM
23	ADEM ÖZTÜRK (OILER)	Yangın elbisesi giyer.Takım amiri emri ile olay mahaline hareket eder. (YEDEK) (Wear fireman outfit. Wait for instruction team leader.) (SPARE)	YANGIN EKİBİ FIRE TEAM
24	İRFAN KARAGÜLLE (OILER)	Yangın elbisesi giyiminde yardım eder. Can halatını kumanda eder. Assist to wearing fireman outfit and control to life line.	YANGIN EKİBİ FIRE TEAM
25	AHMET ÖZBEY (OILER)	Yangın elbisesi giyiminde yardım eder. Can halatını kumanda eder. Assist to wearing fireman outfit and control to life line.	YANGIN EKİBİ FIRE TEAM
26	MEMET KEMAL TOPAL (FITTER)	Yangın elbisesi giyiminde yardım eder. Can halatını kumanda eder. Assist to wearing fireman outfit and control to life line.	YANGIN EKİBİ FIRE TEAM
27	(OILER)	Olay mahaline yangın hortumu ve minimax getirir. Ekip amirinin talimatı ile yangın olan bölgenin yangın kapısını kapatır. Bring fire hose and portable fire extinguisher . In order of Team leader Closed to fire door in which fire area.	YANGIN EKİBİ FIRE TEAM
28	FATİH MEHMET AKYOL (MECH.MAINT.TECH.)	Olay mahaline yangın hortumu ve minimax getirir. Ekip amirinin talimatı ile yangın olan bölgenin yangın kapısını kapatır. Bring fire hose and portable fire extinguisher . In order of Team leader Closed to fire door in which fire area.	YANGIN EKİBİ FIRE TEAM
29	YAŞAR TÜRKAN (SENIOR FITTER)	Olay mahaline yangın hortumu ve minimax getirir. Ekip amirinin talimatı ile yangın olan bölgenin yangın kapısını kapatır. Bring fire hose and portable fire extinguisher . In order of Team leader Closed to fire door in which fire area.	YANGIN EKİBİ FIRE TEAM
30	GÖKHAN ÇELİK (FITTER)	Olay mahaline yangın hortumu ve minimax getirir. Ekip amirinin talimatı ile yangın olan bölgenin yangın kapısını kapatır. Bring fire hose and portable fire extinguisher . In order of Team leader Closed to fire door in which fire area.	YANGIN EKİBİ FIRE TEAM
31	DURMUŞ YILDIRIM (FITTER)	Yangın bölgesinin kontrolünü yapar yaralı olup olmadığının teyidini ekip amirine verir. Gerektiğinde foam applicatorü hazırlar. It controls the fire zone and gives the team leader the confirmation of whether he's injured or not. If necessary prepare to Foam applicator.	YANGIN EKİBİ FIRE TEAM
32	İSMAİL BAL (SENIOR FITTER)	Yangın bölgesinin kontrolünü yapar yaralı olup olmadığının teyidini ekip amirine verir. Gerektiğinde foam applicatorü hazırlar. It controls the fire zone and gives the team leader the confirmation of whether he's injured or not. If necessary prepare to Foam applicator.	YANGIN EKİBİ FIRE TEAM
33	AYHAN ORAN (MECH.MAINT.TECH.)	Yangın bölgesinin kontrolünü yapar yaralı olup olmadığının teyidini ekip amirine verir. Gerektiğinde foam applicatorü hazırlar. It controls the fire zone and gives the team leader the confirmation of whether he's injured or not. If necessary prepare to Foam applicator.	YANGIN EKİBİ FIRE TEAM

TEKNİK EKİP 1 .TECHNIC TEAM			
34	ENGİN ÖZCAN (SHIFT SUPERVISOR)	1. Teknik ekip amiridir.Tes. Müd. Emriyle emg. diesel generatorü çalıştırır . 2. Teknik ekip amiri olmadığı durumda her iki teknik ekibin de amirliğini yapar. Acil durumda Shutdown prosedürünün gerekliliklerini yerine getirir. 1st. technic team leader . Acts asper Plant Mng. Instruction according to the case. Start up emg. diesel generator . When there is no 2th. Technic team leader ,he will be leader of 1st and 2th Technic teams. When there is an emergency stuation, he takes actions according to shutdown procedure.	TEKNİK EKİP TECHNIC TEAM
35	BİROL DÖNMEZ (ENGINEER)	Tes. Müd. Emriyle emg. diesel generatorü çalıştırır Technic team leader (2nd). Acts asper Plant Mng. Instruction according to the case. Start up emg. diesel generator .	TEKNİK EKİP TECHNIC TEAM
36	TURGUT SELMAN TÜMER (ENGINEER)	Emg.Dizel jeneratör çalıştırılmasına yardımcı olur. Takım amiri talimatıyla, gaz yangınlarında yangın mahaline giden gaz hattı shut off vanasını kapatarak gaz akışını keser. Assist for Start up emg. diesel generator. According to the instruction of team leader ,he closes the shut off valve that belong to gas line where feeds the fire area in gas fires.	TEKNİK EKİP TECHNIC TEAM
37	MUSTAFA KOCA (ENGINEER)	Emg. Dizel jeneratör çalıştırılmasına yardımcı olur. Takım amiri talimatıyla, gaz yangınlarında yangın mahaline giden gaz hattı shut off vanasını kapatarak gaz akışını keser. Assist for Start up emg.diesel generator. According to the instruction of team leader ,he closes the shut off valve that belong to gas line where feeds the fire area in gas fires.	TEKNİK EKİP TECHNIC TEAM
38	YUSUF BURAK ARLI (ENGINEER)	Takım amirinin talimatıyla en yakın ulaşabileceği yangın pompasını çalıştırır./ Makine yangınlarında Lokal application Sistemini devreye sokar. Takım amiri talimatıyla, gaz yangınlarında yangın mahaline giden gaz hattı shut off vanasını kapatarak gaz akışını keser. In order of Team leader ,start up one of the closest fire pumps/It activates the Local Application System in case of machine fires. According to the instruction of team leader ,he closes the shut off valve that belong to gas line where feeds the fire area in gas fires.	TEKNİK EKİP TECHNIC TEAM
39	ALPER ESİRGER (ENGINEER)	Takım amirinin talimatıyla en yakın ulaşabileceği yangın pompasını çalıştırır./Makine yangınlarında Lokal application Sistemini devreye sokar. In order of Team leader ,start up one of the closest fire pumps./It activates the Local Application System in case of machine fires.	TEKNİK EKİP TECHNIC TEAM
40	ZİYA SOLAKOĞLU (ENGINEER)	Takım amirinin talimatıyla en yakın ulaşabileceği yangın pompasını çalıştırır./Makine yangınlarında Lokal application Sistemini devreye sokar. In order of Team leader ,start up one of the closest fire pumps./It activates the Local Application System in case of machine fires.	TEKNİK EKİP TECHNIC TEAM
41		Takım amirinin talimatıyla kıç jettydeki Emg. Diesel yangın pompasını çalıştırır. In order of Team leader, start up emg. Diesel fire pump on the aft jetty.	TEKNİK EKİP TECHNIC TEAM
42	ALİ YANAR (MECH.MAINT.TECH.	Takım amirinin talimatıyla kıç jettydeki Emg. Diesel yangın pompasını çalıştırır. In order of Team leader, start up emg. Diesel fire pump on the aft jetty.	TEKNİK EKİP TECHNIC TEAM
43	TACETTİN SERT (MECH.MAINT.TECH.)	Ambarların güverteden girişlerini ve manuel kapatılan havalandırmaları kapatır. Closed the entrances of the cargo holds from the deck and manually closed vents.	TEKNİK EKİP TECHNIC TEAM
44	İSMAİL ÖZ (MECH.MAINT.LEADER)	Ambarların güverteden girişlerini ve manuel kapatılan havalandırmaları kapatır. Closed the entrances of the cargo holds from the deck and manually closed vents.	TEKNİK EKİP TECHNIC TEAM
73	İBRAHİM ÇOLAK (ELC.TECH.)	Tesis Müdürü'nün talimatıyla olay yerinin elektriğini keser Cut off the electricity with P.M. order	DESTEK EKİBİ SUPPORT TEAM
74	MEHMET KAHRAMAN (ELC.TECH.)	Tesis Müdürü'nün talimatıyla olay yerinin elektriğini keser Cut off the electricity with P.M. order	DESTEK EKİBİ SUPPORT TEAM

2. TEKNİK EKİP 2ND TECHNIC TEAM			
45	OKTAY YILDIZ (SHIFT SUPERVISOR)	emriyle CO2 tüplerini patlatır. 1. Teknik ekip amiri olmadığı durumda her iki teknik ekibin de amirliğini yapar. Acil durumda Shutdown prosedürünün Technic team leader acts asper Plant Mng. İnstruction according to the case (Fire in Plant side &Eng.room) Release co2 When there is no 1st. Technic team leader, He will be leader of 1st and 2th Technic Teams. When there is an emergency stuation, he takes actions according to shutdown procedure.	TEKNİK EKİP TECHNIC TEAM
46	ACARALP ATAHAN İÇLİ (ENGINEER)	Teknik ekip lideri ile koordineli olarak olayın tipine göre hareket eder. Yangın plant tarafında veya gemi makine dairesinde ise tesis müd. emriyle CO2 tüplerini patlatır. Acts asper Technic team leader. İnstruction according to the case(Plant &Fire in Eng. Room). Release co2	TEKNİK EKİP TECHNIC TEAM
47	NURİ SENAVER (ELEC. TECHNICIAN)	CO2 tüplerinin patlatılmasına yardım eder./Makine yangınlarında Lokal application Sistemini devreye sokar Assist for release CO2./It activates the Local Application System in case of machine fires.	TEKNİK EKİP TECHNIC TEAM
48	MUSTAFA YILMAZ (ENGINEER)	CO2 tüplerinin patlatılmasına yardım eder/Makine yangınlarında Lokal application Sistemini devreye sokar assist for release CO2./It activates the Local Application System in case of machine fires.	TEKNİK EKİP TECHNIC TEAM
49	FATİH TOPAL (ENGINEER)	Tes. Müd. Emriyle 8 nolu ambardaki foam pompalarını devreye alır ve P.M ye rapor eder Order with P.M Release Foam pumps in the Cargo Hold 8 and report to P.M	TEKNİK EKİP TECHNIC TEAM
50	EREN DOĞRUYOL (ENGINEER)	Tes. Müd. Emriyle 8 nolu ambardaki foam pompalarını devreye alır ve P.M ye rapor eder. Order with P.M Release Foam pumps in the Cargo Hold 8 and report to P.M.	TEKNİK EKİP TECHNIC TEAM
51	BARIŞ FETTAHOĞLU (OILER)	Tes. Müd. Emriyle 8 nolu ambardaki foam pompalarını devreye alır ve P.M ye rapor eder Order with P.M Release Foam pumps in the Cargo Hold 8 and report to P.M	TEKNİK EKİP TECHNIC TEAM
52	RIDVAN ÜCAR (ELEC. TECHNICIAN)	Tes. Müd. Emriyle 9 nolu ambardaki Quick closing valfleri kapatır, P.M ye rapor eder Order with P.M shut down quick closing valves and report to P.M	TEKNİK EKİP TECHNIC TEAM
53	MEHMET ÇELİK (FITTER)	Tes. Müd. Emriyle 9 nolu ambardaki Quick closing valfleri kapatır, P.M ye rapor eder Order with P.M shut down quick closing valves and report to P.M	TEKNİK EKİP TECHNIC TEAM
54	MUSTAFA BÜYÜKTEPE (ENGINEER)	Foam tankının güverteden ana valfini, giriş çıkış valflerini ve yangın hangi ambarda ise o ambarın kuç tarafındaki foam sisteminin ayırıcı valfini açar. Pompayı çalıştırır. Takım amiri talimatıyla, gaz yangınlarında yangın mahaline giden gaz hattı shut off vanasını kapatarak gaz akışını keser. Open foam Tank main valve, inner-outer valves and which Cargo Hold in the fire , open isolation valve from aft cargo hold on the deck. Start to foam tank pump. According to the instruction of team leader ,he closes the shut off valve that belong to gas line where feeds the fire area in gas fires.	TEKNİK EKİP TECHNIC TEAM
55	MEHMET CEM GÖKPINAR (MAINT.LEADER)	Foam tankının güverteden ana valfini, giriş çıkış valflerini ve yangın hangi ambarda ise o ambarın kuç tarafındaki foam sisteminin ayırıcı valfini açar. Pompayı çalıştırır. Open foam Tank main valve, inner-outer valves and which Cargo Hold in the fire , open isolation valve from aft cargo hold on the deck. Start to foam tank pump.	TEKNİK EKİP TECHNIC TEAM
56	(OILER)	Foam tankının güverteden ana valfini, giriş çıkış valflerini ve yangın hangi ambarda ise o ambarın kuç tarafındaki foam sisteminin ayırıcı valfini açar. Pompayı çalıştırır. Open foam Tank main valve, inner-outer valves and which Cargo Hold in the fire , open isolation valve from aft cargo hold on the deck. Start to foam tank pump.	TEKNİK EKİP TECHNIC TEAM
72	FERDİ ŞAHİN (ELC.TECH.)	Tesis Müdürü'nün talimatıyla olay yerinin elektriğini keser Cut off the electricity with P.M. order	DESTEK EKİBİ SUPPORT TEAM
75	NEBİ BAĞCI (ELC.TECH.)	Tesis Müdürü'nün talimatıyla olay yerinin elektriğini keser Cut off the electricity with P.M. order	DESTEK EKİBİ SUPPORT TEAM
76	HALİS TURGUT (ELC.TECH.)	Tesis Müdürü'nün talimatıyla olay yerinin elektriğini keser Cut off the electricity with P.M. order	DESTEK EKİBİ SUPPORT TEAM

İLK YARDIM EKİBİ **FIRST AID TEAM**			
57	FAHRETTİN BULUT (HEALTH OFFICER)	İlk yardım ekiplerine Amirlik Eder, olay mahalinde koordine sağlar .Tesis müdürüyle haberleşme sağlar. leader of first aid squads,coordinates action taken and communicates with plant manager	İLK YARDIM EKİBİ FIRST AID TEAM
58	ALİ ÇELİK/MERDAN SAPAROV (HEALTH OFFICER)	Revirden ilk yardım çantası ve oksijen tüpü getirir./Toplanma mahaline gider. Bring the first aid kit and O2 tube ./Going to muster station	İLK YARDIM EKİBİ FIRST AID TEAM
59	GÜNER GÜLLER (OILER)	Revirden ilk yardım çantası ve oksijen tüpü getirir./Toplanma mahaline gider. Bring the first aid kit and O2 tube ./Going to muster station	İLK YARDIM EKİBİ FIRST AID TEAM
60	İSMET ÖZTÜRK (COOK)	Revirden sedye ve battaniye getirir/ Toplanma mahaline gider Bring to strecher and blanket from hospital/Going to muster station	İLK YARDIM EKİBİ FIRST AID TEAM
61	ZEYNEL AYDIN (STEWARD)	Revirden sedye ve battaniye getirir/ Toplanma mahaline gider Bring to strecher and blanket from hospital/Going to muster station	İLK YARDIM EKİBİ FIRST AID TEAM
62	EMREN GÜLLER (COOK)	Toplanma mahaline gider. Ekip amirinin talimatına göre hareket eder. (ilk yardım ekibindedir) Goes to muster station and wait order from team leader.	DESTEK EKİBİ SUPPORT TEAM
63	RAMAZAN TOPRAK (MECH.MAINT.TECH.)	Toplanma mahaline gider. Ekip amirinin talimatına göre hareket eder. (ilk yardım ekibindedir) Goes to muster station and wait order from team leader.	DESTEK EKİBİ SUPPORT TEAM
DESTEK EKİBİ **SUPPORT TEAM**			
64	MEVLÜT YURTSEVEN (HSE SPECIALIST)	Müdürüne rapor eder. Emre göre hakaret eder Support team leader.Responsible for the Ghanaian personnel of evacuation and counting in muster station . Report to Plant Manager.	DESTEK EKİBİ SUPPORT TEAM
65	FARUK ÖZYİĞİT (MECH.MAINT.TECH.)	yapar Tesis Müdürüne rapor eder. Emre göre hakaret eder. Destek ekip amiri olmadığında destek ekip amirliği yapar. When there is no support team leader, he will be team leader.	DESTEK EKİBİ SUPPORT TEAM
66	UFUK GÜNGÖR (OILER)	Ganalı personelin tahliyesinden sorumludur.Toplanma alanında sayımını yapar Tesis Müdürüne rapor eder. Emre göre hakaret eder Responsible for the Ghanaian personnel of evacuation and counting in muster station . Report to Plant Manager	DESTEK EKİBİ SUPPORT TEAM
67	AHMET AÇIKGÖZ (MECH. MAINT. TECHN.)	Ganalı personelin tahliyesinden sorumludur.Toplanma alanında sayımını yapar Tesis Müdürüne rapor eder. Emre göre hakaret eder Responsible for the Ghanaian personnel of evacuation and counting in muster station . Report to Plant Manager	DESTEK EKİBİ SUPPORT TEAM
68	BAHATTİN ÖZÇELİK (ELC. ENGINEER)	Kontrol odasında Tesis Müdürü'nün talimatıyla hareket eder.Tesis Müdürü'nün talimatıyla fanları stop eder. Standby in order of P.M at the control room and close the ventilations with P.M. order	DESTEK EKİBİ SUPPORT TEAM
69	MEHMET UYGUN (SENIOR. ELC.TECH.)	Kontrol odasında Tesis Müdürü'nün talimatıyla hareket eder.Tesis Müdürü'nün talimatıyla fanları stop eder. Standby in order of P.M at the control room and close the ventilations with P.M. order	DESTEK EKİBİ SUPPORT TEAM
70	NEVZAT GÜNEŞ (SENIOR. ELC.TECH.)	Kontrol odasında Tesis Müdürü'nün talimatıyla hareket eder.Tesis Müdürü'nün talimatıyla fanları stop eder. Standby in order of P.M at the control room and close the ventilations with P.M. order	DESTEK EKİBİ SUPPORT TEAM
71	SEDAT TATAR (ELC. TECH.)	Tesis Müdürü'nün talimatıyla olay yerinin elektriğini keser Cut off the electricity with P.M. order	DESTEK EKİBİ SUPPORT TEAM
77	AYDIN GÖKSU (FITTER)	Tesis Müdürü'nün talimatıyla su geçirmez kapıtaları ve yangın damperlerini kapatır Close the watertight doors and fire dampers with P.M. order	DESTEK EKİBİ SUPPORT TEAM
78		Tesis Müdürü'nün talimatıyla su geçirmez kapıtaları ve yangın damperlerini kapatır Close the watertight doors and fire dampers with P.M. order	DESTEK EKİBİ SUPPORT TEAM
79	AYHAN GEBEŞ (MECH.MAINT.TECH.)	Toplanma mahaline gider.Tesis Müdürü talimatıyla hareket eder. Close the watertight doors and fire dampers with P.M. order	DESTEK EKİBİ SUPPORT TEAM
80	YAVUZ ATASOY (REPORTING SPECIALIST)	Gemi sertifikaları ve evrakların taşınmasına yardım eder. Acente ve yerel otoritelere haber verir. Assist to bring ship certificates and important documents. Inform the agent and local authories	DESTEK EKİBİ SUPPORT TEAM
81	ÜNAL MULLA (WAREHOUSE STAFF)	Toplanma mahaline gider.Tesis Müdürü talimatıyla hareket eder. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
82	SERDAR ALTIOK (CHEMIST)	Toplanma mahaline gider.Tesis Müdürü talimatıyla hareket eder. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
83	İBRAHİM SEVEN (OILER)	Toplanma mahaline gider.Tesis Müdürü talimatıyla hareket eder./Yangın durumuna göre jettydeki yangın nozullarını kullanır. Goes to muster station and wait for order/Use the fire gun nozzles on the jetty according to the fire situation.	DESTEK EKİBİ SUPPORT TEAM
84	FATİH UZGÖREN (OILER)	Toplanma mahaline gider.Tesis Müdürü talimatıyla hareket eder./Yangın durumuna göre jettydeki yangın nozullarını kullanır. Goes to muster station and wait for order / Use the fire gun nozzles on the jetty according to the fire situation.	DESTEK EKİBİ SUPPORT TEAM
85	LEVENT EMRE (OILER)	Toplanma mahaline gider.Tesis Müdürü talimatıyla hareket eder./Yangın durumuna göre jettydeki yangın nozullarını kullanır. Goes to muster station and wait for order /Use the fire gun nozzles on the jetty according to the fire situation.	DESTEK EKİBİ SUPPORT TEAM
86		Toplanma mahaline gider.Tesis Müdürü talimatıyla hareket eder./Yangın durumuna göre jettydeki yangın nozullarını kullanır. Goes to muster station and wait for order/Use the fire gun nozzles on the jetty according to the fire situation.	DESTEK EKİBİ SUPPORT TEAM
87		Toplanma mahaline gider.Tesis Müdürü talimatıyla hareket eder. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM

YAĞ KİRLİLİĞİ (OIL SPILL)

ROLE NO	GÖREVİ (RANK)	ACİL DURUM GÖREVİ (EMERGENCY DUTY)	EKİBİ (SQUAD)
		KUMANDA EKİBİ COMMAND TEAM	
1	ALİ KUŞ (PLANT MANAGER)	Genel Kumanda. General Command	KUMANDA EKİBİ COMMAND TEAM
2	EMRE KOÇAK (ASST.PLANT MANAGER)	Genel Kumanda. General Command	KUMANDA EKİBİ COMMAND TEAM
3	SEMİH ŞAHİN (ASST.PLANT MANAGER))	Genel Kumanda. General Command	KUMANDA EKİBİ COMMAND TEAM
4	ERDI SAKALLI (ADM.AFF.ASST.MANAGER)	Temizlik takımı amiridir.Tesis müdürüyle haberleşme sağlar. Leader of suquad, coordinates action taken and communicates with plant manager	1. EKİP FIRST TEAM
19	ERSIN KANDEMIR (DECK OFFICER)	Takım amirinin talimatıyla hareket eder. Takım amiri olmadığında yedek takım amiridir. Assist for aid squad team	1. EKİP FIRST TEAM
5	ARKI YÜKSELEN BOSUN)	Olay mahaline SOPEP malzemesi getirir . Emre göre hareket eder Bring SOPEP equipment to scene areas . Stand by in order	1. EKİP FIRST TEAM
6	TEVFİK KAR (A/B)	Olay mahaline SOPEP malzemesi getirir . Emre göre hareket eder Bring SOPEP equipment to scene areas . Stand by in order	1. EKİP FIRST TEAM
7	YAŞAR ERDOĞAN (A/B)	Olay mahaline SOPEP malzemesi getirir . Emre göre hareket eder Bring SOPEP equipment to scene areas . Stand by in order	1. EKİP FIRST TEAM
20	MUSTAFA TAŞÇI (A/B)	Olay mahaline SOPEP malzemesi getirir . Emre göre hareket eder Bring SOPEP equipment to scene areas . Stand by in order	1. EKİP FIRST TEAM
22	KADER KAR (OILER)	Olay mahaline SOPEP malzemesi getirir . Emre göre hareket eder Bring SOPEP equipment to scene areas . Stand by in order	1. EKİP FIRST TEAM
23	ADEM ÖZTÜRK (OILER)	Olay mahaline vildan pompa getirir . Emre göre hareket eder BringWilden pump to scene areas . Stand by in order	1. EKİP FIRST TEAM
24	İRFAN KARAGÜLLE (OILER)	Olay mahaline vildan pompa getirir . Emre göre hareket eder BringWilden pump to scene areas . Stand by in order	1. EKİP FIRST TEAM
14	GÖKSEL SİMSAR (OILER)	Olay mahaline vildan pompa getirir . Emre göre hareket eder BringWilden pump to scene areas . Stand by in order	1. EKİP FIRST TEAM
15	ÖMER ZEKİ KALYONCU (OILER)	Olay mahaline vildan pompa getirir . Emre göre hareket eder BringWilden pump to scene areas . Stand by in order	1. EKİP FIRST TEAM
16	TAYFUN ESENDERE (MECH.MAINT.TECH.)	Olay mahaline SOPEP malzemesi getirir . Emre göre hareket eder Bring SOPEP equipment to scene areas . Stand by in order	1. EKİP FIRST TEAM
17	SEDAT ORDU (OILER)	Olay mahaline SOPEP malzemesi (talaş) getirir . Emre göre hareket eder Bring SOPEP equipment (sawdust) to scene areas . Stand by in order	1. EKİP FIRST TEAM
18	TANJU KUTLU (OILER)	Olay mahaline SOPEP malzemesi (talaş) getirir . Emre göre hareket eder Bring SOPEP equipment (sawdust) to scene areas . Stand by in order	1. EKİP FIRST TEAM

TEKNİK EKİP TECHNIC TEAM			
34	ENGİN ÖZCAN (SHIFT SUPERVISOR)	Teknik ekip amiridir.Olay mahali yakıt akışını keser.Plant manager talimatına göre hareket eder. Technic team leader (1st). Scene areas shut down bunker.Stand-by Plant manager order.	TEKNİK EKİP TECHNIC TEAM
45	OKTAY YILDIZ (SHIFT SUPERVISOR)	Teknik ekip amiridir.Olay mahali yakıt akışını keser.Plant manager talimatına göre hareket eder. Technic team leader(2ND) . Scene areas shut down bunker.Stand-by Plant manager order.	TEKNİK EKİP TECHNIC TEAM
68	BAHATTİN ÖZÇELİK (ELC. ENGINEER)	Olay mahali elektrik tesisatını kontrol eder . scene areas check electric equipment .	TEKNİK EKİP TECHNIC TEAM
69	MEHMET UYGUN (SENIOR. ELC.TECH.)	Olay mahali elektrik tesisatını kontrol eder . scene areas check electric equipment .	TEKNİK EKİP TECHNIC TEAM
70	NEVZAT GÜNEŞ (SENIOR. ELC.TECH.)	Olay mahali elektrik tesisatını kontrol eder . scene areas check electric equipment .	TEKNİK EKİP TECHNIC TEAM
36	TURGUT SELMAN TÜMER (ENGINEER)	Olay mahali yakıt akışını keser. Scene areas shut down bunker	TEKNİK EKİP TECHNIC TEAM
35	BİROL DÖNMEZ (ENGINEER)	Olay mahali yakıt akışını keser. Scene areas shut down bunker	TEKNİK EKİP TECHNIC TEAM
38	YUSUF BURAK ARLI (ENGINEER)	Olay mahali yakıt akışını keser. Scene areas shut down bunker	TEKNİK EKİP TECHNIC TEAM
39	ALPER ESİRGER (ENGINEER)	Olay mahali yakıt akışını keser. Scene areas shut down bunker	TEKNİK EKİP TECHNIC TEAM
50	EREN DOĞRUYOL (ENGINEER)	Olay mahali yakıt akışını keser. Scene areas shut down bunker	TEKNİK EKİP TECHNIC TEAM
49	FATİH TOPAL (ENGINEER)	Olay mahali yakıt akışını keser. Scene areas shut down bunker	TEKNİK EKİP TECHNIC TEAM
46	ACARALP ATAHAN İÇLİ (ENGINEER)	Olay mahali yakıt akışını keser. Scene areas shut down bunker	TEKNİK EKİP TECHNIC TEAM
37	MUSTAFA KOCA (ENGINEER)	Olay mahali yakıt akışını keser. Scene areas shut down bunker	TEKNİK EKİP TECHNIC TEAM
47	NURİ SENAVER (ELC. TECH)	Olay mahali yakıt akışını keser. Scene areas shut down bunker	TEKNİK EKİP TECHNIC TEAM
48	MUSTAFA YILMAZ (ENGINEER)	Olay mahali yakıt akışını keser. Scene areas shut down bunker	TEKNİK EKİP TECHNIC TEAM
İLK YARDIM EKİBİ FIRST AID TEAM			
57	FAHRETTİN BULUT (HEALTH OFFICER)	İlk yardım ekibi amiridir .Tesis müdürüyle haberleşme sağlar. Leader of first aid suquad ,coordinates action taken and communicates with plant manager	İLK YARDIM EKİBİ (FIRST AID TEAM)
58	ALİ ÇELİK /MERDAN SAPAROV(HEALTH OFFICER)	Revirden lk yardım çantası ve oksijen tüpü getirir./Toplanma mahaline gider. Bring the first aid kit and O2 tube ./Going to muster station	İLK YARDIM EKİBİ (FIRST AID TEAM)
60	İSMET ÖZTÜRK (COOK)	Revirden lk yardım çantası ve oksijen tüpü getirir./Toplanma mahaline gider. Bring the first aid kit and O2 tube ./Going to muster station	İLK YARDIM EKİBİ (FIRST AID TEAM)
61	ZEYNEL AYDIN (STEWARD)	Revirden sedye ve battaniye getirir/ Toplanma mahaline gider Bring to strecher and blanket from hospital/Going to muster station	İLK YARDIM EKİBİ (FIRST AID TEAM)
62	EMREN GÜLLER (COOK)	Revirden lk yardım çantası ve oksijen tüpü getirir./Toplanma mahaline gider. Bring the first aid kit and O2 tube ./Going to muster station	İLK YARDIM EKİBİ (FIRST AID TEAM)
63	RAMAZAN TOPRAK (MECH.MAINT.TECH.)	Toplanma mahaline gider.ilk yardım ekibine yardım eder Assist for aid squad team	İLK YARDIM EKİBİ (FIRST AID TEAM)

DESTEK EKIBI SUPPORT TEAM			
64	MEVLÜT YURTSEVEN (HSE SPECIALIST)	Destek ekibi amiridir. Tesis müdürüyle haberleşme sağlar. Leader of support team ,coordinates action taken and communicates with plant manager	DESTEK EKİBİ SUPPORT TEAM
8	OSMAN ÖZGÜR ÇİÇEK (SENIOR MECHANICAL TECH.)	Toplanma yerinde emre hazır bekler. Destek ekibi amiri olmadığında, destek ekip amirliği yapar. Goes to muster station and wait for order. If leader of support team is absent, he will be leader of support team.	DESTEK EKİBİ SUPPORT TEAM
9	SEMİR ARACI (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
10	MEHMET BOZAN (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
11	GÜROL ERGİN (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
12	FATİH KARAGÖZ (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
13	TURGUT KAYA (MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
21	GÖKSEL SİMSAR (OILER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
25	AHMET ÖZBEY (YAĞCI)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
26	MEMET KEMAL TOPAL (FITTER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
27	(YAĞCI)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
28	FATİH MEHMET AKYOL (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
29	YAŞAR TÜRKAN (SENIOR FITTER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
30	GÖKHAN ÇELİK (FITTER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
31	DURMUŞ YILDIRIM (FITTER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
32	İSMAİL BAL (SENIOR FITTER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
33	AYHAN ORAN (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
40	ZİYA SOLAKOĞLU (ENGINEER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
41		Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
42	ALİ YANAR (MECH.MAINT.TECH.	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
43	TACETTİN SERT (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
44	İSMAİL ÖZ (MECH.MAINT.LEADER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
51	BARIŞ FETTAHOĞLU (OILER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
52	RIDVAN ÜCAR (ELEC. TECHNICIAN)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
53	MEHMET ÇELİK (FITTER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
54	(ENGINEER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
55	MEHMET CEM GÖKPINAR (ENGINEER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
56	(OILER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
59	GÜNER GÜLLER (OILER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM

65	FARUK ÖZYİĞİT (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
66	UFUK GÜNGÖR (OILER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
67	AHMET AÇIKGÖZ (OILER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
68	BAHATTİN ÖZÇELİK (ELC. ENGINEER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
69	MEHMET UYGUN (SENIOR. ELC.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
70	NEVZAT GÜNEŞ (SENIOR. ELC.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
71	SEDAT TATAR (ELC. TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
72	FERDİ ŞAHİN (ELC.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
73	İBRAHİM ÇOLAK (ELC.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
74	MEHMET KAHRAMAN (ELC.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
75	NEBİ BAĞCI (ELC.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
76	HALİS TURGUT (ELC.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
77	AYDIN GÖKSU (FITTER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
78		Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
79	AYHAN GEBEŞ (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
80	YAVUZ ATASOY (REPORTING SPECIALIST)	Toplanma mahaline gider.Tesis Müdürü talimatıyla hareket eder. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
81	ÜNAL MULLA (WAREHOUSE STAFF)	Toplanma mahaline gider.Tesis Müdürü talimatıyla hareket eder. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
82	SERDAR ALTIOK (CHEMIST)	Toplanma mahaline gider.Tesis Müdürü talimatıyla hareket eder. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
83	İBRAHİM SEVEN (OILER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
84	FATİH UZGÖREN (OILER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
85	LEVENT EMRE (OILER)	Toplanma mahaline gider.Tesis Müdürü talimatıyla hareket eder. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
86		Toplanma mahaline gider.Tesis Müdürü talimatıyla hareket eder. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
87		Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM

ÇATIŞMA (COLLUSION)

ROLE NO	GÖREVİ (RANK)	ACİL DURUM GÖREVİ (EMERGENCY DUTY)	EKİBİ (SQUAD)
		KUMANDA EKİBİ **COMMAND TEAM**	
1	ALİ KUŞ (PLANT MANAGER)	Genel Kumanda. General Command	KUMANDA EKİBİ COMMAND TEAM
2	EMRE KOÇAK (ASST.PLANT MANAGER)	Genel Kumanda. General Command	KUMANDA EKİBİ COMMAND TEAM
3	SEMİH ŞAHİN (ASST.PLANT MANAGER))	Genel Kumanda. General Command	KUMANDA EKİBİ COMMAND TEAM
		1.EKİP **FIRST TEAM**	
4	ERDI SAKALLI (ADM.AFF.ASST.MANAGER)	1.Ekip lideri.Olay mahalinde koordine sağlar .Tesis müdürüyle haberleşme sağlar. 1 ST.team leader. Coordinates action taken and communicates with plant manager	1. EKİP FIRST TEAM
19	ERSIN KANDEMIR (DECK OFFICER)	Ekip amiri talimatıyla hareket eder. Ekip lideri olmağında ekibe liderlik eder. Stand by in order team leader. If there is no team leader , he will be leader of team.	1. EKİP FIRST TEAM
5	ARKIN YÜKSELEN(BOSUN)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	1. EKİP FIRST TEAM
6	TEVFİK KAR (A/B)	Ekip amiri talimatıyla hareket eder. Tanklardan sürekli iskandil alır. Stand by in order team leader. Taking sounding from all Wbt tanks.	1. EKİP FIRST TEAM
7	YAŞAR ERDOĞAN (A/B)	Ekip amiri talimatıyla hareket eder. Tanklardan sürekli iskandil alır. Stand by in order team leader. Taking sounding from all Wbt tanks.	1. EKİP FIRST TEAM
20	MUSTAFA TAŞÇI (A/B)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	1. EKİP FIRST TEAM
22	KADER KAR (OILER)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	1. EKİP FIRST TEAM
23	ADEM ÖZTÜRK (OILER)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	1. EKİP FIRST TEAM
24	İRFAN KARAGÜLLE (OILER)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	1. EKİP FIRST TEAM
14	GÖKSEL SİMSAR (OILER)	Ekip amiri talimatıyla hareket eder In order of team leader.	1. EKİP FIRST TEAM
15	ÖMER ZEKİ KALYONCU (OILER)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	1. EKİP FIRST TEAM
16	TAYFUN ESENDERE (MECH.MAINT.TECH.)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	1. EKİP FIRST TEAM
17	SEDAT ORDU (OILER)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	1. EKİP FIRST TEAM
18	TANJU KUTLU (OILER)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	1. EKİP FIRST TEAM
		TEKNİK EKİP **TECHNIC SQUAD**	
34	ENGİN ÖZCAN (SHIFT SUPERVISOR)	Teknik ekip amiri (1.)olay mahalinde denize sızıntı olup olmadığını kontrol eder .Plant manager Emrine göre hareket eder Technic team leader (1 ST).check for leaks at the scene areas.Stand-by Plant manager order.	TEKNİK EKİP TECHNIC TEAM
45	OKTAY YILDIZ (SHIFT SUPERVISOR)	Teknik ekip amiri (2.).olay mahalinde denize sızıntı olup olmadığını kontrol eder .Plant manager Emrine göre hareket eder Technic team leader (2ND)check for leaks at the scene areas.Stand-by Plant manager order.	TEKNİK EKİP TECHNIC TEAM
68	BAHATTİN ÖZÇELİK(ELC. ENGINEER)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	TEKNİK EKİP TECHNIC TEAM
69	MEHMET UYGUN (SENIOR. ELC.TECH.)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	TEKNİK EKİP TECHNIC TEAM
70	NEVZAT GÜNEŞ (SENIOR. ELC.TECH.)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	TEKNİK EKİP TECHNIC TEAM
36	TURGUT SELMAN TÜMER (ENGINEER)	olay mahalinde denize sızıntı olup olmadığını kontrol eder .Teknik ekip amiri ile hareket eder. check for leaks at the scene areas	TEKNİK EKİP TECHNIC TEAM
35	BİROL DÖNMEZ (ENGINEER)	olay mahallinde denize sızıntı olup olmadığını kontrol eder .Teknik ekip amiri talimatı ile hareket eder check for leaks at the scene areas	TEKNİK EKİP TECHNIC TEAM
38	YUSUF BURAK ARLI (ENGINEER)	olay mahalinde denize sızıntı olup olmadığını kontrol eder . .Teknik ekip amiri ile hareket eder. In order of Technıc team leader.	TEKNİK EKİP TECHNIC TEAM
39	ALPER ESİRGER (ENGINEER)	tesis müdürü talimatı ile olay mahali elektriğini keser . shut down electric according to P.M. Order .	TEKNİK EKİP TECHNIC TEAM
50	EREN DOĞRUYOL (ENGINEER)	olay mahalinde denize sızıntı olup olmadığını kontrol eder .Teknik ekip amiri ile hareket eder. check for leaks at the scene areas	TEKNİK EKİP TECHNIC TEAM
49	FATİH TOPAL (ENGINEER)	tesis müdürü talimatı ile olay mahali elektriğini keser . shut down electric according to P.M. Order .	TEKNİK EKİP TECHNIC TEAM
46	ACARALP ATAHAN İÇLİ (ENGINEER)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	TEKNİK EKİP TECHNIC TEAM
37	MUSTAFA KOCA (ENGINEER)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	TEKNİK EKİP TECHNIC TEAM
47	NURI SENAVER (ELC. ELECTRICAL)	Olay mahalinde denize sızıntı olup olmadığını kontrol eder . In order of Technıc team leader.	TEKNİK EKİP TECHNIC TEAM
48	MUSTAFA YILMAZ (ENGINEER)	Olay mahalinde denize sızıntı olup olmadığını kontrol eder . check for leaks at the scene areas	TEKNİK EKİP TECHNIC TEAM

		İLK YARDIM EKİBİ **FIRST AID SQUAD**	
57	FAHRETTİN BULUT (HEALTH OFFICER)	İlk yardım ekiplerine Amirlik Eder, olay mahalinde koordine sağlar .Tesis müdürüyle haberleşme sağlar. leader of first aid squads,coordinates action taken and communicates with plant manager	İLK YARDIM EKİBİ FIRST AID TEAM
58	ALİ ÇELİK /MERDAN SAPAROV(HEALTH OFFICER)	Revirden İlk yardım çantası ve oksijen tüpü getirir./Toplanma mahaline gider. Bring the first aid kit and O2 tube ./Going to muster station	İLK YARDIM EKİBİ FIRST AID TEAM
60	İSMET ÖZTÜRK (COOK)	Revirden İlk yardım çantası ve oksijen tüpü getirir./Toplanma mahaline gider. Bring the first aid kit and O2 tube ./Going to muster station	İLK YARDIM EKİBİ FIRST AID TEAM
61	ZEYNEL AYDIN (STEWARD)	Revirden sedye ve battaniye getirir/ Toplanma mahaline gider Bring to strecher and blanket from hospital/Going to muster station	İLK YARDIM EKİBİ FIRST AID TEAM
62	EMREN GÜLLER (COOK)	Revirden sedye ve battaniye getirir/ Toplanma mahaline gider Bring to strecher and blanket from hospital/Going to muster station	İLK YARDIM EKİBİ FIRST AID TEAM
63	RAMAZAN TOPRAK (MECH.MAINT.TECH.)	Toplanma mahaline gider. Ekip amirinin talimatına göre hareket eder. (ilk yardım ekibindedir) Goes to muster station and wait order from team leader.	DESTEK EKİBİ SUPPORT TEAM
		DESTEK EKIBI **SUPPORT TEAM**	
64	MEVLÜT YURTSEVEN (HSE SPECIALIST)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
8	OSMAN ÖZGÜR ÇİÇEK (SENIOR MECHANICAL TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
9	SEMİR ARACI (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
10	MEHMET BOZAN (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
11	GÜROL ERGİN (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
12	FATİH KARAGÖZ (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
13	TURGUT KAYA (MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
21	GÖKSEL SİMSAR (OILER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
25	AHMET ÖZBEY (YAĞCI)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
26	MEMET KEMAL TOPAL (FITTER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
27	(YAĞCI)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
28	FATİH MEHMET AKYOL (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
29	YAŞAR TÜRKAN (SENIOR FITTER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
30	GÖKHAN ÇELİK (FITTER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
31	DURMUŞ YILDIRIM (FITTER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
32	İSMAİL BAL (SENIOR FITTER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
33	AYHAN ORAN (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
40	ZİYA SOLAKOĞLU (ENGINEER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
41		Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
42	ALİ YANAR (MECH.MAINT.TECH.	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
43	TACETTİN SERT (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
44	İSMAİL ÖZ (MECH.MAINT.LEADER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
51	BARIŞ FETTAHOĞLU (OILER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
52	RIDVAN ÜCAR (ELEC. TECHNICIAN)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
53	MEHMET ÇELİK (FITTER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
54		Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
55	MEHMET CEM GÖKPINAR (ENGINEER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM

56	(OILER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
59	GÜNER GÜLLER (OILER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
65	FARUK ÖZYİĞİT (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
66	UFUK GÜNGÖR (OILER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
67	AHMET AÇIKGÖZ (MECH. MAINT. TECHN.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
71	SEDAT TATAR (ELC. TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
72	FERDİ ŞAHİN (ELC.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
73	İBRAHİM ÇOLAK (ELC.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
74	MEHMET KAHRAMAN (ELC.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
75	NEBİ BAĞCI (ELC.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
76	HALİS TURGUT (ELC.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
77	AYDIN GÖKSU (FITTER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
78		Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
79	AYHAN GEBEŞ (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
80	YAVUZ ATASOY (REPORTING SPECIALIST)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
81	ÜNAL MULLA (WAREHOUSE STAFF)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
82	SERDAR ALTIOK (CHEMIST)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
83	İBRAHİM SEVEN (OILER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
84	FATİH UZGÖREN (OILER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
85	LEVENT EMRE (OILER)	Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
86		Toplanma yerinde emre hazır bekler Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM

KAPALI MAHALDEN ADAM KURTARMA (ENCLOSED SPACE RESCUE)

ROLE NO	GÖREVİ (RANK)	ACİL DURUM GÖREVİ (EMERGENCY DUTY)	EKİBİ (SQUAD)
		KUMANDA EKİBİ **COMMAND TEAM**	
1	ALİ KUŞ (PLANT MANAGER)	Genel Kumanda. General Command	KUMANDA EKİBİ COMMAND TEAM
2	EMRE KOÇAK (ASST.PLANT MANAGER)	Genel Kumanda. General Command	KUMANDA EKİBİ COMMAND TEAM
3	SEMİH ŞAHİN (ASST.PLANT MANAGER))	Genel Kumanda. General Command	KUMANDA EKİBİ COMMAND TEAM
		1.EKIP **FIRST TEAM**	
4	ERDİ SAKALLI (ADM.AFF.ASST.MANAGER)	1.Ekip amiridir. İçeri girilmeden Gaz ölçüm cihazının kullanılmasını sağlar, verileri kontrol eder..Tesis müdürüyle haberleşme sağlar. Leader of suquad 1, He provides the gas dedector and take datas from this device without going inside. He communicates with plant manager	1. EKİP FIRST TEAM
64	MEVLÜT YURTSEVEN (HSE SPECIALIST)	Ekip amirleri olmadığında yangın ekiplerine liderlik eder. 2th leader of suquad 1, When the leader is absent , he will be team leader.	1. EKİP
20	MUSTAFA TAŞÇI (A/B)	Solunum cihazını takarak kapalı mahale girer. Wearing to breathing apparatus and entering to enclosed space	1. EKİP FIRST TEAM
5	ARKIN YÜKSELEN (BOSUN)	Solunum cihazını takarak kapalı mahale girer. Wearing to breathing apparatus and entering to enclosed space	1. EKİP
6	TEVFİK KAR (A/B)	Solunum cihazı ve can halatının getirilmesi ,kumandası ve giyilmesine yardımcı olur. Assist to bring 1st breathing apparatus, life line and wearing to breating apparatus and life line	1. EKİP FIRST TEAM
7	YAŞAR ERDOĞAN (A/B)	Solunum cihazı ve can halatının getirilmesi ,kumandası ve giyilmesine yardımcı olur. Assist to bring 1st breathing apparatus, life line and wearing to breating apparatus and life line	1. EKİP
56	(OILER)	Solunum cihazı ve can halatının getirilmesi, kumandası ve giyilmesine yardımcı olur. Assist to bring 1st breathing apparatus, life line and wearing to breating apparatus and life line	1. EKİP FIRST TEAM
66	UFUK GÜNGÖR (OILER)	Solunum cihazı ve can halatının getirilmesi ,kumandası ve giyilmesine yardımcı olur. Assist to bring 1st breathing apparatus, life line and wearing to breating apparatus and life line	1. EKİP
19	ERSİN KANDEMİR (DECK OFFICER)	1. Ekip amiri olmadığında ekip amiridir. Gaz ölçüm cihazı kullanır.Tesis müdürüyle haberleşme sağlar. Stand by in order	1. EKİP FIRST TEAM
83	İBRAHİM SEVEN (OILER)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	1. EKİP
18	TANJU KUTLU (OILER)	Ekip amiri talimatıyla hareket eder Stand by in order	1. EKİP FIRST TEAM
14	GÖKSEL SİMSAR (OILER)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	1. EKİP
15	ÖMER ZEKİ KALYONCU (OILER)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	1. EKİP FIRST TEAM
67	AHMET AÇIKGÖZ (OILER)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	1. EKİP
17	SEDAT ORDU (OILER)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	1. EKİP FIRST TEAM
16	TAYFUN ESENDERE (MECH.MAINT.TECH.)	Ekip amiri talimatıyla hareket eder In order of team leader.	1. EKİP
26	MEMET KEMAL TOPAL (FITTER)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	1. EKİP FIRST TEAM
84	FARUK UZGÖREN (OILER)	Ekip amiri talimatıyla hareket eder In order of team leader.	1. EKİP
24	İRFAN KARAGÜLLE (OILER)	Ekip amiri talimatıyla hareket eder Stand by in order team leader	1. EKİP FIRST TEAM
23	ADEM ÖZTÜRK (OILER)	Ekip amiri talimatıyla hareket eder Stand by in order	1. EKİP

TEKNİK EKİP TECHNIC TEAM			
34	ENGİN ÖZCAN (SHIFT SUPERVISOR)	Teknik ekip amiridir.Plant manager Emrine göre hareket eder Stand by in order P.M	TEKNİK EKİP TECHNIC TEAM
45	OKTAY YILDIZ (SHIFT SUPERVISOR)	Teknik ekip amiridir (2).Plant manager Emrine göre hareket eder Stand by in order	TEKNİK EKİP TECHNIC TEAM
68	BAHATTİN ÖZÇELİK (ELC. ENGINEER)	Teknip ekip amiri talimatıyla hareket eder Stand by in order P.M	TEKNİK EKİP TECHNIC TEAM
69	MEHMET UYGUN (SENIOR. ELC.TECH.)	kapalı mahal deki aydınlatmayı sağlar,geçiş yollarının aydınlatılmasından sorumludur. in charge of enclosed spaces and passage ways lighting	TEKNİK EKİP TECHNIC TEAM
70	NEVZAT GÜNEŞ (SENIOR. ELC.TECH.)	Teknip ekip amiri talimatıyla hareket eder Stand by in order team leader	TEKNİK EKİP TECHNIC TEAM
36	TURGUT SELMAN TÜMER (ENGINEER)	Teknip ekip amiri talimatıyla hareket eder Stand by in order	TEKNİK EKİP TECHNIC TEAM
35	BİROL DÖNMEZ (ENGINEER)	Teknip ekip amiri talimatıyla hareket eder Stand by in order team leader	TEKNİK EKİP TECHNIC TEAM
38	YUSUF BURAK ARLI (ENGINEER)	Teknip ekip amiri talimatıyla hareket eder Stand by in order	TEKNİK EKİP TECHNIC TEAM
39	ALPER ESİRGER (ENGINEER)	kapalı mahaldeki aydınlatmayı sağlar,geçiş yollarının aydınlatılmasından sorumludur. in charge of enclosed spaces and passage ways lighting	TEKNİK EKİP TECHNIC TEAM
50	EREN DOĞRUYOL (ENGINEER)	kapalı mahaldeki aydınlatmayı sağlar,geçiş yollarının aydınlatılmasından sorumludur. in charge of enclosed spaces and passage ways lighting	TEKNİK EKİP TECHNIC TEAM
49	FATİH TOPAL (ENGINEER)	kapalı mahaldeki aydınlatmayı sağlar,geçiş yollarının aydınlatılmasından sorumludur. in charge of enclosed spaces and passage ways lighting	TEKNİK EKİP TECHNIC TEAM
46	ACARALP ATAHAN İÇLİ (ENGINEER)	kapalı mahaldeki aydınlatmayı sağlar,geçiş yollarının aydınlatılmasından sorumludur. in charge of enclosed spaces and passage ways lighting	TEKNİK EKİP TECHNIC TEAM
37	MUSTAFA KOCA (ENGINEER)	kapalı mahaldeki aydınlatmayı sağlar,geçiş yollarının aydınlatılmasından sorumludur. in charge of enclosed spaces and passage ways lighting	TEKNİK EKİP TECHNIC TEAM
47	NURİ SENAVER (ELC. TECH.)	kapalı mahaldeki aydınlatmayı sağlar,geçiş yollarının aydınlatılmasından sorumludur. in charge of enclosed spaces and passage ways lighting	TEKNİK EKİP TECHNIC TEAM
48	MUSTAFA YILMAZ (ENGINEER)	Teknip ekip amiri talimatıyla hareket eder Stand by in order	TEKNİK EKİP TECHNIC TEAM
İLK YARDIM EKİBİ FIRST AID SQUAD			
57	FAHRETTİN BULUT (HEALTH OFFICER)	İlk yardım ekibi amiridir .Tesis müdürüyle haberleşme sağlar. Leader of first aid suquad . communicates with plant manager	İLK YARDIM EKİBİ (FIRST AID TEAM)
58	ALİ ÇELİK/MERDAN SAPAROV (HEALTH OFFICER)	olay mahali yaralanma durumuna karşın ilk yardım çantası ve sedye ile hazır bekler . waiting in order with first aid kit and strecher	İLK YARDIM EKİBİ (FIRST AID TEAM)
60	İSMET ÖZTÜRK (COOK)	olay mahali yaralanma durumuna karşın ilk yardım çantası ve sedye ile hazır bekler . waiting in order with first aid kit and strecher	İLK YARDIM EKİBİ (FIRST AID TEAM)
61	ZEYNEL AYDIN (STEWARD)	olay mahali yaralanma durumuna karşın ilk yardım çantası ve sedye ile hazır bekler . waiting in order with first aid kit and strecher	İLK YARDIM EKİBİ (FIRST AID TEAM)
62	EMREN GÜLLER (COOK)	olay mahali yaralanma durumuna karşın ilk yardım çantası ve sedye ile hazır bekler . waiting in order with first aid kit and strecher	İLK YARDIM EKİBİ (FIRST AID TEAM)
63	RAMAZAN TOPRAK (MECH.MAINT.TECH.)	İlk yardım ekibine yardım eder Assist for aid squad team	İLK YARDIM EKİBİ (FIRST AID TEAM)

DESTEK EKİBİ SUPPORT TEAM			
64	MEVLÜT YURTSEVEN (HSE SPECIALIST)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
8	OSMAN ÖZGÜR ÇİÇEK (SENIOR MECHANICAL TECH.)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
9	SEMİR ARACI (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
10	MEHMET BOZAN (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
11	GÜROL ERGİN (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
12	FATİH KARAGÖZ (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
13	TURGUT KAYA (MAINT.TECH.)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
21	GÖKSEL SİMSAR (OILER)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
22	KADER KAR (OILER)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
25	AHMET ÖZBEY (YAĞCI)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
27	(YAĞCI)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
28	FATİH MEHMET AKYOL (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
29	YAŞAR TÜRKAN (SENIOR FITTER)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
30	GÖKHAN ÇELİK (FITTER)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
31	DURMUŞ YILDIRIM (FITTER)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
32	İSMAİL BAL (SENIOR FITTER)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
33	AYHAN ORAN (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
40	ZİYA SOLAKOĞLU (ENGINEER)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
41		Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
42	ALİ YANAR (MECH.MAINT.TECH.	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
43	TACETTİN SERT (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
44	İSMAİL ÖZ (MECH.MAINT.LEADER)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
51	BARIŞ FETTAHOĞLU (OILER)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
52	RIDVAN ÜCAR (ELEC. TECHNICIAN)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
53	MEHMET ÇELİK (FITTER)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
54	(ENGINEER)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM

55	MEHMET CEM GÖKPINAR (ENGINEER)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
59	GÜNER GÜLLER (OILER)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
65	FARUK ÖZYİĞİT (MECH.MAINT.TECH.)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
71	SEDAT TATAR (ELC. TECH.)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
72	FERDİ ŞAHİN (ELC.TECH.)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
73	İBRAHİM ÇOLAK (ELC.TECH.)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
74	MEHMET KAHRAMAN (ELC.TECH.)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
75	NEBİ BAĞCI (ELC.TECH.)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
76	HALİS TURGUT (ELC.TECH.)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
77	AYDIN GÖKSU (FITTER)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
78		Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
79	AYHAN GEBEŞ (MECH.MAINT.TECH.)	Toplanma mahaline gider.Tesis Müdürü talimatıyla hareket eder. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
80	YAVUZ ATASOY (REPORTING SPECIALIST)	Toplanma mahaline gider.Tesis Müdürü talimatıyla hareket eder. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
81	ÜNAL MULLA (WAREHOUSE STAFF)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
82	SERDAR ALTIOK (CHEMIST)	Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
85	LEVENT EMRE (OILER)	Toplanma mahaline gider.Tesis Müdürü talimatıyla hareket eder. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
86		Toplanma mahaline gider.Tesis Müdürü talimatıyla hareket eder. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM
87		Toplanma yerinde emre hazır bekler. Goes to muster station and wait for order	DESTEK EKİBİ SUPPORT TEAM

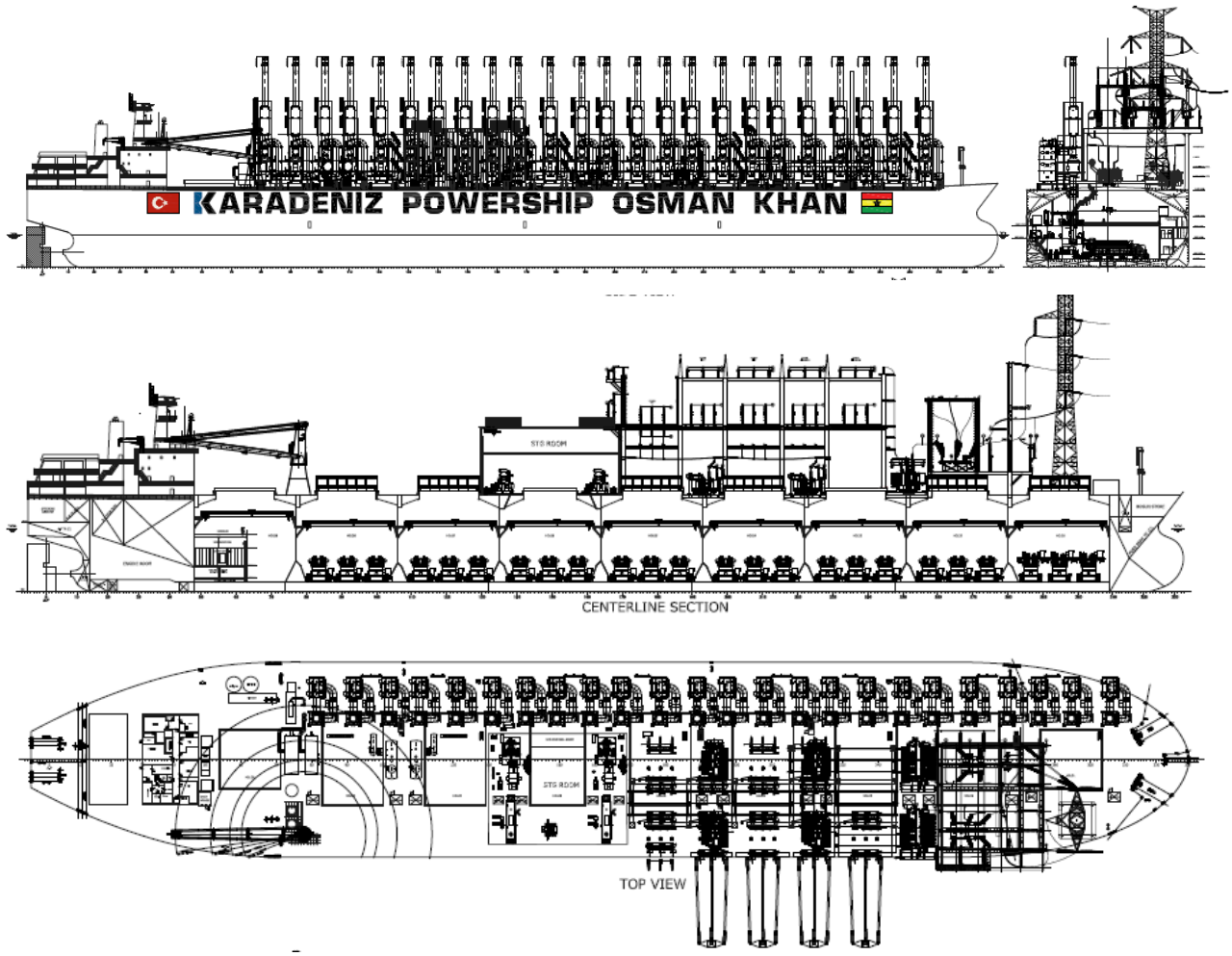
ALARMLAR (ALARMS)

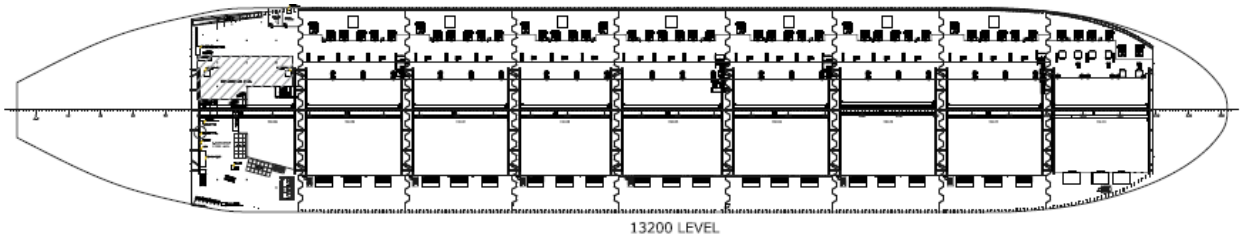
ACİL DURUMLAR(EMERGENCIES)	İŞARET (SIGNALS)	AÇIKLAMA (EXPLANATION)	
YANGIN ALARMI (FIRE ALARM)		Genel alarmın kısa fasılalı sürekli çalması Following continnois intervals short sound	Görevliler techizatlarıyla görev yerlerine gelir Duty crew to arrive Muster Station to receive their instruction
GENEL ALARM (GENERAL ALARM)		Genel alarmın kesintisiz sürekli çalması + Anons Following to the continous general alarm signal + Announce	

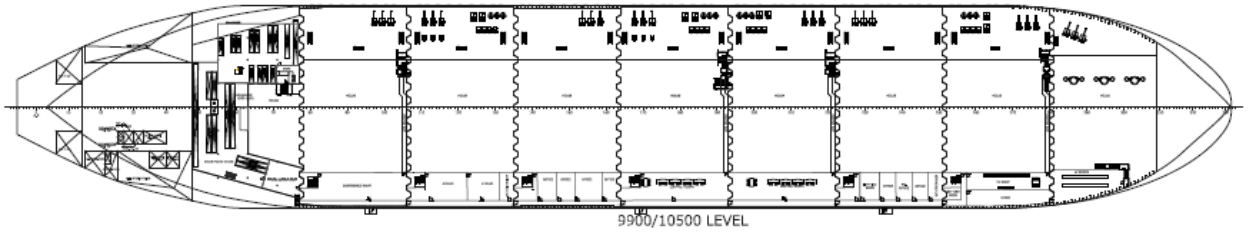
ACİL DURUM ALARMINA MÜTEAKİP ACİL DURUMUN TİPİ ANONS EDİLİR VE GÖREVLİLER DURUMA MÜDAHELE EDER.
(THE TYPE OF EMERGENCY TO BE DECLERATED AT MUSTER STATION FOLLOWING THE EMERGENCY ALARM SIGNAL AND THE DUTY CREW INTERVENTION STARTS)
PANİĞE KAPILMA- ROLE KARTINI AL- TOPLANMA İSTASYONUNA GİT- KENDİNİ RAPORET
DO NOT PANIC- TAKE YOUR MUSTER CARD- GO TO YOUR MUSTER STATION- REPORT YOURSELF

7.9. Plant General Layout Plan

General Layout Plan of Karadeniz Powership Osman Khan is given below.




13200 LEVEL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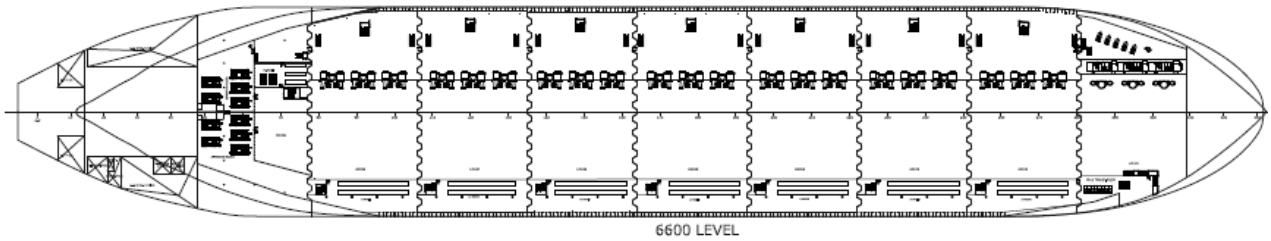
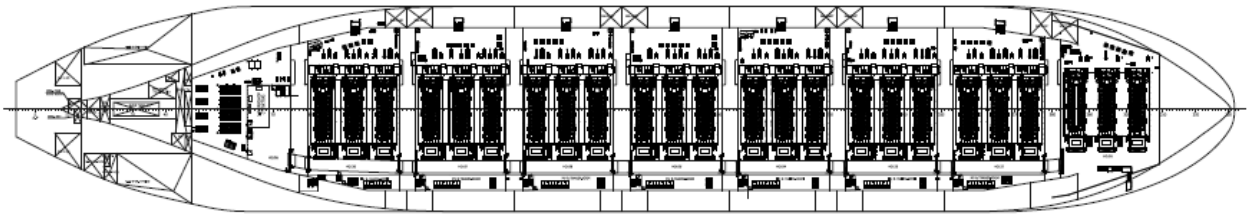
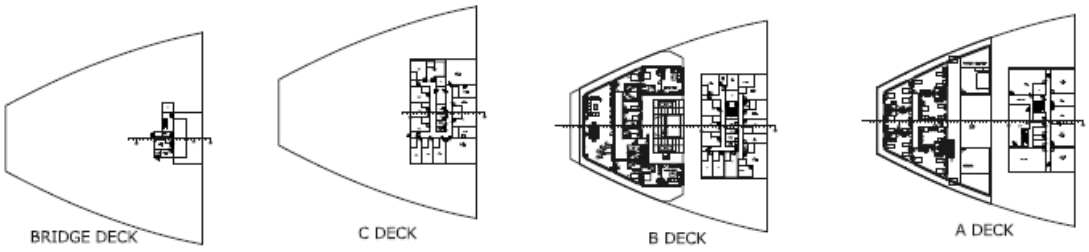
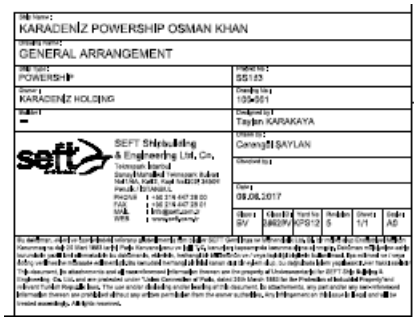
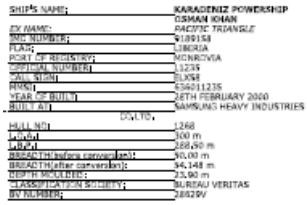

6600 LEVEL


1600 LEVEL

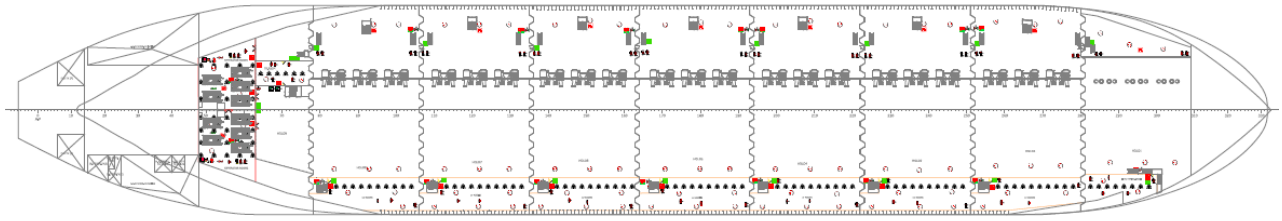

BRIDGE DECK C DECK B DECK A DECK


KARADENİZ POWERSHIP OSMAN KHAN
GENERAL ARRANGEMENT
POWERSHIP
KARADENİZ HOLDING
SEFT SHIPBUILDING & ENGINEERING LTD. CO.
09.06.2017


SHIP'S NAME: KARADENIZ POWERSHIP OSMAN KHAN
BUILT AT: SAMSUNG HEAVY INDUSTRIES

7.10. Plant Fire Plan

Fire Plan of Karadeniz Powership Osman Khan is given below.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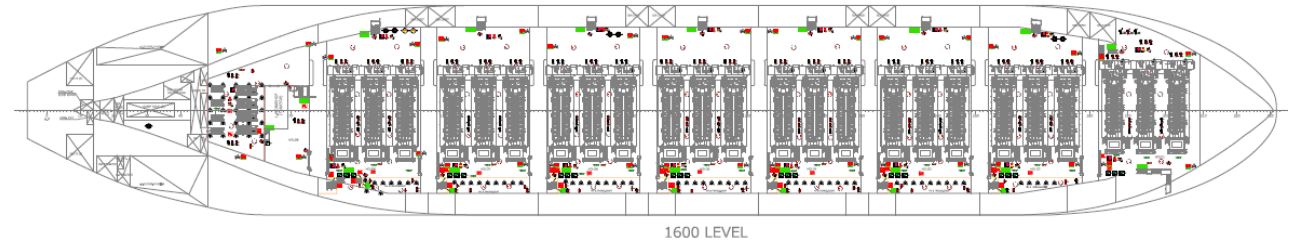
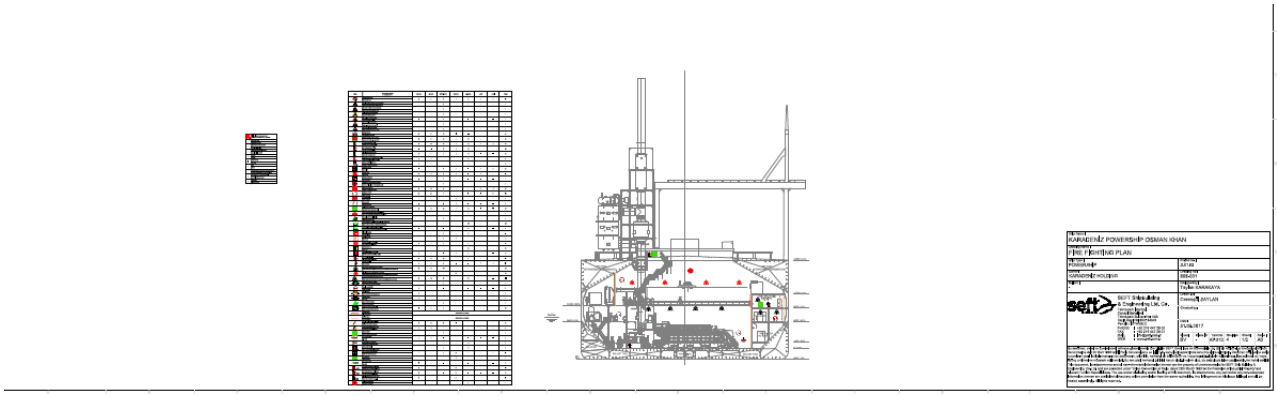
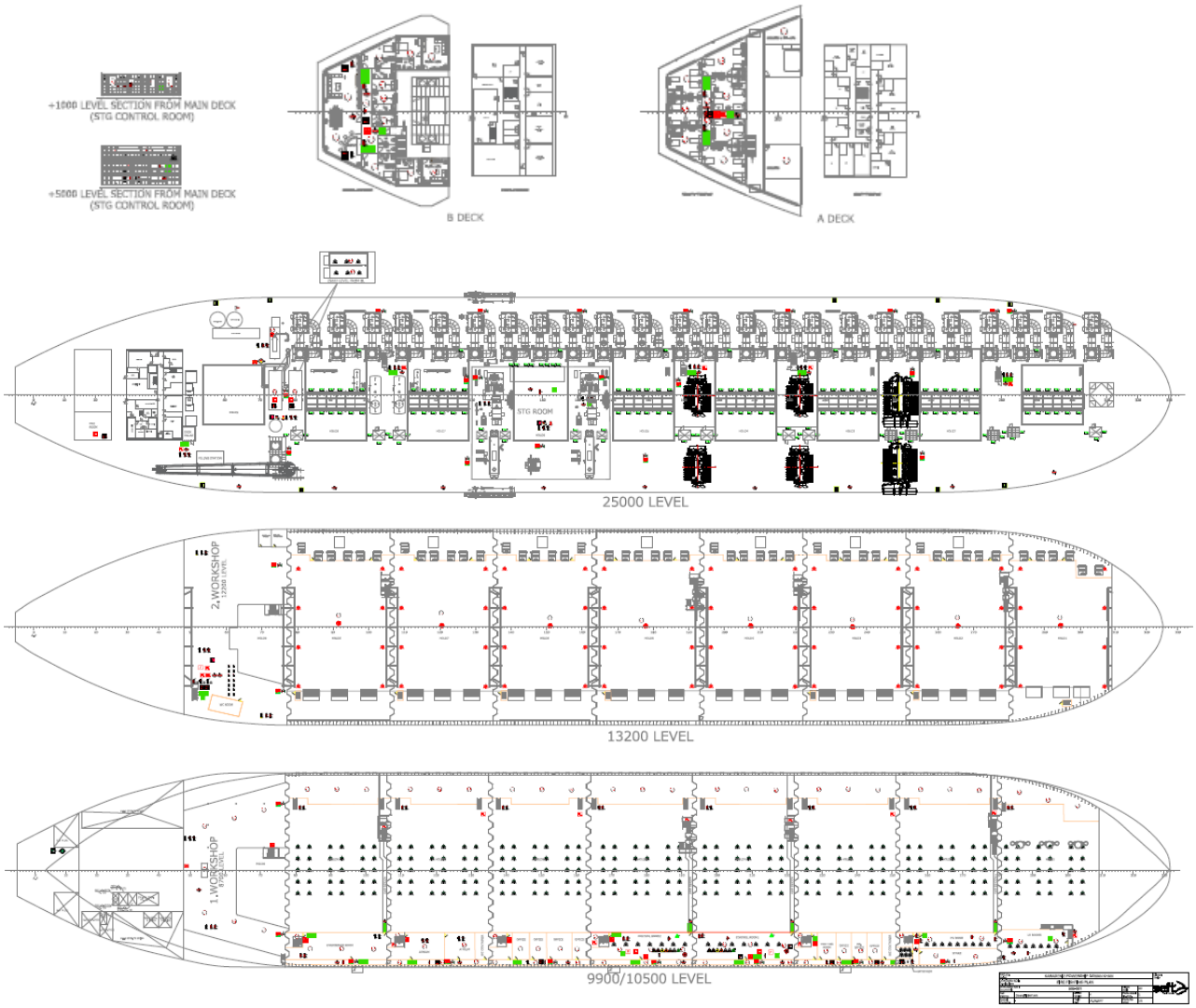
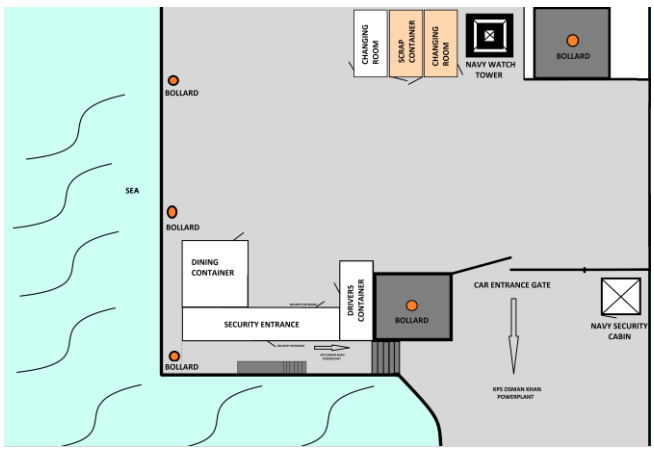

1600 LEVEL

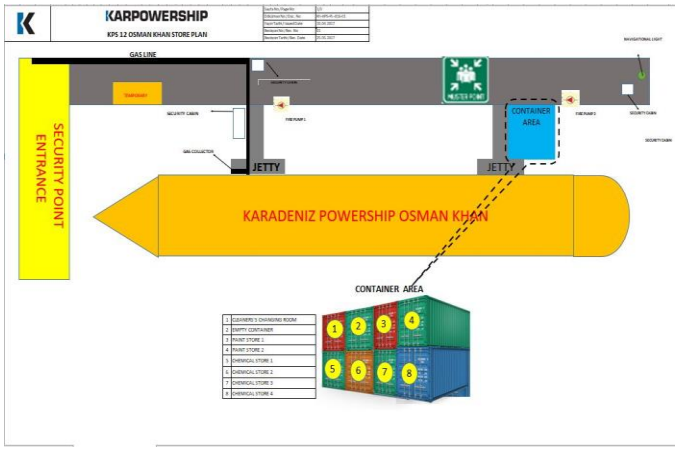




7.11. Muster Point & Evacuation Plans

Muster point/s and Evacuation Plan of Karadeniz Powership KPS 12 are given below.





8. REPORTING

QDMS

KH-KPS-FR-023 Record of Safety Drills Form

KH-HSE-FR-004 Incident Investigation and Reporting Form

KH-KPS-FR-024 Emergency Response Checklist

KH-KPS-FR-006 Training Record Form KH-KPS-FR-177 Heavy Weather Emergency Checklist

RELATED DOCUMENTS

KH-KPS-FR-175 Emergency Contact List Form

Plant Role Chart

Plant General Layout Plan

Plant Fire Plan

9. REFERENCES

KH-HSE-PR-011 Emergency Response Procedure

KH-HSE-PL-001 Occupational Health and Safety and Environmental Plan

Standart Article 4.4.7 Emergency Preparation and Response

ISO 14001: 2015 Environmental Management System Standard Article 8.2 Emergency Preparation and Response

KH-HSE-PR-025 Incident Reporting and Investigation Procedure

MARPOL 73/78 - Annex I

IFC Environmental Health and Safety Guidelines 2.0 Occupational Health and Safety

10. REVISION FOLLOW-UP

REVISION FOLLOW-UP

Rev. No	Rev. Date	Revision Definition	Prepared By
0	20.02.2019	First preparation of the document	Ferdi Aşılıoğlu
01	16.09.2019	Relocation another port (Takoradi -Sekondi)	Erdi SAKALLI
02	19.01.2020	Gas Conversion	Mevlüt YURTSEVEN
03	01.06.2020	Pandemic (Epidemic Disease)	Mevlüt YURTSEVEN

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/14/12/16/3/3/2007
Date Received:	02 November 2020

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

The Proposed Gas to Power Powership Project at the Port of Richards Bay, Umhlathuze Local Municipality, King Cetshwayo District, Kwazulu-Natal.

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

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Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	Major Hazard Risk Consultants			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	N/A
Specialist name:	Terence Thackwray			
Specialist Qualifications:	BSc Environmental Management – Chemistry			
Professional affiliation/registration:	SANAS 17020 Registration MHI0017			
Physical address:	13 Slade Street, Tableview			
Postal address:	13 Slade Street, Tableview			
Postal code:	7441	Cell:	083 746 8933	
Telephone:	021 426 5688	Fax:		
E-mail:	terence@mhrconsultants.co.za			

2. DECLARATION BY THE SPECIALIST

I, Terence Thackwray, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

Major Hazard Risk Consultants

Name of Company:

11 October 2022

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Terence Thackwray, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

Major Hazard Risk Consultants

Name of Company

12 October 2022

Date

7162650-6

Signature of the Commissioner of Oaths

Date

SUID-AFRIKAANSE POLISIEDIENS
GEMEENSKAPSDIENSSENTRUM
12 OCT 2022
COMMUNITY SERVICE CENTRE
MELKBOSSTRAND
SOUTH AFRICAN POLICE SERVICE

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/14/12/16/3/3/2006
Date Received:	08 October 2020

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

The Proposed Gas to Power Powership Project at the Port of Saldanha Bay and associated evacuation route within Saldanha Bay Local Municipality, West Coast District, Western Cape.

Kindly note the following:

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Email: EIAAdmin@environment.gov.za

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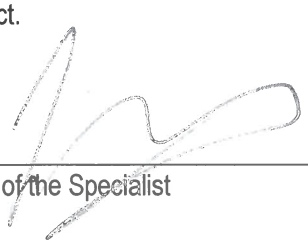

Signature of the Specialist

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Name of Company:

11 October 2022

Date

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Signature of the Specialist

Major Hazard Risk Consultants

Name of Company

12 October 2022

Date

7162650-6
SF BOTHA

Signature of the Commissioner of Oaths

SUID-AFRIKAANSE POLISIEDIENS
GEMEENSKAPSDIENSSENTRUM
12 OCT 2022
COMMUNITY SERVICE CENTRE
MELKBOSSTRAND
SOUTH AFRICAN POLICE SERVICE

Date

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/14/12/16/3/3/2005
Date Received:	08 October 2020

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

The Proposed Gas to Power Powership Project at the Port of Ngqura within the Coega SEZ, Nelson Mandela Bay Metropolitan Municipality, Eastern Cape

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