



ElectroGas Malta Project

Internal Emergency Plan – Containment, Detection,
ESD and Fire Fighting Systems

21st September 2016

ENEM-AEC-E0-00-RP-SE-00015 REV 02

Prepared for:
ElectroGas Malta Limited

<i>Rev</i>	<i>Date</i>	<i>Details</i>	<i>Prepared by</i>	<i>Reviewed by</i>	<i>Approved by</i>
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01	11/07/2016	Revised from comments	S Hartz Process Safety	K Aplin Technical Director	K Aplin Technical Director
02	21/09/2016	Final version	S Hartz Process Safety	K Aplin Technical Director	K Aplin Technical Director

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1 INTRODUCTION

1.1 Objective

This document describes the Containment Systems, the Fire, Spill and Gas Detection Systems, the Emergency Shut Down Systems and the Fire Fighting Systems, for the FSU, the Delimara LNG Regasification Terminal (Regasification Compound and Jetty) and the Delimara 4 Power Plant (CCGT).

1.2 Reference Documents

The reference documents are tabulated below:

Reference	Designation	Issued by	Date
ENEM-AEC-E0-00-RP-SE-00005	Safety Report - Description of the Environment	AECOM	21/09/2016
ENEM-AEC-E0-00-RP-SE-00004	Safety Report - Description of the Installations	AECOM	21/09/2016
ENEM-AEC-E0-00-RP-SE-00003	Safety Report - Hazard Identification	AECOM	21/09/2016
OPS-MALT-ALM-MAR-MAN-003 - R1	Cargo Operations Manual	Bumi Armada	
ENEM-JPA-E2-00-DR-ME-00044	General Plant Layout	J&P Avax	24/03/2015
ENEM-JPA-E2-00-DR-IC-00009	Fire Gas and Spill Detection System Functional Principle	J&P Avax	02/09/2015
ENEM-JPA-E2-00-RP-IC-00016	Fire, Spill & Gas Detection and Protection System Control Description	J&P Avax	03/11/2015
ENEM-JPA-E2-00-RP-ME-00047	LNG Regasification Terminal ESD Philosophy	J&P Avax	30/04/2015
ENEM-JPA-E2-00-RP-IC-00015	Emergency Shutdown System Control Description	J&P Avax	03/11/2015
ENEM-JPA-E2-00-RP-ME-00027	Fire Fighting System Concept	J&P Avax	17/02/2015
ENEM-JPA-E2-00-RP-ME-00028	Fire Water Requirements Calculation Report	J&P Avax	29/12/2015
ENEM-JPA-E2-00-RP-ME-00052	Fire Fighting Pumps - Philosophy of Operation	J&P Avax	25/09/2015
ENEM-JPA-E2-00-RP-HS-00010	Passive Fire Protection Design Basis	J&P Avax	02/03/2016
ENEM-SIT-E1-00-RP-ME-00045	Explosion Protection Concept	Siemens	12/05/2015
ENEM-SIT-E1-00-RP-ME-00046	Fire Protection Concept	Siemens	12/05/2015

Table 1: Reference Documents

1.3 Glossary

BOG	Boil-Off Gas
CCGT	Combined Cycle Gas Turbine
CO₂	Carbon Dioxide
CWS	Cooling Water System
D3PP/D3PS	Delimara 3 Power Plant/Delimara 3 Power Station
D4PP/D4PS	Delimara 4 Power Plant/Delimara 4 Power Station
DH	Dry Hydrant
EGM	ElectroGas Malta Ltd
FSU	Floating Storage Unit
GRS	Gas Receiving Station
IEP	Internal Emergency Plan
IFV	Intermediate Fluid Vaporizers
IHC	Indoor Hose Cabinet
KO	Knock-Out
LNG	Liquefied Natural Gas
NG	Natural Gas
OHC	Outdoor Hose Cabinet
PID	Process and Instrument Diagram
RGU	ReGasification Unit
WC	Water Column
WH	Wet Hydrant
[TBC]	To Be Completed

2 LNG SPILLS CONTAINMENT SYSTEMS

Potential LNG spills can be collected, safely confined and controlled in the following containment systems:

Area	Equipment	Product	Length (m)	Width (m)	Height (m)	Volume (m ³)
FSU	Tanks (5) Bottom Drip Pan	LNG	2.70	1.70	0.25	1.15
	Port Manifold Drip Tray	LNG	9.56	1.50	0.20	2.87
Regasification Unit	Impounding Basin	LNG	2.5	2.0	3.0	15.0
	Flare KO Drum Pit	LNG	11.0	7.0	5.5	423.5

Table 2: LNG Spills Containment Systems

At the FSU, each tanks bottom drip pan is fitted with an injection pump (“eductor” system) which sends LNG back to the tank through a dedicated LNG line.

At the Regasification Unit, the impounding basin is fitted with a drainage valve, normally open to sea and which closes in the case of LNG spill detection (low temperature). The flare KO drum pit is fitted with 2 drain pumps to spillage channel, which stop in the case of LNG spill detection.

3 FIRE, SPILL AND GAS DETECTION SYSTEMS

Refer to **APPENDIX 1: FIRE, SPILL AND GAS DETECTION LAYOUTS**.

3.1 FSU

Fire and Gas Detection System at the FSU is installed as follows:

Subzone	Risk	# Fire detectors Flame, smoke and heat	# Gas detectors	# Manual Call Points
Cargo tanks' drip pan	LNG/BOG	-	1 x 5 tanks	-
Cargo tanks' hold top	LNG/BOG	-	1 x 5 tanks	-
Cargo tanks' upper insulation space	LNG/BOG	-	1 x 5 tanks	-
Cargo tanks' lower insulation space	LNG/BOG	-	1 x 5 tanks	-
Compressors room	BOG	7	2	-
Engine control room / Engine room	BOG/Diesel / Lube oil	circa 120	4	17
IG generator room	Various	5	-	1
Emergency generator room	Various	2	-	1
Drain tank air vent	Various	-	1	-
Cofferdam	Various	-	1	-
Bow thruster room	Various	-	1	-
Boat Sn room	Various	-	1	-
Hydraulic pump unit room	Various	-	2	-
Accommodations (including cargo control room)	Various	circa 110	8	12

Table 3: Gas and Fire Detection System at the FSU

3.2 Delimara LNG Regasification Terminal

Fire, Spill and Gas Detection System at the Delimara LNG Regasification Terminal is installed as follows:

Subzone	Risk	# Fire detectors	# Spill detectors	# Gas detectors	# Manual Call Points
Jetty	LNG/BOG	2	2	4	3
Fire fighting pumps	Diesel	1	-	-	1
NVCC	LNG/BOG	1	2	4	1
Impounding basin	LNG	-	2	-	1
Suction drum	LNG	2	2	6	1
LNG pumps	LNG	2	4	4 x 6	1
IFV	LNG/NG	2	4	2 x 6	1
BOG compressors	NG	4	-	13	2
Utilities building	Various	1	-	2	1
WG pumps	Lube oil	2	-	-	1
Electrical building	Transformer oil	3	-	4	3
D3PP GRS	NG	1	-	2	1
D4PP GRS	NG	-	-	2	1
CWS building	Lube oil	2	-	-	1

Table 4: Gas, Fire and Spill Detection System at the Delimara LNG Regasification Terminal

3.3 Delimara 4 Power Plant

Fire and Gas Detection Systems at the Delimara 4 Power Plant is installed as follows:

Building / Area	Risk	Fire & gas detection
Gas insulated switchgear building (50UAB)	PVC / Various	Smoke
Electrical & control building (50UBA11)	Various	Smoke
Electrical building (50UBA12)	Various	Smoke
Battery module 1, 2, 3 (51/52/53UBA13)	PVC	Smoke
GT electrical and control module 1, 2, 3 (51/52/53UBA14)	PVC	Smoke / Heat
Auxiliary transformer 1, 2 (51/53UBE)	Transformer oil	Control sprinkler
Step up transformer (ST, GT) (50/51/53UBF)	Transformer oil	Control sprinkler
Standby diesel (50UBN)	Diesel / PVC	Flame / Smoke
CEMS container HRSG 1, 2, 3 (51/52/53UCH)	Various	Smoke
Gas preheater (container) (50UEN10)	Fuel gas (NG) / PVC	Gas Flame / Smoke
Gas receiving station (container) (50UEN01)	Fuel gas (NG)	See Table 4
Heat recovery steam generator (open structure) (51/52/53UHA)	Various	-
Feed water pumps (50ULA)	Lube oil	-
Steam turbine package (50UMA)	Oil / Lube oil / Hydraulic oil	Smoke / Sprinkler
Gas turbine package (51/52/53UMB)	Fuel gas / Oil	Gas Flame and heat / Smoke
Admin CCR & workshop building (50UYC/UST) including control room	PVC / Various / Chemicals	Smoke / Heat

Table 5: Gas and Fire Detection System at the Delimara 4 Power Plant

5 FIRE FIGHTING SYSTEMS

Refer to **APPENDIX 3: FIRE FIGHTING PI&DS AND LAYOUTS**.

5.1 FSU

5.1.1 Fire Fighting Pumps

Fire Fighting Pumps at the FSU are designed as follows:

Reference	Designation	Flowrate	Pressure	Water supply	Driver type	Location
-	Fire pumps (x2)	90/220 m ³ /h	115/30 m WC	Sea water		Floor / Engine room
-	Emergency fire pump (x1)	40 m ³ /h	95 m WC	Sea water		3 rd deck
-	Sprinkler cum inert gas scrubber pump	480/1300 m ³ /h	75/60 m WC	Water		Floor / Engine room

Table 9: Fire Fighting Pumps at the FSU

5.1.2 Fixed Fire Fighting Systems

Fixed Fire Fighting Systems at the FSU are designed as follows:

System	Designation	Number of units	Location	Feed Pumps
Sea Water Fire Extinguishing System	Fire hydrant (with coupling)	23	Weather deck	Fire pumps Emergency fire pump
		3	Steering gear box, Boatswain's store	
		13	Engine room	
		12	Residence area deck	
	Fire hose & nozzle	9	Weather deck	Fire pumps Emergency fire pump
		3	Steering gear box, Boatswain's store	
		13	Engine room	
		5	Residence area deck	
	Fire hose	5	Weather deck	Fire pumps Emergency fire pump
Dry Powder Fire Extinguishing System	Hand hose	20	Weather deck	-
	Fixed monitor	2	Port and starboard manifolds	-
Sprinkler System	Spray nozzles	270	Manifolds Compressors room Cargo tanks domes Accommodation front side	Sprinkler cum inert gas scrubber pump

System	Designation	Number of units	Location	Feed Pumps
Carbon Dioxide Fire Extinguishing System	CO ₂ release cabinet CO ₂ nozzle		Engine room Compressor room Inert Gas generator	-

Table 10: Fixed Fire Fighting Systems at the FSU

5.1.3 Portable Fire Extinguishers

Portable fire extinguishers are installed for all areas of the FSU. The following types of extinguishers are used:

- CO₂ extinguishers;
- Dry powder extinguishers;
- Foam extinguishers.

5.1.4 Passive Fire protection

At the FSU, the accommodation area is provided with Class A and Class B Fire Divisions. The accommodation front side is reinforced and fire protected.

5.2 Delimara LNG Regasification Terminal

At the Delimara LNG Regasification Terminal, including the jetty platform and D3PP/GRS, the Fire Fighting System can be actuated automatically via the automatic detectors, manually remotely via the fire & gas detection system interface or manually mechanically by opening the manual release valve located at the appropriate valve station.

5.2.1 Fire Fighting Pumps

Fire Fighting Pumps at the Delimara LNG Regasification Terminal are designed as follows:

Reference	Designation	Flowrate	Pressure	Water supply	Driver type	Location
12SGA20 AP001	Primary fire pump	3060 GPM	108 m WC	Sea water	Diesel engine	Jetty
12SGA10 AP001	Secondary fire pump	3000 GPM	108 m WC	Sea water	Electric motor	Jetty
12SGA30 AP001	Jockey pump	20 m ³ /h	108 m WC	Fresh water	Electric motor	Regasification compound

Table 11: Fire Fighting Pumps at the Delimara LNG Regasification Terminal

5.2.2 Fire Water Tanks

Fire Water Tanks at the Delimara LNG Regasification Terminal are designed as follows:

Reference	Designation	Volume	Type	Location	Feed Water
-	Sea water to fire pumps	-	-	Jetty	Sea
12SGA60 BB001	Water tank to jockey pumps	11 285 lt	Vertical drum	Regasification compound	Enemalta

Table 12: Fire Water Tanks at the Delimara LNG Regasification Terminal

5.2.3 Water Spray Deluge and Water Curtain Systems

Water Spray Deluge and Water Curtain Systems at the Delimara LNG Regasification Terminal are designed as follows:

Reference	Designation	Number of nozzles	Flowrate / nozzle	Total flowrate	Location	Feed Pumps
-	Jetty water curtain	3	1200 lt/min	3600 lt/min	Jetty platform	Main fire fighting pumps
-	BOG compressors building side wall water curtain	18	161.66 lt/min	2909.88 lt/min	BOG compressors building	Main fire fighting pumps
-	BOG compressors lube oil area water spray deluge	5	20.47 lt/min	102.35 lt/min	BOG compressor 12EKH10 AN001	Main fire fighting pumps
		5	20.47 lt/min	102.35 lt/min	BOG compressor 12EKH10 AN001	Main fire fighting pumps
		5	20.47 lt/min	102.35 lt/min	BOG compressor 12EKH10 AN001	Main fire fighting pumps
-	IFV water deluge	28	25.43 lt/min	712.04 lt/min	IFV 12EGA80 AC001	Main fire fighting pumps
		28	25.43 lt/min	712.04 lt/min	IFV 12EGA90 AC001	Main fire fighting pumps
-	Transformers water deluge	28+1+4	27.22 + 69.57 + 27.22 lt/min	762.16 + 69.57 + 108.88 lt/min	Transformer 12BBT10 (upper and lower area + bottom surface+oil tank)	Main fire fighting pumps
		20+1	27.22 + 33.13 lt/min	544.4 + 33.13 lt/min	Transformer 12BFT10 (upper and lower area + bottom surface)	Main fire fighting pumps
		20+1	27.22 + 33.13 lt/min	544.4 + 33.13 lt/min	Transformer 12BFT20 (upper and lower area + bottom surface)	Main fire fighting pumps

Reference	Designation	Number of nozzles	Flowrate / nozzle	Total flowrate	Location	Feed Pumps
		16+1	27.22 + 18.81 lt/min	435.52 + 18.81 lt/min	Transformer 12BFT30 (upper and lower area + bottom surface)	Main fire fighting pumps
		16+1	27.22 + 18.81 lt/min	435.52 + 18.81 lt/min	Transformer 12BFT30 (upper and lower area + bottom surface)	Main fire fighting pumps
-	Emergency diesel generator	6	83.90 lt/min	503.40 lt/min	Regasification compound	Main fire fighting pumps

Table 13: Water Spray Deluge and Water Curtain Systems at the Delimara LNG Regasification Terminal

The purpose of water spray deluge systems is for exposure protection: equipment subjected to radiation will not reach unacceptably high local temperatures.

Water curtain are installed in order to mitigate gas releases and protect against radiant heat. Water curtain system will rapidly lower the gas concentration in case of an LNG vapour cloud in order to attain the lower flammability limit of gas in air. In addition, water curtain will entrain large volumes of air that transfer additional heat, will dilute the LNG vapour or BOG/NG cloud, thus enhancing its buoyancy and facilitating its dispersion.

5.2.4 Water Hydrants

Water Hydrants at the Delimara LNG Regasification Terminal are designed as follows:

Reference	Designation	Flowrate	Pressure	Location	Feed Pumps
WH-1	Wet barrel hydrant #1	> 63 lt/s	mini. 7	Jetty	Main fire fighting pumps
WH-2	Wet barrel hydrant #2	> 63 lt/s	mini. 7	Jetty	Main fire fighting pumps
WH-3	Wet barrel hydrant #3	> 63 lt/s	mini. 7	Jetty	Main fire fighting pumps
WH-4	Wet barrel hydrant #4	> 63 lt/s	mini. 7	Jetty	Main fire fighting pumps
WH-5	Wet barrel hydrant #5	> 63 lt/s	mini. 7	Jetty	Main fire fighting pumps
WH-6	Wet barrel hydrant #6	> 63 lt/s	mini. 7	Jetty	Main fire fighting pumps
WH-7	Wet barrel hydrant #7	> 63 lt/s	mini. 7	Jetty	Main fire fighting pumps
DH-1	Dry barrel hydrant #1	> 100 lt/s	mini. 7	Regasification compound	Main fire fighting pumps
DH-2	Dry barrel hydrant #2	> 100 lt/s	mini. 7	Regasification compound	Main fire fighting pumps
DH-3	Dry barrel hydrant #3	> 100 lt/s	mini. 7	Regasification compound	Main fire fighting pumps
DH-4	Dry barrel hydrant #4	> 100 lt/s	mini. 7	Regasification compound	Main fire fighting pumps
DH-5	Dry barrel hydrant #5	> 100 lt/s	mini. 7	Regasification compound	Main fire fighting pumps

Table 14: Water Hydrants at the Delimara LNG Regasification Terminal

5.2.5 Water Monitors

Water Monitors at the Delimara LNG Regasification Terminal are designed as follows:

Reference	Designation	Flowrate	Pressure	Location	Feed Pumps
WM-1	Remote operated wter monitor #1	> 2500 lt/min	mini. 7	Jetty platform	Main fire fighting pumps
WM-2	Remote operated wter monitor #2	> 2500 lt/min	mini. 7	Jetty platform	Main fire fighting pumps

Table 15: Water Monitors at the Delimara LNG Regasification Terminal

5.2.6 High Expansion Foam Systems

High Expansion Foam Systems at the Delimara LNG Regasification Terminal are designed as follows:

Reference	Designation	Number of foam generator	Flowrate / nozzle	Total flowrate	Location	Feed water
-	Impounding basin	2	27x560=15120 lt/min	30240 lt/min	Regasification compound	Main fire fighting pumps
-	Flare KO drum pit	2	82x550=45100 lt/min	90200 lt/min	Regasification compound	Main fire fighting pumps

Note: $Q_{\text{Foamgenerator}} = Q_{\text{Water}} \times \text{High expansion foam}$.

Table 16: High Expansion Foam Systems at the Delimara LNG Regasification Terminal

The purpose of these foam systems is to prevent vaporization of LNG in case of an LNG spillage and to prevent and limit the extension of fire in case the LNG vapour ignites.

5.2.7 Other Fire Fighting Systems

Each hydrant location is provided with an Outdoor Hose Cabinet (OHC) containing the following equipment:

- two (2) adjustable mist/solid stream nozzles;
- one (1) hydrant spanner;
- four (4) coupling spanners;
- two (2) hose coupling gaskets;
- two (2) x Ø 2-½", 25 m fire hose;
- Weatherproof list of contents.

In addition, a standpipe and Indoor Hose Cabinets (IHC) are installed in the BOG compressors building; the Control & electrical building; and the Air compressor & nitrogen generation building. These are connected to the fire fighting main network. Each hose cabinet contains the following equipment:

- one (1) landing valve brass 2" with 1½" BS 336 aluminium coupling;

- one (1) 30mx1½" (40mm) fire hose, fitted with aluminium alloy 1 ½" BS 336 couplings;
- one (1) branch-pipe with shut-off valve 3 position (0/jet/spray) with aluminium alloy 1 ½" BS 336 coupling.

There is a 2 ½" international ship to shore connection to connect to a tug boat or the FSU to provide a back-up fire water supply for the jetty. Four 2 ½" international connection to connect to a fire truck to provide back-up fire water is also installed in the Regasification compound, close to the dry barrel hydrant #3, between the BOG compressors building and the Air compressor & nitrogen generation building.

Portable fire extinguishers are installed in all areas of the Regasification compound and the jetty. The following types of extinguishers are deployed:

- CO₂ extinguishers for Control & electrical building;
- Dry chemical extinguishers for process areas (BOG compressor area, IFVs area, Air compressor & nitrogen generation building and jetty);
- Foam extinguishers for BOG compressor area;
- Fire & gas detection and fire protection equipment at the CCGT are tabulated in the following table.

5.2.8 Passive Fire Protection

The main objectives of Passive Fire Protection are:

- To limit the escalation of fire between adjacent areas;
- To minimize the possibility of collapse of steel work supporting equipment containing flammable materials in a fire, the release of which would add materially to the intensity of a fire and to the problems and hazards of fire fighting;
- To protect vital safety equipment (and associated power and signal cables) for a period sufficient to permit them to fulfil their function;
- To provide sufficient time for personnel escape from the area;
- To provide sufficient time for active fire fighting systems to be applied.

At the Regasification Plant, the Control & Electrical Building is designed with reinforced concrete and concrete block wall with thermal insulation.

Fireproofing using cellular glass is provided for the following structures/equipment: IFVs, LNG pumps suction drum, main LNG pumps, small scale LNG pumps, steel supports of main LNG pumps and small scale LNG pumps.

Fireproofing using intumescent epoxy coating is provided for the steel structure supporting LNG suction drum.

Critical cables are also fireproofed. ESD valves will be fire protected with fire blankets providing a 30-minute protection.

5.3 Delimara 4 Power Plant

5.3.1 Fire Water Distribution

With regards to the fire fighting system for the Delimara 4 Power Plant, the fresh water from Enemalta is solely used for the transformer area, all other requirements are met from the connection to Enemalta's sea water firefighting system.

At the Enemalta Power Plant there are two (2) fire water pumps are available for the sea water hydrant system, one (1) electrical fire pump and one (1) back-up diesel-fuelled fire pump both with a flow of 820 m³/h at 9 barg. The seawater system is maintained at 10 barg with a jockey pump. In addition there are two (2) fire water pumps are available for the fresh water hydrant system, one (1) electrical fire pump and one (1) back-up diesel-fuelled fire pump both with a flow of 630 m³/h at 8 barg. The maximum available volume of fresh water is 330 m³ in 24 hours.

5.3.2 Fire Fighting Systems

Fire Fighting Systems at the Delimara 4 Power Plant are designed as follows:

Building / Area	Risk	Fire protection
Gas insulated switchgear building (50UAB)	PVC / Various	Clean agent system (automatic/manual) Dry chemical and CO ₂ portable extinguishers
Electrical & control building (50UBA11)	Various	Clean agent system (automatic/manual) Dry chemical and CO ₂ portable extinguishers
Electrical building (50UBA12)	Various	Clean agent system (automatic/manual)
Battery module 1, 2, 3 (51/52/53UBA13)	PVC	Dry chemical and CO ₂ portable extinguishers
GT electrical and control module 1, 2, 3 (51/52/53UBA14)	PVC	Dry chemical and CO ₂ portable extinguishers
Auxiliary transformer 1, 2 (51/53UBE)	Transformer oil	Spray deluge system (automatic/manual)
Step up transformer (ST, GT) (50/51/53UBF)	Transformer oil	Spray deluge system (automatic/manual)
Standby diesel (50UBN)	Diesel / PVC	Dry chemical and CO ₂ portable extinguishers
CEMS container HRSG 1, 2, 3 (51/52/53UCH)	Various	Dry chemical and CO ₂ portable extinguishers
Gas preheater (container) (50UEN10)	Fuel gas / PVC	Dry chemical and CO ₂ portable extinguishers
Gas receiving station (container) (50UEN01)	Fuel gas	Dry chemical and CO ₂ portable extinguishers
Heat recovery steam generator (open structure) (51/52/53UHA)	Various	Dry chemical and CO ₂ portable extinguishers
Feed water pumps (50ULA)	Lube oil	Dry chemical and CO ₂ portable extinguishers
Steam turbine package (50UMA)	Oil / Lube oil / Hydraulic oil	Pre-action sprinkler system (automatic) for steam turbine and generator bearings Sprinkler system (automatic) for lube oil tank and hydraulic skid Dry chemical and CO ₂ portable extinguishers
Gas turbine package (51/52/53UMB)	Fuel gas / Oil	CO ₂ system (automatic/manual) for gas turbine enclosure Dry chemical and CO ₂ portable extinguishers
Admin CCR & workshop building (50UYC/UST) including control room	PVC / Various / Chemicals	Clean agent system (automatic/manual) for electrical equipment Dry chemical and CO ₂ portable extinguishers

Table 17: Fire Fighting Systems at the Delimara 4 Power Plant

6 EXTERNAL FIRE FIGHTING RESOURCES

6.1 Civil Protection Department (Government of Malta)

The Civil Protection Department (CPD) is responsible for fire fighting, rescue and external emergency plans and has stations throughout Malta.

The headquarters are currently situated at Ta' Kandja in a building which comprises of the Administration Department, Stores and Inventory Section, EU related matters, Fire Safety Relations Unit, together with the Operations Control Centre which co-ordinates all nationwide CPD Operations.

6.1.1 Hal Far Fire Station

Hal Far Fire Station is the closest station from Enemalta Power Plant. It is situated at the historic airfield of Hal Far (formerly a Royal Naval Air Station) and was established in 1996 within the Control Tower complex of the old airfield.

The station currently covers the South East of Malta including Malta Freeport and Hal Far Industrial Estate. The fire appliances at the station are as follows:

- IVECO Magirus – Bull Industrial Fire Engine
- IVECO Magirus – Heavy Rescue Unit
- IVECO Magirus – Falcon Fire Engine
- IVECO Magirus – Control Unit
- IVECO Magirus – Ranger Bowser Engine
- FRESIA – FRESIA Fire Bowser

6.1.2 Marine Section

The CPD Marine Unit is based at the Shipwrights Wharf in Marsa. This unit of the service covers Fire fighting and Search and Rescue at Sea together with Oil Pollution Control and Prevention at Sea.

Equipment based at this unit includes the Fire Fighting Vessel MV-Garibaldi, together with various smaller sea craft and a number of vehicles notably an appliance fully equipped to combat Hazardous Material incidents.

6.2 Transport Malta

As the Authority responsible for maritime affairs, Transport Malta is mandated to implement and maintain the National Marine Pollution Contingency Plan. Through its Pollution and Incidence Response Unit (PIRU), the Authority also has the duty to maintain and operate its offshore Oil Response Equipment including pollution containment booms, surface skimmers, pumps.

In support of the foregoing duties, the Authority has contracted Tug Malta to provide the requested emergency services including transport, handling and operating the equipment to be deployed for oil pollution response in the internal and territorial waters of Malta, if and when an emergency response and disaster clean-up operation arises. For this purpose, Tug Malta is standby 24/7 with its tugs equipped with fire fighting capabilities and other pollution prevention equipment, as specified in the following table:

Name	Deck & auxiliary equipment	Fire fighting and anti pollution systems
MT SPINOLA	Misc. deck equipment: tugger, winch, karm fork, guide pins, deck crane, tow hook, stern roller, work boat Deck area: clear deck, deck strength Anchoring: windlass	Fire fighting pumps: two (2) main engine driven horizontal mounted single stage centrifugal pumps each having a capacity of 1,356 m ³ /hr Fire monitors: two (2) water/foam monitors with step-less control of fog/spray/ jet setting remotely controlled by hydraulic/electric motor. Each monitor has a capacity of 1,200 m ³ /hr water and 300 m ³ /hr foam.
MT ST. ELMO	Forward escort towing winch, AFT towing winch, Spare towing wire storage reel, Capstan, Towing hook, Deck crane	2 x main engine driven fire fighting pumps, each pump with a capacity of 1,338 m ³ /hr. One water only and one foam/water fire fighting, each with a capacity of 1,200 m ³ /hr (300 m ³ /hr foam).
MT PAWLINA	Towing/ Anchor winch, Capstan, Towing hook	Two fire fighting pumps, each with a capacity of 1,200 m ³ /hr and a pressure capacity of 11 bars. Two fire fighting monitors each with a capacity of 1,200 m ³ /hr
MT WENZINA	Towing/ Anchor winch, Capstan, Towing hook	Two general service pumps connected to sea water inlet and to the ship's set fire fighting hydrants.
MT MARI	Windlass/Mooring winch, Capstan/mooring winch, Towing hook Oily water separator, Bilge/general service pump, Air compressors	Fire pump: one (1) unit marine diesel engine 220 bhp at 2,200 rpm driving through a flexible coupling a fire fighting pump displacing 360 m ³ /hr at 120 m head. Fire monitors: one (1) unit 100 mm manual operated water/foam 2,000 l/min fire monitor on wheelhouse top and (1) unit 100 mm electric hydraulic remote controlled water/foam 2,000 l/min fire monitor on main mast top.
MT SEA SALVOR	Windlass, Towing winch, Towing hook, Crane Hand air compressor, Sewage treatment plant, Air compressors, Counterfire monitors, drenching System	Fire fighting/Salvage pump: 2 x Fire Fighting pumps, coupled to the main engines through a step up gearbox. Starboard pump capacity 2,700 m ³ /hr at 150m head. Port pump capacity 1,200 m ³ /hr at 150 m head. Port pump can be used as a salvage pump. Anti pollution equipment: clear spray 50 dispersant system, Oily water separator
MT LIENI	Windlass/Mooring winch, Capstan, Tow hook	Fire monitors: Three (3) manually operated foam/water fire fighting monitors. One monitor has a capacity of 6,000 l/min and the other two (2) monitors have a capacity of 3000 l/min at 130 m head. Fire pump/engine: marine diesel engine (510 bhp) driving a fire fighting pump having a capacity of 720 m ³ /hr at 130 m head. Oil dispersant system: Comprised of a dispersant pump having a capacity of 50 m ³ /hr at 110 m head, dispersant tank having a capacity of 11 m ³ and two (2) x 5 metres spray booms each fitted with five (5) dispersant nozzles supplied via proportioning educators.

Table 18: Tugs and Equipment

APPENDIX 1: FIRE, SPILL AND GAS DETECTION LAYOUTS (CONFIDENTIAL)

FSU

Refer to Fire and Safety Plan in [APPENDIX 3](#).

Delimara LNG Regasification Terminal

ENEM-JPA-E2-00-DR-HS-00007	Fire, Gas and Spill Detection System, Area 1 - Jetty
ENEM-JPA-E2-00-DR-HS-00008	Fire, Gas and Spill Detection System, Area 2 - Fire Fighting Pumps
ENEM-JPA-E2-00-DR-HS-00009	Fire, Gas and Spill Detection System, Area 3 - Flare
ENEM-JPA-E2-00-DR-HS-00010	Fire, Gas and Spill Detection System, Area 4 - Impounding Basin
ENEM-JPA-E2-00-DR-HS-00011	Fire, Gas and Spill Detection System, Area 5 - Suction Drum
ENEM-JPA-E2-00-DR-HS-00012	Fire, Gas and Spill Detection System, Area 6 - LNG Pumps
ENEM-JPA-E2-00-DR-HS-00013	Fire, Gas and Spill Detection System, Area 7 - IFV
ENEM-JPA-E2-00-DR-HS-00014	Fire, Gas and Spill Detection System, Area 8 - BOG
ENEM-JPA-E2-00-DR-HS-00015	Fire, Gas and Spill Detection System, Area 9 - Utilities Building
ENEM-JPA-E2-00-DR-HS-00016	Fire, Gas and Spill Detection System, Area 10 - Water Glycol Pumps
ENEM-JPA-E2-00-DR-HS-00017	Fire, Gas and Spill Detection System, Area 11 - Electrical Building
ENEM-JPA-E2-00-DR-HS-00018	Fire, Gas and Spill Detection System, Area 12 - GRS D3PP
ENEM-JPA-E2-00-DR-HS-00019	Fire, Gas and Spill Detection System, Area 13 - GRS D4PP
ENEM-JPA-E2-00-DR-HS-00020	Fire, Gas and Spill Detection System, Area 14 - Cooling Water System Building

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Refer to Fire Protection layouts in [APPENDIX 3](#).

APPENDIX 2: ESD CAUSE AND EFFECT MATRICES (CONFIDENTIAL)**FSU**

3954-MM-SD-799-001 03 ESD and PSD Cause n Effect Diagram

Delimara LNG Regasification Terminal

2779-85-IC-SC-00003 04 Fire, Spill & Gas Detection and Protection System, Cause & Effects Chart

Delimara 4 Power Plant

ENEM-SIT-E1-00-DR-HS-00002 Emergency Stop Pushbutton Concept

APPENDIX 3: FIRE FIGHTING PI&DS AND LAYOUTS (CONFIDENTIAL)

FSU

-	Fire Fighting Diagrams (extract from Cargo Operations Manual)
3954-MM-SD-101-003 06	Fire and Safety Plan
3954-MM-SD-101-002 03	Fire Water and Spray System

Delimara LNG Regasification Terminal

ENEM-JPA-E2-00-DR-ME-00054	PID Fire Fighting System
ENEM-JPA-E2-00-DR-ME-00055	PID Fire Fighting Pumps
2779-74-ME-DR-00107/08	Propane Vaporizer (12EGA80/90 AC001) - Water Spray Deluge System Layout, Sections & Details
2779-74-ME-DR-00109/10/11	BOG Compressor (12EKH10/20/30 AN001) Lube Oil Area - Water spray deluge System Layout, Sections & Details
2779-74-ME-DR-00112	BOG Compressor Building - Water Curtain System Layout, Sections & Details
2779-74-ME-DR-00113	Jetty Platform - Water Curtain System Layout, sections & details
2779-74-ME-DR-00115	Transformer 12BBT10 - Water Spray Deluge System Layout, Sections & Details
2779-74-ME-DR-00116/17/18/19	Transformer 12BFT10/20/30/40 - Water Spray Deluge System Layout, Sections & Details
2779-74-ME-DR-00120	Flare KO Drum Pit - High Expansion Foam System Layout, Sections & Details
2779-74-ME-DR-00121	Impounding Basin - High Expansion Foam System Layout, Sections & Details
2779-74-ME-DR-00122	Emergency Diesel Generator - Water Sprinkler System Layout, Sections & Details

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ENEM-SIT-E1-00-DR-ME-00513	Fire Fighting System P&ID - Inert Gas Extinguishing System
ENEM-SIT-E1-00-DR-ME-000181	General Layout Fire Protection Plan incl. Hazardous Zones
ENEM-SIT-E1-00-DR-ME-000182	Gas Turbine Electrical & Control Building Fire Protection Plan incl. Hazardous Zones
ENEM-SIT-E1-00-DR-ME-000183	ST Electrical Fire Protection Plan incl. Hazardous Zones
ENEM-SIT-E1-00-DR-ME-000184	Admin CCR & Workshop Building Fire Protection Plan incl. Hazardous Zones
ENEM-SIT-E1-00-DR-ME-000185	Gas Turbine Building Fire Protection Plan incl. Hazardous Zones
ENEM-SIT-E1-00-DR-ME-000186	Steam Turbine Building Fire Protection Plan incl. Hazardous Zones Plan View at 0.000m Level
ENEM-SIT-E1-00-DR-ME-000187	Structure for HRSG Fire Protection Plan incl. Hazardous Zones
ENEM-SIT-E1-00-DR-ME-000188	Deaerator and Pump Building Fire Protection Plan incl. Hazardous Zones
ENEM-SIT-E1-00-DR-ME-000189	GT Transformer Area Fire Protection Plan incl. Hazardous Zones
ENEM-SIT-E1-00-DR-ME-000190	GIS Building Fire Protection Plan incl. Hazardous Zones
ENEM-SIT-E1-00-DR-ME-000191	Steam Building Fire Protection Plan incl. Hazardous Zones Plan View at 2.835m Level
ENEM-SIT-E1-00-DR-ME-000192	ST Transformer Area Fire Protection Plan incl. Hazardous Zones