



-----ENEMALTA DPS IPPC APPLICATION - FORM C-----

APPENDIX H – Coordinated Safety Report
APPENDIX I – Coordinated Safety Management System
APPENDIX J – Coordinated Emergency Response Plan

0466 – Enemalta DPS IPPC Application

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APPENDICES REFERENCE

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Appendix C	Material Safety Data Sheets
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COORDINATED SAFETY REPORT FOR THE DELIMARA POWER STATION

**ENEMALTA PLC
ELECTROGAS MALTA LIMITED
D3 Power Generation Ltd.**

AS REQUIRED BY LN179/2015 CONTROL OF MAJOR ACCIDENT
HAZARDS

Barcelona, October 9th, 2016

Report nº.: 02-901-200560-16217 – rev. 1.2

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SCOPE

This Coordinated Safety Report completes the Safety Report presented by ENEMALTA plc (henceforth ENEMALTA) [1], ELECTROGAS MALTA Ltd. (henceforth EGM) [2] as well as D3PG, Ltd. (henceforth D3PG) [3]. The purpose is to identify additional risk, which could arise from the domino effect identified in the mentioned Safety Reports, as well as to assess the individual and societal risk for each part of the site and for the entire site.

ENEMALTA is the operator of the existing Power Plant, which falls under the scope of the Seveso III Directive [4] due to the presence of Diesel Oil (DO) and Heavy Fuel Oil (HFO), EGM is the operator of the regasification plant currently under construction, which also falls under the scope of the cited directive due to the presence of Natural Gas (NG) and of the Combined Cycle Gas Turbine under construction. D3PG will be the operators of the D3 engines based power plant once they are converted to NG. The presence of hazardous substances in the facilities operated by D3PG will be always below the minimum thresholds established by the Seveso III Directive.

The three operators will share part of the facilities, with ENEMALTA as a main stakeholder and provider of general services to the others. The three operators will run the facilities for which ENEMALTA initially required the permit for construction according to the IPPC regulation. This Coordinated Safety Report has been prepared in order to continue with the permitting application and more specifically in order to provide evidence to the authorities about the overall risk of the entire facilities, combining the outcome from the individual Safety Report and Risk assessment and providing a common assessment of the possible Domino Effect.

The scope of this review of the Safety Report includes all the facilities, considering several phases of operation, according to the planning for the conversion of the facilities for combustion of NG as the principal source of energy.

In other words, the scope of this document includes the loading, unloading, storage and transfer operation in the power plant, both for DO and HFO, as it happens in the



current situation, but also the use of diesel oil only in the power plant and storage of both HFO and gasoil fuels, as it will happen in the future, plus the unloading, storage, regasification and handling of NG according to the future situation. Hazards associated to the transitory construction activities that will be carried out at the facilities have been specifically detected during the HAZOP and HAZID workshops prior to the preparation of the Safety Report and have also been considered in the document. The report assesses the hazards normally due to standard operations. Commissioning, start-up, shut-down and switch from one mode of operation to others have not been taken specifically into account and are not specifically mentioned in the report, but are fully included in the overall risk assessment. In fact, in this kind of power plant, the start-up, shut-down and switch from one mode to another is part of the standard operation and is carried out on a daily basis.

It is of capital importance to highlight that the facilities layout and operation, as well as the hazards and the major accident scenarios will continuously change according to the progress in the construction of the new facilities. The Safety Report cannot be continuously updated to take into account this temporality and, according to common criteria for its preparation, should be a static picture of the facilities and their hazards considering the worst case scenarios. Nevertheless, in order to capture at least the main differences introduced by project, and where considered relevant for a correct comprehension, the data presented are representative of a period in which the existing facilities will still be run on the same fuels but NG will also be present at the facilities due to the commissioning of EGM and D3PG plants. Most of the hazards detected in the HAZOP & HAZID workshop are linked to this stage.

This document complies with the requirements of the Seveso III Directive [4], which has been implemented into the Maltese law as the Control of Major Accident Hazard Regulations 2015 ("COMAH"). The enforcing body for this law is the Competent Authority ("CA") set up jointly by the Occupational Health and Safety Authority ("OHSA"), the Malta Environment and Resources Authority ("ERA") and the Civil Protection Department of the Ministry for Justice and Home Affairs ("CPD"). The Seveso II Directive has been implemented into the Maltese law by the L.N. 179 of 2015. Within this legal framework, this Coordinated Safety Report has been prepared



on the basis of the official and mandatory Safety Reports provided by ENEMALTA plc and ELECTROGAS MALTA Ltd. and shall not be considered as a substitution or integration of the mentioned reports.

This document has been prepared on the basis of the information provided by ENEMALTA and EGM in their Safety Report (report no. 02-901-200560-15958, Review 0.2 and report no. ENEM-AEC-E0-00-RP-SE-00011 REV 02 respectively) and additional information from D3PG. Results, criteria, output tables and descriptive chapters have been extracted by these reports with the permissions from ENEMALTA and EGM .

The document has been revised according to [5] and [6], with no changes in the principal conclusion.

This Coordinated Safety Report has been prepared on behalf of ENEMALTA plc by SGS and has been reviewed and approved by ENEMALTA, D3PG and EGM prior to the submission to the authorities.

The revision 1.2 of this document includes the amendment of some disconformities detected by the Evaluator of the Report (Gap Analysis SA) [7], as well as the addition of a new scenario due to jet fire domino effect from Electrogas Malta facilities.



GLOSSARY

1% lethality distance	The distance to the location where an unprotected person has a 1% probability of dying for a given scenario and weather class
Atmospheric storage tank	Storage tank in which the maximum permitted pressure is less than or equal to 0.5 bar of overpressure. Generally the overpressure is a maximum of 70 mbar.
BLEVE	Boiling Liquid Expanding Vapour Explosion; results from the sudden failure of a vessel containing liquid at a temperature well above its normal (atmospheric) boiling point. A BLEVE of flammables results in a large fire ball (if ignited)
Blocking system	Suppression system to isolate (part of) an installation to prevent (further) outflow
Competent authority	Authority responsible for law enforcement
Compressed liquefied gas	Gas that is compressed to a pressure that is equal to the saturation vapour pressure at storage temperature, so that the majority is condensed into its liquid phase
Containment system	One or several devices, any parts of which are permanently in open contact with one another, and which are intended to contain one or multiple substances. A Loss of Containment in one containment system will not lead to the release of significant quantities of hazardous substance from other containment systems
Dispersion	Mixing and spreading of substances in the air
Domino effect	The effect that Loss of Containment in one installation leads to Loss of Containment in other installations
Dose	A measure of integral exposure; a function of concentration and exposure time



Establishment	The whole area under the control of an operator where dangerous substances are present in one or more installations, including common or related infrastructures or activities
Event tree	A diagram of success and failure combinations are used to identify event sequences leading to all possible consequences of a given initiating event
Explosion	A sudden release of energy that causes a blast
Explosive substances	Explosive substances are: <ul style="list-style-type: none"> a. <ul style="list-style-type: none"> 1°. substances and preparations that present an explosion hazard due to shock, friction, fire or other causes of ignition(risk phrase R2); 2°. pyrotechnic substances. A pyrotechnic substance is understood to be a substance or mixture of substances with the purpose of producing heat, light, sound, gas or smoke or a combination of these phenomena by means of non-explosive, self-propagating exothermic chemical reactions; 3°. explosive or pyrotechnic substances and preparations that are contained in objects; b. substances and preparations that present a serious danger of explosion as a result of shock, friction, fire or other ignition causes (risk phrase R3)
Fault tree analysis	The evaluation of an unwanted event, the top event in the fault tree. Given a top event, a fault tree is drawn up using a deduction method (top-down), which can be used to determine the cause (or causes) of the unwanted event
Fire ball	A fire, burning rapidly enough for the burning mass to rise into the air as a cloud or ball



Flammable substances	(hazardous)	<p>Flammable (hazardous) substances are:</p> <ul style="list-style-type: none"> -flammable substances (category 0, 1 and 2) -category 3 and 4 substances if the process temperature is higher than the flash point
Flash		Part of a superheated liquid that evaporates rapidly due to a relatively rapid depressurization, until the resulting vapor/liquid mixture has cooled to below boiling point at the end pressure. Superheat is the extra heat of a liquid made available by decreasing the liquid's temperature, for instance, by vaporization, until the vapor pressure equals that of the surroundings
Flash fire		The combustion of a flammable vapor and air mixture in which the flame passes through the mixture at a rate less than sonic velocity so that negligible damaging overpressure is generated
FN curve		Log-log graph: the X-axis represents the number of deaths and the y-axis the cumulative frequency of the accidents, with the number of deaths equal to N or more
Frequency		The number of times an outcome is expected to occur in a given period of time (see also probability)
Ignition source		A thing able to ignite a flammable cloud, e.g. due to the presence of sparks, hot surfaces or open flames
Installation		A technical unit within an establishment where hazardous substances are produced, used, handled or stored
Jet fire		Combustion of materials emitted from an opening with great force
LEL / LFL		Lower flammability limit; below this concentration too little flammable gas is present in the air to maintain combustion



Limit value	Measure of the dangerous properties of a substance based on both the physical and the toxic/explosive/flammable properties of the substance
LOC	See Loss of Containment event
Loss of Containment	Event resulting in the release of material to the atmosphere
Nominal pumping rate	Normal flow of material through a pump
Operator	Any natural person or corporate entity who operates or holds an establishment or installation or, if provided for by national legislation, has been given decisive economic power in the technical operation thereof
Operator	Any individual operating technical equipment
Pasquill class	Classification to qualify the stability of the atmosphere, indicated by a letter ranging from A, for very unstable, to F, for stable
Pool fire	The combustion of material evaporating from a layer of liquid
Probit	Number directly related to probability by a numerical transformation
Pressure vessel	Pressurized storage vessel in which the maximum permitted pressure is more than 0.5 bar of overpressure



Probability	Measure of the likelihood of an occurrence, expressed as a dimensionless number between 0 and 1 Risk is defined as the probability that within a fixed time period, usually one year, an unwanted effect occurs. Consequently, risk is a dimensionless number. However, risk is often expressed in units of frequency, 'per year'. Since failure frequencies are low, the probability that an unwanted effect will occur within a fixed time period of one year is, practically speaking, equal to the frequency of occurrence per year. In this Reference Manual, frequency is used to denote the risk
Process vessel	Vessel in which a change in the physical properties of the substance occurs, e.g. temperature or phase
QRA	See Quantitative Risk Analysis
Quantitative Risk Analysis	A numerical evaluation of probabilities, effects and consequences of incidents and their combination into measures of risk
Reactivity	Measure for the flame acceleration in a gas/air mixture
Reactor vessel	Vessel in which a chemical change of the substances occurs
Repression system	System to limit the release of substances into the environment given a certain event
Risk	The combination of probability and effect.
Risk contour	Line on a map connecting points having equal risk



Roughness length	Artificial length scale appearing in relationships describing the wind speed over a surface and characterising the roughness of the surface. The roughness length of a pipeline determines the resistance in the pipe, the roughness length of the surroundings determines the wind speed at ground level
Safety Report	Report on the safety of an establishment
Safety valve	Valve (or here also rupture disk) designed to automatically vent excess pressure
Vapour cloud explosion	The explosion resulting from ignition of a cloud of flammable vapour, gas or spray mixed with air, in which flames accelerate to significantly high velocities to produce significant overpressure
Weather class	Combination of Pasquill stability and wind speed. Weather class D5 means Pasquill category D and wind speed 5 m/s



1. MANAGEMENT SYSTEM AND ORGANISATION OF THE ESTABLISHMENT FOR MAJOR ACCIDENT PREVENTION

This section of the Safety Report fulfils the requirements of the LN 179/2015, Article 8, sub-regulation (a) and Schedule III.

This section should include the Major Accident Prevention Policy (MAPP) and the Safety Management System (SMS). In this case, these documents have been prepared separately by ENEMALTA plc [8] and ELECTROGAS MALTA Ltd [9] and have been published together with their individual Safety Report [1] and [2].

A Coordinated SMS, including procedure required for a safe coordination between stakeholders, have been published for separate.



2. DESCRIPTION OF THE ENVIRONMENT OF THE ESTABLISHMENT

This section of the Safety Report fulfils the requirements of the LN 179/2015, Schedule II Paragraph 2.

The description of the environment of the establishment is already included and published in the individual Safety Report of each operator [1], [2] and [3]. Every part of the site has been included in them and no additional information shall be added in cooperation between the stakeholders.



3. DESCRIPTION OF INSTALLATIONS

The description of the installation and dangerous substances existing is developed in [1] and [2]. Every part of the site has been included in them and no additional information shall be added in cooperation between the stakeholders.

In the future configuration of the facilities, EGM will fall under the scope of the LN 179/2015, while D3PG will not be affected.



4. IDENTIFICATION AND ANALYSIS OF MAJOR ACCIDENT RISKS AND PREVENTATIVE MEASURES

This section of the Safety Report responds to Schedule 3 Paragraph 4 of COMAH. This approach, with slightly different methodologies, has been used for assessing the risk level arising from ENEMALTA, EGM and D3PG scenarios.

4.1 Risk Assessment methodology

A Risk Assessment is used to make decisions about the acceptability of risk in relation to developments for a company or in the area surrounding an establishment or transport route. The criteria for assessing the acceptability of risks are set in internationally recognised guidelines and regulations.

The first step in a risk assessment is to identify all hazards. Once a hazard has been identified, it is necessary to evaluate it in terms of the risk it presents to the neighbouring community, environment and facilities. Both probability and consequence should be considered but there are situations in which, 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.

For accurate hazard identification, HAZID methodology has been applied to the existing facilities operated by ENEMALTA, to the regasification plant operated by EGM and to the CCGT operated by D3PG. The resulting reports have been published in attachment to the corresponding Safety Report by ENEMALTA [1], EGM [2] and D3PG [3] respectively.

Additionally to the HAZID study, the hazard identification has been performed also by a Hazard and Operability Analysis (HAZOP). For additional information regarding HAZID and HAZOP methodology, refer [10], [11] and [3].

In order to be able to use the results of a Risk Assessment for decisions, they must be verifiable, reproducible and comparable. Consequently the risk assessment must



be completed based upon the same assumptions; models and basic information (see [1]).

4.2 Major Hazards Identification

The HAZID & HAZOP workshops have allowed the identification of a large list of possible hazards for the installation, some of them resulting in a possible loss of containment. The hazards in detail may be read in the HAZID & HAZOP reports, while the summary of the possible major accident scenarios is included in the following paragraph.

Any Loss of Containment scenario can result in a number of different final consequences which may affect the people, the environment and the facilities. The developing of one or other effect depends in great measure on environmental conditions, such as the wind velocity, the weather stability, the temperature, the released quantity or the presence of ignition points.

The COMAH regulation specifies the acceptable methods for identification and accidental risk analysis:

- Detailed description of the possible major accident scenarios and their probability or the conditions under which they occur including a summary of the events which may play role in triggering each of these scenarios, the causes being internal or external to the installation.
- Assessment of the extent and severity of the consequences of identified major accidents
- Description of technical parameters and equipment used for the safety of installations.

The scenarios and final events selected in this study are the scenarios identified in [1] and [2].



The EGM scenarios E2-131, E2-141 and E2-151 may be intended as representative of D3PG risk considering that the pressure and size of NG pipeline inside D3 facilities are lower than upstream GRS.

4.3 Final occurrence frequencies of the identified scenarios

The final frequencies proposed for each scenario, considering the results obtained in the application of the event and fault tree analysis, are shown in each operator Safety Report. [See [1] and [2]]

4.4 Calculation criteria

The criteria used in the calculation of the damage zones are presented in [1] and [2].

4.5 Human vulnerability determination

The analysis of physical effects and consequences consists in determination of the consequences of particular physical effects in hazard zones. A hazard zone is the region in which physical effect of the hazard exceeds critical threshold values and induces negative effects for people, environment and property.

The estimation of the damage zones is based on the use of meteorological data, software models and acceptability criteria [1] and [2].



4.6 Domino Effect determination

The article no. 8 of the European Communities Council Directive on the Control of major hazards involving hazardous substances states:

Member States shall ensure that the competent authority, using the information received from the operators in compliance with Article 6 and 9, identifies establishments and groups of establishments or where the likelihood and the possibility of consequences of a major accident may be increased because of the location and the proximity of such establishments, and their inventories of dangerous substances.

In order to address these issues the Health and Safety Executive (HSE) reviewed the previous work on domino effects and edited the document “*Development of methods to assess the significance of domino effects from major hazard sites*” which collects the methodologies for determining the additional risks from domino effects between sites and summarizes the values considered to be most appropriate for use in a Domino Assessment.

For additional information about the definition of Domino Effect see [1]

4.6.1. Mechanism of Domino Effect

In the framework of domino effect analysis, the risk of explosion and fire, characterized by the possibility of an accident in an industrial site may lead to serious consequences for the surrounding process equipment, people, goods and environment. These latter can generate events that may affect and/or cause the failure of the surrounding process equipments/units:

- Fire
- Explosion
- Other hazardous releases



Fire

In the current stage, the relevant mechanism by which a potential domino effect could take place is fire. Effect of fire depends on:

- Passive fire protection
- Fire walls
- Line of sight effects (blocking by others structures, vessels, walls)
- Active fire protection
- Fire load
- Flaring/dump tanks to reduce the inventory of the escaping material

Careful consideration needs to be deserved to whether “fire spread” events should be classified as domino events. A fire may spread due to a burning liquid flowing from one plant area to another, where it causes further hazardous events, or else a fire could spread via combustion of intervening combustible material.

Fire spread depends on:

- Availability of a route for the fire/burning material/gas/liquid to spread along (such as open ground, roads, natural or manmade drainage channels, drains, etc...
- Proximity of combustible material
- Fire walls
- Ditches, dikes, slopes, bunds, kerbs to prevent spread of burning liquid (topographic effects)
- Flashover effects
- Active fire prevention may possible if fire spread is gradual
- Effect of wind spreading fire
- Communication between plants

Another type of fire is the jet fire event. Jet fires are unlikely events in the current stage due to the transfer condition for HFO and DO, but should be considered as a



possibility for high pressure natural gas pipes in the transient and future stage. Jet flames can arise from pressurized releases of gases and liquids. It is considered that in most cases of a jet fire with large hazard range, the jet fire will only give rise to a transient (short duration) hazard since it will involve a large pressurized release from process or storage plant which have a limited inventory. If the leak is being fed from a pipeline bringing material to the site, then it is expected that this will be isolatable so as to limit the duration of the release.

Finally, the case of a flash fire has to be considered. Flash fire is the ignition of a cloud of flammable vapours. Flash fires may happen in the transient and future stages of the project as the result of a natural gas release. In this case, the phenomenon is transient and the combustion takes place in a few seconds. The increase of temperature associated and the thermal radiation is minimum in comparison with a permanent fire, thus no damage is expected on the equipment and domino effect is detected in real cases, even if injuries to people and impact on environment can be important.

Explosion

Explosions have been considered for natural gas clouds in certain conditions and may happen in the transient and future stages of the projects once the natural gas is managed in the facilities. Explosion can provide vectors for domino escalation in terms of the effects of blast overpressure and missiles.

Blast overpressure

- Blast walls
- Shielding by structures/vessels
- Blast wave amplification effects
- Vessel supports
- Vessel thickness
- Collapse of material above target
- Orientation of target to blast wave
- Weight of vessel inventory



Missiles

- Minimum mass/velocity required to cause damage
- Missile trajectory
- Missile shape
- Vessel thickness / material of construction / pre-stressing levels
- Shielding by others structures
- Distribution of missile sizes
- Target size/length
- Number of pipes close together

A gas explosion is defined as a process where combustion of a premixed gas cloud is causing rapid increase of pressure. Gas explosions can occur inside process equipment or pipes, in buildings or offshore modules, in open process areas or in unconfined areas.

The pressure generated by the combustion wave will depend on how fast the flame propagates and how the pressure can expand away from the gas cloud (governed by confinement). The consequences of gas explosions range from no damage to total destruction. The pressure wave caused by the gas explosion can damage personnel and material or it can lead to accidents such as fires.

When a cloud is ignited the flame can propagate in two different modes through the flammable parts of the cloud. These modes are:

- a. deflagration
- b. detonation

The deflagration mode of flame propagation is the most common. A deflagration propagates at subsonic speed relative to the unburnt gas, typical flame speeds (i.e. relative to a stationary observer) are of the order of $1-1000 \text{ m}\cdot\text{s}^{-1}$. The explosion pressure may reach values of several barg, depending on the flame.



A detonation wave is a supersonic (relative to the speed of sound in the unburnt gas ahead of the wave) combustion wave. The shock wave and the combustion wave are in this case coupled. In a fuel-air cloud a detonation wave will propagate at a velocity of 1500-2000 m·s⁻¹ and the peak pressure is typically 15-20 bar.

The consequences of a gas explosion will depend on:

- type of fuel and oxidiser
- size and fuel concentration of the combustible cloud
- location of ignition point
- strength of ignition source
- size, location and type of explosion vent areas
- location and size of structural elements and equipment
- mitigation schemes

Gas explosions may be very sensitive to changes in these factors. Therefore it is not a simple task to estimate the consequences of a gas explosion.

As a result of a violent gas explosion walls or decks may start to move or even break down and fragment. Pipes that are suspended on a moving wall may be sheared off (i.e. guillotine break) as a result of the relative movement of the points of suspension. Piping from one module to another module may have to respond to relative movements of the structure. Cables and control lines may also be damaged by this type of relative movement.

An important aspect of damage to buildings is whether the integrity of buildings survives. Damage to a building in case of an accidental gas explosion is not a serious problem as long as the building is not collapsing or dangerous fragments are generated within or from the building. This is equally important for buildings subjected to blast loads from the outside as well as buildings with possibilities of internal explosions.



4.6.2. Domino Effect Damage Criteria

The events previously described can lead to domino effects depending on the resistance of materials. In this chapter, several thresholds for thermal radiation effects are discussed and final threshold for the project is presented.

When considering process plant, most studies in the past have considered only the intensity and neglected the exposure duration. In case of process plant that is subjected to steady thermal radiation intensity, the temperature of the material exposed will increase until a steady state temperature is reached. In order to define an allowable radiation intensity, some criteria are generally used which are derived from avoidance of unacceptable effects which would occur at higher temperature (loss of structural properties of materials,)

In conclusion of the exposed by HSE, the damage criteria for the domino effect derived from thermal radiation scenarios are shown below:

THERMAL RADIATION DAMAGE CRITERIA	
ITEM	THERMAL RADIATION FLUX (kW / m ²)
Pressure vessels	37.5
Atmospheric Storage Tanks	37.5
Pipework	37.5
Water deluged pipework and vessels	-
Buildings	12.5
Control Buildings	25
People	1000 tdu

As a conservative approach, domino effects should be studied where the thermal flux can exceed 37.5 kW/m².

For the overpressure effects, damage criteria are based on empirical data. An overview of the data in the literature has been undertaken by TNO [12]:



ITEM	OVERPRESSURE (kPa)
Connections between steel and aluminium ondulated plates have failed	7-14
Walls made of concrete blocks have collapsed	15-20
Brickstone walls, 20-30 cm have collapsed	50
Minor damage to steel frames	8-10
Collapse of steel frames and displacement of foundation	20
Industrial steel self-framing structure collapsed	20-30
Cladding of light industry building ripped-off	30
The roof of a storage tank has collapsed	7
The supporting structure of a round storage tank has collapsed	100
Cracking in empty oil-storage tanks	20-30
Displacement of a cylindrical storage tank, failure of connecting pipes	50-100
Damage to a fractionating column	35-80
Slight deformation of a pipe-bridge	20-30
Displacement of a pipe-bridge, breakage of pipes	35-40
Collapse of a pipe bridge	40-55
Plating of cars and trucks pressed inwards	35
Breakage of wooden telephone poles	35
Loaded train carriages turned over	50
Large trees have fallen down	20-40

Additionally, the *Gas Explosion Handbook* [13] notes that an important aspect of damage to buildings is whether the integrity of buildings survives. Damage to a building in case of an accidental gas explosion is not a serious problem as long as the building is not collapsing or dangerous fragments are generated within or from the building. This is equally important for buildings subjected to blast loads from the outside as well as buildings with possibilities of internal explosions.

Buildings made of pre-fabricated walls and roof will often collapse when subjected to explosion loads. As shown in the table, ordinary brick walls are also weak. In case of an internal explosion the brick wall will disintegrate and cause dangerous fragments.



Ordinary window glass will typically fail at 20-70 mbarg and cause dangerous flying fragments. As shown by Harris [14], [15], glass fragments can fly more than 20 m when the breaking pressure is about 0.25 barg. The velocity of these fragments will be up to 30 or 40 m·s⁻¹ (approx. 100 km·h⁻¹). To use ordinary window glass in areas where there is an explosion hazard is not recommended. Use blast resistant glass [16] and make the windows as small as possible. The window frames must be as strong as the window itself. If ordinary windows are replaced by blast resistant windows, the frame also has to be changed. If the frame is weaker than the window, the window will fly out as one piece.

TYPICAL FAILURE PRESSURES OF SOME STRUCTURAL BUILDING ELEMENTS UNDER GAS EXPLOSION CONDITIONS	
STRUCTURAL ELEMENT	TYPICAL FAILURE PRESSURE (mbarg)
Glass windows	20-70
Room doors	20-30
Light partition walls	20-50
50 mm thick breezeblock walls	40-50
Unrestrained brickwalls	70-150

In conclusion of the exposed by the Gas Explosion Handbook and by HSE, the damage criteria for the domino effect derived from blast overpressure scenarios are shown below:

BLAST DAMAGE CRITERIA		
ITEM	OVERPRESSURE RESULTING IN DESTRUCTION (bar)	OVERPRESSURE RESULTING IN PARTIAL DAMAGE (bar)
Pressure vessels	0.48	0.38
Fixed Roof Storage Tanks	0.21	0.07
Floating Roof Storage Tanks	0.45	0.45
Ordinary plant buildings	0.07	0.01
Control Buildings		Depends on design
People - outdoors	0.14	-
People - indoors	0.16	-
Pipework	0.4	0.24



During the evaluation process additional criteria have been agreed with the stakeholders at the site for a detailed evaluation of possible domino effect, not only on the basis of the radiation or overpressure at which critical equipment is exposed, but also on the basis of the exposure duration.

VCE may provoke catastrophic rupture of affected pressurised, elongated and small equipment with a probability higher than 80%, and of atmospheric equipment with a probability higher than 95% at overpressure exceeding 700 mbar. [application of Probit functions (Mingguang& Juncheng 2008, Cozzani et al 2006) ref. Kardell & Loof 2014].

Pool Fires and Jet Fires with duration of more than 10 minutes may generate structural damage and loss of inventory of exposed pressurized equipment (of volume $> 1 \text{ m}^3$) with a probability higher than 50%, and of atmospheric equipment with a probability higher than 85% at heat radiation exceeding 37.5 kW/m^2 [application of Probit functions (Landucci et al 2009, Antonioni et al 2009, Cozzani et al 2006) ref. Kardell & Loof 2014].

Additionally it will be considered that no domino effect to pressurized equipment can be realistically sustained from Pool Fires or Jet Fires with a duration of less than 10 minutes, for all phenomena engulfing pressurized equipment (of volume $> 1 \text{ m}^3$) in flame, specifically for HFO/DO flames since heat emission level of HFO/DO flame is not expected to surpass 50 kW/m^2 .

The same circumstance can also apply to the atmospheric equipment (up to a volume of 28000 m^3) when engulfed in flame with the condition that the fraction of heat radiated to the atmospheric equipment is lower than the 30-50% of the heat emitted by the flame.

For LNG / NG Pool Fires and Jet Fires of short duration (30 seconds to 10 minutes), the heat radiation level of the flame is expected to be high e.g. 140 kW/m^2 , so, domino zones of LNG and NG Pool Fires and Jet Fires, should be handled as following:



- For Pool Fires the pool fire envelope (with pool centre at the location of release), and
- For Jet fires the zone around the release location with distance equal to the jet fire frustum length.

4.7 Major Accident to the Environment (MATTE). Effects determination

The Seveso III Directive requires operators to assess the potential for a major accident with the potential for creating a major impact on the environment. These accidents are described as Major Accidents to the Environment (MATTE). In addition to impacts on the natural environment, indirect impacts on the human population also need to be considered, such as effects on agricultural produce and water supplies. See chapter 4.8 of Enemalta Safety Report [1].

4.8 Consequence Calculation Results

In each operator Safety Report, the results for damage zones, domino effect zones and MATTE are presented for each scenario (see corresponding chapters in the singular Safety Reports)

4.8.1. Domino Effect

The distances obtained for determining the Domino Effect zones are presented in the table below for those scenarios which may introduce a domino effect:

DOMINO EFFECT																		
ITEM	EQUIPMENT / PROCESS	SCENARIO	FINAL EVENT	FINAL FREQ.	UNITS	POOL FIRE DUR. (s)	THERMAL RADIATION			TARGETS								
							DOMINO EFFECT 37,5 kW/m2	DOMINO EFFECT 15 kW/m2	DOMINO EFFECT	QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF.	ENE SERVICE TANKS BUND	DO BUND	HFO BUND	FSU	EGM Jetty
HFO-001 FBR	HFO Unloading hose	Rupture of the unloading hose.	PFIRE	1,73E-05	y-1	144	57	63										
HFO-002	HFO Unloading pipeline from vessel to tank	Leak with an effective diameter of 10% of the nominal diameter, up to a maximum of 50 mm. Pipeline from unloading point to tanks	PFIRE	5,00E-06	y-1	968	27	22										
HFO-002 FBR	HFO Unloading pipeline from vessel to tank	Rupture in the pipeline	PFIRE	1,00E-06	y-1	14524	22	25										
HFO-003	HFO Storage tank n. 1 and 2	Continuous release from a hole with an effective diameter of 10 mm of the HFO storage tank	PFIRE	2,00E-06	y-1	343950	52	22										
HFO-003 CF	HFO Storage tank n. 1 and 2	Instantaneous release of the entire contents of the HFO storage tank	PFIRE	1,00E-07	y-1	156370	39	42										



DOMINO EFFECT																							
						THERMAL RADIATION		TARGETS														COMMENTS	
						DOMINO EFFECT 37,5 kW/m2	DOMINO EFFECT 15 kW/m2	QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF.	ENE SERVICE TANKS BUND	DO BUND	HFO BUND	FSU	EGM Jetty	REGAS AREA	IFV Propane in shell side	NG Pipe Rack	EGM Metering Station	D4 Gas turbines		
HFO-008	HFO D3 buffer tanks	Continuous release from a hole with an effective diameter of 10 mm. HFO service storage tanks	PFIRE	2,00E-06	y-1	1733	22	24															Probable domino effect on the adjacent tanks and centrifuges, and on the NG pipeline, depending on the location of the spillage and fire and the duration of the fire. Duration can be > 10 minutes
HFO-008 CF	HFO D3 buffer tanks	Instantaneous release of the entire contents. HFO service storage tanks	PFIRE	1,00E-07	y-1	2401	22	24															Probable domino effect on the adjacent tanks and centrifuges, and on the NG pipeline, depending on the location of the spillage and fire and the duration of the fire. Duration can be > 10 minutes
HFO-014	HFO D3 service tanks	Continuous release from a hole with an effective diameter of 10 mm. HFO service storage tanks	PFIRE	2,00E-06	y-1	1693	26	22															Probable domino effect on the adjacent tanks and centrifuges, and on the NG pipeline, depending on the location of the spillage and fire and the duration of the fire. Duration can be > 10 minutes
HFO-014 CF	HFO D3 service tanks	Instantaneous release of the entire contents. HFO service storage tanks	PFIRE	1,00E-07	y-1	2401	24	22															Probable domino effect on the adjacent tanks and centrifuges, and on the NG pipeline, depending on the location of the spillage and fire and the duration of the fire. Duration can be > 10 minutes
HFO-015	HFO pipelines from service tanks to D3 engines	Leak with an effective diameter of 10% of the nominal diameter, up to a maximum of 50 mm	PFIRE	1,20E-05	y-1	288	7	9															NO domino effect on pipelines, centrifuges, pump house, buffer tank and other facilities depending on the location of the spillage and fire. Duration < 10 minutes

DOMINO EFFECT																							
THERMAL RADIATION							TARGETS															COMMENTS	
ITEM	EQUIPMENT / PROCESS	SCENARIO	FINAL EVENT	FINAL FREQ.	UNITS	POOL FIRE DUR. (s)	DOMINO EFFECT 37,5 kW/m2	DOMINO EFFECT 15 kW/m2	QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF.	ENE SERVICE TANKS BUND	DO BUND	HFO BUND	FSU	EGM Jetty	REGAS AREA	IFV Propane in shell side	NG Pipe Rack	EGM Metering Station		D4 Gas turbines
HFO-015 FBR	HFO pipelines from service tanks to D3 engines	Rupture in the pipeline	PFIRE	1,80E-06	y-1	389	22	26															NO domino effect on pipelines, centrifuges, pump house, buffer tank and other facilities depending on the location of the spillage and fire. Duration < 10 minutes
HFO-016	HFO pipelines from storage tank to D1 HFO pump house	Leak with an effective diameter of 10% of the nominal diameter, up to a maximum of 50 mm	PFIRE	8,00E-06	y-1	288	7	9															No domino effect on pipelines. Duration < 10 minutes
HFO-016 FBR	HFO pipelines from storage tank to D1 HFO pump house	Rupture in the pipeline	PFIRE	1,20E-06	y-1	389	--	--															No domino effect on pipelines. Duration < 10 minutes
DO-024 DE	DO Raw tank n. 1/2/3	Catastrophic failure of the DO Raw tank n. 1/2/3 due to a jet fire domino effect from EGM	PFIRE	7,81E-05	y-1	46283	29	36															Probable domino effect on adjacent HFO/DO pipeline and service tanks. Duration > 10 minutes
E2-061-50	HP LNG pumps suction line	Medium leak	JFIRE	5,95E-04	y-1	1800	90	94															DO storage tanks are reached by the effects of the jet fire. However no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. Duration of jet fire can be >10 min



DOMINO EFFECT																				
							THERMAL RADIATION		TARGETS											COMMENTS
							DOMINO EFFECT 37,5 kW/m2	DOMINO EFFECT 15 kW/m2	QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF.	ENE SERVICE TANKS BUND	DO BUND	HFO BUND	FSU	EGM Jetty	REGAS AREA	IFV Propane in shell side	
E2-061-FBR	HP LNG pumps suction line	Large leak	JFIRE	1,53E-04	y-1	120	103	107												DO storage tanks are reached by the effects of the jet fire. However no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. Duration of jet fire < 10 min but possible domino due to high heat radiation of LNG/NG with flame length 95 m.
E2-071-50	HP LNG pumps discharge line	Medium leak	JFIRE	5,14E-04	y-1	120	70	74												DO storage tanks are reached by the effects of the jet fire. However no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. Duration of jet fire < 10 min but possible domino due to high heat radiation of LNG/NG with flame length 62 m.
E2-081-50	LNG small scale pumps suction line	Medium leak	JFIRE	5,95E-04	y-1	1800	90	94												DO storage tanks are reached by the effects of the jet fire. However no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. Duration of jet fire can be >10 min

DOMINO EFFECT																				
							THERMAL RADIATION		TARGETS											COMMENTS
							DOMINO EFFECT 37,5 kW/m2	DOMINO EFFECT 15 kW/m2	QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF.	ENE SERVICE TANKS BUND	DO BUND	HFO BUND	FSU	EGM Jetty	REGAS AREA	IFV Propane in shell side	
E2-081-FBR	LNG small scale pumps suction line	Large leak	JFIRE	1,53E-04	y-1	120	99	104												DO storage tanks are reached by the effects of the jet fire. However no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. Duration of jet fire < 10 min but possible domino due to high heat radiation of LNG/NG with flame length 92 m.
E2-131-10	NG pipeline from RGU to GRS (tie-in)	Small leak	JFIRE	1,01E-03	y-1	1800	10	11												DO storage tanks, ENE centrifuges and process pipelines are reached by the effects of the jet fire. However no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. Duration of jet fire can be >10 min



DOMINO EFFECT																							
THERMAL RADIATION							TARGETS													COMMENTS			
ITEM	EQUIPMENT / PROCESS	SCENARIO	FINAL EVENT	FINAL FREQ.	UNITS	POOL FIRE DUR. (s)	DOMINO EFFECT	DOMINO EFFECT	QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF.	ENE SERVICE TANKS BUND	DO BUND	HFO BUND	FSU	EGM Jetty	REGAS AREA	IFV Propane in shell side		NG Pipe Rack	EGM Metering Station	D4 Gas turbines
							37,5 kW/m2	15 kW/m2															
E2-131-50	NG pipeline from RGU to GRS (tie-in)	Medium leak	JFIRE	1,01E-04	y-1	1800	42	48															DO storage tanks, ENE centrifuges, pump house, service tanks and process pipelines are reached by the effects of the jet fire. Regarding the DO, no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. However, the HFO is maintained above its flash point in the most part of the affected area. Duration of jet fire > 10 min

DOMINO EFFECT																							
ITEM	EQUIPMENT / PROCESS	SCENARIO	FINAL EVENT	FINAL FREQ.	UNITS	POOL FIRE DUR. (s)	THERMAL RADIATION		TARGETS												COMMENTS		
							DOMINO EFFECT	DOMINO EFFECT	QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF.	ENE SERVICE TANKS BUND	DO BUND	HFO BUND	FSU	EGM Jetty	REGAS AREA	IFV Propane in shell side	NG Pipe Rack		EGM Metering Station	D4 Gas turbines
							37,5 kW/m2	15 kW/m2															
E2-131-FBR	NG pipeline from RGU to GRS (tie-in)	Large leak	JFIRE	8,08E-05	y-1	600	67	80												DO storage tanks, ENE process pipelines, centrifuges, pumphouse and service tanks are reached by the effects of the jet fire. Regarding the DO, no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. However, the HFO is maintained above its flash point in the most part of the affected area. Duration of jet fire > 10 min			
E2-141-10	NG pipeline to CCGT GRS	Small leak	JFIRE	7,09E+04	y-1	1800	10	11												ENE centrifuges and process pipelines are reached by the effects of the jet fire. No additional scenarios or consequences are expected regarding the DO. Duration can be > 10 min			

DOMINO EFFECT																						
						THERMAL RADIATION		TARGETS														COMMENTS
						DOMINO EFFECT 37,5 kW/m2	DOMINO EFFECT 15 kW/m2	QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF.	ENE SERVICE TANKS BUND	DO BUND	HFO BUND	FSU	EGM Jetty	REGAS AREA	IFV Propane in shell side	NG Pipe Rack	EGM Metering Station	D4 Gas turbines	
E2-141-50	NG pipeline to CCGT GRS	Medium leak	JFIRE	6,81E-05	y-1	600	42	48														ENE pump house, centrifuges, process pipelines and service tanks and oil tanker at quay are reached by the effects of the jet fire. No additional scenarios or consequences are expected regarding the DO. Duration can be > 10 min
E2-141-FBR	NG pipeline to CCGT GRS	Large leak	JFIRE	5,80E-05	y-1	600	61	72														ENE pump house, centrifuges, process pipelines and service tanks and oil tanker at quay are reached by the effects of the jet fire. No additional scenarios or consequences are expected regarding the DO, however, the HFO is present above its flash point. Duration of jet fire > 10 min
E2-151-50	NG equipment at CCGT GRS	Medium leak	JFIRE	4,55E-04	y-1	600	38	43														Oil tanker at quay is reached by the effects of the jet fire. Duration of jet fire > 10 min
E2-151-FBR	NG equipment at CCGT GRS	Large leak	JFIRE	3,00E-04	y-1	600	39	45														Oil tanker at quay is reached by the effects of the jet fire. Duration of jet fire > 10 min
E2-161-10	NG pipeline to Delimara 3 GRS	Small leak	JFIRE	1,06E-04	y-1	1800	10	11														ENE process pipelines and centrifuges are reached by the effects of the jet fire. Regarding the DO, no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. However, in the process pipelines, HFO is maintained above its flash point in the most part of the affected area. Duration > 10 min

DOMINO EFFECT																		
							THERMAL RADIATION		TARGETS							COMMENTS		
							DOMINO EFFECT 37,5 kW/m2	DOMINO EFFECT 15 kW/m2	QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF.	ENE SERVICE TANKS BUND	DO BUND	HFO BUND		FSU	EGM Jetty
E2-161-50	NG pipeline to Delimara 3 GRS	Medium leak	JFIRE	1,45E-05	y-1	600	42	48										ENE centrifuges, service tanks, pump house and process pipelines are reached by the effects of the jet fire. Regarding the DO, no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. However, the HFO is maintained above its flash point in the most part of the affected area. Duration of jet fire > 10 min
E2-161-FBR	NG pipeline to Delimara 3 GRS	Large leak	JFIRE	1,31E-05	y-1	600	60	71										ENE centrifuges, service tanks, pump house and process pipelines are reached by the effects of the jet fire. Regarding the DO, no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. However, the HFO is maintained above its flash point in the most part of the affected area. Duration of jet fire > 10 min
E2-171-FBR	NG equipment at Delimara 3 GRS	Large leak	JFIRE	3,47E-04	y-1	600	41	42										Possible domino effect on DO / HFO pipelines, ENE pumphouse or ENE Centrifuges depending on the direction of the jet fire. Duration can be > 10 min. No effects are expected at EGM and SEP facilities and equipment



4.8.2. Environmental Damage MATTE

The major hazard scenarios identified in the previous chapter could result in environmental damage according to the information listed below:

The spillage of fuel oil or gasoil to the seawater is the result of:

- the result of the leakage of the unloading arm or hose in the quay.
- or a spillage from the pipelines, pumps, centrifuges or tanks inside the facilities not contained in the interceptors

For additional information refer [1] and [2]

4.8.3. Risk matrix

The application of a common Risk Matrix to all the Safety Reports submitted by the operator at Delimara site has been proposed during the evaluation process by the evaluator and approved by the authorities. The risk matrix, developed identical to the French Assessment Grid (Risk Matrix officially established in France), for each operator are presented in [1] and [2].



5 MEASURES FOR THE PREVENTION, CONTROL AND MITIGATION OF RISKS

This section provides information on technical parameters and suitable technological safeguards to prevent and mitigate the consequences of each of the major accidents mentioned in this Safety Report. These measures have been specifically listed for each hazard in the HAZID & HAZOP reports [10], [27] and [3].



6. FINDINGS AND CONCLUSIONS

This Coordinated Safety Report has been carried out providing an additional instrument for the companies ENEMALTA; EGM and D3PG operating in a close future the existing and projected facilities at the Delimara Power Station, managing hazardous substances such as HFO, DO, LNG and NG. The report has been prepared on the basis of the Safety Reports issued by ENEMALTA [1] and EGM [2] with a similar approach in the identification of the hazards, the assessment of the consequences and the estimation of the frequencies, even if different guidelines and databases have been used. The combination of the scenarios in a single list allows direct comparison of damage zones and frequencies and, above all, the study of the possible domino effect generated by each scenario, should the safeguards and the fire fighting measures fail and the consequences escalate. Giving that the facilities are operated by three companies but are located at the same site, sharing pipe racks and several utilities, this part is of capital importance in order to determine whether the final risk is acceptable.

The following findings should be highlighted:

- The hazards identified in the facilities are relatively familiar for the process safety experts and for the personnel at the three companies.
- The conclusion is that the risk level at the site operated by ENEMALTA, EGM and D3PG is absolutely compatible with the surrounding activities and the presence of private houses, the risk for the population is acceptable and the risk for the environment is acceptable, provided that all the safeguards considered or recommended in the HAZOP & HAZID reports are implemented and properly maintained.

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ANNEXURES

ANNEX 1. DRAWINGS

NUMBER	DESCRIPTION	DRAWING SCALE
01	Area of concern	1 / 10,000
02	Land Use	N/S
03	General Plot Plan	1 / 3,000



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CLIENT:

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ENEMALTA PLC

PROJECT: COORDINATED SAFETY REPORT

DRAWING NAME: AREA OF CONCERN

DRAWING: 1

LOCATION: DELIMARA- MALTA

SCALE: DINA3: 1/10000

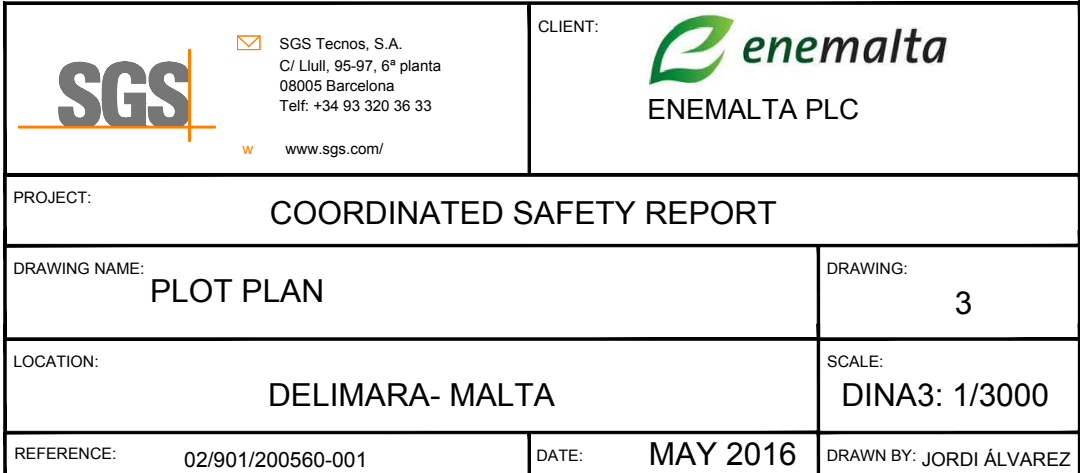
REFERENCE: 02/901/200560-001

DATE: MAY 2016

DRAWN BY: JORDI ÀLVAREZ



<div><div><div>SGS</div></div><div><div><div></div></div><div>SGS Tecnos, S.A. C/ Llull, 95-97, 6ª planta 08005 Barcelona Telf: +34 93 320 36 33 www.sgs.com/</div></div></div>		CLIENT: <div><div></div><div>enemalta</div><div>ENEMALTA PLC</div></div>	
PROJECT: SAFETY REPORT			
DRAWING NAME: LAND USE		DRAWING: 2	
LOCATION: DELIMARA- MALTA		SCALE: NOT SCALED	
REFERENCE: 02/901/200560-001-Rev.03	DATE: SEP 2016	DRAWN BY: JORDI ÁLVAREZ	





COORDINATED SAFETY MANAGEMENT SYSTEM FOR THE DELIMARA POWER STATION

**ENEMALTA PLC
ELECTROGAS MALTA LIMITED
D3 Power Generation Ltd.**

Barcelona, July 29th, 2016

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CMP 07 - Emergency Management Procedure

   国家电投 SPIC D3发电有限公司 D3 Power Generation Ltd	File: CMP01 - CSMS Roles and Responsibilities_r0_2016-08-01.docx COORDINATED SAFETY MANAGEMENT SYSTEM
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CMP 01





Coordinated Safety Management System

Roles and Responsibilities

Revision list


Revision No.	Description	Written By/Revised By	Date
0	First issue	Roberto Vaccari - SGS	01.08.2016

On Behalf of:	Written by:	Verified by:	Approved by:
ENEMALTA PLC			
ELECTROGAS MALTA LTD			
D3 Power Generation LTD			

   	File: CMP01 - CSMS Roles and Responsibilities_r0_2016-08-01.docx COORDINATED SAFETY MANAGEMENT SYSTEM
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1 Aim and Scope

The purpose of this procedure is to establish rules, roles and responsibilities in order to guarantee the best way of cooperation between ENEMALTA Plc, ELECTROGAS MALTA Ltd and D3 Power Generation Ltd (stakeholders) at the Delimara Power Station. This procedure establishes the general framework.

The procedure is applicable to all health, safety and environmental issues in relation to the interfaces between the three operators. The scope includes the interfaces as well as the services provided at them. It must also include any other issue, linked to operations, maintenance and facility management in general, which may have an impact, directly or indirectly, on another operator.

The stakeholders promoting the implementation of this procedure are ENEMALTA Plc, ELECTROGAS MALTA Ltd and D3 Power Generation Ltd. The Operators involved in the implementation are ENEMALTA, ESB International, Bumi Armada and other which may be appointed in the future. The Units are all the Units at ENEMALTA plus EGM FSU, EGM Regas, EGM D4 and D3PG. The table below summarizes the relationship between units and operators.

Unit	Owner / Main Contractor / Responsible	Operator
All units within ENE	ENE	ENE
D3	D3PG	To be appointed
D4	EGM	ESBI on behalf of EGM
FSU	EGM	BUMI ARMADA on behalf of EGM
Regas	EGM	EGM





2 References

OHSAS 18001:2007 Clause 4.4.1

OHSA Act 2000 – Occupational Health & Safety Authority Act 2000


LN 36 of 2003 General Provisions for Health and Safety at Work Places Regulations

LN 282 of 2004 Work Equipment (Minimum Health and Safety Requirements) Regulations

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3 Terms and Definitions

ENE	Enemalta plc
EGM	ElectroGas Malta Ltd
D3PG	D3 Power Generation Ltd
EMS	Environmental Management System
SMS	Safety Management System - this applies only for Delimara Power Station and related Administration
CSMS	Coordinated Safety Management System
E&SC	Environmental and Safety Coordinator
SOPs	Standard Operating Procedures; An established written procedure to be followed by ENE staff, providing technical and organisational requirements to perform a specific activity
H&S	Health and Safety
HSE	Health Safety and Environment
DPS	Delimara Power Station
Stakeholder	other company operating at the Delimara Site, the Government and any other public agency with an interest or concern about the site.
D3	Delimara 3
D4	Delimara 4

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4 Responsibilities

Senior Management (ENEMALTA Board of Directors, EGM CEO, D3PG CEO)

The Senior Management is responsible for ensuring that:


- staff with supervisory or management responsibilities are held accountable for the Management of the CSMS in areas under their control;
- a risk based approach is adopted for the management of CSMS, along with the SMS or procedures in force at each unit;
- meetings are held with the CSMS team at regular intervals or when required;
- CSMS performance is monitored and periodically reviewed.

Site managers (ENEMALTA Station, Capacity and Dispatch and Energy Services Managers, EGM technical director, D3PG Executive of Production)

- Managers are responsible for managing the CSMS in the areas under their control to ensure a safe environment for staff, visitors and contractors. These responsibilities include:
 - Leading by example in relation to the communication and cooperation with other stakeholders and the promotion of H&S awareness;
 - cooperation and consultation with health and safety representatives and staff;
 - transparency in the provision and maintenance of safety and emergency equipment;
 - communication in the safety compliance as part of staff performance appraisal.

HSE Managers (ENEMALTA HSE Manager, EGM HSE Manager, D3PG HSE officer)

- Provision of an appropriate safety personnel for meetings and communication with other stakeholders
- Cooperation with other stakeholders in the implementation of company's and local H&S policies, procedures and plans;
- Cooperation and consultation with health and safety representatives and staff from other stakeholders;

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Operations and Maintenance (ENEMALTA Capacity Planning and Dispatch Engineers and Maintenance Engineers; EGM Operations and Maintenance Engineers; D3PG Operations and Maintenance Engineers)

- Controlling the risks associated with each task that they supervise using a documented risk management process and communicating the risk at interfaces to the other stakeholders;
- Implementing the CSMS procedures;
- Participating in the investigation of reported incidents, near misses and hazards occurred at interfaces within the area they supervise;

Operator at control rooms (ENEMALTA Capacity Planning and Dispatch Engineers Generation Officers and Operators; EGM shift team leader; D3PG Shift Engineers)

- Actively communicating and coordinating with operators in other control rooms during normal operation and in case of emergency;
- Escalating to management any issue not properly and directly addressed with their counterpart.


Maintenance personnel (Enemalta Maintenance personnel, EGM maintenance personnel, D3PG maintenance personnel)

- Each operator is responsible for ensuring that his or her own work reflect high OHS standards in order to protect their own health and safety as well as the health and safety of others;
- Escalating to management any issue not properly and directly addressed with their counterpart.

5 Frequency

Document revision - This document should be reviewed and updated every twenty four (24) months, unless it is deemed necessary that it should be revised prior.

Document utilization – the procedure shall be constantly in usage for any issue potentially involving interfaces.

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6 Detailed procedural rules

The coordination and communication between stakeholders shall be carried out as described below:

6.1 Coordination Meetings

Coordination meetings shall be held periodically in order to ensure a proper moment and place is periodically dedicated to boost the communication and cooperation at the site. In the table below, the proposed assistance and frequency are shown:


Level	Scope	Frequency	ENE	EGM	D3PG
Site managers	Health, Safety, Environment and Security issue (content of the document itself)	Quarterly	Station, Capacity and Dispatch and Energy Services Managers	Technical Director	Executive of Production
HSE Managers			Manager HSE	HSE Manager	HSE officer
Operations and Maintenance			Capacity Planning and Dispatch Engineers	Operations and Maintenance Engineers	Operations and Maintenance Engineers

A specific meeting may be requested by one stakeholder whenever justified nonstandard issues have to be discussed.

6.2 Coordination at Dispatch level

Coordination at dispatch level is ensured by direct communication between control rooms, all manned 24/7. Several documents, including templates and forms are available for the exchange of information between stakeholders, for planning purposes. For any other issue under the scope of this procedure, the immediate communication at Dispatch level is ensured between:

- ENEMALTA dispatch engineer
- EGM duty shift team leader
- D3PG shift engineer

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6.3 Coordination at Maintenance level

Coordination for maintenance purposes, including planning, preparation, risk assessment for each work, permit to works, etc. is ensured by direct communication between stakeholders:

- ENEMALTA maintenance section to inform EGM duty shift leader
- EGM commissioning / operating team to inform ENEMALTA technical team / D3PG shift leader
- D3PG appointed operator to inform ENEMALTA technical team / EGM duty shift leader

6.4 Other levels of coordination





Coordination for any other operational issues, apart from dispatching and maintenance shall be carried out at technical management level. Each field operator shall inform his / her superior, who shall inform:

- ENEMALTA technical team
- EGM technical manager
- D3PG technical director

These last three roles have to coordinate together.

6.2. Escalation

In case of any delay, lack of quality or disagreement in the communication with the direct corresponding person is detected, the person in charge has to escalate the issue through the chain of command, using the internal channel of communication in his / her company. The communication shall be established for a second time at a higher level and treated at that level. The organizational charts for each company are available in attachment. Any person shall have a deputy in case of absence.

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6.3. Interfaces

The following services are provided at interfaces and have to be considered under the scope of these procedures, notwithstanding other activities may fall under the scope of the procedure due to their impact on other stakeholders.

ENE Coordination - EGM

Coordinated tie in points with EGM have been indicated in drawing DPS-XZ-180.

ENE shall provide EGM with 3.3kV and 33kV electrical connections.

The 132kV connection between EGM and ENE shall be bi-directional.

EGM shall provide ENE with Natural Gas connection


ENE Coordination - D3PG

Coordinated tie in points with D3PG have been indicated in drawing DPS-XZ-179.

Prior to the commencement of conversion ENE will remain responsible for operating all eight diesel engines, steam turbine and auxiliary systems. Following the complete transfer of operations of DPS3 to D3PG, ENE will no longer be responsible for operating the DPS3 eight diesel engines, steam turbine and auxiliary systems. The area to be operated by D3PG is indicated in drawing 0466-IPPC-0030. The transfer of DPS3's operations is to take place in two phases, each phase coinciding with the conversion phases of the plant to operate on NG. The first phase will see the conversion of the first four diesel engines to operate on both NG and gasoil. Up to completion of this first phase, ENE will continue to operate engines 1, 2, 3 and 4. Following completion of the first phase, D3PG will have the capability to operate the converted engines on NG and gasoil. Simultaneously ENE will stop operating engines 1, 2, 3 and 4, and to allow said engines to be converted to run on NG. Therefore upon completion of the first phase ENE will no longer operate any of the eight DPS3 engines.

D3PG shall make use of ENE's internal sewer connection. It is however to be noted that DPS3's waste water sump operated by D3PG receives only D3 discharges, therefore needed, an isolated sample can be taken from this sump tank.

ENE shall provide to and receive from D3PG, Evaporated Water.

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ENE shall provide D3PG with 3.3kV, 132kV and 415kV electrical connections.

ENE shall provide D3PG with a tie in point to the interceptor located at TP14.

ENE shall provide D3PG with tie in points for storm-water runoff.

ENE Coordination - D3PG & EGM

The areas to be operated by ENE, EGM & D3PG are delineated in drawing 0466-IPPC-0030-01.

Coordinated tie in points with D3PG and EGM have been indicated in drawing DPS-XZ-179 and DPS-XZ-180 respectively.

ENE shall provide Demineralised water to D3PG and EGM.




ENE shall provide metered potable water connection for each operator.

ENE shall provide access to fire fighting the Delimara Power Station Fire Fighting water circuit to EGM and D3PG sites. Should operators require fire-fighting water capacities greater than that currently available on site a dedicated fire fighting system is to be installed by the said operators. Extension of the fire fighting system is responsibility of the operators.

Each operator will be in charge of operating their own seawater cooling pumps. ENE will retain responsibility for dosing of the cooling water intake.


ENE shall retain responsibility of dispatch and as such shall retain responsibility of National Emission Ceilings (NECs). From the calculations made and results obtained, Enemalta plc is confident that in the perceivable worst case dispatch scenarios using unfavourable fuel composition, the national emission ceilings for NO_x, SO₂, Dust and Ammonia allocated for the energy sector in Malta will not be exceeded.

ENE shall provide a connection to the seawater outflow at Hofra iz-Zghira. As per discussions with ERA, ENE has submitted a proposal for coordinated monitoring should the requirement arise.

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7 Related Documents

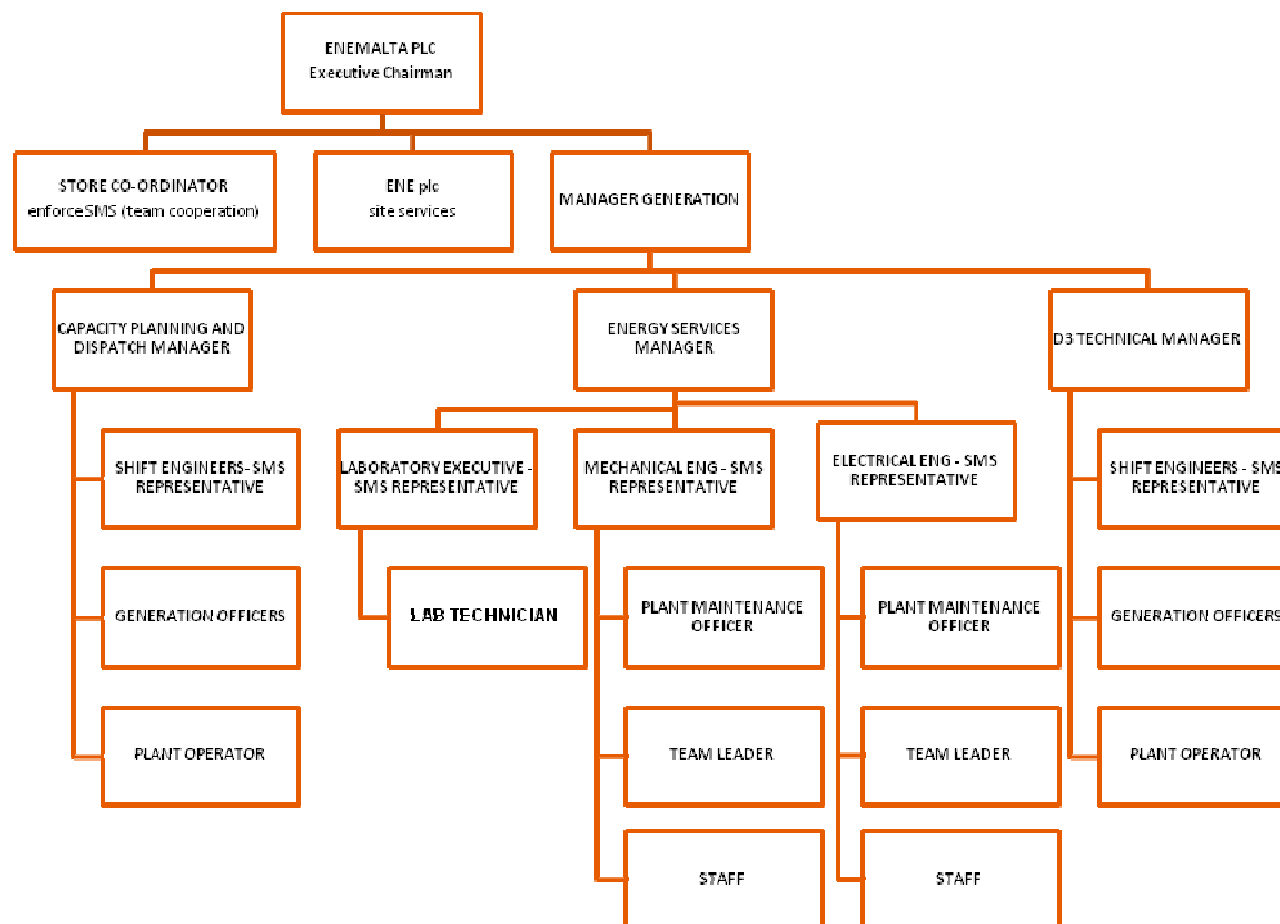
Not applicable




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8 Attachment 1: Organizational charts

ENEMALTA Plc, ELECTROGAS MALTA Ltd and D3 Power Generation Ltd personnel is organized as shown in the three following charts.

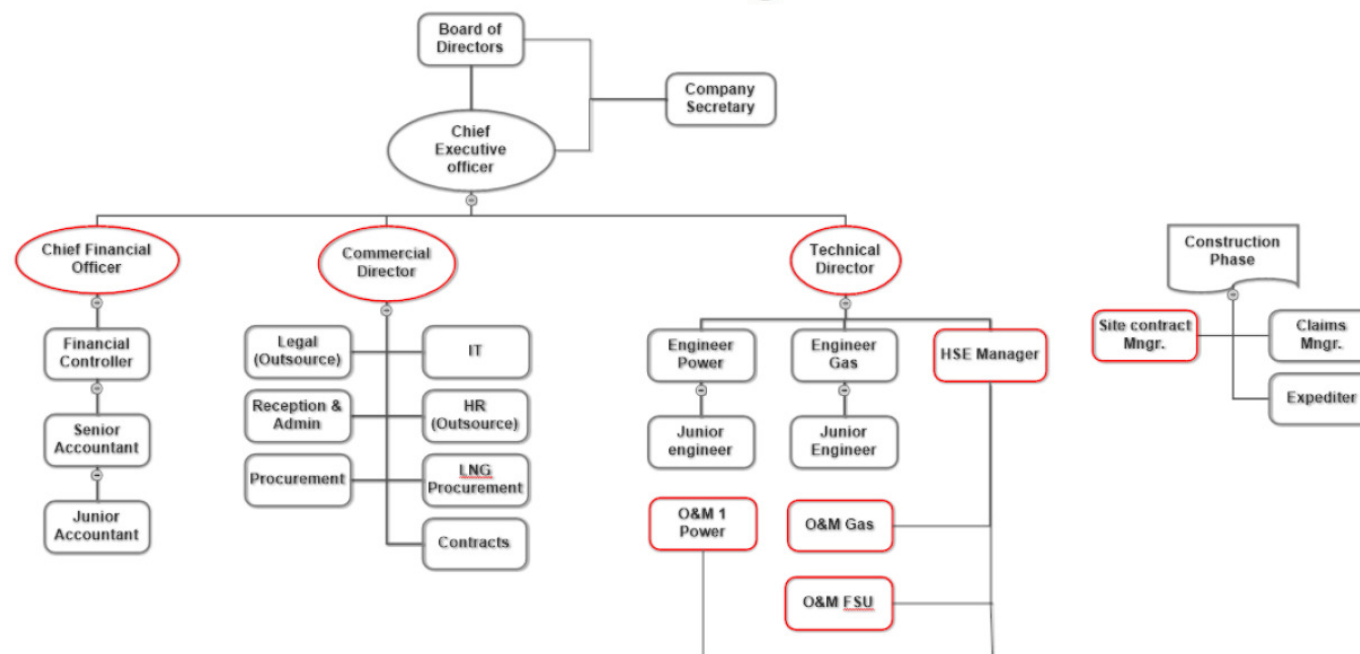
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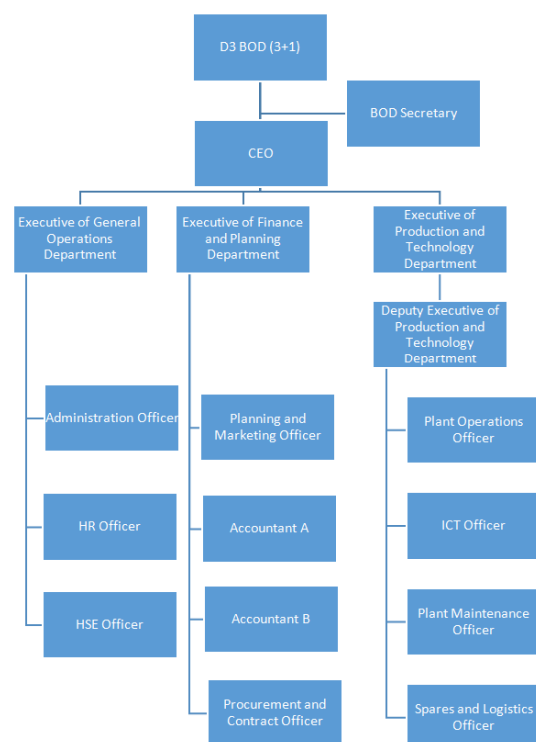
ElectroGas Malta HSE Organization Chart






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D3 Power Generation Ltd. Organizational Structure



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9 Attachment: Tie-In Points

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CMP 02

Interconnected Service Management Procedure

Revision list




Revision No.	Description	Written By/Revised By	Date
0	First issue	Roberto Vaccari - SGS	01.08.2016

On Behalf of:	Written by:	Verified by:	Approved by:
ENEMALTA PLC			
ELECTROGAS MALTA LTD			
D3 Power Generation LTD			

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1 Aim and Scope

The purpose of this procedure is to establish rules, roles and responsibilities in order to guarantee the continuity of interconnected services at interfaces between ENEMALTA Plc, ELECTROGAS MALTA Ltd and D3 Power Generation Ltd (stakeholders) at the Delimara Power Station.

The procedure is applicable to all services shared between operators:

- Natural gas supply
- FF water (fresh and sea water supply)
- Electrical power
- Potable water
- Demineralisation water
- Evaporated water
- Cooling water




The description of the services is included in the CMP01 - CSMS Roles and Responsibilities. The tie-in points are represented in drawing in attachment to the procedure CMP01 - CSMS Roles and Responsibilities.

2 References


Contracts for the provision of the services

3 Terms and Definitions

ENE	Enemalta plc
EGM	ElectroGas Malta Ltd
D3PG	D3 Power Generation Ltd

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EMS	Environmental Management System
SMS	Safety Management System - this applies only for Delimara Power Station and related Administration
CSMS	Coordinated Safety Management System
CSR	Coordinated Safety Report
E&SC	Environmental and Safety Coordinator
SOPs	Standard Operating Procedures: An established written procedure to be followed by ENE staff, providing technical and organisational requirements to perform a specific activity
H&S	Health and Safety
DPS	Delimara Power Station
Stakeholder	A company operating at the Delimara Site, the Government and any other public agency with an interest or concern about the site
Operator	Company that operates, control and maintains one or more units owned by a stakeholder
Unit	Facilities area owned by a stakeholder and operated by an operator (example: FSU, D3, D2A, D2B, ...)
D3	Delimara 3
D4	Delimara 4
Battery limit	Comprises one or more geographic boundaries, imaginary or real, enclosing a plant or unit being engineered and/or erected, established for the purpose of providing a means of specifically identifying certain portions of the plant, related groups of equipment, or associated facilities.

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4 Responsibilities

Operations and Maintenance (ENEMALTA Capacity Planning and Dispatch Engineers and Maintenance Engineers; EGM Operations and Maintenance Engineers; D3PG Operations and Maintenance Engineers)

- Supervising the services provided to others for a prompt communication of any interruption at interfaces to the other stakeholders;
- Planning the operation that may have an impact on the continuity of the aforementioned services;
- Maintaining the communication with their counterpart at the other stakeholders;
- Implementing the CSMS procedures;

Operator at control rooms (ENEMALTA Capacity Planning and Dispatch Generation Officers and Operators; EGM shift team leader; D3PG Shift Engineers)

- Actively communicating and coordinating with operators in other control rooms during normal operation and in case of emergency, with reference to the services provided;
- Escalating to management any issue not properly and directly addressed with their counterpart.

Maintenance personnel (Enemalta Maintenance personnel, EGM Maintenance personnel, D3PG Maintenance personnel)




- Supervising the services provided to others for a prompt communication of any interruption at interfaces to the other stakeholders;
- Escalating to management any issue not properly and directly addressed with their counterpart.




5 Frequency

Document Use – This document needs to be used when in case of planned or unplanned interruption of the services defining the mode of operation and communication at interfaces and battery limits.

Document revision - This document should be reviewed and updated every twenty four (24) months, unless it is deemed necessary that it should be revised prior.

Controlled Document (check latest revision)

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6 Detailed procedural rules

6.1 Service operations at interface




Service operations require coordination between stakeholders at the site in order to ensure common services are delivered. The following items shall be implemented:

- the technical characteristics of the services delivered, as well as obligations, actions to be taken in case of force majeure and environmental and/or safety relevant issues are being described in technical documents subscribed by the parties;
- periodical meeting between technical representatives of the parties are held in order to exchange relevant information about ongoing projects and update the operators;
- constant signal supervision at interfaces have been ensured for all relevant process parameters
- constant communication is ensured between control rooms.

6.2. Immediate interruption of services

Immediate unexpected interruption of services may occur at any time due to several reasons. The interruption shall be properly detected and informed. The operator at the control room of the unit providing the interrupted service to other shall:

- be aware of any lack of service, through direct supervision of parameters by means of receiving information from operators on field;
- inform other control rooms of units where services are delivered about the interruption;
- make a quick assessment and decision-making process and understand whether the service may be re-established in the short term;
- inform the person with the technical responsibility of the service when required (ENEMALTA Capacity Planning and Dispatch Engineers; EGM Operations and Maintenance Engineers; D3PG Operations and Maintenance Engineers);

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- inform other control rooms about foreseen solutions and time requested to re-establish the service.

The operator at the control room of the unit receiving the service shall:

- make a quick assessment of the consequences of the interruption on the operations and take decision about shut-down, while required by the circumstances.
- inform the person with the technical responsibility of the service (ENEMALTA Capacity Planning and Dispatch Engineers and Maintenance Engineers; EGM Operations and Maintenance Engineers; D3PG Operations and Maintenance Engineers);

6.3. Planned interruption of services




Planned interruptions of services are usual and expected at any site, principally for allowing for planned maintenance tasks. The interruption shall be planned well in advance with the users and properly informed. The operator at the control room of the unit providing the interrupted service to other shall:

- be informed of planned maintenance operations provoking any interruption of services;
- inform other control rooms of units where services are delivered about the interruption: service affected, excepted schedule, etc.;
- confirm the message has been received and the interruption is expected prior to the interruption itself.

The operator at the control room of the unit receiving the service shall:




- inform the person with the technical responsibility of the service (ENEMALTA Capacity Planning and Dispatch Engineers and Maintenance Engineers; EGM Operations and Maintenance Engineers; D3PG Operations and Maintenance Engineers);
- make an assessment of the consequences of the interruption on the operations, whether support is requested from other sections within the same Unit or from other stakeholders.

Controlled Document (check latest revision)

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7 Related Documents

CMP02 - Interconnected Service Management Procedure_r0_2016-08-01.docx

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CMP 03

Works Management Procedure

Revision list


Revision No.	Description	Written By/Revised By	Date
0	First issue	Roberto Vaccari - SGS	01.08.2016

On Behalf of:	Written by:	Verified by:	Approved by:
ENEMALTA PLC			
ELECTROGAS MALTA LTD			
D3 Power Generation LTD			

   国家电投 SPIC D3发电有限公司 D3 Power Generation Ltd	File: CMP03 - Works Management Procedure_r0_2016-08-01.docx	
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1 Aim and scope

The purpose of this procedure is to establish rules, roles and responsibilities in order to prevent, assess, correct, control and manage any potential environmental and safety impacts caused by works carried out by direct personnel and contractors of a stakeholder on another stakeholder's personnel, facilities and activities.

The procedure is applicable to all scheduled, planned or unplanned works carried out at interfaces, in common areas or within a Unit with a potential impact on another Unit, owned or managed by a different stakeholder.

2 References

EN ISO 14001:04, clause 4.4.6


EN ISO OHSAS 18001:07, clause 4.4.6

Chapter 424 Occupational Health and Safety Authority Act

L.N. 281 of 2004 - Work Place (Minimum Health and Safety Requirements for Work at Construction Sites) Regulations

3 Terms and Definitions

ENE	Enemalta plc
EGM	ElectroGas Malta Ltd
D3PG	D3 Power Generation Ltd
CSMS	Coordinated Safety Management System
Stakeholder	A company operating at the Delimara Site, the Government and any other public agency with an interest or concern about the site.
Operator	Company that operates, control and maintains one or more units owned by a stakeholder

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Unit	Facilities area owned by a stakeholder and operated by an operator (example: FSU, D3, D2A, D2B ...)
DPS	Delimara Power Station
RA	Risk Assessment
MS	Method Statement
BoP	Balance of Plant

4 Responsibilities




Operations and Maintenance (ENEMALTA Capacity Planning and Dispatch Engineers and Maintenance Engineers; EGM Operations and Maintenance Engineers; D3PG Operations and Maintenance Engineers)

- Planning the works that may have an impact on the neighbouring Units, on services continuity at interfaces, on escape routes from other Units, on communication with other Units and on personnel from other Units;
- Supervising the works performed by personnel or contractors at their Unit for a prompt communication to the affected stakeholders in case of deviation from planned works or emergency;
- Maintaining the communication with their counterpart at the other stakeholders;
- Implementing the CSMS procedures;

Operator at control rooms (ENEMALTA Capacity Planning and Dispatch Engineers, Generation Officers and Operators; EGM shift team leader; D3PG Shift Engineers)

- Be informed about the ongoing works through the usual procedures in place at each Unit;
- Actively communicating and coordinating with operators in other control rooms during normal operation and in case of emergency, with reference to the ongoing works which a possible impact on another stakeholder's Unit;
- Escalating to management any issue not properly and directly addressed with their counterpart.

5 Frequency

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Document Use – This document needs to be used whenever a work with the impact described in the scope is undertaken.

Document revision - This document should be reviewed and updated every twenty four (24) months, unless it is deemed necessary that it should be revised prior.

6 Detailed procedural rules

6.1 Authorization and permit to work

The stakeholders representatives in charge of the work shall:

1. Prepare Risk Assessment / Method Statement (RA/MS)

Contractor to prepare task specific RA/MS. RA/MS is submitted to affected operators for initial review. Information required:

- Timescales;
- Access arrangements;
- Traffic management arrangements;
- Hold point(s) for permit(s) to work;
- Resources (personnel, plant);
- Materials including storage;
- Description of steps constituting task;
- Description of key control measures.

2. Review RA/MS




Stakeholder submits completed RA/MS to interfacing stakeholder/s for formal review. Particular attention is to be given to potential impact of BoP works on ongoing DPS operations.

3. Accept or Revise RA/MS

Where the impact of these works on the interfacing stakeholder/s' operations is not adequately controlled, RA/MS are to be revised by contractor and resubmitted for review.

4. Authorisation to Proceed

Standard authorisation to proceed form issued by interfacing stakeholder/s and fixed to approved RA/MS.

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5. Identify Isolation, Hot Works, Excavation or Confine Spaces requirements

- a. If isolation of power, fuel or other apparatus is required the operator Permit to Work System applies. Operator to prepare Permit to Work.
- b. If any task involves hot work, excavation or confined space access the Project Permit to Work arrangements apply. Operator to prepare Permit to Work.

The requirement for Permit(s) must be clearly identified through appropriate hold points in the approved RA/MS.

6. Supervisor/Permit Issuer Briefing

Task supervisor(s) will generate a method statement and risk assessment which will be used to determine the type of safety document to be issued to the other party to allow the work to proceed.

7. Permit(s) Issued and Accepted

Safety documents are issued by the operator who will carry out the work as appropriate and accepted by the affected operator. Where hold points for permit(s) in RA/MS follow commencement of the task, permit(s) may be issued later (but always prior to that element of the task).

8. Changes in Tasks

Any change in circumstances affecting the approved methodology initiates a review of the RA/MS and associated safety documents.




9. Permits withdrawn and Suspended Tasks

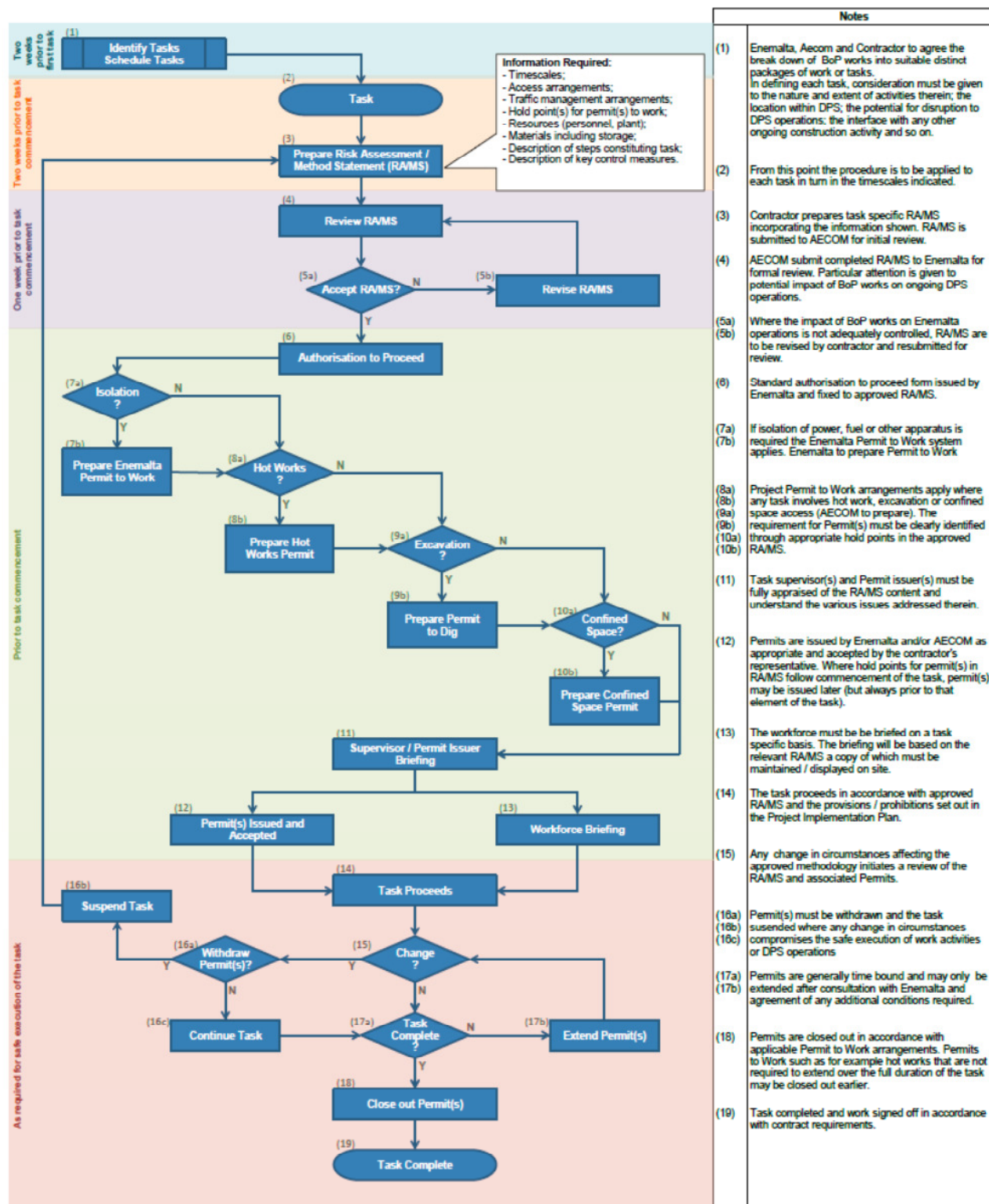
Permit(s) must be withdrawn and the task suspended where any change in circumstances may compromise the safe execution of work activities or operations.


10. Close Out Permits

Permits are closed out in accordance with applicable Permit to Work arrangements. Permits to Work such as for example hot works that are not required to extend over the full duration of the task may be closed out earlier.

The flowchart below summarizes the typical flow of actions for a generic task.

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6.2 *Blocked access or evacuation route to a unit*

In case a planned or unplanned work is expected to block an evacuation route or an access to another stakeholder's Unit, the following procedure should be followed:

1. Planned work:




- a. The person/company making the blockage should notify their unit control room about the expected blockage. The unit control room is to communicate with the other operator's control rooms if they will be affected by this blockage.
- b. The operator causing the blockage should identify alternative routes which are to be communicated to the other operators if they will be affected by the blockage. This operator should consult with the site representative and see what arrangements (signage / bridges) are needed to notify anyone using this route of the alternative route to be utilised.
- c. These alternative routes must be implemented BEFORE blocking the road.

2. Unplanned work due to an accident or fault:

- a. Since this blockage was not expected, the Unit control room should be informed and shall then communicate with the other operator's control rooms if they will be affected by this blockage. Person/company causing the blockage is expected to remove blockage as soon as possible. If the blockage is expected to last for a longer duration, an alternative route needs to be identified and communicated through the control rooms to anyone required to access that route.
- b. If no alternative route is available then situation to be escalated to higher management as this could potentially result in an emergency situation.

6.3 *Contractors and visitors management*

Make reference to procedure CMP05 - Contractors & Visitor Management Procedure_r0_2016-08-01 for Contractors and visitors management with reference to works.

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7 Related documents

CMP01 – CSMS Roles and Responsibilities

CMP05 – Contractors & Visitor Management Procedure




CMP06 – Incident investigation Procedure

System of Work Authorisation and Management Procedure for BoP in Enemalta Controlled Areas

Authorisation to Proceed Form

Hot Work Permit Form

Work Request Form

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Cross Boundary Safety Certificate

No of Sheets Attached:	Number: D4/ENE/001
Plant:	Description:

Terminal Point Number:	Date of issue:
-------------------------------	-----------------------

Terminal points numbers derived from AECOM Drawing Number 47067567-1019 Rev 8




By signing this document all parties involved agree to a common safety co-ordination to ensure that safety across any control boundaries is fully achieved at any time.
In advance to the common activity all parties have to verify within their own scope of responsibility that the respective system can safely be worked on.

Assigned Safety Co-ordinator:		Company:	
--------------------------------------	--	-----------------	--

Associated documents:		Company :	
<input type="checkbox"/> System diagram	Ref. no.:		
<input type="checkbox"/> Isolation List	Ref. no.:		
<input type="checkbox"/> List of overall safety precautions	Ref. no.:		
<input type="checkbox"/> Description of activity	Ref. no.:		

Remarks:

Agreed Date and Time of Execution:				
	Issued by	Responsible Party	Responsible Party	Responsible Party
System				
Company				
Name				
Date				
Signature				
WORKSCOPE COMPLETE				
	Issuer	Responsible Party	Responsible Party	Responsible Party
Company				
Name				
Date				
Signature				

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Authorisation to Proceed

Authorisation to proceed with Task Ref:

Task Summary:.....

.....

.....

.....

is hereby granted subject to:

- (A) Full compliance in all aspects of the task with agreed Risk Assessment / Method Statement (RA/MS)
Ref:.....a copy of which is attached to this form.
- (B) Implementation of any permit(s) to work required under the aforementioned RA/MS.
- (C) Any necessary deviation from the RA/MS being agreed in advance as appropriate, either:
 - Change to be managed through approved amendment to existing RA/MS or:
 - This authorisation to be suspended along with any associated permit(s) to work and new task RA/MS to be prepared.
- (D) Other (*specify*):.....
.....
.....
.....
.....
- (E) *Enemalta plc / D3PG / EGM is hereby granting its approval for the said works. However, such approval is conditional on the Contractor's strict abidance of all applicable laws and regulations. Enemalta plc / D3PG / EGM shall not be liable in any way for any losses or claims whatsoever, howsoever arising, directly or indirectly in connection with the application of this Authorisation to Proceed."*




On behalf of(Company requesting Authorisation to Proceed)

Signed..... Name..... Date.....

On behalf of(Company issuing Authorisation to Proceed¹)

Signed..... Name..... Date.....

¹ Company issuing Authorisation to proceed bears no responsibility for the management of authorised tasks or the quality of temporary and permanent works.

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CMP 04

Management of Changes with impact on others Units

Revision list


Revision No.	Description	Written By/Revised By	Date
0	First issue	Roberto Vaccari - SGS	01.08.2016

On Behalf of:	Written by:	Verified by:	Approved by:
ENEMALTA PLC			
ELECTROGAS MALTA LTD			
D3 Power Generation LTD			

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1 Aim and Scope


The purpose of this procedure is to establish the methodology for identifying, managing and reporting changes within the Enemalta, ElectroGas Malta and D3PG facilities and activities. Changes are inevitable during the development and execution of any activity and they may or may not have a significant impact upon Environment and Safety. Changes may occur during the stages of design, engineering, construction and operation of the installations or equipment both in normal operation and in extraordinary situations. These last include any unusual operating mode plus maintenance and shutdown, with the aim to determine the prevention, protection and mitigation measures to be applied in order to prevent any major accidents. The methodology also applies to future decommissioning phases.

Changes to be considered in the scope shall include facilities, activities, organization, procedures, contracts, legal framework, etc. The procedure will address both permanent and temporary changes. Temporary change reviews and approvals will specify the duration of the change and will require review if an extension is required. Temporary changes are to be considered in the same manner as permanent changes.

2 References


COUNCIL DIRECTIVE 2012/18/EU of the 4th July 2012 on the control of major-accident hazards involving dangerous substances

L.N. 179 of 2015 Occupational Health & Safety Authority Act (CAP.424). Control of Major Accident Hazard Regulations, 2015.

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3 Terms and Definitions

ENE	Enemalta plc
EGM	ElectroGas Malta Ltd
D3PG	D3 Power Generation Ltd
CSMS	Coordinated Safety Management System
Stakeholder	A company operating at the Delimara Site, the Government and any other public agency with an interest or concern about the site.
Operator	Company that operates, control and maintains one or more units owned by a stakeholder
Unit	Facilities area owned by a stakeholder and operated by an operator (example: FSU, D3, D2A, D2B ...)
DPS	Delimara Power Station
Change	Any modification in equipment, organization, procedures, raw materials or process conditions, either with temporary or permanent nature, involving a variation with respect to the documents describing the whole design process, including the typical process information, buildings and facilities, emergency actions, organization of staff.
Hazard	mean the intrinsic property of a dangerous substance or physical situation, with a potential for causing damage to human health and/or the environment
Hazardous Substances	Substance, mixture or preparation listed in Annex 1, Part 1, or fulfilling the criteria laid down in Annex 1, Part 2 of the Council Directive 2012/18/EU, and present as a raw material, product, by-product, residue or intermediate, including those substances which it is reasonable to suppose may be generated in the event of accident.
HAZID	The HAZID is a systematic method for hazards identification
HAZOP	The HAZOP (HAZard and OPerability study) is a systematic technique for identifying potential hazards and operational problems, especially adapted to continuous processes, providing fluid transfer through pipes and equipment which may be represented in piping and instrumentation diagrams (P&ID)

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Major accident	An occurrence such as a major emission, fire, or explosion resulting from uncontrolled developments in the course of the operation of any establishment covered by this Directive, and leading to serious danger to human health or the environment, immediate or delayed, inside or outside the establishment, and involving one or more dangerous substances
P&ID	Piping and instrumentation diagrams
Risk	Likelihood of a specific effect occurring within a specified period or in specified circumstances
Risk Assessment	Activity based on the determination of the possible consequences that may arise regarding the hazards and the likelihood that the consequences may occur.
MOC	Management Of Change

4 Responsibilities

Operations and Maintenance (ENEMALTA Capacity Planning and Dispatch Engineers and Maintenance Engineers; EGM Operations and Maintenance Engineers; D3PG Operations and Maintenance Engineers)

- Planning and assessing the changes that may have an impact on the neighbouring Units, on services continuity at interfaces, on escape routes from other Units, on communication with other Units and on personnel from other Units;
- Supervising the changes performed by personnel or contractors at their Unit for a prompt communication to the affected stakeholders in case of deviation from planned works or emergency;
- Maintaining the communication with their counterpart at the other stakeholders;
- Implementing the CSMS procedures;

5 Frequency

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Document revision - This document should be reviewed and updated every twenty four (24) months, unless it is deemed necessary that it should be revised prior.


Document utilization – the procedure shall be constantly in usage for any change potentially involving interfaces.

6 Detailed procedural rules

6.1 Common changes

In the list below, a non-comprehensive list of changes is presented:

- Facility change: modifications in buildings, utilities, containers, process/emergency equipment location and other non-production related areas.
- Hazardous substances changes: modification of substances (raw materials, fuels, additives, etc) to be used in the process.
- Equipment changes: modification of piping/equipment, piping rearrangements, equipment revisions, design parameters, operating conditions, control system (both hardware and software) impairment of fire water systems, impairment of alarm systems.
- Procedural changes: modification of standard operating procedures, emergency procedures, safe work procedures, temporary operating procedures, maintenance/inspection procedures, maintenance/inspection procedures or development of new procedures.
- Organizational changes: modification in the number of people, structure of the organization, development of a new role in an organization, and absence from job for extended period
- Temporary changes: planned for a limited duration; such as, a trial or evaluation or by-pass of a safety system for maintenance.

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6.2 Exceptions

Replacement-in-kind shall not be considered within the scope of this procedure: any item, equipment, procedure etc. that meets the design specification of the item it is replacing shall not be submitted to the Management of Change. Common examples at the site are:

- Site specific equipment (tanks, vessels, pumps, etc.) manufactured exactly to the original specification and located in the same position as the original.
- Standard equipment and materials manufactured by an approved supplier to a standard specification, such as bolts, gaskets, flanges, steam traps, piping, insulation, structural steel.
- Electric motors, speed drivers, fuses and circuit breakers of the same specification as the original.
- Piping with the same size, material, flange make-up and routing as the existing.
- Instrumentation of the same specification and range as the original.

6.3 MOC process




Any Enemalta, ElectroGas Malta and D3PG employee can initiate or recommend a change, which will be implemented by following the specific unit's internal MOC procedures. The MOC initiator is responsible for implementing the entire MOC internal procedure. As soon as a possible impact on a Unit managed by another stakeholder is foreseen, the MOC shall be escalated and this procedure shall be applicable.

The form in attachment shall be prepared by the responsible person and sent to his / her counterpart at the affected stakeholder for evaluation.

The final approval of the change must be in agreement between the stakeholder's representatives involved in the MOC process.

Minor changes

For minor changes, a direct approval may be obtained by means of a signature on the template.

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Major changes




For major changes an additional independent assessment is required, additional meetings to follow up are suggested prior to the final signature. In details, the MOC responsible shall set up a Coordinated MOC review team for discussion in a proper meeting to be held once the information is available. The team uses its own experience to solve problems and make judgments on MOC impact. The team selects a scribe who takes meeting minutes and reports. An activity can take from 15 minutes for minor changes to several hours depending on the impact of the change and the number of attendees involved. A scheduled meeting for usual activities may be used for MOC scope and specifically to comment on minor changes.

The ultimate purpose of the MOC meeting shall be the discussion of possible impacts of the proposed changes, with specific reference to any direct or indirect possibility for a Major Accident, considering that it may be generated by any impact on equipment or instrumentation failure, human error, procedures non-compliances, circumventions and shortcuts, as well as increased domino effect potential and reduced safeguards effectiveness.

The responsible person should determine in his/her review of the information submitted by the team, and based on the impact of the change, whether additional technical or specialized reviews (HAZID / HAZOP, environmental permits, Occupational Health & Safety assessment, Legal review, etc.) are necessary to evaluate the feasibility of the proposed change. A risk assessment may be used to determine the potential impact of the change on safety and health. Methods and risk matrix proposed in other procedures shall be used in this case. EHS personnel at each stakeholder are available for technical support on these impacts.




7 Related Documents

CMP01 – CSMS Roles and Responsibilities

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8 Attachment: Plant modification proposal form

1. Identification			
Person raising the modification proposal:			
Date of proposal:			
Modification registration number:			
Component/System (Include KKS Identification):			
Purpose of Modification:			
Detail of proposal (include timescale if possible. Attach any documents to further explain proposal):			
Requirement to amend documents or diagrams?	YES	NO	
Signature of Proposer: Designation:			Date:

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2. Categorisation

Category 1: Major hazard or risk to personnel/environment/plant. Risk to plant commercial performance. All safety related Modifications are Category 1. If external expertise is required, it is category 1.	1	YES/NO
Category 2: Internal Assessment	2	YES/NO
Name of Key Person Appointed:		Name:
Confirmation- Manager Modification Committee		Sign:
Key Person: Signature:		Date:

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3. Approval in principle to progress the modification

Approval Production Manager	Signature:	Date:
		Comments
Approval Maintenance Manager	Signature:	Date:
		Comments
Approval Technical Services Manager	Signature:	Date:
		Comments
Approval Plant Manager	Signature:	Date:
		Comments
Not Approved – State reasons	Signature:	Date:
Originator acceptance of decision	Signature:	Date:
Key Person acceptance of decision	Signature:	Date:

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4. Final approval to proceed with the implementation of the proposed modification

Approval Production Manager	Signature:	Date:
		Comments
Approval Maintenance Manager	Signature:	Date:
		Comments
Approval Technical Services Manager	Signature:	Date:
		Comments
Approval Plant Manager	Signature:	Date:
		Comments
Not Approved – State reasons	Signature:	Date:
Originator acceptance of decision	Signature:	Date:
Key Person acceptance of decision	Signature:	Date:

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5. Implementation

Key person confirms implementation of the
modification

Signature:

Date:

Attached all relevant documentation listed below

6. Confirm knowledge of modification completion, departmental personnel informed and required actions implemented

Production Manager

Signature:

Date:

To confirm (if applicable) that required
training is complete and procedures have
been created/modified

Maintenance Manager

Signature:

Date:

To confirm (if applicable) that required
training is complete, maintenance
instructions have been created/modified,
CMMS is updated and spares allocation has
been considered

Technical Services Manager




Signature:

Date:

Plant Manager




Signature:

Date:

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7. Completed documentation & post-modification review

Technical Services Department confirm the completion of amendments to any required documentation e.g. station manuals, plant status records, drawings, training programmes etc.	Signature: Date:
Record confirmation and results of a post-modification review	Signature: Date:

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CMP 05

Contractors & Visitor Management Procedure

Revision list


Revision No.	Description	Written By/Revised By	Date
0	First issue	Roberto Vaccari - SGS	01.08.2016

On Behalf of:	Written by:	Verified by:	Approved by:
ENEMALTA PLC			
ELECTROGAS MALTA LTD			
D3 Power Generation LTD			

  	File: CMP05 - Contractors Visitor Management Procedure_r0_2016-08-01.docx	
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1 Aim and scope

The purpose of this procedure is to establish rules, roles and responsibilities in order to prevent, assess, correct, control and manage any potential health, safety and environmental issue caused by contractors and visitors at the Delimara Power Station site.

The procedure is applicable to any visitors and contractors entering the site, as well as to any personnel with the stakeholder responsible for visitors and contractors management.

2 References

EN ISO 14001:04, clause 4.4.6


EN ISO OHSAS 18001:07, clause 4.4.6

Chapter 424 Occupational Health and Safety Authority Act

L.N. 281 of 2004 - Work Place (Minimum Health and Safety Requirements for Work at Construction Sites) Regulations

3 Terms and Definitions

ENE	Enemalta plc
EGM	ElectroGas Malta Ltd
D3PG	D3 Power Generation Ltd
CSMS	Coordinated Safety Management System
Stakeholder	A company operating at the Delimara Site, the Government and any other public agency with an interest or concern about the site.
Operator	Company that operates, control and maintains one or more units owned by a stakeholder
Unit	Facilities area owned by a stakeholder and operated by an operator (example: FSU, D3, D2A, D2B ...)

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LA Letter of Acceptance:- The LA contains instructions for contractors and the contracting body specifying all conditions in the tender document, including the special conditions.

SAP® Business Management Software:- SAP® is the software Enemalta is using to process all financial, transfer of goods entering the company warehouses and transfer of goods within the company, together with all fault reporting.

ER Environmental Representative

SR Safety Representative

SOPs Standard Operating Procedures: An established written procedure to be followed by ENE staff, providing technical and organisational requirements to perform a specific activity

HSE Health Safety and Environment

MPS Marsa Power Station




DPS Delimara Power Station

PPE Personal Protective Equipment

4 Responsibilities

Site contact person

- Responsible for following this procedure whenever he /she receives a visitor at the site
- Responsible for informing the Enemalta Security Guard room in advance about any visitors expected to come to the DPS installation as per procedure
- Responsible for escorting the visitor within the site
- Responsible for the observance of security measures affecting the organization and the employees under their supervision, if any
- Responsible for granting access to classified information or material with limitation to those employees who have a need to know and are capable of protecting the information
- Responsible for reporting any breach in security


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Security Guard

- Responsible for fence and gate control
- Responsible for checking the identity of the visitor at the gate, as well as informing the visitor about site rules and Emergency procedure
- Responsible for granting access to the visitor. Security guards will allow access only to visitors/contractors about whom they have been pre-notified as per section 6.1
- Informs the employee about the visitor/s, by phone and awaits the site employee to accompany the visitor/contractor inside the DPS Installation. The employee will then indicate if he/she wishes to meet the visitor/s either at the security guard room or will be coming to pick up the visitor. The employee may wish to speak to the visitor by phone without allowing him/her to visit the office.

5 Frequency

- Document Use – Permanently in use.
- Document revision - This document should be reviewed and updated every twenty four (24) months, unless it is deemed necessary that it should be revised prior.

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6 Detailed procedural rules

6.1. ID check




Access to the site shall be done always through the main gate operated by ENEMALTA. Security checks shall be enforced by Enemalta Security Guards for any visitor and contractor.

For employees (or permanent subcontractors):

- check that the company identification passes are worn at all times;
- ensure that the persons permitted to enter are authorized and are on official duty.
- Contractors who will be working for a predetermine time may also be issued a temporary pass, which constitutes two cards, one red and one green. Upon entering the facility, one of the cards is to be left with the security guards, and another kept at all times by the contractor's employee.

For any visitor reporting at the gate, the security guard shall:

- check identification document (ID card, passport),
- register (log in) the personal contact data, date & time of entry, contact person, visitor's tag number and any other required information in the Visitor's log book
- Visitor is to sign this log book.
- call contact person and confirm that the employee would like to meet the visitor:
 - o if yes, the employee is requested to meet the visitor at the security gate
 - o alternatively, the employee may wish to speak to the visitor by phone without meeting him/her personally.
- Ensure that Contractors and visitors heading to EGM and D3PG premises have to be accompanied all the time when crossing ENEMALTA premises. Predefined routes have to be followed to reach each stakeholder premises. Remember that one operator's contractor working within another operator's premises needs consent to work from that operator.
- supply visitor with briefing document, according to form.
- The security guard is to give the visitor a briefing on the emergency alarms of the site and advise of hard hat and/or other PPE areas.
- supply visitor with the visitor's tag and advise the visitor to have the pass displayed at all times.

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For any visitor leaving the site, the security guard shall:

- collect visitor's tag
- log the visitor out from the register

The visitor shall:

- show ID or any other means of identification
- accept Enemalta rules and instructions detailed in the Safety Instruction Card
- sign in the register where required
- Follow instructions received from the Security guard
- Contact any employee in case of being lost or return to security at gate

The site contact person shall:

- Fill the access request form (sample below) and submit it to the security department in advance for all planned visitors.
- Report to the safety guard in case of non expected visitor or unknown visitor
- Pick up the visitor from the Enemalta Security guard room
- Immediately inform the security guard in case of lost visitor


**Company requesting
access**

DATE >

**Request Location
Access**

< (DPS or MPS)

Name & Surname	Identification	Staff / Visitor /Contractor	Vehicle Reg	Duration	Comments
	(ID or passport)	Supplier (S / V / C / P)			

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6.2. Refusal/Unable to produce ID

Any person who fails to provide proper identification or whose details fail to satisfy security personnel will be ordered to leave facility. Such incident should be recorded by the security guard in the Incident Form and referred to their superiors for further action if necessary.

6.3. Refusal to leave

Security personnel may, if required, use any reasonable force to remove any person who fails to or refuse to leave immediately. In such case, the security guard, in consultation with his superior, shall call in the police/emergency services if deemed necessary. The incident should be recorded by the security guard in the Incident Form and referred to their superiors for further action if necessary.

6.4 Site induction




Site induction (access routes, site procedures, emergency procedures, evacuation, etc.) shall be carried out at each operator's premises. The site induction will cover the whole site including Enemalta premises, D3PG, EGM, FSU.

6.5 Prohibition against entry

In some cases, a contractor or specific contractor personnel shall be prevented to access the site due to their brakeage of one stakeholder or operator HSE or security policy.

The person responsible of the ongoing contracts with the contractor shall decide if the contractors or specific personnel have to be includes in a list of persons / companies with specific prohibition against entry.

The list shall be circulated through the HSE departments of the other stakeholders and operators for information.




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DPS main gate security guard shall have the right to prohibit access to any visitor if reasonably explained to the respective stakeholder that awaited visitor is not adequate to enter.

7 Related documents

CMP01 - CSMS Roles and Responsibilities_r0_2016-07-29

MP 16 - Access Control Procedure_r0_2016-07-28

  	File: CMP06 - Incident investigation _r0_2016-08-01.docx	
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CMP 06

Incident and Accident investigation Procedure

Revision list




Revision No.	Description	Written By/Revised By	Date
0	First issue	Roberto Vaccari	01.08.2016

On Behalf of:	Written by:	Verified by:	Approved by:
ENEMALTA PLC			
ELECTROGAS MALTA LTD			
D3 Power Generation LTD			

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1 Aim and scope

The purpose of this procedure is to establish rules, roles and responsibilities in order to guarantee the best way of cooperation during the investigation of any incident, accidents and near misses occurred at ENEMALTA Plc, ELECTROGAS MALTA Ltd and D3 Power Generation Ltd (stakeholders) at the Delimara Power Station.

2 References

OHSAS 18001:2007, clause 4.5.3.1




EN ISO 14001:2004 Clause 4.5.3

Chapter 424 Occupational Health and Safety Authority Act




Chapter 452 - Employment and Industrial Relations Act

3 Terms and Definitions




ENE	Enemalta plc
EGM	ElectroGas Malta Ltd
D3PG	D3 Power Generation Ltd
CSMS	Coordinated Safety Management System
Stakeholder	A company operating at the Delimara Site, the Government and any other public agency with an interest or concern about the site.
Operator	Company that operates, control and maintains one or more units owned by a stakeholder
Unit	Facilities area owned by a stakeholder and operated by an operator (example: FSU, D3, D2A, D2B ...)
Occupational Health Hazard	A chemical, physical or biological hazard arising in or from the work environment that may cause discomfort or adverse health effects.
H&S	Health and Safety Department
HSE	Health, Safety and Environment
OHSA	Occupational Health and Safety Authority
COMAH	Control Of Major Accident Hazards

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Enemalta Personnel	All personnel working directly with Enemalta Plc
Subcontractors/Third party	
Incident	An incident can be defined as any dangerous occurrence such as fires, gas leaks or explosions, oil and chemical spillages, damages to any equipment/structure etc. containing asbestos, failure of machinery or lifting equipment, etc
Accident	Any unplanned event resulting in an injury ONLY (not including damage to property, plant or equipment).
Injury	When a person hurts himself/herself at the place of work. Injury leave will be applied in accordance to the Social Security Act.
Fatality	A death
Serious Accident	A significant event which demands a response beyond the routine, resulting from uncontrolled developments with the potential to cause multiple injuries, ill-health or loss of life.
Serious/Major Injury	<p>A major injury which demands a response beyond the routine, resulting from uncontrolled developments with the potential to cause multiple injuries, ill-health or loss of life. This includes:</p> <ul style="list-style-type: none"> • Death of an employee or third party; • Fracture of any bone other than the wrist or ankle; • Fracture of the skull, spine or pelvis; • Any amputation; • Dislocation of the shoulder, hip, knee or spine injury; • Loss of sight (whether temporary or permanently); • Chemical or hot metal burn to the eye or any penetrating injury to the eye; • An injury resulting from electric shock or electrical burns; • Any injury that leads to loss of consciousness or requires resuscitation; and • Any injury that requires the injured employee to be hospitalised for more than 24 hours than for observation.
Minor Injury	A minor injury may include: cuts, abrasions, bruising and fractured finger.
Violent Incident	Physical or verbal assault or the threat of assault.

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Major Accident	an occurrence such as a major emission, fire, or explosion resulting from uncontrolled developments in the course of the operation of any establishment covered by these regulations, and leading to serious danger to human health or the environment, immediate or delayed, inside or outside the establishment, and involving one or more dangerous substances.
Near Miss	Unsafe act, condition, unplanned event or out of compliance with the potential for injury or damage to plant, people or the environment. The incident has occurred but, on this occasion, there has been no immediate adverse consequence. If circumstances had been slightly different, injury or damage to plant, people or the environment would have occurred.
Ill-Health and Diseases	These include physical or Physiological diseases as a result of work activities such as dermatitis (skin infections) due to use of chemicals, occupational asthma, musculoskeletal disorders as result of using computers or manual handling (repetitive movements), Protection to expecting mothers and the unborn fetus, etc.
HSE Observation	Unsafe act, condition or unplanned event with the potential for injury or damage to plant, people or the environment. The event has been observed but has not, necessarily, occurred.

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Risk control measures The workplace precautions in place to reduce the risk to a tolerable level. For incident control, risk control measures should address direct, underlying and root causes.

Direct cause The condition that directly resulted in the incident.

Underlying cause Although in most of the cases an unsafe act or condition are the most obvious reason why an incident happens (and the direct cause), there may be several immediate hidden causes identified in any one adverse event.

Root cause An initiating event or failure from which all other causes or failings spring. Root causes are generally management, system, planning or organizational failures.

PR Public Relations

FO Fuel Oil

DO Diesel Oil

LNG Liquefied Natural Gas

NG Natural Gas

4 Responsibilities

Senior Management (ENEMALTA Board of Directors, EGM CEO, D3PG CEO)

The Top Management is responsible for ensuring that:

- *PR formalities are dealt*
- *Providing support to investigation team*




HSE Managers (ENEMALTA HSE Manager, EGM HSE Manager, D3PG HSE officer)

HSE managers are responsible for:

- Providing the necessary support and environmental and safety documentation
- Coordinating with stakeholders whenever there is any safety, environmental or security issue.
- Requesting presence of other departments
- Requesting support from external services

HSE officer (ENEMALTA E&S coordinator and Head of H&S, EGM CCGT Production manager, Regas HSE manager, FSU Safety Officer, D3PG Operation officer)

HSE officers are responsible for:

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- Site investigation
- Interviews with the personnel
- Reporting
- Recommendations
- Follow ups

5 Frequency

Document Use – This document needs to be used in case of incident, accident, near misses, etc.




Document revision - This document should be reviewed and updated every twenty four (24) months, unless it is deemed necessary that it should be revised prior.

6 Detailed procedural rules

6.1 Incident, accident, major accident, job injury, near miss

Any incident, accident, major accident, job injury, near miss (afterwards generically called “incident”) that occurs on site, whether they result in injury or not, must be assessed to determine if the incident had the potential to result in a Serious Injury, Fatality or Major Accident.

Potential Serious Injury or Fatality or Major Accidents are incidents or near misses, which result in no injury or in an injury not fulfilling criteria for being a Serious Injury or Fatality, but under slightly different circumstances could result in a Serious Injury or Fatality or Major Accidents.

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Potential Serious Injury or Fatality includes:


- Work with Hazardous Energies – including moving or rotating machine parts, electricity, pressure, steam systems, line breaking, tasks requiring Lock-out / Tag-out procedures etc;
- Confined Space Entry – regular maintenance or repair being the cause of entry etc;
- Lifting Operations – use of cranes, lifting beams, block and tackle etc;
- Working at Height – use of scaffolds, ladders or fall arrest systems etc;
- High Risk Contractor & Construction Work – excavations, demolitions, etc;
- Mobile Equipment / Vehicles – use in operation and interaction with pedestrians, structures etc;
- Manual Handling – involving considerable weight or highly repetitive movements etc;
- Exposure to or Release of Hazardous Materials –in operation or maintenance;
- Hazardous Materials Handling – in operation or maintenance and repair etc;
- Process Instability – in operation or maintenance and repair etc;
- Unexpected Maintenance – of plant and equipment or systems etc;
- Unexpected Changes – in plant and equipment or processes etc; and
- Emergency Shutdown Procedures – due to unforeseen events etc.

Potential major accidents include:

- Hazardous substance spillage to the seawater
- Hazardous substance spillage on the ground
- Hazardous substance release to the atmosphere
- Pool fire, jet fire, flash fire proceeding from the ignition of flammable or combustible substances
- Explosion proceeding from the ignition of hazardous substances dispersed in the atmosphere




6.2. Joint investigation team

Whenever an incident occurs at the interfaces with another stakeholder, a joint investigation is required. An interface with another stakeholder, with reference to this procedure, shall be the physical interfaces described in the procedures CMP01 - CSMS Roles and Responsibilities and CMP02 - Interconnected Service Management Procedure, as well as any other issue, linked to operations, maintenance and facility management in general, which may have an impact, directly or indirectly, on another operator.

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The investigation shall be carried out as follows:

- Whenever the Coordinated Emergency Plan is activated, the stakeholder in charge of the emergency shall undertake the responsibility for leading the joint investigation. Otherwise, the criteria mentioned in the CERP shall be applied in order to allocate the responsibility to lead the team:
 1. Location of the incident (incidents within ENE buildings shall be led by ENE; incidents within EGM Units shall be led by EGM, incidents within D3PG Unit shall be led by D3PG; incidents in common areas of the site shall be led applying the following bullet).
 2. Knowledge (incidents involving FO, DO shall be led by ENE; incidents involving LNG and NG shall be led by EGM; incidents involving other substances or more than one substance shall be led applying the following bullet).
 3. Personnel involved (incidents with injuries to ENE personnel shall be led by ENE; incidents with injuries to EGM personnel shall be led by EGM; incidents with injuries to D3PG personnel shall be led by D3PG).
- The investigating team shall be appointed including personnel having the required expertise but who are not directly involved with the incident to avoid conflict of interest. The chairperson of the investigating committee shall be independent of the department pertaining to the injured person, if any. At least one expert from each operator involved shall be appointed to the team.
- Investigations need to be done immediately after the incident to determine the root cause of the incident.
- The team shall visit the site and interview the witnesses and gather all relevant evidence of the accident. The team shall be granted access to the facilities, documents and personnel involved in the incident.
- The team shall issue a report on the accident and his recommendations for remedial measures and it is the responsibility to escalate the issue within their organizations in order to ensure that such measures are implemented to prevent similar occurrences in the future. These recommendations could include safer work procedures, revision of personal protective equipment used, requirement for further H&S Awareness training, etc.

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6.3 *Injured personnel, contractors or visitors*

In case of injured personnel, contractors or visitors, the welfare section reporting and other obligations must be fulfilled by the employer, following internal procedures and legal obligations. Whenever additional information is required from other operators to fulfil the requirements, this may be obtained with the cooperation from the other operators, which have to response as soon as practically possible.

6.4 *Major Accidents*

In case of major accident generated by a COMAH site, the generating COMAH operator has to notify the authorities. If the major accident has been generated by others, the affected COMAH operator has to notify the authorities.

6.5 *Other incidents*




In case of material accident, without any hazardous substances affected, not reportable as a Major Accident, the affected operator shall report to OHSA.

7 Related documents

Incident/Exercise Report Form

CMP01 - CSMS Roles and Responsibilities

CMP02 - Interconnected Service Management Procedure

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CMP 07

Emergency Management Procedure

Revision list




Revision No.	Description	Written By/Revised By	Date
0	First issue	Roberto Vaccari - SGS	05.08.2016

On Behalf of:	Written by:	Verified by:	Approved by:
ENEMALTA PLC			
ELECTROGAS MALTA LTD			
D3 Power Generation LTD			

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1 Aim and Scope

The purpose of this procedure is to establish rules, roles and responsibilities in order to organize human and material resources involved in the management of an emergency at the Delimara Power Station.




The scope of the procedure is to address the preparation and review of the Coordinated Emergency Response Plan (CERP), the alarm tests, the common drills, the management of the shared material resources and the first aid room service.

2 References

Not applicable.

3 Terms and Definitions

ENE	Enemalta plc
EGM	ElectroGas Malta Ltd
D3PG	D3 Power Generation Ltd
Stakeholder	A company operating at the Delimara Site, the Government and any other public agency with an interest or concern about the site
Operator	Company that operates, control and maintains one or more units owned by a stakeholder
Unit	Facilities area owned by a stakeholder and operated by an operator (example: FSU, D3, D2A, D2B, ...)
EMS	Environmental Management System
SMS	Safety Management System - this applies only for Delimara Power Station and related Administration
CSMS	Coordinated Safety Management System
CERP	Coordinated Emergency Response Plan
E&SC	Environmental and Safety Coordinator

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SOPs Standard Operating Procedures: An established written procedure to be followed by ENE staff, providing technical and organisational requirements to perform a specific activity

HSE Health Safety and Environment

H&S Health and Safety

DPS Delimara Power Station

D3 Delimara 3

D4 Delimara 4

4 Responsibilities

HSE Managers (ENEMALTA HSE Manage, EGM HSE Manager, D3PG HSE officer)




- Provides the necessary support and environmental and safety documentation
- Coordinates with stakeholders whenever there is any safety, environmental or security issue.

HSE officer (ENEMALTA E&S coordinator and Head of H&S, EGM CCGT Production manager, Regas HSE manager, FSU Safety Officer, D3PG Operation officer)

- Assists in the periodical meetings organized in coordination with the other stakeholders to discuss issues related to HSE
- Organizes specific exercises to test the CERP, in cooperation with other stakeholders
- Schedules all the events to be done in cooperation at the beginning of each fiscal year
- Reviews periodically the inventory his material resources

5 Frequency

Document Use – This document needs to be used for the cooperation and communication in case of emergency with the frequency indicated in the table below:

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Item:	Frequency:	Responsible:	Comments:
Alarm test	Weekly, each Tuesday between 11:00 and 11:30 am	Control room operator at each unit	To be sounded in a sequence, one unit every five minutes
Common CERP exercise	Once a year	ENEMALTA	CPD shall be invited
CERP review	Once a year, two weeks after Common CERP exercise	ENEMALTA	Meeting shall be scheduled together with Common CERP exercise
Material resources replacement	When required, after use		

Document revision - This document should be reviewed and updated every twenty four (24) months, unless it is deemed necessary that it should be revised prior.

6 Detailed procedural rules

Emergency events require immediate coordination and communication with stakeholders at the site in order to minimize the consequences for the employees, the public, the environment and the critical assets.

- A common cooperation policy in case of emergency (namely consolidated Emergency Response Plan) have been agreed and shall be reviewed and maintained through this procedure;




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- A communication chain in case of emergency, including escalation levels, coordination with security guards and with external emergency services, has been set in place and shall be maintained through this procedure.
- Periodical meeting shall be held between technical representatives of the parties with the purpose of reviewing and maintaining updated the consolidated Emergency Response Plan, the organization and the material resources required in case of emergency.
- Periodical fire drills and emergency practices shall be organized in cooperation with the stakeholders at the site; outcomes should be evaluated and corrective measures taken when required.

6.1 Management of shared material resources

There will be no material resources shared between the operators. If during an emergency an operator requires some material which another operator can provide, this will be provided with the condition that the operator utilizing this material replaces the material used once the emergency is over.

The Fire fighting system is covered by a specific SOP.

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6.2 Management of the ENE first aid room service

EGM and D3PG have been granted use of the ENE first aid room during both commissioning and operation phases. The service is available 7am to 6 pm, Monday to Saturday, excluding public holidays.

The Room is accessible from common road within ENEMALTA area, thus accessible to all personnel.


The nurse is available to go on site with assistance from operator's personnel whenever the injured person is not in a position to be moved from the location of injury. .

ENEMALTA will issue a report on each intervention including actions taken and material resources used. A monthly record will be issued by the HSE services and copy will be forwarded to other operators, in case they made use of the services during the same month.

6.3 Coordinated Emergency Response Plan (CERP) Review

The CERP shall be submitted to update at least once a year or in the following cases:

- Modification of the facilities or activities taking place (especially extensions or change of classified product)
- Incorporation of new risks
- Legislative changes
- Real emergency involving subsequent amendments to improve the operability of the CERP
- Result arising from the different drills.




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Only HSE Managers are authorised to amend the CERP. Amendments shall be inserted in full in the following manner:

- The HSE Managers in collaboration with the HSE officers shall implement all necessary changes and updates to the CERP.
- The relevant page is amended on the electronic copy, with text changes clearly marked in red.
- The electronic copy is issued for all stakeholders' approval when minor changes are implemented.
- After approval, the CERP shall be re-printed and stakeholders informed to destroy and replace outdated copies by the Document Controller.




7 Related Documents

Coordinated Emergency Response Plan

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8 Annexure 1.- Alarm Test Recording

Test Alarm Date	Unit							Notes
XX / XX / XXXX	D1	D2A	D2B	D3	D4	FSU	RGU	
XX / XX / XXXX	D1	D2A	D2B	D3	D4	FSU	RGU	
XX / XX / XXXX	D1	D2A	D2B	D3	D4	FSU	RGU	
XX / XX / XXXX	D1	D2A	D2B	D3	D4	FSU	RGU	
XX / XX / XXXX	D1	D2A	D2B	D3	D4	FSU	RGU	
XX / XX / XXXX	D1	D2A	D2B	D3	D4	FSU	RGU	
XX / XX / XXXX	D1	D2A	D2B	D3	D4	FSU	RGU	




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COORDINATED EMERGENCY RESPONSE PLAN

Revision list




Revision No.	Description	Written By/Revised By	Date
0	First issue	Roberto Vaccari - SGS	28.07.2016

On Behalf of:	Written by:	Verified by:	Approved by:
ENEMALTA PLC			
ELECTROGAS MALTA LTD			
D3 Power Generation LTD			

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0. GENERAL


0.1. LIST OF ACRONYMS AND ABBREVIATIONS

ACRONYM OR ABBREVIATION	FULL TERM
BLEVE	Boiling Liquid Expanding Vapour Explosion
BOG	Boil-Off Gas
CCA	Casualty Clearing Area
CCGT	Combined Cycle Gas Turbine
CCR	Central Control Room (Enemalta)
CERP	Coordinated Emergency Response Plan
COMAH	Control of Major Accident Hazards
CPD	Civil Protection Department
CSMS	Coordinated Safety Management System
D3PP/D3PS	Delimara 3 Power Plant/Delimara 3 Power Station
D4PP/D4PS	Delimara 4 Power Plant/Delimara 4 Power Station
EAT	Emergency Advisory Team
EC	Emergency Controller
ECC	Emergency Control Center
EGM	ElectroGas Malta Ltd
ERP	Emergency Response Plan
ERT	Emergency Response Team
ERTL	Emergency Response Team Leader
FC	Forward Controller
FCP	Forward Control Point
FG	Fuel Gas
FSU	Floating Storage Unit
GO	Generation Officer
GRS	Gas Reducing Station
GT	Gas Turbine
H&S	Health and Safety
HAZID	HAZard IDentification
HAZOP	HAZard and OPerability study

Controlled Document (check latest revision)

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ACRONYM OR ABBREVIATION	FULL TERM
HFO	Heavy Fuel Oil
HP	High Pressure
LNG	Liquefied Natural Gas
LNGC	LNG Carrier(s)
MSDS / SDS	Material Safety Data Sheet
NG	Natural Gas
PID	Process and Instrument Diagram
RGU	ReGasification Unit
SOP	Standard Operating Procedure

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0.2. INTRODUCTION




This Coordinated Emergency Response Plan (CERP) defines the coordinated actions that will be taken by the ENEMALTA Plc, ELECTROGAS MALTA Ltd and D3 Power Generation Ltd (stakeholders) during an emergency situation. The CERP includes protocols to ensure communication and close coordination between stakeholders and with local area emergency response organizations and authority. The objective is to be prepared to:

- Ensure safety of own and others' personnel
- Prevent fatalities and injuries.
- Reduce damage to buildings, facilities and equipment.
- Avoiding or minimising damage to third party property
- Minimising or avoiding damage to plant
- Minimising or avoiding financial loss
- Minimising or avoiding loss of supply to consumers
- Protect the environment and the community.
- Speed up the resumption of normal operations.

0.3. SCOPE (WHEN TO APPLY THIS PLAN)

The CERP is applicable to any major accident, accident, incident, occupational injury, near loss which may occur at the Delimara Power Station site, independently of the location, substance involved, personnel involved, stakeholder involved, Unit involved or operator involved.




The stakeholders included in the CERP are ENEMALTA Plc, ELECTROGAS MALTA Ltd and D3 Power Generation Ltd. The Operators are ENEMALTA, ESB International, Bumi Armada and others to be appointed. The Units are all the Units at ENEMALTA plus EGM FSU, EGM Regas, EGM D4 and D3PG. The table below summarizes the relationship between units and operators.

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Unit	Owner / Main Contractor / Responsible	Operator
All units within ENE	ENE	ENE
D3	D3PG	D3PG / To be appointed
D4	EGM	ESBI on behalf of EGM
FSU	EGM	BUMI ARMADA on behalf of EGM
Regas	EGM	EGM

The level of application shall be at least the communication of the emergency situation, with a possible escalation to the full activation of the CERP as described afterwards.

The CERP is a common procedure to be followed by all the stakeholders as an additional tool. The activation of the CERP will not replace the activation of the internal ERP for each Unit. The roles, responsibilities and procedures included in the CERP shall be intended as additional to the internal ERP. A full understanding of the CERP is only possible in combination with the internal ERP applicable at each Unit. Each CERP copy shall be folded and maintained together with the corresponding ERP applicable in the location. For those topics not mentioned in the CERP, make reference to the ERP of each Unit.

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1. FACILITIES DESCRIPTION


For specific facilities operated by each stakeholder, make reference to the stakeholder Emergency Response Planning. In the following lines, interface facilities are exclusively addressed.

ENE Coordination - EGM

- Coordinated tie in points with EGM have been indicated in drawing DPS-XZ-180.
- ENE shall provide EGM with 3.3kV and 33kV electrical connections.
- The 132kV connection between EGM and ENE shall be bi-directional.
- EGM shall provide ENE with Natural Gas connection

ENE Coordination - D3PG

- Coordinated tie in points with D3PG have been indicated in drawing DPS-XZ-179.
- Prior to the commencement of conversion ENE will remain responsible for operating all eight diesel engines, steam turbine and auxiliary systems. Following the complete transfer of operations of DPS3 to D3PG, ENE will no longer be responsible for operating the DPS3 eight diesel engines, steam turbine and auxiliary systems. The area to be operated by D3PG is indicated in drawing 0466-IPPC-0030. The transfer of DPS3's operations is to take place in two phases, each phase coinciding with the conversion phases of the plant to operate on NG. The first phase will see the conversion of the first four diesel engines to operate on both NG and gasoil. Up to completion of this first phase, ENE will continue to operate engines 1,2,3 and 4. Following completion of the first phase, D3PG will have the capability to operate the converted engines on NG and gasoil. Simultaneously ENE will stop operating engines 1,2,3 and 4, and to allow said engines to be converted to run on NG. Therefore upon completion of the first phase and gas availability. ENE will no longer operate any of the eight DPS3 engines.
- D3PG shall make use of ENE's internal sewer connection. It is however to be noted that DPS3's waste water sump operated by D3PG receives only D3 discharges,




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therefore needed, an isolated sample can be taken from this sump tank. Further details have been provided in Section C3.3.

- ENE shall provide to and receive from D3PG, Evaporated Water. Further details can be found in Section C1.3.5 & C2.7.2.
- ENE shall provide D3PG with 3.3kV, 132kV and 415V electrical connections.
- ENE shall provide D3PG with a tie in point to the interceptor located at TP14. Further details can be found in section C1.3.11
- ENE shall provide D3PG with tie in points for storm-water runoff as described in Section C1.3.




ENE Coordination - D3PG & EGM

- The areas to be operated by ENE, EGM & D3PG are delineated in drawing 0466-IPPC-0030-01.
- Coordinated tie in points with D3PG and EGM have been indicated in drawing DPS-XZ-179 and DPS-XZ-180 respectively.
- ENE shall provide Demineralised water to D3PG and EGM. Further details can be found in Section C1.3.4 & C2.7.2.
- ENE shall provide metered potable water connection for each operator. Further details can be found in section C1.3.6.
- ENE shall effectively extend the Delimara Power Station Fire Fighting water circuit to EGM and D3PG sites. Should operators require fire-fighting water capacities greater than that currently available on site a dedicated fire fighting system is to be installed by the said operators. Further details can be found in section C1.3.7.
- Each operator will be in charge of operating their own seawater cooling pumps. ENE will retain responsibility for dosing of the cooling water intake. Further details on dosing procedures can be found in Section C1.3.9.
- ENE shall retain responsibility of dispatch and as such shall retain responsibility of National Emission Ceilings (NECs). From the calculations made and results obtained, Enemalta plc is confident that in the perceivable worst case dispatch scenarios using unfavourable fuel composition, the national emission ceilings for NO_x, SO₂, Dust and Ammonia allocated for the energy sector in Malta will not be exceeded.

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- ENE shall provide a connection to the seawater outflow at Hofra iz-Zghira. Further details can be found in section C2.7.1. As per discussions with ERA, ENE has submitted a proposal for coordinated monitoring should the requirement arise.

The cited drawing may be found in the Annexure no. 3.

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2. RISK ANALYSIS




2.1. INTRODUCTION

Although emergencies by definition are unexpected events, their occurrence can be predicted with some degree of certainty, through the experience gained by the investigation of past accidents, the identification of the possible hazards and the assessment of the risk. For the purposes of this document five categories of hazards have been analyzed:




- **Major accident** (or process accident): Analyzed in the Safety Report. Are usually caused by the process and operations carried out in the facility and specifically to the handling of hazardous materials.
- **Other industrial accident**: Analyzed in the HAZID study and they are due to other causes apart from the handling of hazardous materials.
- **External incident**: Caused by events outside of the facility and analyzed within the HAZID study. Could be caused by environmental events and by human activities (intentional or not).
- **Occupational injuries**: Incident linked to personnel activities that can lead to different kind of emergency and that involve the employee safety at work.
- **Near misses**: Incident that do not have consequences neither on persons nor on the structures, but very useful to be analysed and recorded because they provide information to prevent future accident.

2.2. MAJOR ACCIDENTS / DOMINO EFFECT




Major accidents, according to the definition above, include spillages, gas leakages, pool fires, flash fires, jet fires, explosions and BLEVEs. The credible scenarios are included in the Safety Reports prepared by each stakeholder. In the same documents, some scenarios have been highlighted as potential generator of a domino effect on other stakeholder's facilities. These scenarios have been summarized in the table below, where the green colour means no domino effect is expected and the red colour means a domino effect may occur, provided that the conditions described in the comment are satisfied.

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						DOMINO EFFECT																	
						THERMAL RADIATION		TARGETS															
ITEM	EQUIPMENT / PROCESS	SCENARIO	FINAL EVENT	FINAL FREQUENCY y-1	POOL FIRE DURATION (s)	DOMINO EFFECT 37,5 kW/m2	DOMINO EFFECT 15 kW/m2	QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF	ENE SERVICE TANKS BUND	DO BUND	HFO BUND	FSU	EGM Jetty	REGAS AREA	Propane Tank	NG Pipe Rack	EGM Metering Station	D4 Gas turbines	COMMENTS	
HFO-001 FBR	HFO Unloading hose	Rupture of the unloading hose.	PFIRE	1,73E-05	144	57	63															NO domino effect on adjacent HFO / DO pipelines and unloading facilities, with duration < 10 minutes	
HFO-002	HFO Unloading pipeline from vessel to tank	Leak with an effective diameter of 10% of the nominal diameter, up to a maximum of 50 mm. Pipeline from unloading point to tanks	PFIRE	5,00E-06	968	27	22															Probable domino effect on the NG pipeline, depending on the location of the spillage and fire and the duration of the fire. Duration < 10 minutes	
HFO-002 FBR	HFO Unloading pipeline from vessel to tank	Rupture in the pipeline	PFIRE	1,00E-06	14524	22	25															Probable domino effect on the adjacent tank, depending on the location of the spillage and fire and the duration of the fire. Duration can be > 10 minutes	
HFO-003	HFO Storage tank n. 1 and 2	Continuous release from a hole with an effective diameter of 10 mm of the HFO storage tank	PFIRE	2,00E-06	343950	52	22															Probable domino effect on the adjacent tank, depending on the location of the spillage and fire and the duration of the fire. Duration can be > 10 minutes	
HFO-003 CF	HFO Storage tank n. 1 and 2	Instantaneous release of the entire contents of the HFO storage tank	PFIRE	1,00E-07	156370	39	42															Probable domino effect on the adjacent tank, depending on the location	

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						DOMINO EFFECT																	COMMENTS
						THERMAL RADIATION		TARGETS															
								QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF	ENE SERVICE TANKS BUND	DO BUND	HFO BUND	FSU	EGM Jetty	REGAS AREA	Propane Tank	NG Pipe Rack	EGM Metering Station	D4 Gas turbines		
ITEM	EQUIPMENT / PROCESS	SCENARIO	FINAL EVENT	FINAL FREQUENCY y-1	POOL FIRE DURATION (s)	DOMINO EFFECT 37,5 kW/m2	DOMINO EFFECT 15 kW/m2																
																						of the spillage and fire and the duration of the fire. Duration can be > 10 minutes	
HFO-008	HFO D3 buffer tanks	Continuous release from a hole with an effective diameter of 10 mm. HFO service storage tanks	PFIRE	2,00E-06	1733	22	24															Probable domino effect on the NG pipeline, depending on the location of the spillage and fire and the duration of the fire. Duration can be > 10 minutes	
HFO-008 CF	HFO D3 buffer tanks	Instantaneous release of the entire contents. HFO service storage tanks	PFIRE	1,00E-07	2401	22	24															Probable domino effect on the NG pipeline, depending on the location of the spillage and fire and the duration of the fire. Duration can be > 10 minutes	
HFO-014	HFO D3 service tanks	Continuous release from a hole with an effective diameter of 10 mm. HFO service storage tanks	PFIRE	2,00E-06	1693	26	22															Probable domino effect on the NG pipeline, depending on the location of the spillage and fire and the duration of the fire. Duration can be > 10 minutes	
HFO-014 CF	HFO D3 service tanks	Instantaneous release of the entire contents. HFO service storage tanks	PFIRE	1,00E-07	2401	24	22															Probable domino effect on the NG pipeline, depending on the location of	

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						DOMINO EFFECT																	COMMENTS
						THERMAL RADIATION		TARGETS															
								QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF	ENE SERVICE TANKS BUND	DO BUND	HFO BUND	FSU	EGM Jetty	REGAS AREA	Propane Tank	NG Pipe Rack	EGM Metering Station	D4 Gas turbines		
ITEM	EQUIPMENT / PROCESS	SCENARIO	FINAL EVENT	FINAL FREQUENCY y-1	POOL FIRE DURATION (s)	DOMINO EFFECT 37,5 kW/m2	DOMINO EFFECT 15 kW/m2																
																						the spillage and fire and the duration of the fire. Duration can be > 10 minutes	
HFO-015	HFO pipelines from service tanks to D3 engines	Leak with an effective diameter of 10% of the nominal diameter, up to a maximum of 50 mm	PFIRE	1,20E-05	288	7	9															NO domino effect on pipelines, centrifuges, pump house, buffer tank and other facilities depending on the location of the spillage and fire. Duration < 10 minutes	
HFO-015 FBR	HFO pipelines from service tanks to D3 engines	Rupture in the pipeline	PFIRE	1,80E-06	389	22	26															NO domino effect on pipelines, centrifuges, pump house, buffer tank and other facilities depending on the location of the spillage and fire. Duration < 10 minutes	
HFO-016	HFO pipelines from storage tank to D1 HFO pump house	Leak with an effective diameter of 10% of the nominal diameter, up to a maximum of 50 mm	PFIRE	8,00E-06	288	7	9															No domino effect on pipelines. Duration < 10 minutes	
HFO-016 FBR	HFO pipelines from storage tank to D1 HFO pump house	Rupture in the pipeline	PFIRE	1,20E-06	389	--	--															No domino effect on pipelines. Duration < 10 minutes	
DO-024 DE	DO Raw tank n. 1/2/3	Catastrophic failure of the DO Raw tank n. 1/2/3 due to a jet fire domino effect from EGM	PFIRE	7,81E-05	46283	29	36															Probable domino effect on adjacent HFO/DO pipeline and service tanks. Duration	

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						DOMINO EFFECT																	COMMENTS
						THERMAL RADIATION		TARGETS															
ITEM	EQUIPMENT / PROCESS	SCENARIO	FINAL EVENT	FINAL FREQUENCY y-1	POOL FIRE DURATION (s)	DOMINO EFFECT 37,5 kW/m2	DOMINO EFFECT 15 kW/m2	QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF	ENE SERVICE TANKS BUND	DO BUND	HFO BUND	FSU	EGM Jetty	REGAS AREA	Propane Tank	NG Pipe Rack	EGM Metering Station	D4 Gas turbines		
																						> 10 minutes	
E2-061-50	HP LNG pumps suction line	Medium leak	JFIRE	5,95E-04	ND	90	94															DO storage tanks are reached by the effects of the jet fire. However no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. Duration of jet fire can be >10 min	
E2-061-FBR	HP LNG pumps suction line	Large leak	JFIRE	1,53E-04	ND	103	107															DO storage tanks are reached by the effects of the jet fire. However no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. Duration of jet fire can be >10 min	
E2-071-50	HP LNG pumps discharge line	Medium leak	JFIRE	5,14E-04	ND	70	74															DO storage tanks are reached by the effects of the jet fire. However no additional scenarios or consequences are expected, the storage conditions of the DO are set	

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						DOMINO EFFECT																	COMMENTS
						THERMAL RADIATION		TARGETS															
								QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF	ENE SERVICE TANKS BUND	DO BUND	HFO BUND	FSU	EGM Jetty	REGAS AREA	Propane Tank	NG Pipe Rack	EGM Metering Station	D4 Gas turbines		
ITEM	EQUIPMENT / PROCESS	SCENARIO	FINAL EVENT	FINAL FREQUENCY y-1	POOL FIRE DURATION (s)	DOMINO EFFECT 37,5 kW/m2	DOMINO EFFECT 15 kW/m2																
																						below its flammability limits. Duration of jet fire can be >10 min	
E2-071-FBR	HP LNG pumps discharge line	Large leak	JFIRE	1,36E-04	ND	43	44															DO storage tanks are reached by the effects of the jet fire. However no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. Duration of jet fire can be >10 min	
E2-081-50	LNG small scale pumps suction line	Medium leak	JFIRE	5,95E-04	ND	90	94															DO storage tanks are reached by the effects of the jet fire. However no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. Duration of jet fire can be >10 min	
E2-081-FBR	LNG small scale pumps suction line	Large leak	JFIRE	1,53E-04	ND	99	104															DO storage tanks are reached by the effects of the jet fire. However no additional scenarios or consequences are expected,	

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						DOMINO EFFECT																	COMMENTS
						THERMAL RADIATION		TARGETS															
								QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF	ENE SERVICE TANKS BUND	DO BUND	HFO BUND	FSU	EGM Jetty	REGAS AREA	Propane Tank	NG Pipe Rack	EGM Metering Station	D4 Gas turbines		
ITEM	EQUIPMENT / PROCESS	SCENARIO	FINAL EVENT	FINAL FREQUENCY y-1	POOL FIRE DURATION (s)	DOMINO EFFECT 37,5 kW/m2	DOMINO EFFECT 15 kW/m2																
																						the storage conditions of the DO are set below its flammability limits. Duration of jet fire can be >10 min	
E2-131-10	NG pipeline from RGU to GRS (tie-in)	Small leak	JFIRE	1,01E-03	ND	10	11															DO storage tanks and ENE centrifuges are reached by the effects of the jet fire. However no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. Duration of jet fire can be >10 min	
E2-131-50	NG pipeline from RGU to GRS (tie-in)	Medium leak	JFIRE	9,85E-05	ND	42	48															DO and HFO storage tanks, ENE centrifuges and ENE process pipelines are reached by the effects of the jet fire. Regarding the DO, no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. However, the HFO is maintained above its flash	

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						DOMINO EFFECT																	COMMENTS
		SCENARIO	FINAL EVENT	FINAL FREQUENCY y-1	POOL FIRE DURATION (s)	THERMAL RADIATION		TARGETS															
ITEM	EQUIPMENT / PROCESS					DOMINO EFFECT 37,5 kW/m2	DOMINO EFFECT 15 kW/m2	QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF	ENE SERVICE TANKS BUND	DO BUND	HFO BUND	FSU	EGM Jetty	REGAS AREA	Propane Tank	NG Pipe Rack	EGM Metering Station	D4 Gas turbines		
																					point in the most part of the affected area. Duration of jet fire > 10 min		
E2-131-FBR	NG pipeline from RGU to GRS (tie-in)	Large leak	JFIRE	7,81E-05	ND	67	80														DO and HFO storage tanks, ENE process pipelines, ENE centrifuges and ENE pumphouse are reached by the effects of the jet fire. Regarding the DO, no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. However, the HFO is maintained above its flash point in the most part of the affected area. Duration of jire > 10 min		
E2-141-10	NG pipeline to CCGT GRS	Small leak	JFIRE	7,24E-04	ND	10	10														DO storage tanks and ENE centrifuges are reached by the effects of the jet fire. No additional scenarios or consequences are expected regarding the DO. Duration can be > 10 min		

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						DOMINO EFFECT																	COMMENTS
						THERMAL RADIATION		TARGETS															
ITEM	EQUIPMENT / PROCESS	SCENARIO	FINAL EVENT	FINAL FREQUENCY y-1	POOL FIRE DURATION (s)	DOMINO EFFECT 37,5 kW/m2	DOMINO EFFECT 15 kW/m2	QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF	ENE SERVICE TANKS BUND	DO BUND	HFO BUND	FSU	EGM Jetty	REGAS AREA	Propane Tank	NG Pipe Rack	EGM Metering Station	D4 Gas turbines		
E2-141-50	NG pipeline to CCGT GRS	Medium leak	JFIRE	8,33E-05	ND	42	48														DO storage tanks and ENE centrifuges are reached by the effects of the jet fire. No additional scenarios or consequences are expected regarding the DO. Duration can be > 10 min		
E2-141-FBR	NG pipeline to CCGT GRS	Large leak	JFIRE	7,32E-05	ND	61	72														DO storage tanks, ENE pump house, ENE centrifuges, HFO process pipelines and oil tanker at quay are reached by the effects of the jet fire. No additional scenarios or consequences are expected regarding the DO, however, the HFO is present above its flash point. Duration of jet fire > 10 min		
E2-161-10	NG pipeline to Delimara 3 GRS	Small leak	JFIRE	1,04E-04	ND	10	10														DO storage tanks, and ENE process pipelines are reached by the effects of the jet fire. Regarding the DO, no additional scenarios or consequences are expected, the storage conditions of the		

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						DOMINO EFFECT																	COMMENTS
						THERMAL RADIATION		TARGETS															
ITEM	EQUIPMENT / PROCESS	SCENARIO	FINAL EVENT	FINAL FREQUENCY y-1	POOL FIRE DURATION (s)	DOMINO EFFECT 37,5 kW/m2	DOMINO EFFECT 15 kW/m2	QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF	ENE SERVICE TANKS BUND	DO BUND	HFO BUND	FSU	EGM Jetty	REGAS AREA	Propane Tank	NG Pipe Rack	EGM Metering Station	D4 Gas turbines		
																						DO are set below its flammability limits. However, in the process pipelines, HFO is maintained above its flash point in the most part of the affected area. Duraation >10 min	
E2-161-50	NG pipeline to Delimara 3 GRS	Medium leak	JFIRE	1,25E-05	ND	42	48															DO and HFO storage tanks, ENE centrifuges and ENE process pipelines are reached by the effects of the jet fire. Regarding the DO, no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. However, the HFO is maintained above its flash point in the most part of the affected area. Duration of jet fire > 10 min	
E2-161-FBR	NG pipeline to Delimara 3 GRS	Large leak	JFIRE	1,10E-05	ND	60	71															DO and HFO storage tanks, ENE centrifuges and ENE process pipelines are reached by the effects of the jet fire. Regarding	

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						DOMINO EFFECT																	COMMENTS
						THERMAL RADIATION		TARGETS															
								QUAY	ENE PIPE RACK	ENE PUMP HOUSE	ENE CENTRIF	ENE SERVICE TANKS BUND	DO BUND	HFO BUND	FSU	EGM Jetty	REGAS AREA	Propane Tank	NG Pipe Rack	EGM Metering Station	D4 Gas turbines		
ITEM	EQUIPMENT / PROCESS	SCENARIO	FINAL EVENT	FINAL FREQUENCY y-1	POOL FIRE DURATION (s)	DOMINO EFFECT 37,5 kW/m2	DOMINO EFFECT 15 kW/m2																
																						the DO, no additional scenarios or consequences are expected, the storage conditions of the DO are set below its flammability limits. However, the HFO is maintained above its flash point in the most part of the affected area. Duration of jet fire > 10 min	
E2-171-FBR	NG equipment at Delimara 3 GRS	Large leak	JFIRE	3,45E-04	ND	41	43															Possible domino effect on DO / HFO pipelines, ENE pumphouse or ENE Centrifuges depending on the direction of the jet fire. Duration can be > 10 min. No effects are expected at EGM and SEP facilities and equipment	

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2.3. OTHER INDUSTRIAL ACCIDENTS

Apart from the scenarios identified in the previous chapter, other possible industrial accidents have been identified:

- Fire in the workshop, in the administrative building, in the control room, etc.
- Vehicle accidents
- Scaffolding, ladders and cranes falling




All of them, when not properly controlled and minimized, may result in hazards to the storage and handling of the hazardous materials. Such accidents may occur as a result of one stakeholder activity and may have an effect on other stakeholder's personnel, asset and activities. They have to be reported to the stakeholders at the site and treated as any other incident.

2.4. EXTERNAL INCIDENT

Amongst the external events that may result in an emergency inside Delimara Power Station facilities, unauthorized entries are the most relevant. All of them may result in spillages and/or fires and are prevented by the security systems:

- unauthorized entry jumping over the fence
- unauthorized entry from the main entrance
- unauthorized entry from the side close to the HFO bund
- access of external personnel (not belonging to DPS) in the port area
- organised people (former workers, environmental activists, terrorists)
- object throwing, light weapon, heavy weapon
- helicopter crashes inside the facility (no plane crash is expected, since the facility is out of the proximity area for landing and take-off)

Additionally, the only natural event which may result in damages to the tanks and spillages is the unlikely possibility for an earthquake / tsunami to occur.

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Such accidents may occur as a result of one stakeholder activity and may have an effect on other stakeholder's personnel, asset and activities. They have to be reported to the stakeholders at the site and treated as any other incident.




2.5. OCCUPATIONAL INJURIES

Many types of occupational injuries can happen while at work in the facility, even if the standard operating procedures, the job place risk assessment and the personal protective equipment reduce their occurrence to a minimum. While some of them can be managed internally with first aid kit, others require rescue, stabilization and emergency medical responders.

Such accidents may occur as a result of one stakeholder activity and may have an effect on other stakeholder's personnel, asset and activities. They have to be reported to the stakeholders at the site and treated as any other incident.

2.6. NEAR MISSES

Near misses may include a large list of incidents, human errors and instrument failures. They do not produce damages or injuries but a similar occurrence may occur and result in actual damage or injury. Thus, although they are not treated as emergencies, they must be investigated in order to prevent recurrence.

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3. MATERIAL AND HUMAN RESOURCES




3.1. MATERIAL RESOURCES

The material resources allocated to the CERP are all the resources available in the common areas within the site, i.e. those resources located in the internal roads between the main gate and the units. All these resources including fire extinguishers, hydrants and fire fighting network are available, provided that the emergency is located in proximity of the resources and their usage is informed to the Enemalta CCR. Enemalta is responsible for the maintenance of these resources and will replace them after usage, reserving the right to invoice the costs to the user. A full list of resources available at ENEMALTA is included in the attachment no. 2.

3.2. HUMAN RESOURCES

The human resources allocated to the CERP are defined in the internal ERP at each single Unit. No additional resources are specifically allocated. The same resources, with the same roles as per their internal ERP are requested to join the CERP once activated.

According to legal provisions on labour contracts, no resources will be exchanged, transferred, hired or provided between, to or from stakeholders at the site in case of emergency. Human resources have to cooperate as described in the chapter no. 3, by means of full cooperation in the communication and decision making processes.

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4. EMERGENCY PROCEDURES

The purpose of this plan is to reduce injuries to people and damages to the environment and properties in case of emergency situations generated by or involving one stakeholder's activities with a potential effect on another stakeholder's activities. To do so, it has to specify those staff members in each organization who may put the plan into action and to identify clearly the staff members who will take responsibility for the strategic and on field decision. It has also to ensure that at least one of them must be on site at all times whenever the facility is operative.

4.1. EMERGENCY CLASSIFICATION




Many factors determine what procedures are needed in a real emergency. They can be summarized in the following classes:

- Nature of emergency: spill, fire, explosion, unauthorized entry, earthquakes, others. However, the CERP may also be activated by any other unforeseen circumstances that may cause a significant hazard to personnel or equipment.
- Emergency level: alert, partial activation, full activation
- External resources required: controllable or uncontrollable emergency.

Regarding the first classification, it can help to identify the hazards and the possible threat for the personnel and the environment outside of the facility. It can also help in further defining the emergency level and in the determination of whether external resources are required.

Controllable Emergency (within a single Unit) – Stand-by CERP activation

This is an emergency in which the emergency crew within one stakeholder's facilities can prevent harm to the personnel or equipment by taking reasonable and prudent actions such as valve manipulations, shutting down equipment, spill control, etc. and no effect will be noticed by the other stakeholders.




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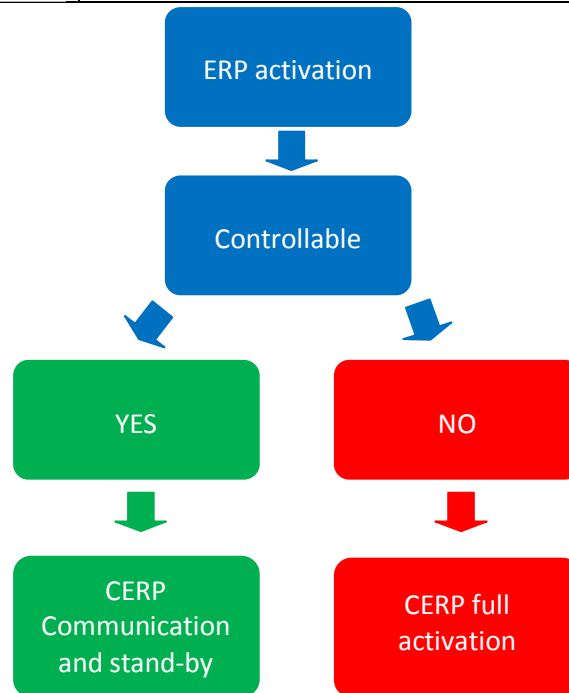
Non-controllable Emergency (emergency escalated to a site level) – Full CERP activation

This is an emergency in which emergency crew within one stakeholder's facilities cannot prevent harm to another stakeholder's personnel or equipment by taking reasonable and prudent actions such as in the previous case. A Site Emergency shall trigger a joint action with the other stakeholders at the site.

From a general perspective, and with regards to this CERP, the following criteria must be applied:


- The CERP is applicable to any major accident, accident, incident, occupational injury, near loss which may occur at the Delimara Power Station site, independently of the location, substance involved, personnel involved, stakeholder involved, Unit involved or operator involved.
- The CERP shall be activated for communication and stand-by when the Emergency is controllable, within one Unit, with resources of that Unit and no impact on others.
- The CERP shall be fully activated for non-controllable emergencies and shall trigger the activation of the remaining ERP for a joint coordination as described in the following chapters.

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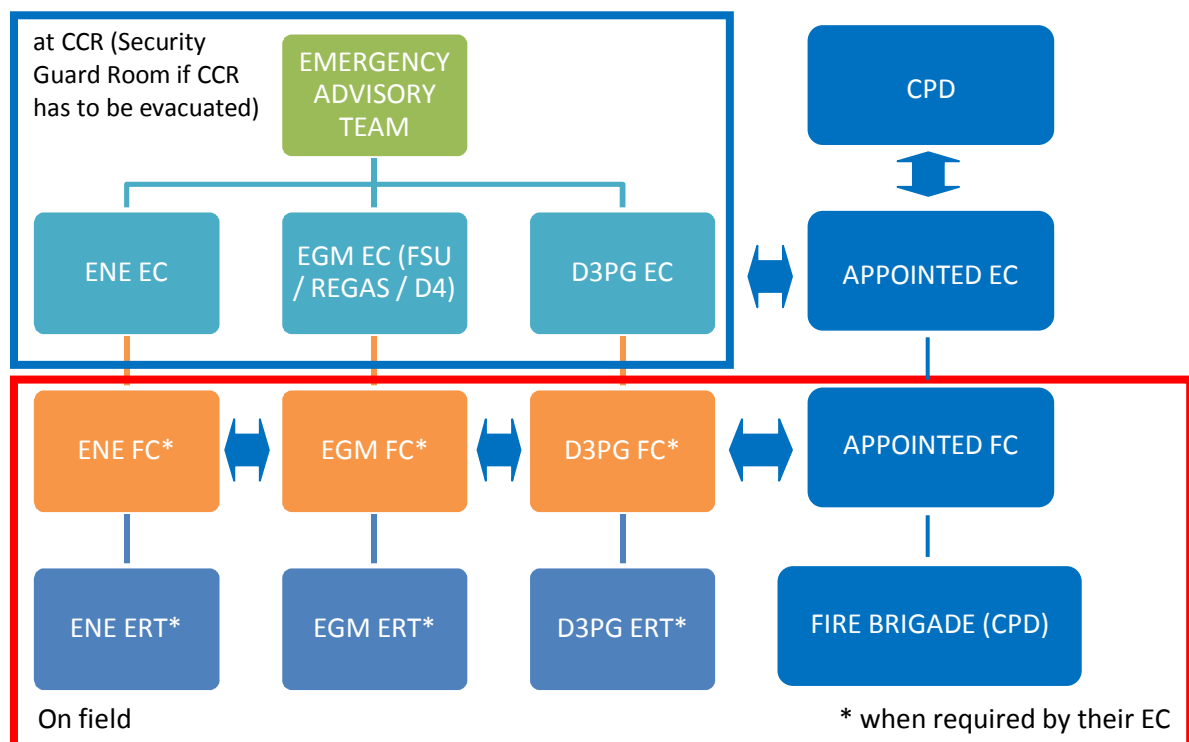
4.2. ORGANIZATION AND RESPONSIBILITIES

The organization of the personnel in case of emergency is shown in the Organization charts in each ERP. These organizations and roles shall also take on the responsibilities defined below.

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CERP Organization

The overall organization in case of activation of the CERP is described in the organizational chart shown below.

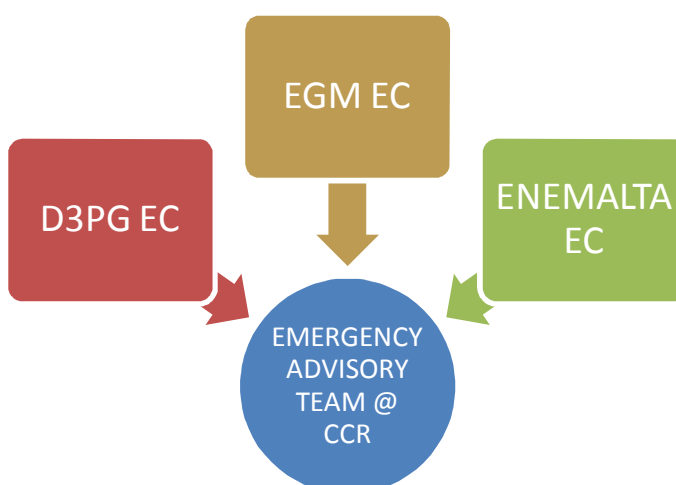





Emergency Advisory Team (EAT)

- The team comprises the Emergency Controllers of each Operator.
- Following activation of the CERP, the Emergency Controllers (ECs), or their representative, shall head to the CCR maintaining contact with the control rooms of their Units through mobile phone or radio.
- Should the CCR be evacuated, the team has to move to the Security Guard Room.
- Once at CCR, the team has to appoint a team leader following the criteria below:
 1. Location of the emergency (emergencies within ENE buildings shall be led by ENE EC; emergencies within EGM Units shall be led by EGM ECs, emergencies within D3PG Unit shall be led by D3PG EC; emergencies in common areas of the site shall be led applying the following criterion).

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2. Knowledge (emergencies involving FO, DO shall be led by ENE EC; emergencies involving LNG and NG shall be led by EGM ECs; emergencies involving other substances or more than one substance shall be led applying the following criterion).
 3. Personnel involved (emergencies with injuries to ENE personnel shall be led by ENE EC; emergencies with injuries to EGM personnel shall be led by EGM ECs; emergencies with injuries to D3PG personnel shall be led by D3PG).
- The FC on field has to be appointed on the same basis, thus he / she has to be part of the same Unit / Operator.
 - The team has to support the emergency with their knowledge on the management of the substances.
 - The team has to agree on major decision such as production shut down and evacuation.
 - The team has to request intervention of other ERTs, shall the emergency escalate to other neighbouring units. In this case, the team has to suggest to the FCs the actions to be taken on field and has to promote full cooperation between the FC, in order to avoid any possible misunderstanding.
 - Despite that a team leader is appointed according to these criteria above, each EC shall be the ultimate responsible person for all actions taken on his respective plant and HR resources according to the respective individual ERPs



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Emergency Controllers (EC)

- Each EC shall follow his / her responsibility and function in case of Emergency as stated in the Emergency Planning of his / her Unit
- Each EC shall keep contact with his / her Unit through the corresponding control room at Forwarder Controller.

Forward Controller (FC)




- Each FC shall follow his / her responsibility and function in case of Emergency as stated in the Emergency Planning of his / her Unit
- Each FC shall keep contact with his / her Unit through the corresponding control room at Emergency Controller.
- Each FC shall lead his / her ERT.
- Whenever more than one FCs are on field taking actions to solve the emergency, they are requested to cooperate and maintain contact in order to agree on a common strategy and to avoid misunderstanding and minimize injuries to their teams.
- Each FC shall limit the actions of his / her team to their Unit(s) and avoid any intervention in other Units. In case of need, the corresponding ERT shall be requested to actuate on field.

Emergency Response Team (ERT)

- Each ERT shall follow his / her responsibility and function in case of Emergency as stated in the Emergency Planning of his / her Unit
- Each FC shall keep contact with his / her Unit through the corresponding control room at Emergency Controller.

Security Guard Room

- The security personnel at ENE is in charge of security for the entire site
- Security guard shall keep contact with CCR (or applicable other CR) and follow ENE ERP at any moment.

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4.3. EMERGENCY PROCEDURES




During an emergency, some standard actions are always taken. Common elements to be considered include pre-emergency preparation and provisions for alerting and evacuating staff, handling casualties, and controlling the hazards. They can be defined using simple and standard procedures, in order to minimize the effort and maximize the efficiency. The following emergency procedures shall be followed in addition to the ones included in the single ERPs.

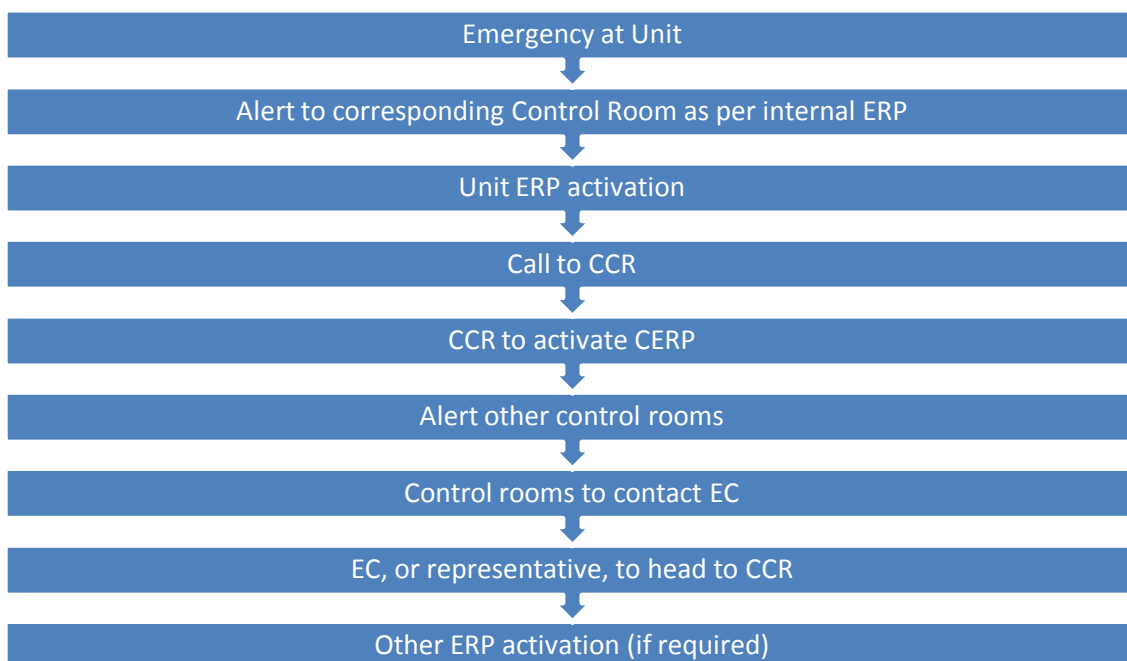
Emergency detection and alert to a control room

Emergency detection shall be done as described in each single ERP. In general all emergencies will be detected either by personnel on field or by gas, smoke or other detectors. The channel for communication will in any case lead to the corresponding control room at the affected Unit. Once received there and confirmed, the corresponding ERP will be activated and in parallel, the CERP shall be also activated as follows:

- Operator at Unit Control Room shall call the Central Control Room and inform about the activation of the internal ERP, providing details of location, substances involved and personnel involved, injuries and casualties as well as about controllability of the emergency.
- Operator at CCR shall spread the alert calling other control rooms involved and the security guard.
- Operators at other control rooms receiving the alert shall contact the corresponding EC in their Unit as per their internal ERP and await instruction for their activation, should it be required either by their EC or by the CERP.
- EC, or representative, shall proceed to the CCR as per their responsibilities and constitute the Emergency Advisory Team.

The figure below summarizes the same procedure.




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Stand-by CERP activation (Communication only for controllable emergency)

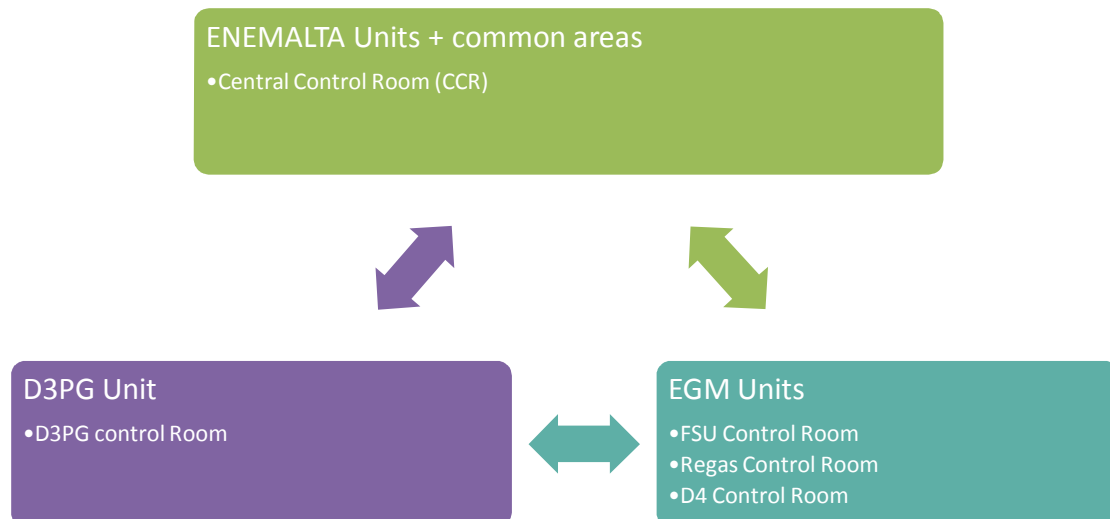
Whenever the emergency is considered controllable according to the Unit EC, the CERP shall be activated in stand-by level, taking the following actions:




- Operator at involved Unit control room shall promptly inform the CCR about the development of the emergency, possible escalation, resources requested, injuries and casualties.
- Operator at CCR shall periodically report the information to the other control room.
- Any other relevant information detected by other means or by other operators shall be promptly reported to the CCR.
- Operator at CCR shall inform the Emergency Advisory Team (EAT), which is expected to meet at the CCR.
- The EAT shall inform the operator at CCR and instruct him on the information to spread across.
- No action shall be taken by personnel not directly involved in the emergency, i.e. personnel of other units, contractors and visitors of other units, etc. Normal operation is expected to continue at these units.

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- No external calls to CPD and other authorities are expected to be done by the operator at CCR and / or other operators. CPD shall be informed and external resources required by the Unit which initially activated the ERP.

The communication between the control rooms is shown in the figure below. The units within EGM are expected to be in constant communication.






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Full CERP activation (joint action)

When the emergency is considered or escalated to non-controllable, the CERP shall be fully activated and a joint action on field shall be triggered as follows:

- Operators at Unit control room to act as described for Stand-by CERP activation
- Operators at CCR to act as described for Stand-by CERP activation
- Emergency Advisory Team (EAT) shall agree on the coordinated actions to be taken on field by their corresponding ERTs, focusing on the protection of their personnel and facilities and preventing any entrance, action or impact on neighbouring units. CPD shall be informed and external resources required by the Unit which initially activated the ERP.

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5. IMPLEMENTATION OF THE PLAN

Completing a comprehensive plan for handling emergencies is a major step towards preventing disasters. However, it is difficult to predict the problems that may happen unless the plan is tested. Exercises and drills may be conducted to practice all or critical portions (such as evacuation) of the plan. A thorough and immediate review after each exercise, drill, or after an actual emergency will point out areas that require improvement.




The plan should be revised when shortcomings have become known, and should be reviewed at least annually. The plan should be updated when there are changes in facility infrastructure, processes, materials used, and key personnel.

An annual full-scale exercise will be performed with the participation of the three stakeholders and the operators eventually involved. The exercises shall be organized as follows:

- Organization in cooperation between the three stakeholders and the operators involved.
- One month in advance.
- Information / invitation shall be given to CPD and other authorities which may be interested. Full participation of CPD
- A scenario with domino effect to another stakeholder will be selected.
- The scenario will be considered as non controllable, the emergency escalated and the CERP fully activated.

The goals for a correct implementation can be summarized as follows:

- Developing and implementing procedures and incident and emergency protocols
- Providing adequate and ongoing training for personnel
- Conducting desktop and field exercises
- Regular auditing of construction activities
- Ongoing and effective communication
- Ongoing liaison with public authorities

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- Identifying new or additional resources and equipment required for effective emergency response
- Identifying new or additional roles and responsibilities of individuals
- Identifying new or additional key personnel and reliable means of contacting them
- Maintaining documentation so potential incidents or emergencies can be properly managed
- Ongoing compliance checks with OHS requirements by Health and Safety Department at each stakeholder.

5.1. PERSONNEL TRAINING AND DRILLS




The CERP will not replace the training and drills performed by each stakeholder following internal procedures. The internal training at each stakeholder shall include a module covering the interface with the CERP, thus the communication and cooperation with other stakeholders in case of emergency escalation.

5.2. ANALYSIS AND EVALUATION OF THE ACCIDENTS

Incidents and accidents occurred at the site, within any stakeholder's premises, shall be investigated according to the procedure no. CMP06 - Incident investigation included in the CSMS.

5.3. CERP REVIEW

The CERP is a classified document and its filing, handling, replication and distribution shall be controlled by ENEMALTA on behalf of the three stakeholders in accordance with the procedures no. CMP07 – Emergency Management Procedure




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ANNEXURE 1. EMERGENCY CONTACT LIST

Main contacts in case of emergency – available 24/7		
Contact	Company	Phone no.
Central Control Room (CCR)	ENE	██████████
Security Guard Room	ENE	██████████
D3 Control Room (at CCR)	D3PG	██████████
D4 Control Room	EGM (operated by ESBI)	
Regas Control Room	EGM	
FSU Control Room	EGM (operated by BA)	

Other contact numbers are available at CCR through the EC.

Controlled Document (check latest revision)

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ANNEXURE 2. LIST OF MATERIAL RESOURCES IN COMMON AREAS

Site: **Delimara PS**Checklist: **Fire Alarms - Admin & Stores**

Type of Check	Checked by:
Date	Signature:

Administration building(Terofire)			
Fire Alarm panel		Terofire	
Installed on			
Detector type		Terofire	
Fire Alarm		Check	Remarks
Panel on / condirtion.			
Alarm test			
Logbook signed			
ZONES			
1	Ground		
2	Ground		
3	Ground		
4	First		
5	First		
6	First		

Workshop & Stores (TW)							
FP	PLACE	Panel	BGU	DS	DT	Bell	
8	Main Store (spare batteries)			1	-		
9	Main Store (issue)	TF	1	1	-	1	
10	Ex-Oil Store (facing BEI)		1	-	-	1	
11	Paint stores			-	-		
12	Work/shop swichgear room			1	-		
13	New Chemical Stores			-	-		
14	W/Shop		1	-	-	1	
15	W/Shop		1	-	-	1	
16	W/Shop Electronics			1	-		
17	W/Shop Electrical			1	-		
18	W/Shop Welders			-	1		
19	W/Shop C/hand office	TW	1	1	-	1	
20	Drawing Office 1st floor	TW	1	1	-	1	
21	Mess			-	1		

Workshop & Stores (Terofire)			
Fire Alarm panel		Terofire	
Installed on		2013	
Detector type		Terofire	
Fire Alarm	Check	Remarks	
Panel on / condirtion.			
Alarm test			
Autodialler working			
SCADA working			
Logbook signed			
ZONES			
1			
2			
3			
4			
5			
6			

Notes:

Site:

Delimara PS

Checklist:

Fire Alarms - PLANT

Type of Check							Checked by:
Date							Signature:
FP	PLACE	Panel	BGU	DS	DT	Bell	
Cable corridor behind canteen							Alberta - Terofire - Apollo
1	Left bay		1	1	-	1	
2	Right bay	Y	1	1	-	1	
	EHV Building						Total Walther - Apollo
22	EHV (ex Tel. Operator)		1	1	-	1	
23	EHV Sub-Station			1	-		
24	EHV Batt. Room			1	-		
25	EHV (Old ECR 2nd flr)	TW		6	-		
26	Relay Room EHV			4	-		
27	Relay Room EHV		1	1	-	1	
28	Feeders EHV 132KV			1	-		
29	Feeders EHV 33KV		1	6	-	1	
30	Feeders EHV 132KV			14	-		
31	Feeders EHV 132KV		1	1	-	1	
32	Cable Flat EHV 132		1	1	-	1	
33	Cable Flat EHV 132			12	-		
34	Cable Flat EHV 33		1		-	1	
35	Cable Flat EHV 34			7	-		
36	EHV SCE Office		1	1	1	1	
	Turbine Hall PH/1&2						Total Walther - Apollo
37	4m Auxiliaries		4	-	-	1	
38	13m Turbine		1	-	1	1	
39	13m Turbine		1	-	1	1	
40	13m Turbine		1	-	1	1	
41	13m Turbine		1	-	1	1	BGU out of order
42	13m Batt. Charger			2	-		
43	13m AVR 1			2	-		
44	13m AVR 2			1	-		
45	13m C/Room	TW		6	-	1	
46	18m Cable Flat					1	
47	21m S/Gear		1		-	1	
48	21m S/Gear			12	1		

FP	PLACE	Panel	BGU	DS	DT	Bell	
49	21m S/Gear			1	-	1	
50	21m S/Gear		1	1	-		
51	Dearator			-		1	
52	4m Boiler 1		1	-			
53	12m Boiler 1		1	-	1	1	
54	12m Boiler 2		1	-	1	1	
55	17m Boiler 1		1	-	1	1	
56	17m Boiler 2		1	-	1	1	
57	19m Boiler 1		1	-	1	1	
58	19m Boiler 2		1	-	1	1	
59	Lift Room				1		
	Phase 1 areas						
60	Demin. P/house		1			1	
61	Demin. P/house WT2			3	1		
62	Generator Room						
63	FFI Pumphouse	TW	1	-	1	1	
64	CW Switchgear	TW	1	2	-	1	
65	CW Switchgear		1	1	-	1	
	FO areas						
68	Diesel Centrifuge	TW					
69	FO Pumping		2		15	1	
70	FO S/Gear	TW	1	3	-	1	Bell not working
71	FO S/Gear			1	-		
72	Bladder Tank Diesel						
73	Diesel pump Switchgear						
	Phase 2A John Brown						
74	GT c/room - S/Gear	CPI	1	x	-	1	
75	GT c/room - Cable flat		1	x	-		
	Phase 2B						
76	CCR ground (lift)		1	1	-	1	
77	CCR 1st floor mess			4	-		
78	CCR 1st Floor (lift)		1	1	-	1	
79	CCR 2nd floor C/R	1	1	5	-	1	
80	CCR 2nd floor lift		1	1	-	1	
81	CCR roof				-		
	CCR COMAH Siren						Check visual
82	HV room (SF6) entrance		1	1	-	1	

FP	PLACE	Panel	BGU	DS	DT	Bell	
83	HV room (SF6) cable flat				5		
84	HV room (SF6) battery room		1	2	-		
85	HV room (SF6) switchgear		1	2	-		
86	HV room (SF6) chargers		1	2	-		
87	HV room (SF6) HV switchgear		1	4	-		
88	LCR 1st floor		1	3	-		
89	LCR 2nd floor		1	3	-		
	Ph 2B Hall						
90	GT 1 Exhaust		1	1			
91	Condenser	1	1	1		1	
92	GT 2 Exhaust		1	1			
93	Steam Generator		1			1	
94	Compressor room			15			
	Phase 3						
			50	141	35	39	265

Notes:

Site: **Delimara PS**
 Checklist: **Fire Points - Extinguishers (Plant)**

Type of Check	Checked by:
Date	Signature:

FP	PLACE	DP 9	DP 50	CO ₂ 5	AFFF 9	CO ₂ 30	REMARKS
	Admin						
1	Security	2					
2	Admin Ground floor hall	2					
3	Drawing Office	1		1			
4	Admin. AHU	1		1			
5	Admin 1st floor	2					
	Workshop						
10	Main Store	2					
11	Main Store (DO)	3					
12a	Main Store (spare batteries)			1			
12b	Stores messroom (Ground)			1			+fire blanket
13	Main Store (issue)	2					
14	Ex-Oil Store (facing BEI)	1					
15	Paint stores	1					(facing cliff)
16	Workshop Garage	1					
17	Work/shop switchgear room			2			
18	New Chemical Stores	2					
19	W/Shop	2					
20	W/Shop	2					
21	New drawing office			1			+fire blanket (kitchen)
22	W/Shop Electronics			2			
23	W/Shop Electrical			2			
24	W/Shop Welders	1					
25	W/Shop C/hand office	1					
26	New drawing office	2					(1st floor near stairs)
27	Mess	2					
28	Canteen			2			+fire blanket

FP	PLACE	DP 9	DP 50	CO ₂ 5	AFFF 9	CO ₂ 30	REMARKS
	Phase 1						
29	EHV (ex Tel. Operator)			1			
29A	EHV Electrical store			1			(key from elec STO)
30	EHV Sub-Station			2			
31	EHV Batt. Room			2			
32	EHV (Old ECR 2nd flr)					1	
33	Relay Room EHV			2			
34	Relay Room EHV			1			
35	Feeders EHV 33KV					1	
36	Feeders EHV 33KV			2			
37	Feeders EHV 132KV					1	
38	Feeders EHV 33KV			1			
39	Feeders EHV 132KV			1			
40	Feeders EHV 132KV			1			
41	Cable Flat EHV	1					
42	Cable Flat EHV	1					
43	Cable Flat EHV	1					
44	Cable Flat EHV	1					
45	Unloading Bay EHV	1					
46	EHV SCE Office	2					
47	4m Auxiliaries	4	1				
48	4m Auxiliaries	2					
49	4m Auxiliaries	2					
50	4m Auxiliaries	4					
51	4m Auxiliaries	2					
52	4m Auxiliaries	4					
53	4m Auxiliaries	4					
54	4m Auxiliaries	4					
55	4m Auxiliaries	2					
56	4m Auxiliaries	4					
57	8m Heaters	2					
58	8m Heaters	2					
59	8m Heaters	2			1		
60	8m Heaters	2					
61	8m Heaters	2					
62	8m Heaters	2					

FP	PLACE	DP 9	DP 50	CO ₂ 5	AFFF 9	CO ₂ 30	REMARKS
63	13m Turbine	2	1			1	
64	13m Turbine	4					
65	13m Turbine	4					
66	13m Turbine	3	1				
67	13m Turbine	3	1				
68	13m Turbine	2					
69	13m Batt. Charger			1			
70	13m AVR 1			1			
71	13m AVR 2			1			
72	13m Outside C/Room (A & B)	2					
73	13m C/Room					1	
74	10m Cable Flat	3					
75	10m Cable Flat	3					
76	TA Crane oper (coridor)	2					
79	18m Cable Flat	3					
80	18m Cable Flat	3					
81	21m S/Gear			4			
82	21m S/Gear			2			
83	21m S/Gear			2			
84	21m S/Gear			4			
85	Dearator	2					
86	Dearator	2					
87	Dearator	2					
88	4m Boiler 1		1				
89	4m Boiler 2		1				
90	12m Boiler 1	1					
91	12m Boiler 2	1					
92	15m Boiler 1	1					
93	15m Boiler 1	1					
94	15m Boiler 1	1					
95	15m Boiler 2	1					
96	15m Boiler 2	1					
97	15m Boiler 2	1					
98	17m Boiler 1	1					
99	17m Boiler 1	1					
100	17m Boiler 2	1					

FP	PLACE	DP 9	DP 50	CO ₂ 5	AFFF 9	CO ₂ 30	REMARKS
101	17m Boiler 2	1					
102	19m Boiler 1	1					
103	19m Boiler 1	1					
104	19m Boiler 2	1					
105	19m Boiler 2	1					
106	Lift Room	1					
107	GT 1 (John Brown)	2					
108	GT 1 (John Brown) Co2 battery	2	1				
109	GT 2 (John Brown)	2					
110	GT c/room - S/Gear			1			
111	GT c/room - S/Gear			1			

FP	PLACE	DP 9	DP 50	CO ₂ 5	AFFF 9	CO ₂ 30	REMARKS
112	GT c/room - Cable flat	2					
113	Demin. P/house	3					
114	Demin. P/house WT2			1			
115	Evaporator	1					
116	Evaporator	1					
117	Generator Room	2					Keys @ GO
118	FFI Pumphouse	4					
119	Chlorination Plant	2					
120	First Aid Room (BWSC)			1			
121	CW Switchgear			1			
122	CW Switchgear			1			
123	CW Pump area	2					
124	CW Pump area	2					
125	CW Pit	1					
126	CW Pit	2					
127	Dry Pit	1					Missing April 2014 to be replaced
128	CWP Crane						
129	Diesel Centrifuge				2		
130	FO Unloading	2					
131	FO Storage (Tanks)	2					
132	FO Pumping	1					
133	FO Pumping	1					
134	FO Pumping	1					
135	FO Pumping	2					
136	FO S/Gear			2			
138	FO S/Gear	1					
139	Bladder Tank Diesel	2					
140	Diesel pump Switchgear			1			

FP	PLACE	DP 9	DP 50	CO ₂ 5	AFFF 9	CO ₂ 30	REMARKS
	PhaselIB General areas						
141	CCR ground (stairs)	2					
142	CCR ground (lift)	2					
143	CCR 1st floor (stairs)	2					
144	CCR 1st floor corridor	2					
145	CCR 1st floor mess	2					
146	CCR 1st Floor (lift)	2					
147	CCR 2nd floor C/R			4			
148	CCR 2nd floor lift	2					
149	CCR roof	2					
150	HV room (SF6) entrance	2		2			
151	HV room (SF6) cable flat	2					
152	HV room (SF6) battery room			2			
153	HV room (SF6) switchgear			4			
154	HV room (SF6) chargers			2			
155	HV room (SF6) HV switchgear	2					
156	HV room (SF6) HV switchgear			2			
157	LCR 1st floor			2			
158	LCR 2nd floor			2			

ENEMALTA

FIRE SECTION

FP	PLACE	DP 9	DP 50	CO ₂ 5	AFFF 9	CO ₂ 30	REMARKS
	Phase IIB Turbine Hall						
159	GT 1 Exhaust	2					
160	Condenser	2	1				
161	Condenser	2	1		2		
162	GT 2 Exhaust	2					
163	Steam Generator	2					
164	Steam Generator	2					
164a	HRSg turbine	2					
164b	HRSg turbine	2					
165	GT 1 (roof)	2					
166	GT 2 (roof)	2					
167	Outside - GT 1 (Chimney)	2					
168	Outside - GT 1 (Inlet)	2					
169	Outside - GT 2 (Inlet)	2					
170	Outside - GT 2 (Chimney)	2					*Box & ext to be replaced!
171	Compressor room	2					
172	Boiler 1	2					
173	Boiler 2	2					
174	Diesel Tank 0	2					
175	Diesel Tank 1	2					
176	Diesel Tank 2	2					
177	Diesel Tank 3	2					
190	Waste area				2		

ENEMALTA

FIRE SECTION

FP	PLACE	DP 9	DP 50	CO ₂ 5	AFFF 9	CO ₂ 30	REMARKS
Vehicles							
	Forklift (Eagle - Diesel)						1 DP2 new fitted 21-11-06
	Forklift (Electric)						1 DP2
	ENE050 (Surveyors)						1 DP2
	Manitou Stacker						
	ENE043 (HiAB)						
	ENE047 (workshop)						1 DP2
	ENE039 (Workshop)						1 DP2
	TOTAL	243	9	71	7	5	335
	Assembly Point A						
	Assembly Point B						
	Assembly Point C						
	Assembly Point D						

Notes:

Site:

Delimara PS

Checklist:

Extinguishers - Admin & W/shop

Type of Check	Checked by:
Date	Signature:

FP	PLACE	DP 9	DP 50	CO ₂ 5	AFFF 9	CO ₂ 30	REMARKS
	Admin						
1	Security	2					
2	Admin Ground floor hall	2					
3	Drawing Office	1		1			
4	Admin. AHU	1		1			
5	Admin 1st floor	2					
	Workshop						
10	Main Store	2					
11	Main Store (DO)	3					
12a	Main Store (spare batteries)			1			
12b	Stores messroom (Ground)			1			+fire blanket
13	Main Store (issue)	2					
14	Ex-Oil Store (facing BEI)	1					
15	Paint stores	1					(facing cliff)
16	Workshop Garage	1					
17	Work/shop switchgear room			2			
18	New Chemical Stores	2					
19	W/Shop	2					
20	W/Shop	2					
21	New drawing office			1			+fire blanket (kitchen)
22	W/Shop Electronics			2			
23	W/Shop Electrical			2			
24	W/Shop Welders	1					
25	W/Shop C/hand office	1					
26	New drawing office	2					(1st floor near stairs)
27	Mess	2					
28	Canteen			2			+fire blanket
	TOTAL	30	0	13	0	0	43
	Assembly Point A						
	Assembly Point B						
	Assembly Point C						

[illegible]

Site: **Delimara PS - D3**Checklist: **Extinguishers D3**

Type of Check	Checked by:
Date	Signature:

FP	PLACE	DP	DP	CO ₂	AFFF	CO ₂	REMARKS
		9	50	5	9	30	

FP	PLACE	DP 9	DP 50	CO ₂ 5	AFFF 9	CO ₂ 30	REMARKS
Phase 3 (Block IV) - engine hall							
401	Engine 1	5		2			
402	Engine 2	5		2			
403	Engine 3	5		2			
404	Engine 4	5		2			
405	Engine 5	5		2			
406	Engine 6	5		2			
407	Engine 7	5		2			
408	Engine 8	5		2			
409	Engine hall			1			
410	Engine hall			1			
411	Engine hall			1			
412	Engine hall			1			
413	Engine hall			1			
414	Battery room			2			
415	HV Switchgear			2			
416	Stairs			2			
417	Cable flat	2					(To be installed)
418	Switchgear 2nd floor			2			
419	Switchgear 2nd floor			2			
420	Stairs			1			
420a	UAT42			1			
420b	UAT41			1			
420c	UAT43			1			
420c	UAT44			1			
421	Switchgear 4th floor			2			
422	Switchgear 4th floor			2			
423	Switchgear 4th floor			1			
424	Switchgear 5th floor			1			
425	Control Room 5th floor stairs			1			
426	Control Room			1			
427	Control Room			1			
428	Control Room Switchgear			2			

FP	PLACE	DP 9	DP 50	CO ₂ 5	AFFF 9	CO ₂ 30	REMARKS
	Phase 3 (Block IV) - Turbine Hall						
429	Ground floor	1					
430	Ground floor	1					
431	First Floor	1					
431b	Battery charger room			1			
431c	Motor Control Room			2			
432	First Floor	1					
433	2nd floor	3		2			
434	Boiler lift 1 - level 3	2					
434a	Boiler lift 1 - level 2	2					
435	Boiler lift 2 - level 3	2					
435a	Boiler lift 2 - level 2	2					
	FOT Area						
436	FOT Building			2			
437	Transformers			2			
438	Centrifuges	1					
439	Compressors	1					
440	Switchgear 1st floor		1				
441	Switchgear 1st floor		1				
442	Tank farm	2					
443	Tank area LO	1					
444	Tank Area HFO	2					
445	Tank Area DM	1					

[illegible]

Site: Delimara Power StationChecklist: FFE Fire Pumps

Type of Check:	Checked by:
Date:	Signature:

Item	Unit	Pump 1 (Electric)	Pump 2 (Diesel)	Jockey Pump	Remarks
Starting	Check				
Start Pressure	Bar				
Stop Pressure	Bar				
Discharge	Bar				
Suction	Bar				
Flow	m³/h				
Running Amps	A				
Engine revs.	RPM				
Fuel Level	%				
Oil level	Check				
Oil pressure	Bar				
C/Water level	Check				
C/Water Temp.	°C				
C/Water press.	Bar				
Running Hours	Hours				
Batteries					
Set 1 Volts	V				
Set 1 Amps	A				
Set 2 Volts	V				
Set 2 Amps	A				
Lamp test					
Local Alarm	Check				
C/Room Alarm	Check				

Notes	
	Fuel to be replenished at 75% Fuel level below 50% to be reported

Site: **Delimara Power Station**

Checklist: **FFE Fire Pumps**

Type of Check: <i>FLOW TEST</i>	Checked by:
Date:	Signature:

Pump 1 - Electric				
Suction Pressure	Discharge Pressure	Flow %	Flow LPM	Remarks
		0	0	(Static head - Closed Discharge - no flow)
Pump 2 - Diesel				
Suction Pressure	Discharge Pressure	Flow %	Flow LPM	Remarks
		0	0	(Static head - Closed Discharge - no flow)

Notes	Run the pump for at least 10 min. to warm up
	Take readings from closed discharge to (approx) 6 bar

Site: Delimara Power StationChecklist: FFI Fire Pumps

Type of Check:				Checked by:	
Date:				Signature:	
Item	Unit	Pump 1 (Electric)	Pump 1 (Diesel)	Jockey Pump	Remarks
Starting	Check				
Start Pressure	Bar				
Discharge	Bar				
Suction	Bar				
Flow	m ³ /h				
Running Amps	A				
Engine revs.	RPM				
Fuel Level	%				
Oil level	Check				
Oil pressure	Bar				
C/Water level	Check				
C/Water Temp.	°C				
C/Water press.	Bar				
Running Hours	Hours				
Batteries					
Set 1 Volts	V				
Set 1 Amps	A				
Set 2 Volts	V				
Set 2 Amps	A				
Lamptest	Check				
Local Alarm	Check				
C/Room Alarm	Check				
Water tank	m ³				
Transfer Pump 1					
Transfer Pump 2					
Notes					
Fuel to be replenished at 75% Fuel level below 50% to be reported					
Sprinkler tank level must not be allowed to fall below 200m ³ unless an alternative supply is available.					

Site: **Delimara Power Station**

Checklist: **FFI Fire Pumps**

Type of Check: <i>FLOW TEST</i>	Checked by:
Date:	Signature:

Pump 1 - Electric				
Suction Pressure	Discharge Pressure	Flow %	Flow LPM	Remarks
		0	0	(Static head - Closed Discharge - no flow)
Pump 2 - Diesel				
Suction Pressure	Discharge Pressure	Flow %	Flow LPM	Remarks
		0	0	(Static head - Closed Discharge - no flow)

Notes	Run the pump for at least 10 min. to warm up
	Take readings from closed discharge to (approx) 6 bar

Site: **Delimara PS**
 Checklist: **FFE Hydrants**

Type of Check				Checked by:
Date				Signature:
FP	Location	Type	Check	Remarks
1	Punchroom	2AG		
2	Adm Parking (skips)	2AG		
3	Piazza monument	2AG		
4	Stores (behind)	2AG		
5	Canteen	2AG		
6	Quay (Unloading)	2AG		
21	Quay - CW inlet	U/G		
23	Quay	U/G		
23a	Quay	4C/H		
24	Workshop	U/G		
25	Workshop	U/G		
26	Chimney	U/G		
27	Chimney	U/G		To Check
28	DM Plant	U/G		
29	EHV Building	2AG		
30	Turbine Hall	U/G		
31	Turbine Hall	A/G		
34	FO pumphouse	U/G		
35	FO pumphouse	AG		
143	FO foam tanks	AG		
Phase 2B				
41	2B Boiler 1 Chimney	U/G		
42	2B GT 1 Chimney	U/G		
43	2B GT 1 inlet	U/G		
44	2B GT 2 inlet	U/G		
45	2B GT 2 Chimney	U/G		
46	2B Boiler 2 Chimney	U/G		
	Section Valve 1			
	Section Valve 2			
	Section Valve 3			

FP	Location	Type	Check	Remarks
	Interconnect			Between FFE-FFI
	Tank Area			
141	FO Tank 1	AG		
142	FO Tank 2	AG		
36	Diesel Tk 1	2AG		
37	Diesel Tk 3	2AG		
47	Diesel Tank 0	2AG		
48	Diesel Tank 3	AG		
49	Diesel Tank 3	AG		
50	Diesel Tank 2	AG		
51	Diesel Tank 1	AG		
	Section valve			(Near weighbridge)
	Section valve			Near FO foam tanks
			TOTAL:	54

Notes	NOTE GT 1 nearer the sea
UG underground / AG above ground / CH Collecting head/inlet	

Site: **Delimara PS**Checklist: **Equipment -FFE Cabinets**

Type of Check		Checked by:							
Date		Signature:							
FP	PLACE	Hose 70mm	Hose 38mm	MP Branch	Foam Branch	Inductor	S/pipe & key	Hose Test (Year)	Remarks
12	Admin block		4	2			4		(removed)
15	Quay (Main gate)	2		1			1		
16	Stores	2		1			1		
17	Stores	1	1	1			1		
18	BEI block		2	1			1		
19	Quay								(removed)
20	Fire Section								(removed)
22	Quay	2		1					
23	Quay	2		2			1		(1)
24	Workshop	2	1	2			1		
25	Workshop	2	1	2			1		
26	Chimney								(To be sited)
28	DM Plant	2	1	1			1		
29	EHV Building	2	2	1					
30	G/T 1&2 C/room	2		1			1		
31	G/T 1&2 C/room	2		1					
34	FO Pumphouse	2		1			1		
35	FO Pumphouse	2		1			-		
36	Diesel Tk 3	2		1					
141	FO Tank 1	1	1	1					
142	FO Tank 2	1	1	1					
143	FO foam tanks		1		1				
41	2B Boiler 1 Chimney	2		1			1		
42	2B GT 1 Chimney	2		1			1		
43	2B GT 1 inlet	2		1			1		
44	2B Boiler 2 Chimney	2		1			1		
45	2B GT 2 Chimney	2		1			1		
46	2B GT 2 inlet	2		1			1		
	Phase 3								
A21	Steam turbine	2		2			1		
A22	Transformers	2		2			1		

A23	Evaporators West	2		2			1		
A31	Lift 2	2		2					
A32	Lift 1	2		2					
A41	Chimney 3/4	2		2			1		
A42	Silo	2		2			1		
A43	Chimney 1/2	2		2			1		
A44	Evaporators East	2		2			1		
A71	Weighbridge	2		2			1		
A72	Containers	2		2			1		
A81	FOT	2		2			1		
A82	Containers	2		2			1		

Foam making machines (120 ltr FP)						Full		Check level & inductor function
1	T/A Feed pumps		2		1	1		
2	FFI pumps		2		1	1		
3	FFI pumps		2		1	1		
4	FO Pumps		2		1	1		
5	TA Auxiliaries		2		1	1		
7	Diesel Tanks		2		1	1		
8	Ph3 turbine ground		2		1	1		
9	Ph3 turbine 2nd		2		1	1		
10	Ph3 Engine hall		2		1	1		
11	Ph3 Engine hall		2		1	1		
12	Ph3 FOT - foam		2		1	1		
TOTAL		67	37	54	12	11	28	209

Notes								
Inductors: Check each inductor works + suction & rinse properly + set to 3%								
Branches - Check operation & rinse								
Foam machines - Check level								

Site: **Delimara PS - D3**Checklist: **FFE Hydrants - D3**

Type of Check				Checked by:
Date				Signature:
FP	Location	Type	Check	Remarks
Phase 3				
	Steam turbine	UG		
A22	Transformers	UG		
A23	Evaporators West	UG		
A31	Lift 2	2AG		
A32	Lift 1	2AG		
A41	Chimney 3/4	UG		
A42	Silo	UG		
A43	Chimney 1/2	UG		
A44	Evaporators East	UG		

FP	Location	Type	Check	Remarks
A71	Weighbridge	UG		
A72	Containers	UG		
A81	FOT	UG		
A82	Containers	UG		
	Section valve			Near FO foam tanks
			TOTAL:	54

Notes	NOTE GT 1 nearer the sea
UG underground / AG above ground / CH Collecting head/inlet	

Site: **Delimara PS**Checklist: **FFI Hydrants**

Type of Check	Checked by:
Date	Signature:

No	PLACE	Type	Valve	Washer	Remarks
1	Admin (Parking)	2WH			
2	Stores (outside corner)	2WH			
11	FFI Pumps	WH			
12	FFE Pumps	WH			
13	D/M Plant	WH			
14	T/A Hall 4m	WH			
15	T/A Hall 4m	WH			
16	T/A Hall 13m	WH			
17	T/A Hall 4m	FWH			
18	T/A Hall 4m	FWH			
19	T/A Hall 13m	FWH			
20	T/A Hall 4m	WH			
21	T/A Hall 4m	WH			
22	T/A Hall 13m	WH			
23	T/A Hall 4m	FWH			
24	T/A Hall 13m	FWH			
25	Boiler 1 4m	WH			
26	Boiler 1 4m	WH			
27	Boiler 1 14.4m	WH			
28	Boiler 1 12.6m	WH			
29	Boiler 2 4m	WH			
30	Boiler 2 14.4m	WH			
31	Boiler 2 4m	WH			
32	Boiler 2 12.6m	WH			
	FFI Interconnect hydrant	WH			
41	2B GT 1 generator	WH			
42	2B Condenser	WH			
43	2B Condenser	WH			
44	2B GT 2 generator	WH			
45	2B Steam T/A Generator end	WH			
46	2B Steam T/A Generator end	WH			

No	PLACE	Type	Valve	Washer	Remarks
D3 - Engine Hall (All hydrants single & above ground)					
401	Engine Hall	WH			
402	Engine Hall	WH			
403	Engine Hall	WH			
404	Engine Hall	WH			
405	Engine Hall	WH			
406	Engine Hall	WH			
407	Engine Hall	WH			
D3 - Turbine Hall (All hydrants single & above ground)					
408	Steam turbine Ground	WH			
409	Steam turbine Ground	WH			
410	Steam turbine Ground	WH			
411	Steam turbine 2nd floor	WH			
412	Steam turbine 2nd floor	WH			
413	Steam turbine 2nd floor	WH			
	TOTAL	43			43

No	PLACE	Type	Valve	Washer	Remarks
	Section Valves	Norm	State	Check	
	FFI Interconnect FFE side	NC			
	FFI Interconnect FFI side	NC			
	Connection to phase IIB	NO			
	IIB section 1	NO			
	IIB section 2	NO			
	IIB section 3	NO			
	Phase 3 (418)	NO			(*)
	Phase 3 (413)	NO			
	Phase 3 (412)	NO			
	Phase 3 (407)	NO			
	Phase 3 (406)	NO			

[illegible]

Site: **Delimara PS**Checklist: **FFI Equipment**

Type of Check	Checked by:
Date	Signature:

No	PLACE	Hose 64mm	Hose 38mm	MP Brch	FI + B	Foam 25ltr	Hose Tested	Remarks
11	FFI Pumps	2		1				
12	FFE Pumps	2		1				
13	D/M Plant	2		1				
14	T/A Hall 4m	2		1				
15	T/A Hall 4m	2		1				
16	T/A Hall 13m	2		1				
17	T/A Hall 4m	1		1	1	2		
18	T/A Hall 4m	1		1	1	2		
19	T/A Hall 13m	1		1	1	2		
20	T/A Hall 4m	2		1				
21	T/A Hall 4m	2		1				
22	T/A Hall 13m	2		1				
23	T/A Hall 4m	1		1	1	2		
24	T/A Hall 13m	1		1	1	2		
25	Boiler 1 4m	2		1				
26	Boiler 1 4m	2		1				
27	Boiler 1 14.4m	2		1				
28	Boiler 1 12.6m	2		1				
29	Boiler 2 4m	2		1				
30	Boiler 2 14.4m	2		1				
31	Boiler 2 4m	2		1				
32	Boiler 2 12.6m	2		1				
	FFI Interconnect hydrant	1		1				

No	PLACE	Hose 64mm	Hose 38mm	MP Brch	FI + B	Foam 25ltr	Hose Tested	Remarks
41	2B GT 1 generator		2	1				
42	2B Condenser		2	1				
43	2B Condenser		2	1				
44	2B GT 2 generator		2	1				
45	2B Steam T/A Generator end		2	1				
46	2B Steam T/A Generator end		2	1				
Phase 3 - Engine Hall								
401	Engine Hall	2		1				
403	Engine Hall	2		1				
405	Engine Hall	2		1				
407	Engine Hall	2		1				
Phase 3 - Turbine Hall								
410	Ground	2		1				
413	Second floor	2		1				
	Fire Store (FFI Pumps)	8	4					
	TOTAL	60	16	35	5	10		126

Notes

Foam trolleys on FFE Equip list

FWH -Foam & Water hydrant
 WH - Water hydrant
 FI+B - Foam inductor & Branch

IMPORTANT
In the hose cabinets the hose
is NOT TO BE LEFT
CONNECTED to the hydrant
coupling

Site: **Delimara PS**Checklist: **FFE - Fixed equipment**

Type of Check	Checked by:
Date	Signature:

PLACE	Valve	Nozzles	Dry test	Wet test	Rinsed	Remarks
HFO Tanks 1 & 2						
Tank 1 Cooling (S)						
Tank 1 Cooling (N)						
Tank 1 Foam						
Tank 2 Cooling (S)						
Tank 2 Cooling (N)						
Tank 2 Foam						
Tank 3 Cooling						
Tank 3 Foam						
Bladder tank 1						
Bladder Tank 2						
FO Pumphouse						
Foam Sprinklers						
Diesel centrifuge room						
Foam Sprinklers						
FO Unloading						
Bladder tank 3						
Monitor						

PLACE	Valve	Nozzles	Dry test	Wet test	Rinsed	Remarks
Diesel tanks						
Tank 0 Cooling						
Tank 0 Foam						
Tank 1 Cooling						
Tank 1 Foam						
Tank 2 Cooling						
Tank 2 Foam						
Tank 3 Cooling						
Tank 3 Foam						
Bladder tank 4						
Bladder tank 5						
Notes:					<div>>Advise Shift Engineer & pumphouse >Isolate FFE section to tanks >Drain line (near isol. valve) >Connect FFI from near FO transformers >Flush with fresh water only >Check nozzles / valves >Drain & restore system >NO WATER TO FOAM SYSTEM (Check valves only while isolated)</div>	

Site:

Delimara PS

Checklist:

FFI - DELUGE VALVE SYSTEM

Type of Check					Checked by:
Date					Signature:
No	Loc	Description	Type	Pos.	Remarks
	CW	FFE Fire pumps	S	N.O.	
	CW	FFI Fire Pumps	S	N.O.	
41	CW	Diesel Generator	A	N.O.	
42	FO	Transformer 1	A	N.O.	
43	FO	Transformer 2	A	N.O.	
44	CW	Transformer 1	A	N.O.	
45	CW	Transformer 2	A	N.O.	
46	ECR	Workshop TX 1	A	N.O.	
47	ECR	Workshop TX 2	A	N.O.	
48	ECR	Interbus TX 1	A	N.O.	
49	ECR	Interbus TX 2	A	N.O.	
50	ECR	EHV Subst. TX 1	A	N.O.	
51	ECR	EHV Subst. TX 2	A	N.O.	
52	ECR	Cable Flat EHV	S	N.O.	
53	DM	Transformer 1	A	N.O.	
54	DM	Transformer 2	A	N.O.	
55	T/A	Unit TX 1	A	N.O.	
56	T/A	Generator TX 1	A	N.O.	
57	T/A	Station TX 1	A	N.O.	
58	T/A	Cable Flat 10m	S	N.O.	(over unit trans.)
59	T/A	Station TX 2	A	N.O.	
60	T/A	Generator TX 2	A	N.O.	
61	T/A	Unit TX 2	A	N.O.	
62	T/A	BFP 1A	A	N.O.	
63	T/A	BFP 1B	A	N.O.	
64	T/A	T/A 1 Lub Oil Tank	M	N.C.	
65	T/A	Cable Flat 18m	S	N.O.	(above c/room)
66	T/A	Unit Aux TX 1	A	N.O.	
67	T/A	Station Aux TX 1	A	N.O.	
68	T/A	Ess. Services TX 1	A	N.O.	
69	T/A	BFP 2A	A	N.O.	
70	T/A	BFP 2B	A	N.O.	
71	T/A	T/A 2 Lub Oil Tank	M	N.C.	
72	T/A	Ess. Services TX 2	A	N.O.	

No	Loc	Description	Type	Pos.	Remarks
73	T/A	Station Aux TX 2	A	N.O.	
74	T/A	Unit Aux TX 2	A	N.O.	
75	BLR	Boiler 1 Front	M	N.C.	
76	BLR	Boiler 2 Front	M	N.C.	
	T/A	Water Mist	A	NO	
	T/A	Water Mist	A	NO	
D2A					
		2A Gas TA Unit tx 1	A	NO	
		2A Gas TA Unit tx 2	A	NO	
		2A Gas TA Aux TX	A	NO	
D2B					
		Block Main TX 3	A	NO	
		SF6 Cable flats	A	NO	
		Unit TX	A	NO	
		Steam T/A front standard	A	NO	
		Steam T/A oil skid	A	NO	
		Centrifugal Separators	M	NO	(Foam)
D3 Main block					
		3.3kv/15kv Start up Trx	A	NO	Leaking
		Main Block Trx 43	A	NO	
		Main Block Trx 42	A	NO	
		Main Block Trx 41	A	NO	
		Engine Hall Cable Trench	A	NO	
		132Kv Basement	A	NO	
D3 FOT					
		FOT Separators Room	A		
		1 4 OSGF41 AA010	M		
		2 4 OSGF42 AA010	M		
		3 4 OSGF43 AA010	M		
		4 4 OSGF44 AA010	M		
		5 4 OSGF45 AA010	M		
		6 4 OSGF46 AA010	M		
		7 4 OSGF47 AA010	M		
		8 4 OSGF48 AA010	M		
		9 4 OSGF49 AA010	M		

(*) Foam deluge are on FFE except Separators room on FFI

Notes:

PIC
SCE (Phase I) 79008917
SCE (Phase II) 79008986
Central Control Room
508/509/510 / 79009905

- CW- Circ. water pumps
- FO- Fuel oil
- ECR- Elect. c/room
- DM- Water plant
- T/A- Turbine hall (1&2)
- BLR- Boiler 1&2
- TX - Transformer
- All valve numbers are prefixed AA 72
- A-Auto
- M-Manual
- S-Conventional sprinkler (with bell)

Site: **Delimara PS**
 Checklist: **PPE in ERT room**

Type of Check	Checked by:
Date	Signature:

ERT room							
PPE	Quantity	Check		Remarks			
BA sets with 3 spare cylinders	3						
Spare cylinder	3						
Fire proof overall							
Fire helmets	6						
first aid bag (1ft x 1ft x 2ft)	1						
Stretcher	1						

Site: **Delimara PS**
 Checklist: **Spillage recovery material**

Type of Check	Checked by:
Date	Signature:

Container at Quay				
Type	Quantity	Check		Remarks
Absorbent pads	1pkt--200			
Absorbent socks	47			
Wheel barrows	2			
Floating booms	121 m			
Oil skimmer	1			
Brooms	5			
Spades	5			
Mop squeezer	5			
Fish nets	2			
Hooks	3			
Plastic bags	3 rolls			
20lt empty barrels	5			
Ropes	40 m			
Bag absorbent flakes	1			
10lt buckets	3			
Drum funnels	2			
Diesel fuel	10 ltrs			
Life jackets	3			
Boat with oars	1			
Bag with rags	1			
Sand bags	50			
Tyvek				

Site: DPSChecklist: FFI Pumps - Fire Store

Type of Check - Inventory	Checked by:
Date	Signature:

	ITEM	QTY.	REMARKS
1	CO2 Trolley 30 Kg	3	
2	Foam Machines	2	
3	64mm Hoses	6	
4	38mm Hoses	4	
5	Foam Monitors	2	
6	Water Monitor	1	
7	Oil Spill Trailer	1	<i>Separate Checklist</i>
8	Foam Jerry Cans x 25 Lt	5	<i>Komet</i>
9	Expandol x 25 Lt	4	
10	Foam 3% x 25 Lt	34	

Notes:

Site: **Delimara PS**
 Checklist: **GT 2A-1 (John Brown)**

Type of Check	Checked by:
Date	Signature:

Cylinders							
	Date				Date		
<-Front	Filled	Test	Check	Rear	Filled	Test	Check
1 / Act		1994		2		1994	
3 / Act		1994		4		1994	
5		1994		6		1994	
7		1994		8		1994	
9		1994		10		1994	
11		1994		12		1994	
13		1994		14		1994	
15		1994		16		1994	
17		1994		18		1994	
CO2 Nozzles							
Initial				Extended			
Accessory				Accessory			
Turbine				Turbine			
Turbine				Turbine			
Generator				Generator			
Generator BRG							
Dampers							
Accessory				Reduction Gear			
Combustion				Generator			
Generator BRG							
Remarks							

Site: **Delimara PS**
 Checklist: **GT 2A-2 (John Brown)**

Type of Check	Checked by:
Date	Signature:

Cylinders							
	Date				Date		
<-Front	Filled	Test	Check	Rear	Filled	Test	Check
1 / Act		1994		2		1994	
3 / Act		1994		4		1994	
5		1994		6		1994	
7		1994		8		1994	
9		1994		10		1994	
11		1994		12		1994	
13		1994		14		1994	
15		1994		16		1994	
17		1994		18		1994	
CO2 Nozzles							
Initial				Extended			
Accessory				Accessory			
Turbine				Turbine			
Turbine				Turbine			
Generator				Generator			
Generator BRG							
Dampers							
Accessory				Reduction Gear			
Combustion				Generator			
Generator BRG							
Remarks							

Site: **Delimara PS**Checklist: **GT3A**

Type of Check	Checked by:
Date	Signature:

Cylinders							
	Date				Date		
<-Front	Filled	Test	Check	Rear	Filled	Test	Check
1 / Act				2			
3 / Act				4			
5				6			
7				8			
9				10			
11				12			
13				14			
15				16			
17				18			
19				20			
21				22			
23				24			
CO2 Nozzles							
Initial				Extended			
Accessory				Accessory			
Turbine				Turbine			
Turbine				Turbine			
Generator				Generator			
Generator BRG							
Dampers							
Accessory				Reduction Gear			
Combustion				Generator			
Generator BRG							
Remarks							

Site: **Delimara PS**Checklist: **GT3B**

Type of Check	Checked by:
Date	Signature:

Cylinders							
	Date				Date		
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1 / Act				2			
3 / Act				4			
5				6			
7				8			
9				10			
11				12			
13				14			
15				16			
17				18			
19				20			
21				22			
23				24			
CO2 Nozzles							
Initial				Extended			
Accessory				Accessory			
Turbine				Turbine			
Turbine				Turbine			
Generator				Generator			
Generator BRG							
Dampers							
Accessory				Reduction Gear			
Combustion				Generator			
Generator BRG							
Remarks							

Site: **Delimara PS**Checklist: **Phase 2B - Generator CO2 system**

Type of Check	Checked by:
Date	Signature:

	Item	Date		Remarks
		Filled	Test	
3A-1	Initial			
3A-1	Extended			
3A-2	Initial			
3A-2	Extended			
3A-3	Initial			
3A-3	Extended			
Remarks				

ENEMALTA




FIRE SECTION

Boiler	Wagner Biro	2	1992	260 T/hr	87bar
Feed pumps		4		295m3/hr	126bar
CW pumps		3		10500m3/hr	

HRSG	Stork			100t/hour (55bar
CCGT					

	Nouvo Pignone	3A	37MW	Brush
	Nouvo Pignone	3B	37MW	Brush
	Nouvo Pignone	3C	36MW	Brush
Combined			110MW	

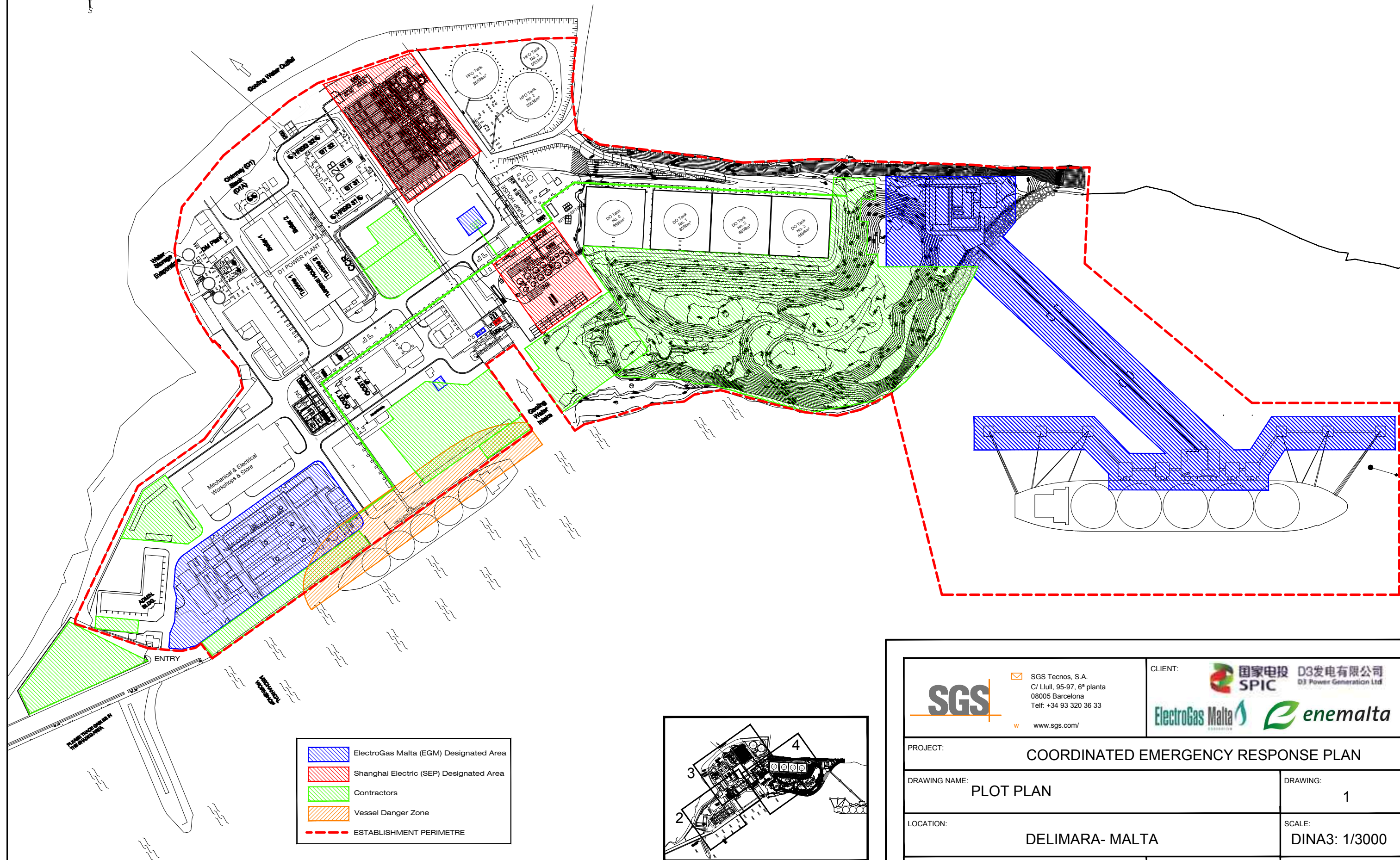
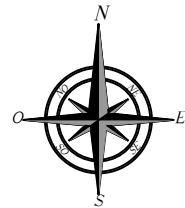
<i><u>Delimara PS - Transformers</u></i>				
Description	Quantity	Type	Capacity (MVA)	Voltage (kV) (415 =
Interbus TX 1	2	Oil	90	132/33
Block Main TX / CCGT	1	Oil	150	13.8/132
Generator TX 1	2	Oil	75	11/132
Unit TX 1	2	Oil	8	11/3.3
Unit TX	1	Oil	5	13.8/3.3
Station TX	2	Oil	15	33/3.3
HV S/station	2	Oil	630kVA	3.3/415
Workshop	2	Oil	630kVA	3.3/415
Water Treatment plant	2	Oil	630kVA	3.3/415
Fuel Oil Pumphouse	2	Oil	630kVA	3.3/415
CW & Chlorination	2	Oil	630kVA	3.3/415
Essential Services	2	Oil	1,5	3.3/415
Unit Auxiliary	2	Oil	1,5	3.3/415
Station Auxiliary	1	Oil	2.5MVA	3.3/415
Gas T/A Auxiliary	1	Oil	630kVA	3.3/415
Gas T/A Generator TX	2	Oil	50	11/33
Auxiliary TX	2	Cast resin	750kVA	11/415
Auxiliary TX	2	Cast resin	1,5	33/415

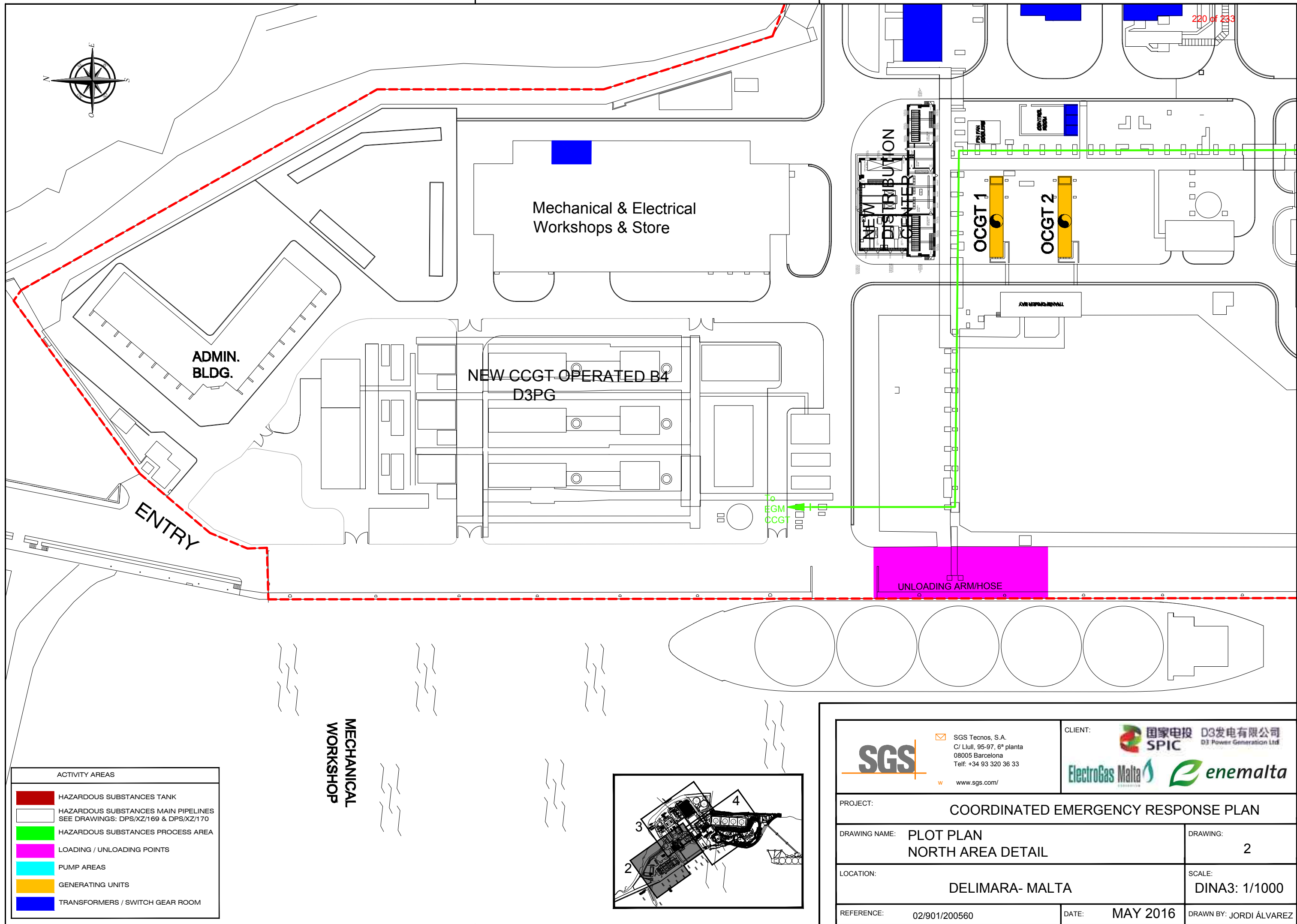
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	COORDINATED EMERGENCY RESPONSE PLAN	Page 38 of 38

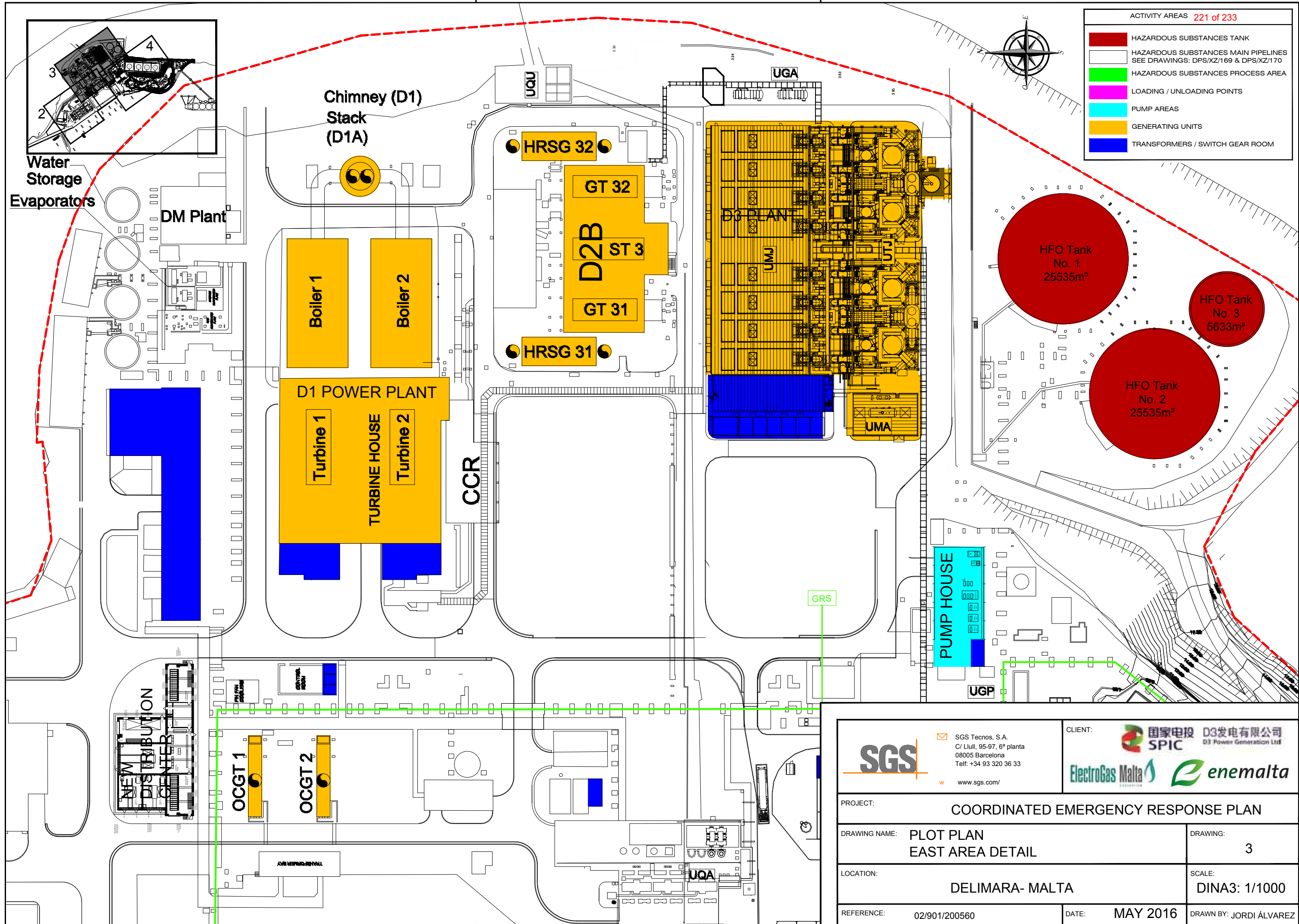
ANNEXURE 3. MAPS AND DRAWINGS

The following drawings have been attached:

- Plot Plan (entire site)
- Plot Plan Details
- Tie-In Points
- Pits and interceptors (common areas)
- Services (common areas)
- Escape Routes and Assembly Points (entire site)







MECHANICAL EQUIPMENT

		WEIGHT
EGE21	FO SEPARATOR NO.1	2080 kg
EGE22	FO SEPARATOR NO.2	2080 kg
EGE23	FO SEPARATOR NO.3	2080 kg
EGE24	FO SEPARATOR NO.4	2080 kg
EGE25	FO SEPARATOR NO.5	2080 kg
EGE26	FO SEPARATOR NO.6	2080 kg
EGF11	HFO BUFFER TANK NO.1: 125m3 ø5.000mm	156000 kg
EGF12	HFO BUFFER TANK NO.2: 125m3 ø5.000mm	156000 kg
EGF21	VOC UNIT FOR HFO BUFFER TANK NO.1	150 kg
EGF22	VOC UNIT FOR HFO BUFFER TANK NO.2	150 kg
EGT11	STEAM TRAP UNIT, TYPE 2	120 kg
EGT12	STEAM TRAP UNIT, TYPE 2	120 kg
GME50	SERVICE TF SLUDGE PIT PUMP UNIT NO. 1	50 kg
GME51	SERVICE TF SLUDGE PIT PUMP UNIT NO. 2	50 kg
GMG23	SERVICE TF OILY WATER PIT PUMP UNIT	50 kg
GMG42	UREA TANK FARM DRAIN PUMP UNIT	50 kg
GMG50	UREA SPILLAGE TANK	16000 kg
GMG60	UREA SPILLAGE TRANSFER PUMP UNIT	50 kg
GNL51	SLUDGE STORAGE TANK NO.1	55000 kg
GNL52	SLUDGE STORAGE TANK NO.2	35000 kg
GNL60	SLUDGE TRANSFER PUMP UNIT	100 kg
GNT51	STEAM TRAP UNIT, TYPE 2	120 kg
GNT52	STEAM TRAP UNIT, TYPE 2	120 kg
HSG11	UREA DISSOLVING TANK NO.1	83000 kg
HSG12	UREA DISSOLVING TANK NO.2	83000 kg
HSJ11	UREA STORAGE TANK NO.1	155000 kg
HSJ12	UREA STORAGE TANK NO.2	155000 kg
HSJ30	UREA PRESSURE CONTROL UNIT	75 kg
HSL10	DEMINERALIZED WATER TANK	58000 kg
HSU11	UREA TANK HEATING UNIT NO.1	120 kg
HSU12	UREA TANK HEATING UNIT NO.1	120 kg
MJN11	HFO SERVICE TANK NO.1: 125m3 ø5.000mm	156000 kg
MJN12	HFO SERVICE TANK NO.2: 125m3 ø5.000mm	156000 kg
MJN15	DO SERVICE TANK: 140m³, D=5.000mm	172000 kg
MJN21	VOC UNIT FOR HFO SERVICE TANK NO.1	150 kg
MJN22	VOC UNIT FOR HFO SERVICE TANK NO.2	150 kg
MJN25	VOC UNIT FOR DO SERVICE TANK	150 kg
MJN31	HFO FEEDER PUMP UNIT	3900 kg
MJN32	DO FEEDER PUMP UNIT	850 kg
MJN70	DO FILTER UNIT	300 kg
MJT11	STEAM TRAP UNIT, TYPE 2	120 kg
MJT12	STEAM TRAP UNIT, TYPE 2	120 kg
MVA30	LO STORAGE TANK	208000 kg
MVB20	LO TRANSFER PUMP UNIT	400 kg
MVD20	MAINTENANCE LUBE OIL DRAIN TANK	55000 kg
MVD30	MAINTENANCE LUBE OIL PUMP UNIT	400 kg
QEA11	STARTING AIR COMPRESSOR NO.1 UNIT	1250 kg
QEA12	STARTING AIR COMPRESSOR NO.2 UNIT	1250 kg
QEA13	STARTING AIR COMPRESSOR NO.3 UNIT	1250 kg
QFA11	CONTROL AIR COMPRESSOR NO.1 UNIT	2720 kg
QFA12	CONTROL AIR COMPRESSOR NO.2 UNIT	2720 kg
QFA13	CONTROL AIR COMPRESSOR NO.3 UNIT	2720 kg
QFA14	CONTROL AIR COMPRESSOR NO.4 UNIT	2720 kg
QFA30	CONTROL & SERVICE AIR RECIEVER UNIT	20000 kg
QLB12	STEAM TRAP UNIT, TYPE 4	60 kg
QLC13	STEAM TRAP UNIT, TYPE 4	60 kg
SAA47	VENTILATION, UAT45 TRAFO ROOM	unset kg
SAA48	VENTILATION, UAT46 TRAFO ROOM	unset kg
SAM53	INLET LOUVER	200 kg
SAM54	INLET LOUVER	200 kg
SAM55	INLET LOUVER	200 kg
SAM56	INLET LOUVER	200 kg
SCA11	SERVICE AIR COMPRESSOR NO.1 UNIT	2720 kg
SCA12	SERVICE AIR COMPRESSOR NO.2 UNIT	2720 kg
SGF30	FOAM TANK UNIT	10000 kg
SGJ03	INERT GAS UNIT	unset kg

ELECTRICAL EQUIPMENT

		WEIGHT
BFT50	UNIT AUXILIARY TRANSFORMER UAT45	12535 kg
BFT60	UNIT AUXILIARY TRANSFORMER UAT46	12535 kg
BGT10	AUX. TRANSFORMER 41	2055 kg
BGT20	AUX. TRANSFORMER 42	2055 kg

REFERENCE:

2970:D2.611.001 SECTIONS, LOOKING EAST
2970:D2.612.001 SECTIONS, LOOKING NORTH

REV	DATE	DRAWN BY	ISSUED/VERIFIED BY	DESCRIPTION	APPROVED BY
7	2012.07.12	MOMA	JNJ		WSH
6	2011.09.13	CHH	THV	VENTILATION AND PIT PUMP ADDED	JNJ
5	2011.02.24	DKB	CHH	VOC UNIT, STEAM TRAPS & PIPE MODIFIED	JNJ
4	2010.09.17	REL	CHH		JNJ
3	2010.06.30	JES	THV		ESO
2	2010.03.19	JAV	JES	CROSS DISCIPLINARY REVIEWED	CHH
1	2010.01.08	JES	JVS	NEW FOT LAYOUT INCL. NEW FIRST FLOOR.	CHH
REV	DATE	DRAWN BY	ISSUED/VERIFIED BY	DESCRIPTION	APPROVED BY

OWNER

Enemalta Corporation



CENTRAL ADMINISTRATION BUILDING
CHURCH WARRF, MARSA MRS 1000
MALTA
TEL.: +356 2298 0755
FAX: +356 2125 1241

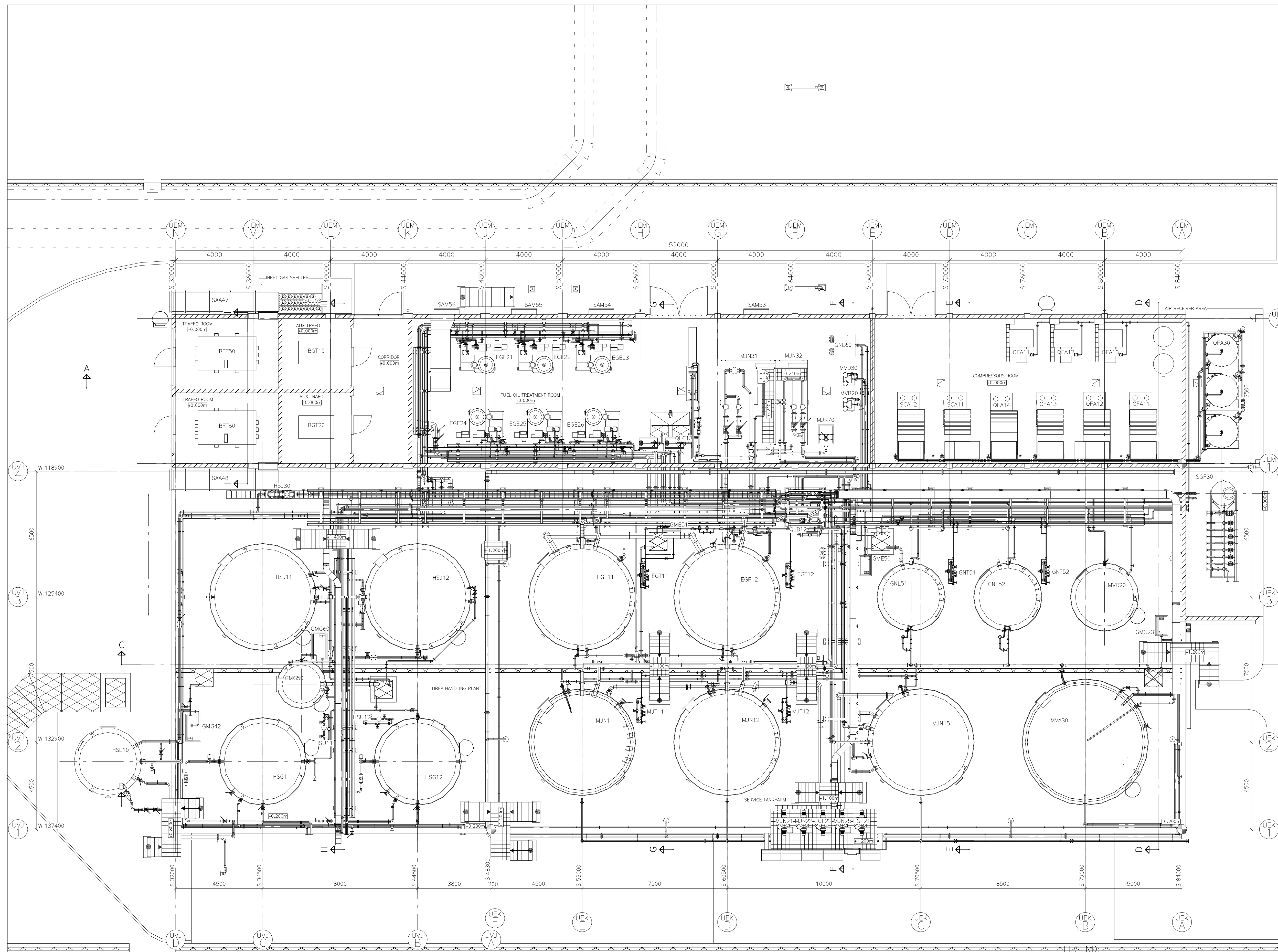
CONTRACT	DRAWING No.	Sht. No.	REV
GN/DPS/8/2006			

BWSC	BURMEISTER & WAIN SCANDINAVIAN CONTRACTOR A/S DENMARK	POST OFFICE BOX 235 DK 3450 ALLERØD, DENMARK TELEPHONE : +45 48140022 TELEFAX : +45 48140150
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PROJECT
ENEMALTA BLOCK 4 DELIMARA DIESEL POWER PLANT

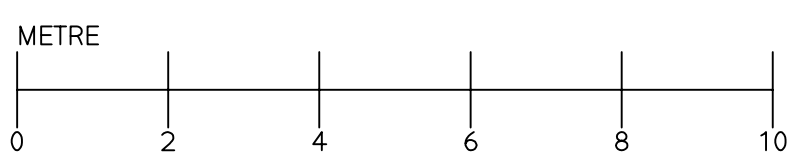
SUBJECT
FOT BUILDING (UEM), SERVICE T. F. (UEK) LAYOUT GROUND FLOOR PLAN, LEVEL +0.000

SCALE	DWG. NO.	PROJECT NO.	GR.	NO.	SHT.	REV.
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NOTE:

NO.: 1. ALL MEASUREMENT IN mm
NO.: 2. ALL LEVELS ARE RELATIVE IN METRE

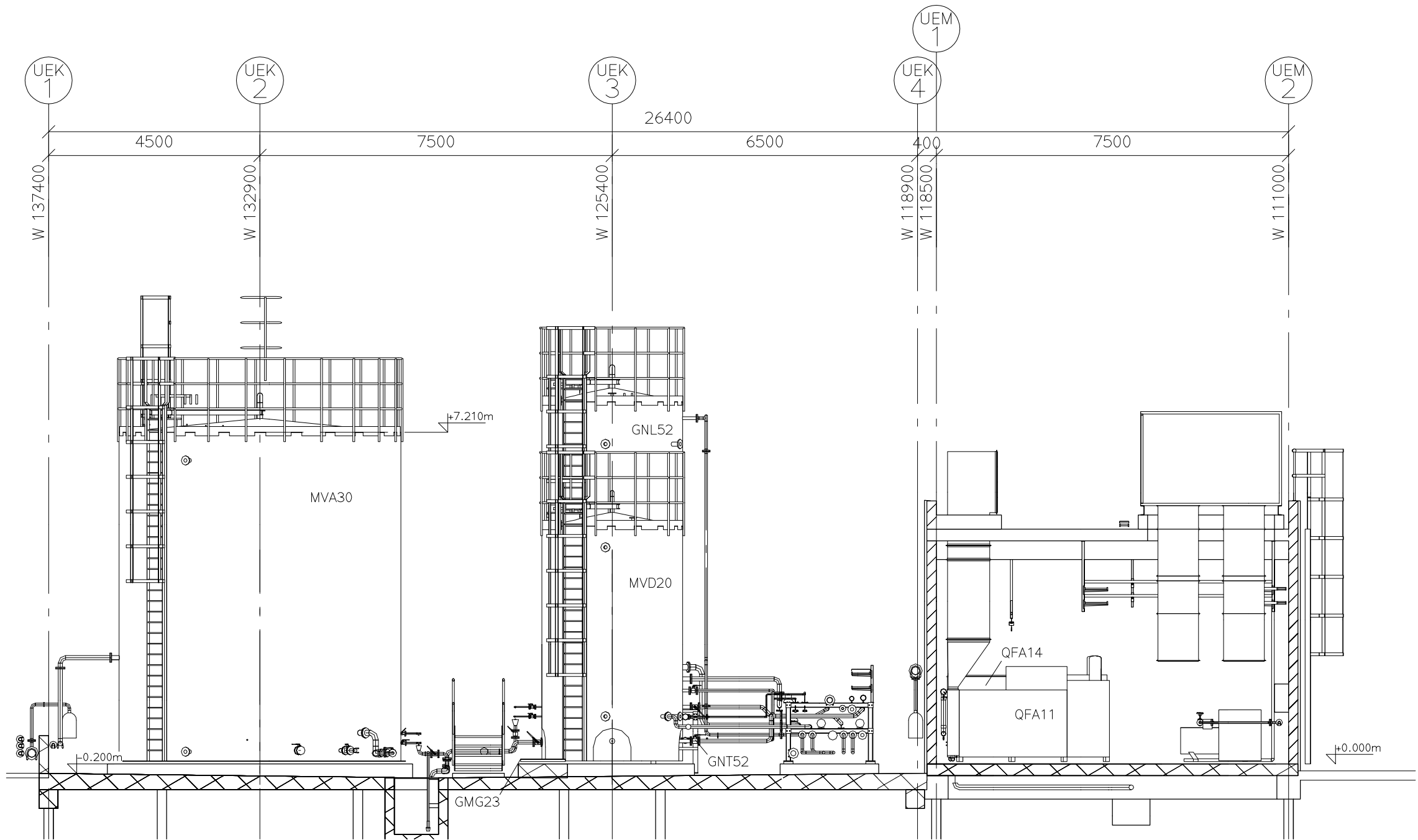


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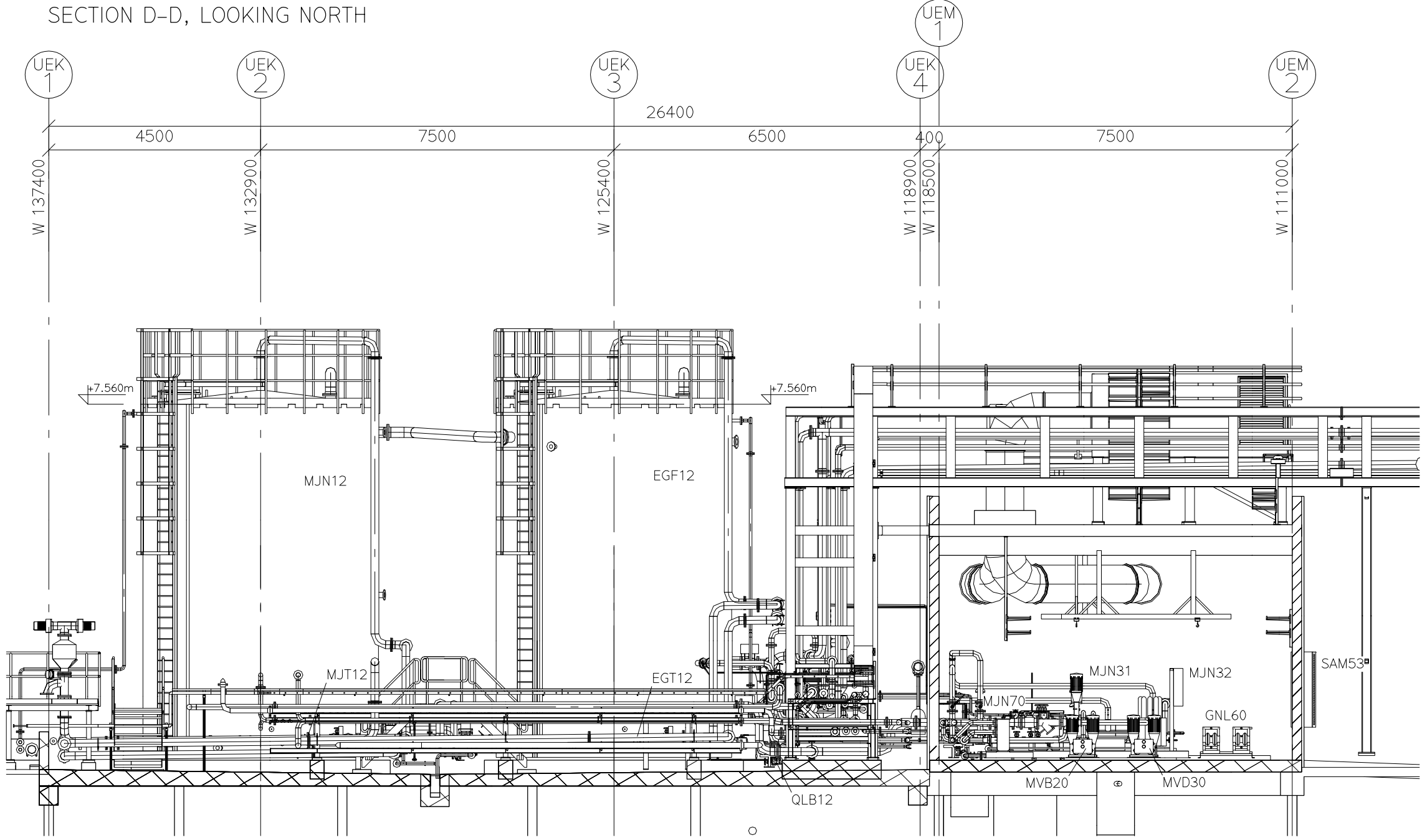
LEGEND:

	TRENCHES & PITS
	PLATFORM

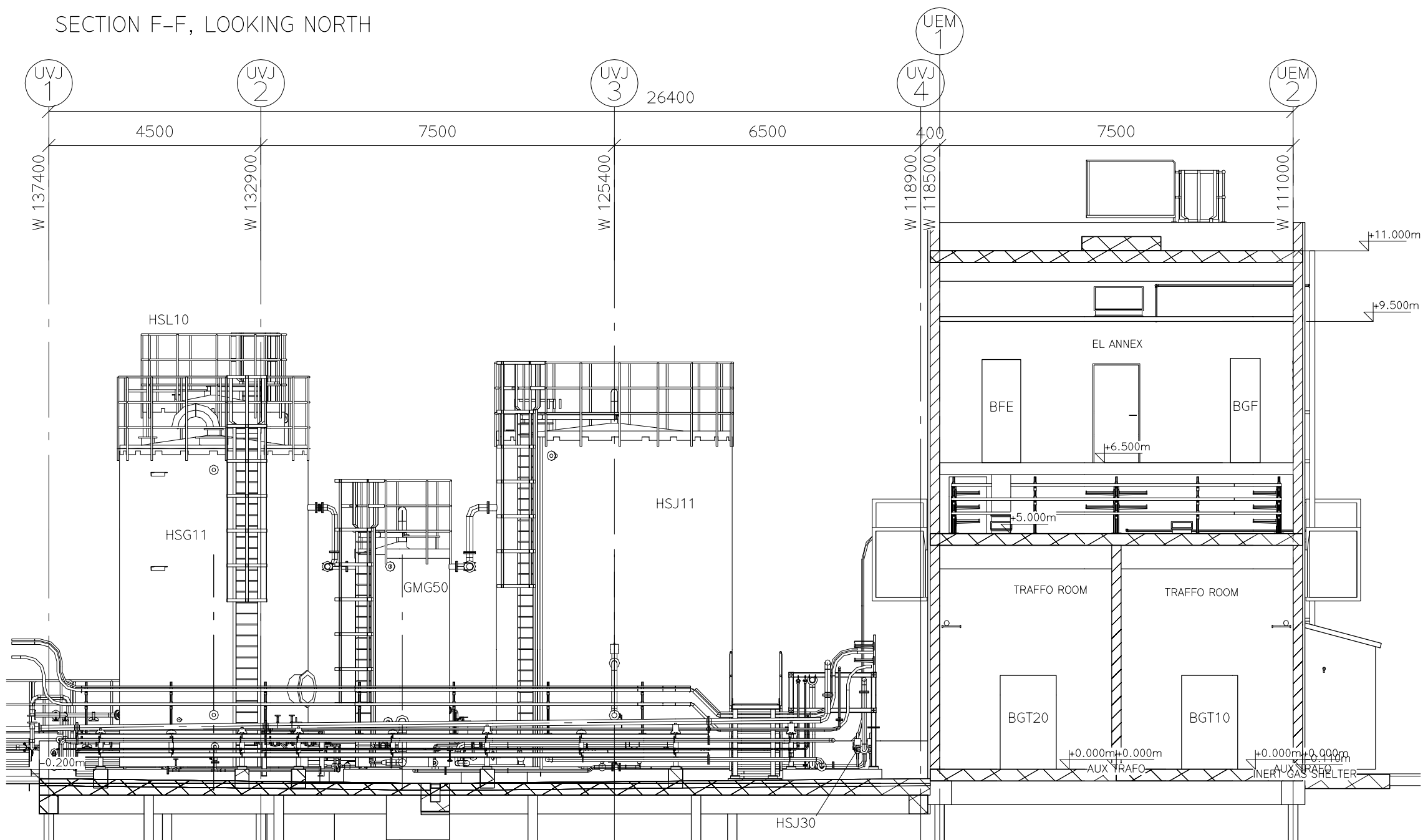
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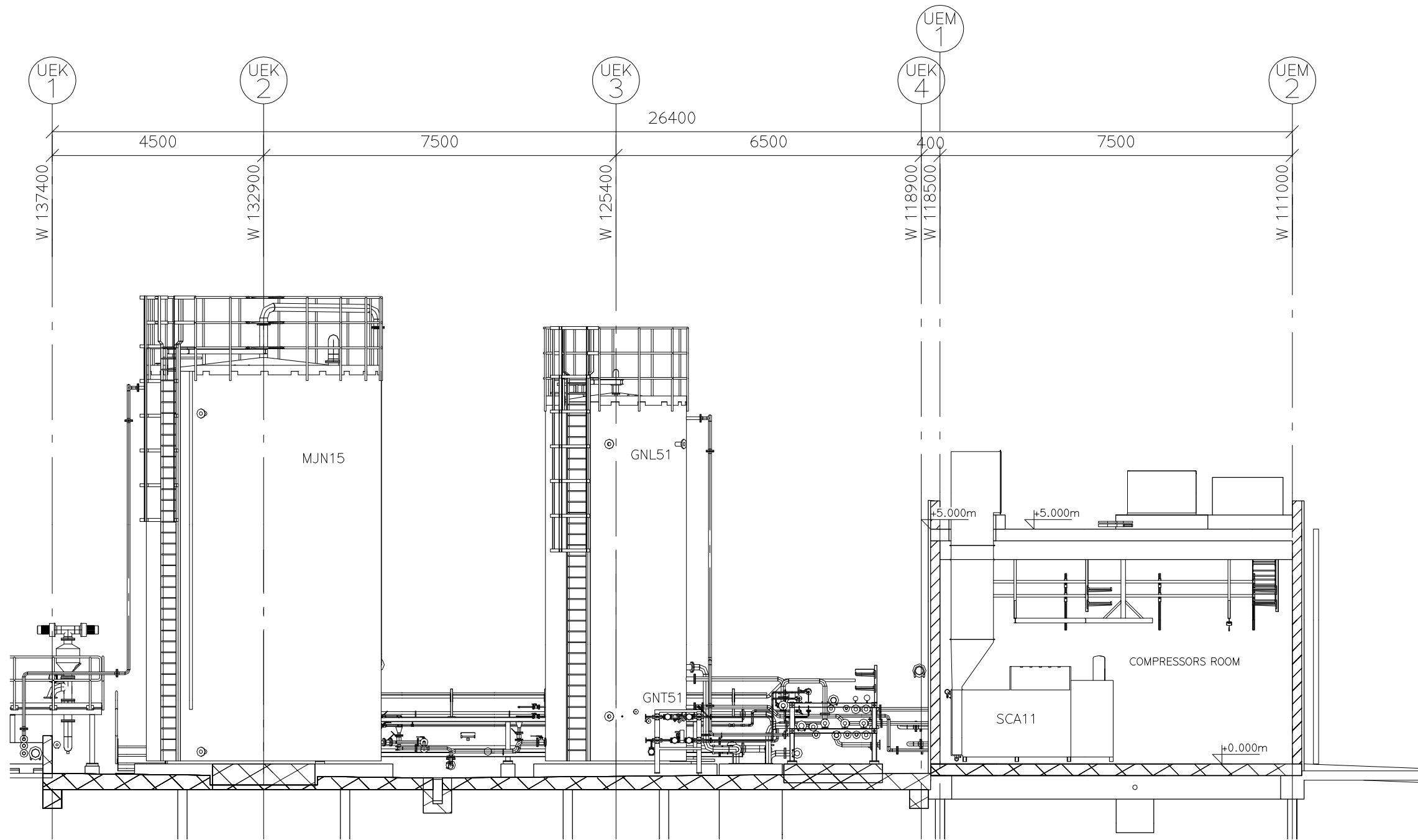
SECTION D-D, LOOKING NORTH



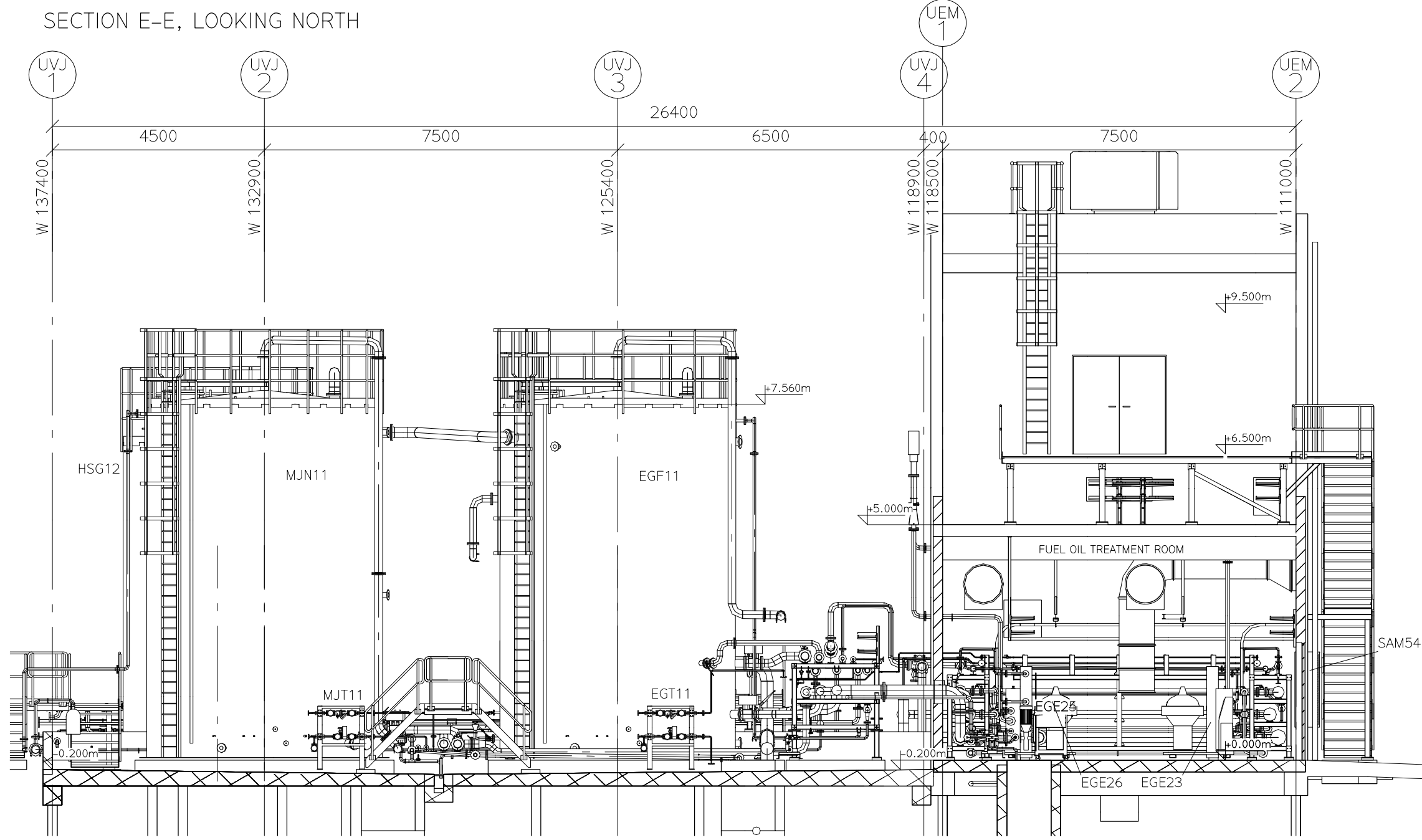
SECTION F-F, LOOKING NORTH



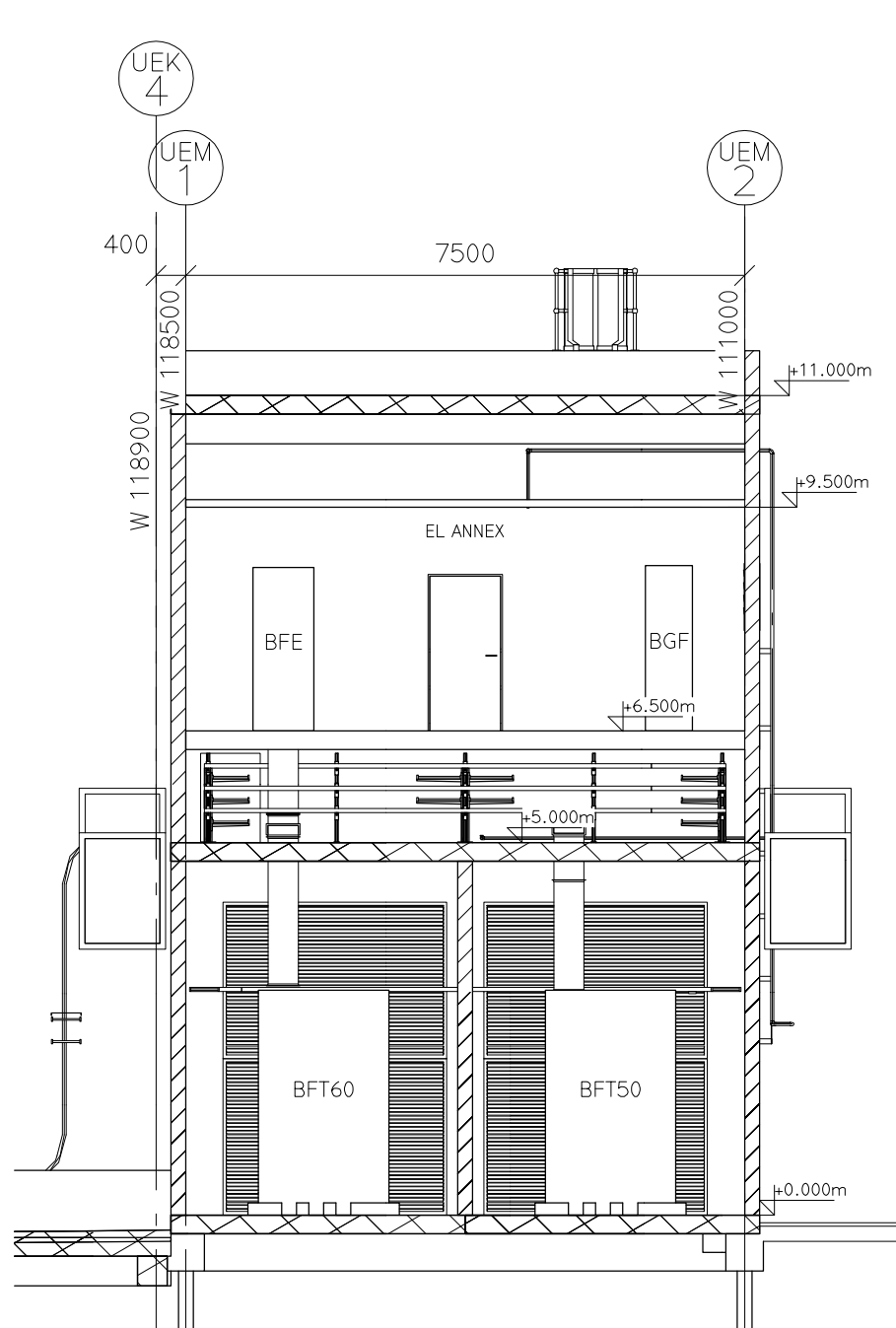
SECTION H-H, LOOKING NORTH



SECTION E-E, LOOKING NORTH



SECTION G-G, LOOKING NORTH



SECTION I-I, LOOKING NORTH

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MECHANICAL EQUIPMENT			WEIGHT
EGT11	STEAM TRAP UNIT, TYPE 2		120 kg
EGE23	FO SEPARATOR NO.3		2080 kg
EGE24	FO SEPARATOR NO.4		2080 kg
EGE25	FO SEPARATOR NO.5		2080 kg
EGE26	FO SEPARATOR NO.6		2080 kg
EGF11	HFO BUFFER TANK NO.1: 125m3 ø5.000mm		156000 kg
EGF12	HFO BUFFER TANK NO.2: 125m3 ø5.000mm		156000 kg
EGT12	STEAM TRAP UNIT, TYPE 2		120 kg
GMG21	FOT BUILDING OILY WATER PUMP UNIT		100 kg
GMG23	SERVICE TF OILY WATER PIT PUMP UNIT		50 kg
GMG50	UREA SPILLAGE TANK		16000 kg
GNL51	SLUDGE STORAGE TANK NO.1		55000 kg
GNL52	SLUDGE STORAGE TANK NO.2		35000 kg
GNL60	SLUDGE TRANSFER PUMP UNIT		100 kg
GNT51	STEAM TRAP UNIT, TYPE 2		120 kg
GNT52	STEAM TRAP UNIT, TYPE 2		120 kg
HSG11	UREA DISSOLVING TANK NO.1		83000 kg
HSG12	UREA DISSOLVING TANK NO.2		83000 kg
HSJ11	UREA STORAGE TANK NO.1		155000 kg
HSJ30	UREA PRESSURE CONTROL UNIT		75 kg
HSL10	DEMINEALIZED WATER TANK		58000 kg
MJN11	HFO SERVICE TANK NO.1: 125m3 ø5.000mm		156000 kg
MJN12	HFO SERVICE TANK NO.2: 125m3 ø5.000mm		156000 kg
MJN15	DO SERVICE TANK: 140m³, D=5.000mm		172000 kg
MJN31	HFO FEEDER PUMP UNIT		3900 kg
MJN32	DO FEEDER PUMP UNIT		850 kg
MJN70	DO FILTER UNIT		300 kg
MJT11	STEAM TRAP UNIT, TYPE 2		120 kg
MJT12	STEAM TRAP UNIT, TYPE 2		120 kg
MVA30	LO STORAGE TANK		208000 kg
MVB20	LO TRANSFER PUMP UNIT		400 kg
MVD20	MAINTENANCE LUBE OIL DRAIN TANK		55000 kg
MVD30	MAINTENANCE LUBE OIL PUMP UNIT		400 kg
QEA13	STARTING AIR COMPRESSOR NO.3 UNIT		1250 kg
QFA11	CONTROL AIR COMPRESSOR NO.1 UNIT		2720 kg
QFA14	CONTROL AIR COMPRESSOR NO.4 UNIT		2720 kg
QLB12	STEAM TRAP UNIT, TYPE 4		60 kg
SAA10	VENTILATION INLET LOUVRE		1500 kg
SAA20	SEPARATOR ROOM EXHAUST UNIT		1000 kg
SAA22	VENTILATION,UAT 42 TRAFQ ROOM		584 kg
SAA23	VENTILATION,UAT 41 TRAFQ ROOM		584 kg
SAM53	INLET LOUVRE		200 kg
SAM54	INLET LOUVRE		200 kg
SCA11	SERVICE AIR COMPRESSOR NO.1 UNIT		2720 kg

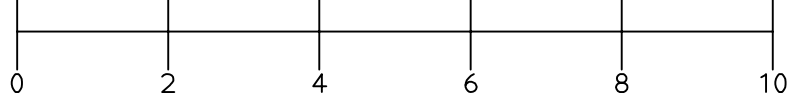
ELECTRICAL EQUIPMENT			WEIGHT
BFE	690 V MAIN SWITCHBOARD 2		9500 kg
BFT50	UNIT AUXILIARY TRANSFORMER UAT45		12535 kg
BFT60	UNIT AUXILIARY TRANSFORMER UAT46		12535 kg
BGF	COMMON/FUEL TREATMENT SWITCHBOARD		4000 kg
BGT10	AUX. TRANSFORMER 41		2055 kg
BGT20	AUX. TRANSFORMER 42		2055 kg
SAA22	VENTILATION,UAT 42 TRAFQ ROOM		584 kg



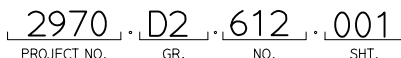

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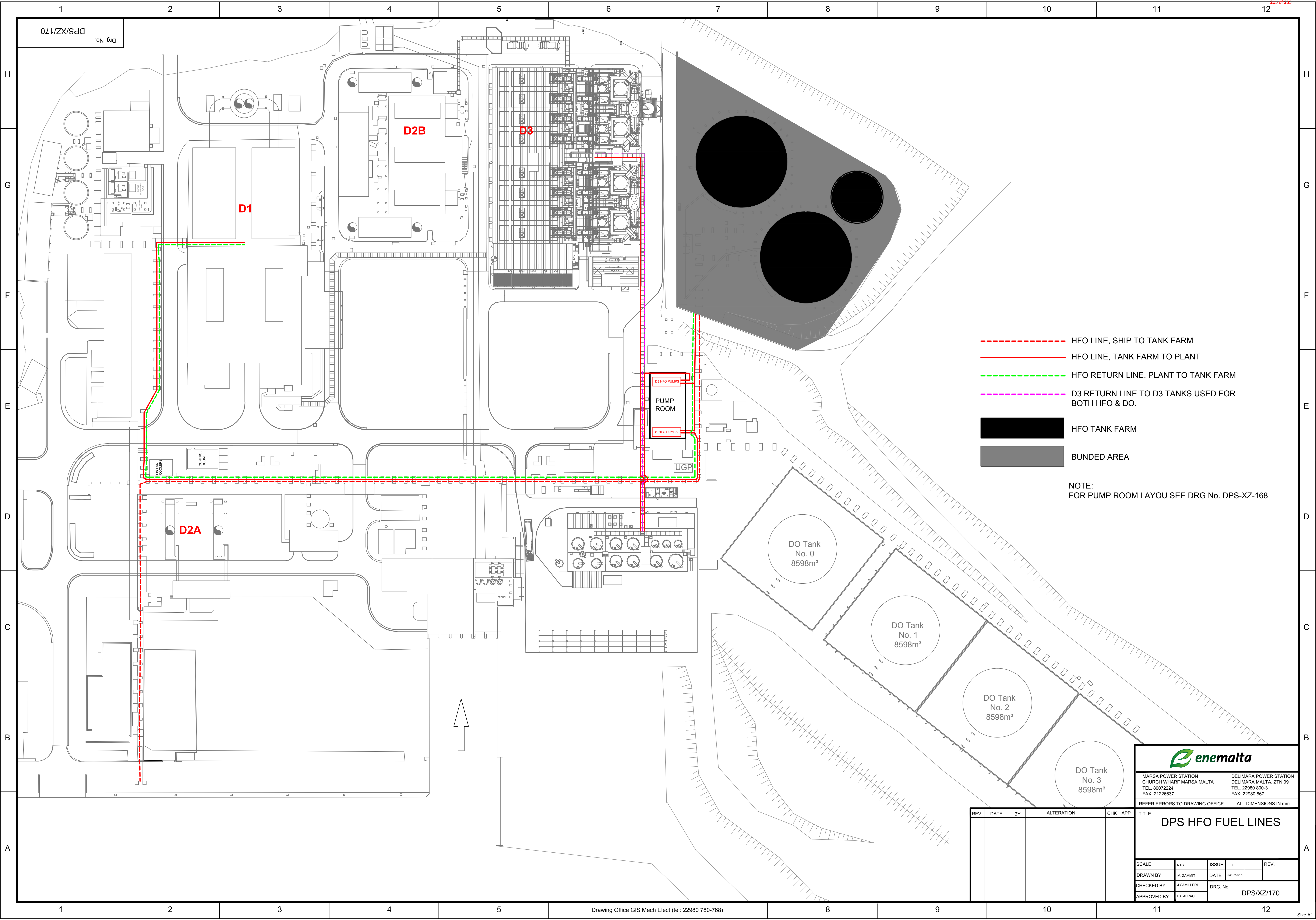
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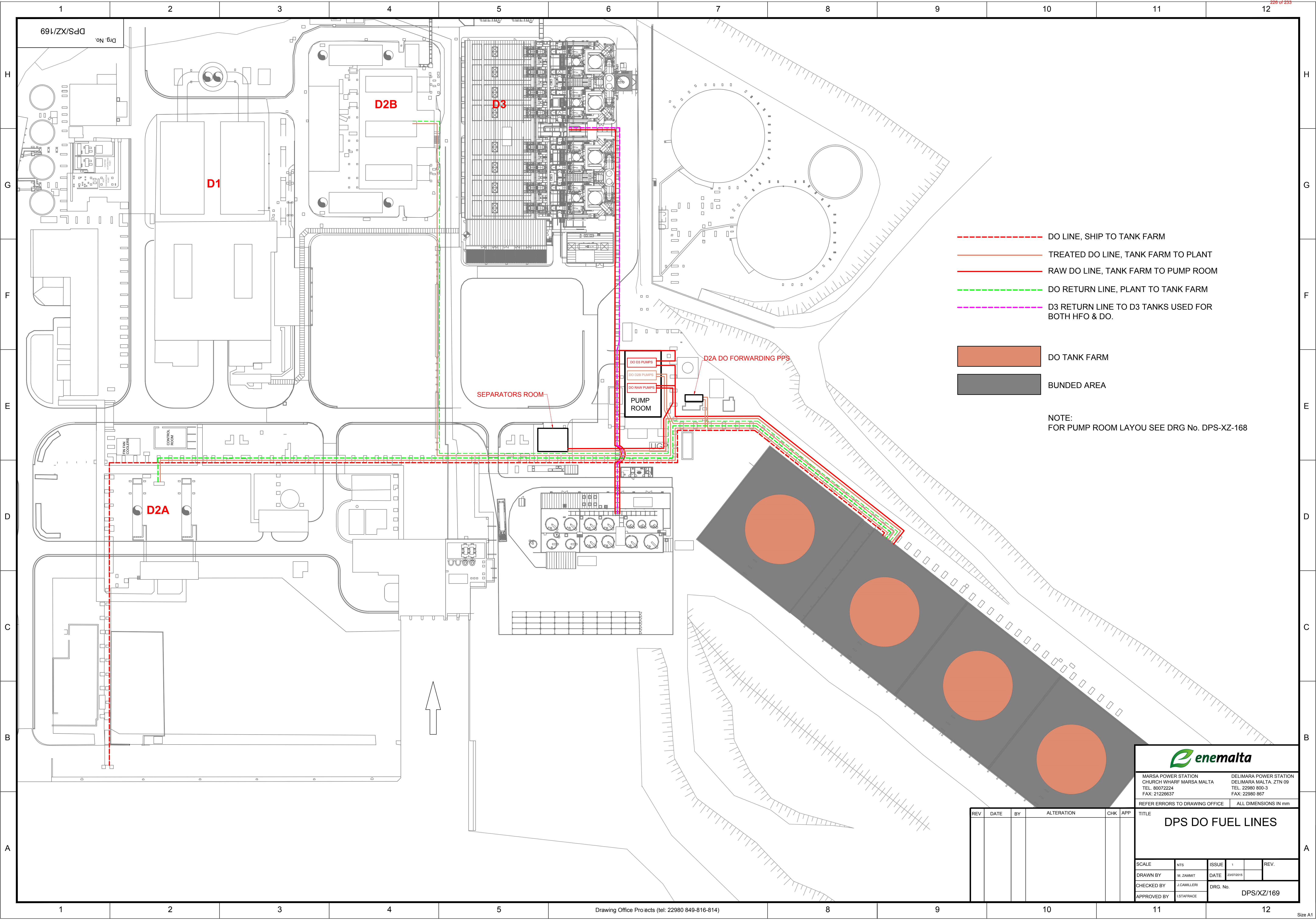
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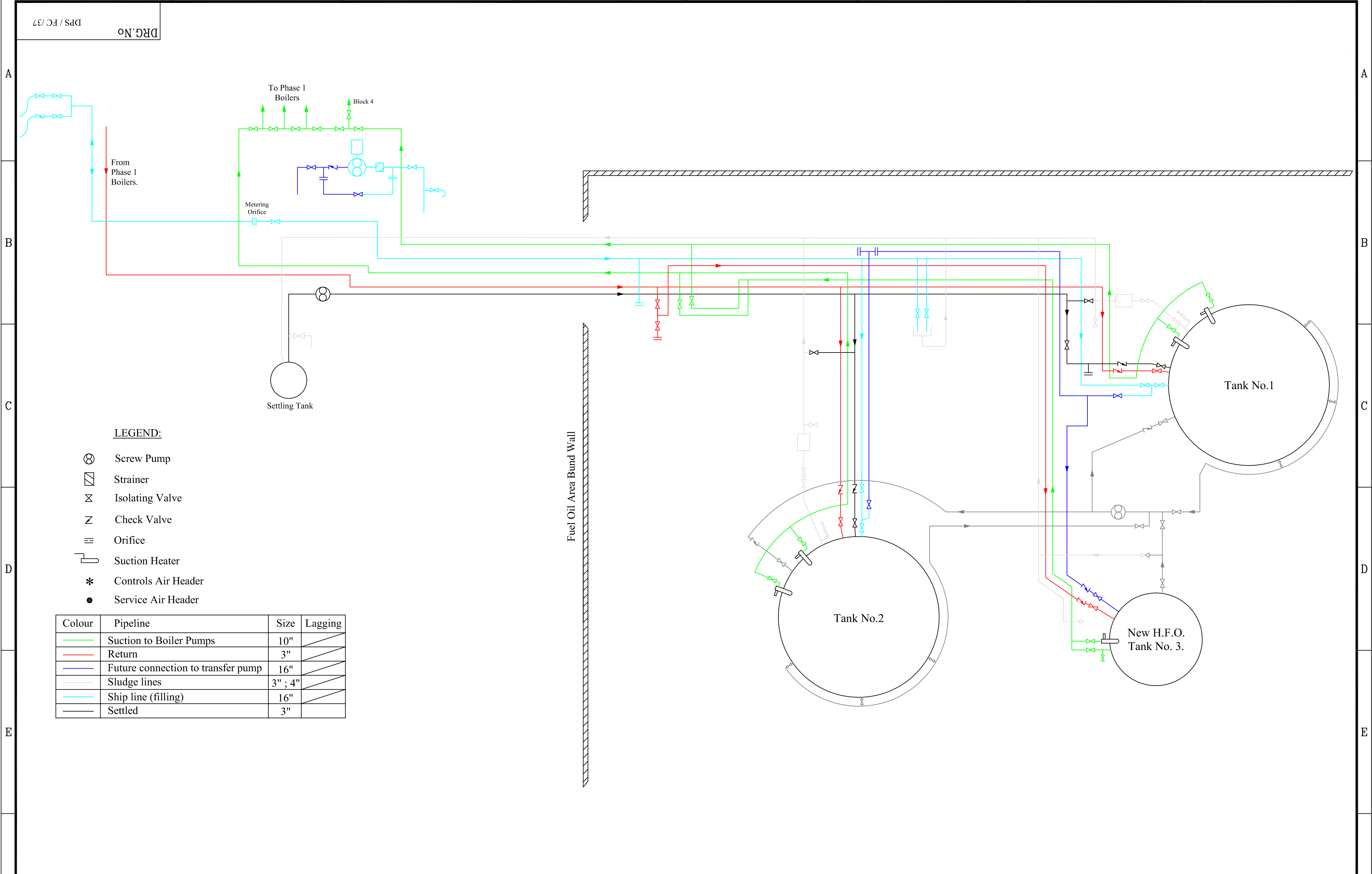
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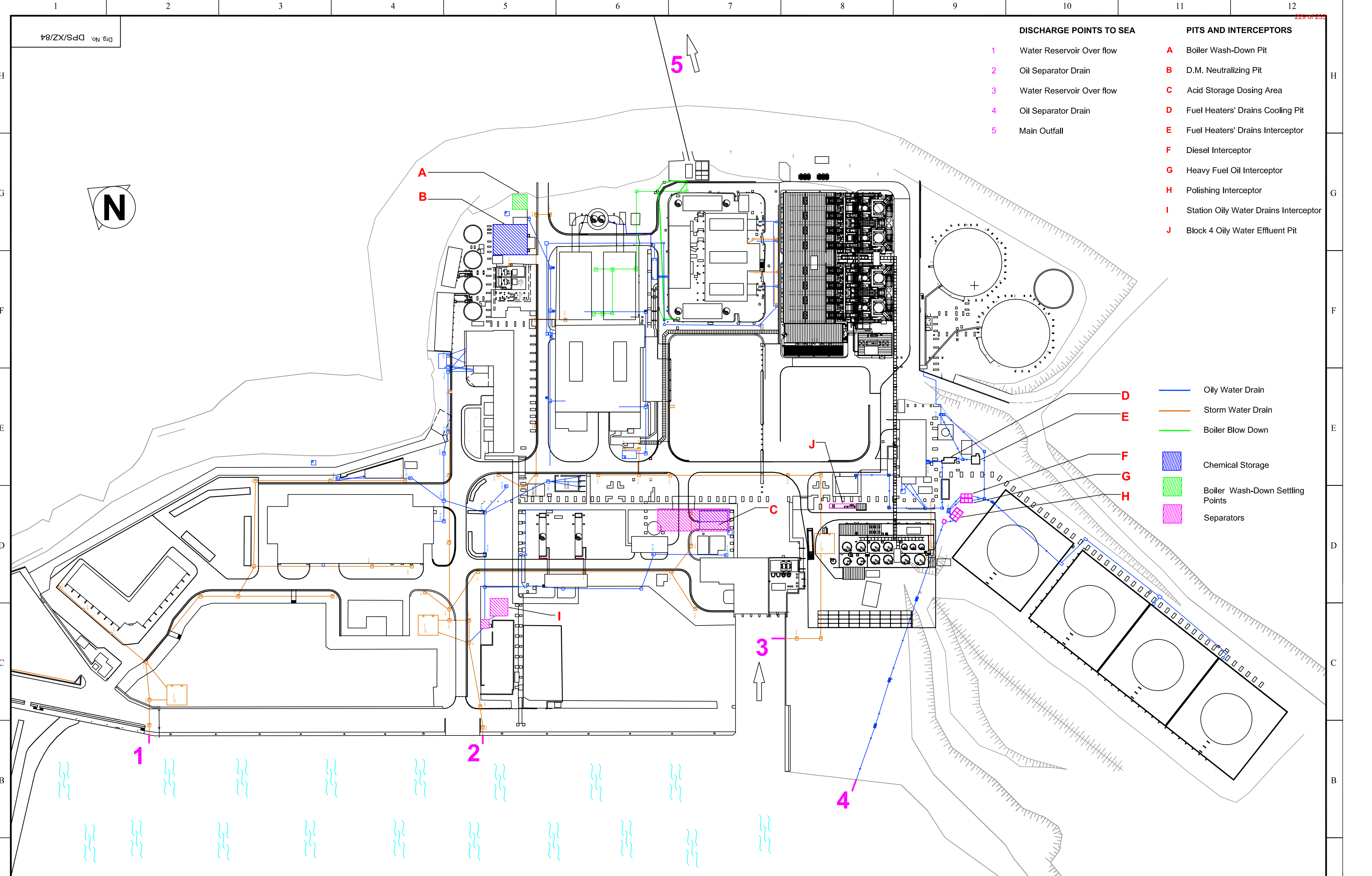
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2	2010.03.19	JAV	JES	CROSS DISCIPLINARY REVIEWED	CHH
1	2010.01.08	JES	JVS	NEW FOT LAYOUT INCL. NEW FIRST FLOOR.	CHH
0	2009.10.30	JES	CHH		JNJ
REV	DATE	DRAWN BY	ISSUED/VERIFIED BY	DESCRIPTION	APPROVED BY
OWNER					
				Enemalta Corporation	
CENTRAL ADMINISTRATION BUILDING CHURCH WARRF, MARSA MRS 1000 MALTA TEL.: +356 2298 0755 FAX: +356 2125 1241					
CONTRACT		DRAWING No.		Sht. No.	REV
				BURMEISTER & WAIN SCANDINAVIAN CONTRACTOR A/S DENMARK	
POST OFFICE BOX 235 DK 3450 ALLERØD, DENMARK TELEPHONE :+45 48140022 TELEFAX :+45 48140150					
PROJECT					
SUBJECT					
FOT BUILDING (UEM), SERVICE T. F. (UEK) & UREA T. F. (UVJ) LAYOUT SECTIONS, LOOKING NORTH					
SCALE		A1=1:100 A3=1:200		DWG. NO. 	
					







Colour	Pipeline	Size	Lagging
	Suction to Boiler Pumps	10"	
	Return	3"	
	Future connection to transfer pump	16"	
	Sludge lines	3" ; 4"	
	Ship line (filling)	16"	
	Settled	3"	



- DISCHARGE POINTS TO SEA**
 - 1 Water Reservoir Over flow
 - 2 Oil Separator Drain
 - 3 Water Reservoir Over flow
 - 4 Oil Separator Drain
 - 5 Main Outfall
- PITS AND INTERCEPTORS**
 - A Boiler Wash-Down Pit
 - B D.M. Neutralizing Pit
 - C Acid Storage Dosing Area
 - D Fuel Heaters' Drains Cooling Pit
 - E Fuel Heaters' Drains Interceptor
 - F Diesel Interceptor
 - G Heavy Fuel Oil Interceptor
 - H Polishing Interceptor
 - I Station Oily Water Drains Interceptor
 - J Block 4 Oily Water Effluent Pit

- Oily Water Drain
 - Storm Water Drain
 - Boiler Blow Down
 - Chemical Storage
 - Boiler Wash-Down Settling Points
 - Separators

MARSA POWER STATION
CHURCH VILAGE MARSA MALTA
TEL. 21223601, 21221907, 21220462
TELEGRAMS: ELPDGA MALTA
TELEX No.: 1735 ENECOR MW, 1942-ENERGY MW
FAX: 21243055, 21232592

DELIMARA POWER STATION
DELIMARA MALTA. ZTN 09
TEL. 21650293/5
FAX: 21663519, 21657449

REFER ERRORS TO DRAWING OFFICE

ALL DIMENSIONS IN MM

**Delimara Power Station
Pits & Interceptors**

REV	DATE	BY	ALTERATION	CHK'D	APP'D
A	16/08/2010	M. Borg	Added Acid Storage and Dosing Area		
B	06/03/2013	M. Borg	Added Block 4, marked Block 4 oily water effluent pit as 11		
C	07/05/2013	M. Borg	Legend modified Nos. from 1-11 changed to A-K _ Added No.5 Main Outfall	C. G	C. A
D	21/03/2014	M. Borg	Pits I & H renamed	C. G	C. A
E	11/04/2014	M. Borg	Waste management area and Turntable added	C.G.	I.S.

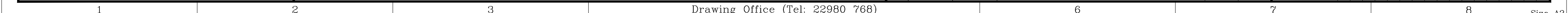
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DRAWN BY CHECKED BY APPROVED BY REVISION	M. Borg C. Busuttill Ing. C. Agius	ISSUE	1		
		DATE	16/11/09		
		DRG. No. DPS/XZ/84			
A	B	C	D	E	

Mechanical Engineering Design Section (tel: 22980 849)

225 of 235

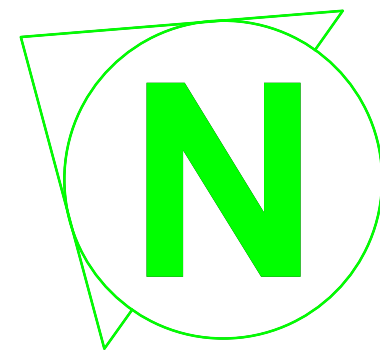


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size A2

Drg. No. DPS-XZ-179



EVAPORATED WATER STORAGE TANKS

DM WATER STORAGE TANKS

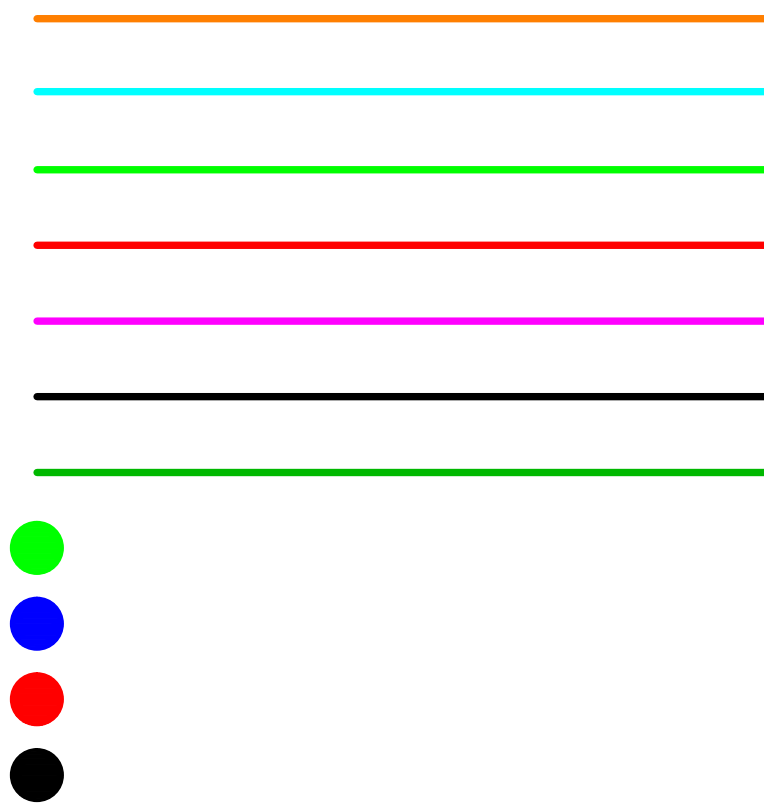
OVERFLOW TO THE SEA

Cast Iron Rising Main Sewer

- TP1.D3 - EVAPORATED WATER TIE IN
- TP2.D3 - DM WATER TIE IN
- TP3.D3 - POTABLE WATER TIE IN
- TP4.D3 - DIESEL OIL TIE IN FROM ENEMALTA STORAGE TANKS
- TP5.D3 - GAS
- TP6.D3 - HFO
- TP7.D3 - INTERNAL FIRE FIGHTING SYSTEM
- TP8.D3 - EXTERNAL FIRE FIGHTING SYSTEM
- TP9.D3 - 3.3kV
- TP10.D3 - 132kV
- TP11.D3 - FOUL WATER TIE IN
- TP12.D3 - STORM WATER TIE IN ENGINE HALL BUILDING & ABATEMENT AREA(ENEMALTA RESERVOIR OVERFLOWING TO SEA OUTFALL)

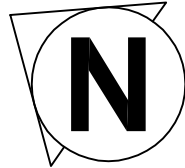
- TP13.D3 - STORM WATER TIE IN FOT AREA (ENEMALTA RESERVOIR OVERFLOWING TO SEA)
- TP14.D3 - OILY WATER TIE IN
- TP15.D3 - 415kV
- TP17.D3 - STEAM TIE IN
- TP18.D3 - SEA WATER OUTLET
- TP19.D3 - SEA WATER INTAKE ANTI-FOULING CHEMICAL INJECTION

- STEAM
- POTABLE WATER
- FOUL WATER
- DIESEL OIL
- OILY WATER
- HV CABLE ROUTE
- FIRE FIGHTING SYSTEM
- INPUT
- OUTPUT
- DISCHARGE
- INACTIVE



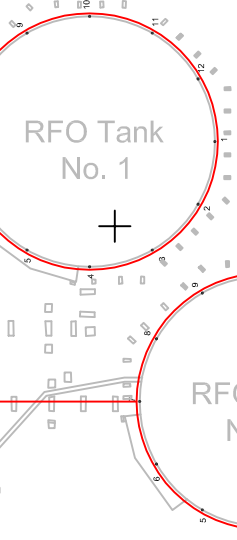
REV	DATE	BY	ALTERATION	CHK	APP
MARSA POWER STATION CHURCH WHARF MARSA MALTA TEL: 80072224 FAX: 21226637			DELIMARA POWER STATION DELIMARA MALTA, ZTN 09 TEL: 22980 800-3 FAX: 22980 867		
REFER ERRORS TO DRAWING OFFICE ALL DIMENSIONS IN mm					
TITLE ROUTES OF ENEMALTA SERVICES TO D3 PG					
SCALE	NTS	ISSUE	1	REV.	
DRAWN BY	A.MANGION	DATE	16/05/2019		
CHECKED BY	D.SAMMUT	DRG. No.	DPS-XZ-179		
APPROVED BY	I.STAFRACE				

Drg. No. DP/PS/XZ/107



5

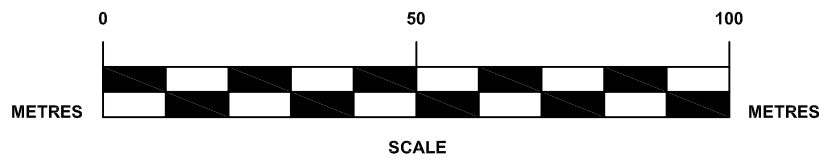
BLOCK 4
(UNDER CONSTRUCTION)



Shut off valve in case of
spillage in container area

Water 5ppm
Hydrocarbon

PLEASE TRACE CABLES IN
THE SHADED AREA



Block 4 Connection to existing services

- A** Storm water connection
- B** Sewage Water
- C** Oily Water Interceptor
- D** Sea Water Out fall
- E** Sea Water Intake

Outlet to sea

- 1** Water Reservoir Over flow
- 2** Oil Separator Drain
- 3** Water Reservoir Over flow
- 4** Oil Separator Drain
- 5** Out fall

Existing services

- Oily Water Pipes
- Sewage Water Pipes
- Storm Water Pipes
- Cooling Water Pipes
- Chemical Drain
- Condensor Drain
- Water main
- Boiler Wash Down
- Fire Fighting

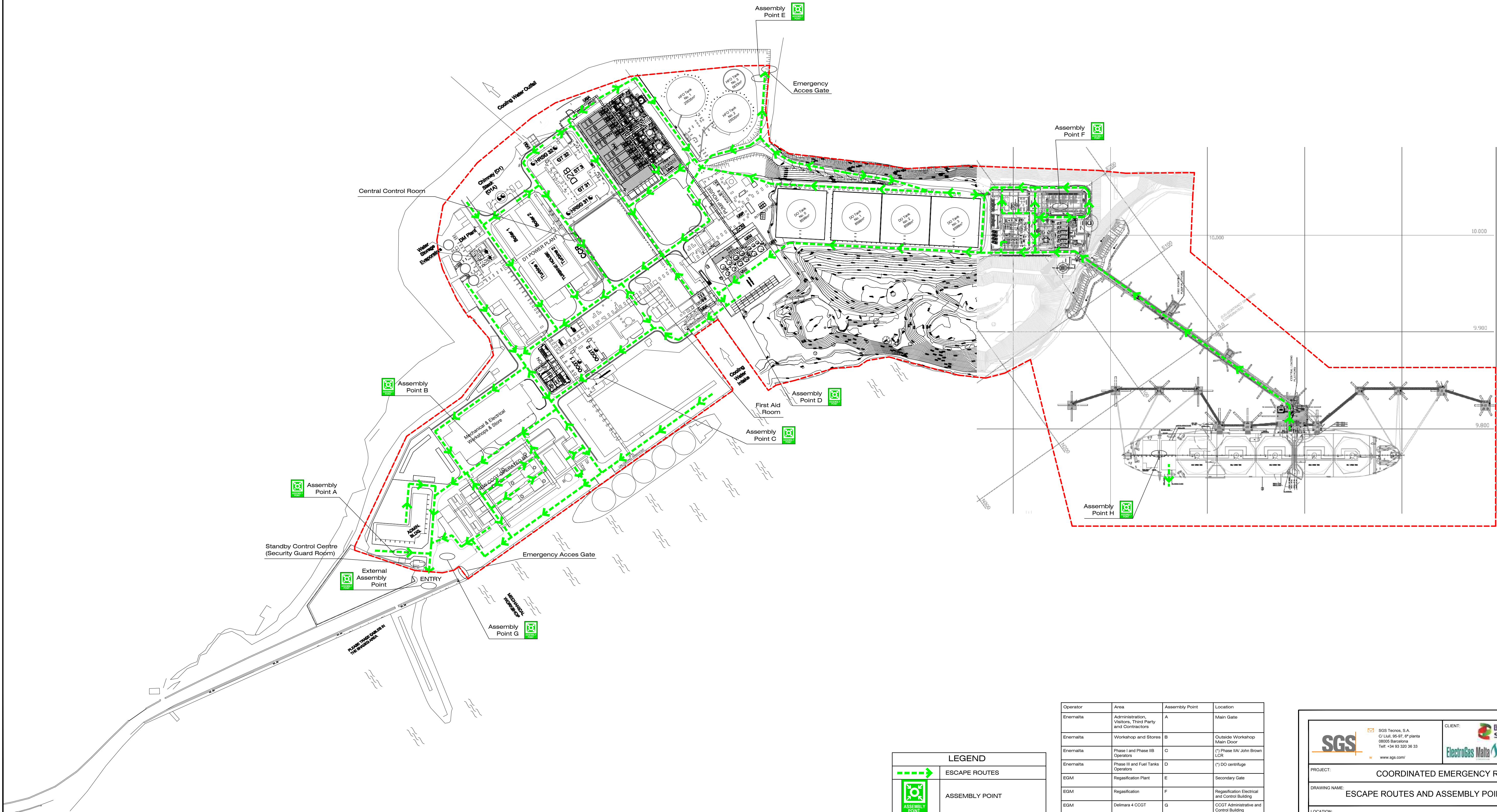
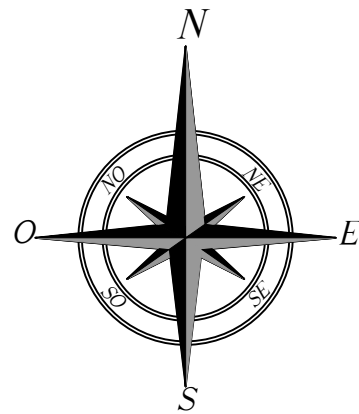
Block 4 services

- Oily Water Pipes
(5ppm Hydrocarbon)
- Oily Water Pipes
- Oil Residue Pipes
- Urea Solution Spillage
- Sewage Water Pipes
- Cooling Water Pipes
- Storm Water Pipes
- Storm Water Culverts

REV	DATE	BY	ALTERATION	CHK	APP
MARSA POWER STATION CHURCH WHARF MARSALA, ZTN 03 TEL: 80072224 FAX: 21226637			DELIMARA POWER STATION DELIMARA MALTA, ZTN 03 TEL: 22980 800-3 FAX: 22980 867		

REFER ERRORS TO DRAWING OFFICE ALL DIMENSIONS IN mm

TITLE Delimara Power Station Services					
SCALE		ISSUE	1	REV.	
DRAWN BY	M. Borg	DATE	08/05/11		
CHECKED BY		DRG. No.			
APPROVED BY	Ing. J. Drago				DPS/XZ/107



LEGEND	
	ESCAPE ROUTES
	ASSEMBLY POINT
	ESTABLISHMENT PERIMETRE

Operator	Area	Assembly Point	Location
Enemalta	Administration, Visitors, Third Party and Contractors	A	Main Gate
Enemalta	Workshop and Stores	B	Outside Workshop Main Door
Enemalta	Phase I and Phase IIB Operators	C	(*) Phase IIA/ John Brown LCR
Enemalta	Phase III and Fuel Tanks Operators	D	(*) DO centrifuge
EGM	Regasification Plant	E	Secondary Gate
EGM	Regasification	F	Regasification Electrical and Control Building
EGM	Delimara 4 CCGT	G	CCGT Administrative and Control Building
EGM	FSU	H	Emergency Boats

(*) Operations staff will report to their area of duty, unless their area is endangered.

		CLIENT: 国家电网 D3发电有限公司 08005 Barcelona Telf: +34 93 320 38 33 www.sgs.com/	
PROJECT: COORDINATED EMERGENCY RESPONSE PLAN		DRAWING: 5	
DRAWING NAME: ESCAPE ROUTES AND ASSEMBLY POINTS		SCALE: DIN A1: 1/2000	
LOCATION: DELIMARA- MALTA		DATE: MAY 2016	
REFERENCE: 02/901/200560		DRAWN BY: JORDI ALVAREZ	