Attachment 10

Marine Discharges to Comply with EU Directive 78/464 & 7 Water Sample Analytical Reports

Marine Discharges to Comply with EU Directive 76/464

Marsa Power Station

Background

Marsa Power Station is a Fossil Fuel Power Station with a total generating capacity of 271MW. It consists of basically eight steam plants, comprising heavy fuel oil fired boilers and conventional steam turbines, and two open cycle diesel fired gas turbines.

Seawater is essential for the plant operation, since it is the prime source of boiler water make-up and hence production of steam to the steam turbines. It is also the main cooling medium for the Steam Turbine Condensers and other heat exchangers.

The main discharges to the marine environment from Marsa Power Station are to the Grand Harbour.

1. Evaporator Discharge
2. Demineralisation Plant Effluent
3. Boiler wash-down
4. Boiler Blow-down
5. Steam Turbine Condenser Outlets
6. Surface Drains comprising:
    6.1. Storm water drains
    6.2. Oily water interceptor
    6.3. Diesel tank bund drain interceptor
    6.4. HFO tank bund drain interceptor
7. Sewage system

1.0 Evaporator Discharge

The Evaporator Plant is the prime source of boiler water make up for generation of steam. It is basically a desalination plant where seawater is distilled. Marsa Power Station owns two Multiple Effect Evaporators. The produced distilled water is then further purified by means of Demineralisation Plants, where cations and anions present in the Evaporator Distilled Water are removed.

1.1 Discharges From Evaporator

The Evaporator Discharge includes:

1. A cooling flow (at about 25ºC above inlet seawater temperature) from the Evaporator Plant Condenser.

2. A concentrated brine blow-down resulting from the evaporating process, and,
3. Annual Discharges due to Evaporator Acid Cleaning, for removal of lime (Calcium Carbonate) deposited on Evaporator Heat Exchanger tubes. ***Sulfamic acid*** together with a proprietary corrosion inhibitor is used for this acid cleaning and the effluent is then neutralized by ***Sodium Hydroxide***, and discharged to sea through the Evaporator Blow-down route.

All the above effluents are discharged to the sea, through the seawater outfall.

1.2 Chemical Dosages Used:

The Evaporator Plant regularly uses only one type of Chemical Dosage, dosed continuously, which is basically an anti-scaling agent. The chemical trade name used is:

1. ***Belgard EV*** (3%) used as an Anti-Scalant,

It is important to note the fact that this is contained in the evaporator brine blow-down.

2.0 Demineralisation Plant Effluent

The Demineralisation plant produces pure water for boiler make-up. The process includes regular regeneration with ***sulphuric acid*** (4%) and ***caustic soda*** (4%).

2.1 Discharges:

The effluents are directed to a neutralizing pit, from which the neutralized effluent is then discharged to the sea together with the evaporator discharge.

3.0 Boiler Wash-down

Boiler Washing is considered to be one of the most essential maintenance procedures in a standard Power Station maintenance practice. The procedure essentially involves the washing of the deposits on both Furnace Water Tubes and the Gas Air Heater. The layer of deposits normally includes Magnesium Vanadate Oxide (MgO is dosed with the heavy fuel oil to prevent the formation of Vanadium Oxide on the boiler furnace sides). Generally, Vanadium is present as an impurity in Residual Heavy Fuel Oils, and a ***magnesium oxide*** (MgO), ***FireMag/PentoMag 2000***, is used to prevent the formation of Vanadium Oxide which is a very hard oxide on the furnace walls. An emulsifier, ***Fuelsolv PEP990***, is also used to improve combustion performance and reduce particulate emissions. Other expected contaminants are sulphur due to the percentage sulphur content in the fuel, and soot formed due to combustion of heavy fuel oil which is normally vented of by means of soot blowers located in different furnace locations. The effluent is transported to Delimara Power Station where it is allowed to settle, either with the

assistance of a flocculant or naturally and the water is neutralized prior to discharge to the sea at the seawater outfall.

3.1 Expected Contaminants in Boiler Washdown:

Typical contaminants and analysis results obtained after a boiler washdown, where the effluent is neutralized with ***sodium hydroxide***, NaOH to pH 7.5, and a flocculating agent has been added.

Filtrate Analysis
Boiler Washdown effluent

Description	mg/l
Sodium	370
Potassium	2.1
Magnesium	830
Calcium	69
Strontium	1.2
Barium	0.8
Iron	3340
Manganese	32
Chromium	2.1
Nickel	203
Vanadium	320
Aluminium	53
Zinc	17
Copper	4.1
Silicon	26
Sulphur	3460

The quantity discharged annually is about 1000m^3.

4.0 Boiler Blow Down

Boiler Blow down is considered to be an essential part of boiler operation, and involves the shot or continuous discharge of boiler water to a flashing vessel, the object of which is to keep the amount of dissolved and or suspended solids in boiler water within safe levels. High levels of dissolved and suspended solids are detrimental to boiler operation. The boiler blowdown is discharged to the sea.

It is normal Boiler water chemistry procedure to dose the boiler water with a mixture of ***Tri sodium phosphate*** and ***Sodium Hydroxide*** in order to obtain the necessary Ph level of Boiler water to help in the formation of magnetite to limit boiler corrosion.

Typical boiler blow down analysis depends on the amount of chemical dosing, dosed to the boiler. Expected contaminants are SiO_2, PO_4, NaOH present as OH ions, minimal traces of Cu and Fe which are mainly present due to corrosion.

Typical Boiler Water Analysis

Description	ppm
SiO2	1
PO4	1.5

The typical pH is 9.8.

5.0 Steam Turbine Condenser Outlets

As previously mentioned seawater is also used as a major source of cooling fluid, due to its availability. In Marsa Power Station, seawater is mostly used as a coolant for the Steam Turbine Condensers, of which each turbine condenser has two seawater inlets and outlets. The total seawater intake is approximately 40,000m^3/hr, where the outlet temperature is approximately 10ºC higher than the seawater intake temperature. The cooling water is taken and discharged back from/to the harbour.

5.1 Chemical Dosing Employed

The Sea Water Intake is initially dosed with a biocide whose main function is to prevent both marine organism (macro fouling) and biofilm growth (micro fouling) in the seawater piping and condenser heat exchanger tubes.

The dosage regime varies widely depending on the type of biocide used. Currently at the Marsa Power Station, Enemalta makes use of Chlorine Dioxide: Chlorine Dioxide is produced in situ under water by the measured mixing of ***Biocaf 1320*** and ***Sulphuric acid***.

Dosing is usually carried out three times daily, and the maximum typical residual at condenser outlet is less than 0.2 mg/m^3.

6.0 Surface Drains

The surface water drainage system at Marsa Power Station may be considered to comprise two main systems. One of these is storm water which is drained directly to the harbor. The other system collects storm or wash water from drains in areas where oil spillages are likely.

6.1 Storm Water Drains

The storm water from the roofs of the station buildings is drained to the sea. Some of the water is collected into tanks, where it is used for boiler washing during boiler overhauls.

6.2 Oily Water Drains

The surface drains in the main steam turbine hall and under the boiler plant are considered to be oily water drains, due to the possibility that oil spillages (expected to be minor), will also be washed into the drains. This oily water system discharges to the sea through an interceptor, which is routinely checked and maintained. The oil collected in the interceptor is skimmed off, and disposed of safely.

6.3 Diesel Tank Bund Area Drain

The Diesel storage tank is located in individual bund, which has sufficient free volume to contain the entire contents of the tank, in the event of a major spillage. The bund area is drained manually, after each rainfall, through a valve located outside the bund walls. This valve is routinely kept locked closed. The surface drain from the bund passes through a dedicated interceptor prior to discharge to the sea. The interceptor is routinely checked and maintained. The oily residue collected in the interceptor is skimmed off and disposed of safely.

6.4 HFO Tank Bund Area Drains

The HFO storage tanks are either located in a common or a dedicated bund, which has sufficient free volume to contain the entire contents of one or two tanks, in the event of a major spillage. The bund area is drained manually, after each rainfall, through a valve, which although located within the bund walls, is operated from outside the bund. This valve is routinely kept locked closed. The surface water drained from the bund is passed through an interceptor prior to discharge to the sea. The interceptor is routinely checked and maintained. The oily residue collected in the interceptor is skimmed off and disposed of safely.

7.0 Sewage system overflow

Foul water drains in the station buildings is connected to the main local sewage system.

Conclusions

The main marine discharge points are three, which are the discharge from the turbine units with an average flow of 40,000 m^3/hr. Other outlets are those from oil interceptors. In all there are seven main outlets. These discharge point are routinely monitored, as part of the operation of the plant.

Appendix A

Chemicals Used and Stored at Marsa Power Station

Description of Chemical Stored	Annual Consumption
Fuel Oil Additive MgO (in gas oil)	100,000 kg
Fuel Oil additive (PEP990)	40,000 kg
Sodium Hydroxide	10,000 kg
Sodium Bicarbonate[1]	1,000 kg
Oxygen Scavenger CORTROL[2]	10,000 kg
Tri Sodium Phosphate	750 kg
Belgard EV	9,000 kg
Sulphuric Acid (98%)	30,000 kg
Sulfamic Acid	500 kg
Biocaf 1320	90,000 kg

[1] Sodium bicarbonate is stocked for emergency to help neutralise the acid in the eventuality of an acid spill.
[2] Cortrol OS5009 is used an oxygen scavenger in feedwater to boilers.

ANALYTICAL REPORT

ID. Number	:	**0504018**	**Date: 19 - May - 2006**
PURCHASER	:	The Chairman Enemalta Corporation	
ADDRESS	:	Central Administration Building - CHURCH Wharf, Marsa HMR 01 MALTA	
SAMPLE	:	**Water - Sample N° 5 BOILER BLOW DOWN OUTLET**	
Samping date	:	**04 - May - 2006**	
Start of analyses	:	**04 - May - 2006**	**End of analyses: 19 - May - 2006**

PARAMETERS	UNIT OF MEASURE	RESULTS	ANALYTICAL MATHOD
BOD5	mg/l	22,6	APAT-CNR-IRSA M. 5120 Man. 29/2003
COD	mg/l	52	APAT-CNR-IRSA M. 5130 Man. 29/2003
Fluorides	µg/l	500	UNICHIM 876
Total Kjedahl Nitrogen	mg/l	<1	APAT-CNR-IRSA M. 5030 Man. 29/2003
Total Phophorus	mg/l	0,08	UNICHIM 876
Total Suspended Solids	mg/l	<0,05	APAT-CNR-IRSA M. 2090 Man. 29/2003
Benzene	µg/l	<0,1	EPA 8260
Ethylbenezene	µg/l	<0,1	EPA 8260
o-m-p Xilene	µg/l	<0,1	EPA 8260
Toluene	µg/l	<0,1	EPA 8260
CHLORINATED			
1,2,3 Trichlorobenzene	µg/l	<0,1	EPA 8260
1,2,4 Trichlorobenzene	µg/l	<0,1	EPA 8260
Hexachlorobenzene	µg/l	<0,1	EPA 8260
Hexachlorobutadiene	µg/l	<0,1	EPA 8260
1,2 Dichloroethane	µg/l	<0,1	EPA 8260
Trichloroethylene	µg/l	<0,1	EPA 8260
Chloroform	µg/l	<0,1	EPA 8260
Carbon Tetrachloride	µg/l	<0,1	EPA 8260
Tetrachloroethylene	µg/l	<0,1	EPA 8260
Pentachlorophenol	µg/l	<0,1	EPA 8260
HYDROCARBONS			
Hydrocarbons <C8	µg/l	<10	EPA 8015
Hydrocarbons (C8 to C32)	µg/l	<10	EPA 8015
METALS			
Arsenic	µg/l	<1	EPA 7060 A
Cadmium	µg/l	<0,6	APAT-CNR-IRSA M. 3120 B Man 29/2003
Chromium	µg/l	<0,6	APAT-CNR-IRSA M. 3150 B1 Man 29/2003
Copper	µg/l	<0,6	APAT-CNR-IRSA M. 3250 B Man 29/2003
Lead	µg/l	<1	EPA 3010 A 1992 +7421 1986
Mercury	µg/l	<0,5	EPA 7473
Nickel	µg/l	<1	APAT-CNR-IRSA M. 3220 B Man 29/2003
Silver	µg/l	<0,2	EPA 200.8
Tin	µg/l	<3	APAT-CNR-IRSA M. 3280 Man 29/2003
Zinc	µg/l	<5	EPA 7950

The results refer to the sample as received
n.r. = not detected

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ANALYTICAL REPORT

ID. Number	:	**0504019** **Date: 19 - May - 2006**
PURCHASER	:	The Chairman Enemalta Corporation
ADDRESS	:	Central Administration Building - CHURCH Wharf, Marsa HMR 01 MALTA
SAMPLE	:	**Water - Sample N° 6 BRINE OUTLET**
Samping date	:	**04 - May - 2006**
Start of analyses	:	**04 - May - 2006** **End of analyses: 19 - May - 2006**

PARAMETERS	UNIT OF MEASURE	RESULTS	ANALYTICAL MATHOD
BOD5	mg/l	10,4	APAT-CNR-IRSA M. 5120 Man. 29/2003
COD	mg/l	24	APAT-CNR-IRSA M. 5130 Man. 29/2003
Fluorides	µg/l	<20	UNICHIM 876
Total Kjedahl Nitrogen	mg/l	<1	APAT-CNR-IRSA M. 5030 Man. 29/2003
Total Phophorus	mg/l	<0,05	UNICHIM 876
Total Suspended Solids	mg/l	<0,05	APAT-CNR-IRSA M. 2090 Man. 29/2003
Benzene	µg/l	<0,1	EPA 8260
Ethylbenezene	µg/l	<0,1	EPA 8260
o-m-p Xilene	µg/l	<0,1	EPA 8260
Toluene	µg/l	<0,1	EPA 8260
CHLORINATED			
1,2,3 Trichlorobenzene	µg/l	<0,1	EPA 8260
1,2,4 Trichlorobenzene	µg/l	<0,1	EPA 8260
Hexachlorobenzene	µg/l	<0,1	EPA 8260
Hexachlorobutadiene	µg/l	<0,1	EPA 8260
1,2 Dichloroethane	µg/l	<0,1	EPA 8260
Trichloroethylene	µg/l	<0,1	EPA 8260
Chloroform	µg/l	<0,1	EPA 8260
Carbon Tetrachloride	µg/l	<0,1	EPA 8260
Tetrachloroethylene	µg/l	<0,1	EPA 8260
Pentachlorophenol	µg/l	<0,1	EPA 8260
HYDROCARBONS			
Hydrocarbons <C8	µg/l	<10	EPA 8015
Hydrocarbons (C8 to C32)	µg/l	<10	EPA 8015
METALS			
Arsenic	µg/l	<1	EPA 7060 A
Cadmium	µg/l	<0,6	APAT-CNR-IRSA M. 3120 B Man 29/2003
Chromium	µg/l	<0,6	APAT-CNR-IRSA M. 3150 B1 Man 29/2003
Copper	µg/l	<0,6	APAT-CNR-IRSA M. 3250 B Man 29/2003
Lead	µg/l	<1	EPA 3010 A 1992 +7421 1986
Mercury	µg/l	<0,5	EPA 7473
Nickel	µg/l	<1	APAT-CNR-IRSA M. 3220 B Man 29/2003
Silver	µg/l	<0,2	EPA 200.8
Tin	µg/l	<3	APAT-CNR-IRSA M. 3280 Man 29/2003
Zinc	µg/l	<5	EPA 7950

The results refer to the sample as received

n.r. = not detected

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ANALYTICAL REPORT

ID. Number	:	**0504020** **Date: 19 - May - 2006**
PURCHASER	:	The Chairman Enemalta Corporation
ADDRESS	:	Central Administration Building - CHURCH Wharf, Marsa HMR 01 MALTA
SAMPLE	:	**Water - Sample N° 7 DRAINS TANK - DEMIN PLANT DISCHERGE**
Samping date	:	**04 - May - 2006**
Start of analyses	:	**04 - May - 2006** **End of analyses: 19 - May - 2006**

PARAMETERS	UNIT OF MEASURE	RESULTS	ANALYTICAL MATHOD
BOD5	mg/l	38,6	APAT-CNR-IRSA M. 5120 Man. 29/2003
COD	mg/l	88,8	APAT-CNR-IRSA M. 5130 Man. 29/2003
Fluorides	µg/l	<20	UNICHIM 876
Total Kjedahl Nitrogen	mg/l	11,2	APAT-CNR-IRSA M. 5030 Man. 29/2003
Total Phophorus	mg/l	<0,05	UNICHIM 876
Total Suspended Solids	mg/l	<0,05	APAT-CNR-IRSA M. 2090 Man. 29/2003
Benzene	µg/l	<0,1	EPA 8260
Ethylbenezene	µg/l	<0,1	EPA 8260
o-m-p Xilene	µg/l	<0,1	EPA 8260
Toluene	µg/l	<0,1	EPA 8260
CHLORINATED			
1,2,3 Trichlorobenzene	µg/l	<0,1	EPA 8260
1,2,4 Trichlorobenzene	µg/l	<0,1	EPA 8260
Hexachlorobenzene	µg/l	<0,1	EPA 8260
Hexachlorobutadiene	µg/l	<0,1	EPA 8260
1,2 Dichloroethane	µg/l	<0,1	EPA 8260
Trichloroethylene	µg/l	<0,1	EPA 8260
Chloroform	µg/l	<0,1	EPA 8260
Carbon Tetrachloride	µg/l	<0,1	EPA 8260
Tetrachloroethylene	µg/l	<0,1	EPA 8260
Pentachlorophenol	µg/l	<0,1	EPA 8260
HYDROCARBONS			
Hydrocarbons <C8	µg/l	<10	EPA 8015
Hydrocarbons (C8 to C32)	µg/l	<10	EPA 8015
METALS			
Arsenic	µg/l	<1	EPA 7060 A
Cadmium	µg/l	<0,6	APAT-CNR-IRSA M. 3120 B Man 29/2003
Chromium	µg/l	<0,6	APAT-CNR-IRSA M. 3150 B1 Man 29/2003
Copper	µg/l	<0,6	APAT-CNR-IRSA M. 3250 B Man 29/2003
Lead	µg/l	<1	EPA 3010 A 1992 +7421 1986
Mercury	µg/l	<0,5	EPA 7473
Nickel	µg/l	<1	APAT-CNR-IRSA M. 3220 B Man 29/2003
Silver	µg/l	<0,2	EPA 200.8
Tin	µg/l	<3	APAT-CNR-IRSA M. 3280 Man 29/2003
Zinc	µg/l	<5	EPA 7950

The results refer to the sample as received
n.r. = not detected

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ANALISI - ALIMENTI - AMBIENTE

ANALYTICAL REPORT

ID. Number	:	**0504014** **Date: 19 - May - 2006**
PURCHASER	:	The Chairman Enemalta Corporation
ADDRESS	:	Central Administration Building - CHURCH Wharf, Marsa HMR 01 MALTA
SAMPLE	:	**Water - Sample N° 1 SEA WATER BLANK**
Samping date	:	**04 - May - 2006**
Start of analyses	:	**04 - May - 2006** **End of analyses: 19 - May - 2006**

PARAMETERS	UNIT OF MEASURE	RESULTS	ANALYTICAL MATHOD
BOD5	mg/l	12,5	APAT-CNR-IRSA M. 5120 Man. 29/2003
COD	mg/l	28,7	APAT-CNR-IRSA M. 5130 Man. 29/2003
Fluorides	µg/l	250	UNICHIM 876
Total Kjedahl Nitrogen	mg/l	5,8	APAT-CNR-IRSA M. 5030 Man. 29/2003
Total Phophorus	mg/l	<0,05	UNICHIM 876
Total Suspended Solids	mg/l	<0,05	APAT-CNR-IRSA M. 2090 Man. 29/2003
Benzene	µg/l	<0,1	EPA 8260
Ethylbenezene	µg/l	<0,1	EPA 8260
o-m-p Xilene	µg/l	<0,1	EPA 8260
Toluene	µg/l	<0,1	EPA 8260
CHLORINATED			
1,2,3 Trichlorobenzene	µg/l	<0,1	EPA 8260
1,2,4 Trichlorobenzene	µg/l	<0,1	EPA 8260
Hexachlorobenzene	µg/l	<0,1	EPA 8260
Hexachlorobutadiene	µg/l	<0,1	EPA 8260
1,2 Dichloroethane	µg/l	<0,1	EPA 8260
Trichloroethylene	µg/l	<0,1	EPA 8260
Chloroform	µg/l	<0,1	EPA 8260
Carbon Tetrachloride	µg/l	<0,1	EPA 8260
Tetrachloroethylene	µg/l	<0,1	EPA 8260
Pentachlorophenol	µg/l	<0,1	EPA 8260
HYDROCARBONS			
Hydrocarbons <C8	µg/l	<10	EPA 8015
Hydrocarbons (C8 to C32)	µg/l	<10	EPA 8015
METALS			
Arsenic	µg/l	<1	EPA 7060 A
Cadmium	µg/l	<0,6	APAT-CNR-IRSA M. 3120 B Man 29/2003
Chromium	µg/l	<0,6	APAT-CNR-IRSA M. 3150 B1 Man 29/2003
Copper	µg/l	<0,6	APAT-CNR-IRSA M. 3250 B Man 29/2003
Lead	µg/l	<1	EPA 3010 A 1992 +7421 1986
Mercury	µg/l	<0,5	EPA 7473
Nickel	µg/l	<1	APAT-CNR-IRSA M. 3220 B Man 29/2003
Silver	µg/l	<0,2	EPA 200.8
Tin	µg/l	<3	APAT-CNR-IRSA M. 3280 Man 29/2003
Zinc	µg/l	<5	EPA 7950

The results refer to the sample as received

n.r. = not detected

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ANALYTICAL REPORT

ID. Number	:	**0504015**
PURCHASER	:	The Chairman Enemalta Corporation
ADDRESS	:	Central Administration Building - CHURCH Wharf, Marsa HMR 01 MALTA
SAMPLE	:	**Water - Sample N° 2 CONDENSER (T5+6) COOLING WATER OUTLET**
Samping date	:	**04 - May - 2006**
Start of analyses	:	**04 - May - 2006**

Date: 19 - May - 2006

End of analyses: 19 - May - 2006

PARAMETERS	UNIT OF MEASURE	RESULTS	ANALYTICAL MATHOD
BOD5	mg/l	59,1	APAT-CNR-IRSA M. 5120 Man. 29/2003
COD	mg/l	136	APAT-CNR-IRSA M. 5130 Man. 29/2003
Fluorides	µg/l	<20	UNICHIM 876
Total Kjedahl Nitrogen	mg/l	11,2	APAT-CNR-IRSA M. 5030 Man. 29/2003
Total Phophorus	mg/l	<0,05	UNICHIM 876
Total Suspended Solids	mg/l	<0,05	APAT-CNR-IRSA M. 2090 Man. 29/2003
Benzene	µg/l	<0,1	EPA 8260
Ethylbenezene	µg/l	<0,1	EPA 8260
o-m-p Xilene	µg/l	<0,1	EPA 8260
Toluene	µg/l	<0,1	EPA 8260
CHLORINATED			
1,2,3 Trichlorobenzene	µg/l	<0,1	EPA 8260
1,2,4 Trichlorobenzene	µg/l	<0,1	EPA 8260
Hexachlorobenzene	µg/l	<0,1	EPA 8260
Hexachlorobutadiene	µg/l	<0,1	EPA 8260
1,2 Dichloroethane	µg/l	<0,1	EPA 8260
Trichloroethylene	µg/l	<0,1	EPA 8260
Chloroform	µg/l	<0,1	EPA 8260
Carbon Tetrachloride	µg/l	<0,1	EPA 8260
Tetrachloroethylene	µg/l	<0,1	EPA 8260
Pentachlorophenol	µg/l	<0,1	EPA 8260
HYDROCARBONS			
Hydrocarbons <C8	µg/l	<10	EPA 8015
Hydrocarbons (C8 to C32)	µg/l	<10	EPA 8015
METALS			
Arsenic	µg/l	<1	EPA 7060 A
Cadmium	µg/l	<0,6	APAT-CNR-IRSA M. 3120 B Man 29/2003
Chromium	µg/l	<0,6	APAT-CNR-IRSA M. 3150 B1 Man 29/2003
Copper	µg/l	<0,6	APAT-CNR-IRSA M. 3250 B Man 29/2003
Lead	µg/l	<1	EPA 3010 A 1992 +7421 1986
Mercury	µg/l	<0,5	EPA 7473
Nickel	µg/l	<1	APAT-CNR-IRSA M. 3220 B Man 29/2003
Silver	µg/l	<0,2	EPA 200.8
Tin	µg/l	<3	APAT-CNR-IRSA M. 3280 Man 29/2003
Zinc	µg/l	<5	EPA 7950

The results refer to the sample as received
n.r. = not detected

Il Direttore
Dr. Ettore Bordonaro

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ANALYTICAL REPORT

ID. Number	:	**0504016** **Date: 19 - May - 2006**
PURCHASER	:	The Chairman Enemalta Corporation
ADDRESS	:	Central Administration Building - CHURCH Wharf, Marsa HMR 01 MALTA
SAMPLE	:	**Water - Sample N° 3 OUTLET N° 5 SURFACE DRAINS OUTLET**
Samping date	:	**04 - May - 2006**
Start of analyses	:	**04 - May - 2006** **End of analyses: 19 - May - 2006**

PARAMETERS	UNIT OF MEASURE	RESULTS	ANALYTICAL MATHOD
BOD5	mg/l	15,7	APAT-CNR-IRSA M. 5120 Man. 29/2003
COD	mg/l	36	APAT-CNR-IRSA M. 5130 Man. 29/2003
Fluorides	µg/l	300	UNICHIM 876
Total Kjedahl Nitrogen	mg/l	8,8	APAT-CNR-IRSA M. 5030 Man. 29/2003
Total Phophorus	mg/l	<0,05	UNICHIM 876
Total Suspended Solids	mg/l	<0,05	APAT-CNR-IRSA M. 2090 Man. 29/2003
Benzene	µg/l	<0,1	EPA 8260
Ethylbenezene	µg/l	<0,1	EPA 8260
o-m-p Xilene	µg/l	<0,1	EPA 8260
Toluene	µg/l	<0,1	EPA 8260
CHLORINATED			
1,2,3 Trichlorobenzene	µg/l	<0,1	EPA 8260
1,2,4 Trichlorobenzene	µg/l	<0,1	EPA 8260
Hexachlorobenzene	µg/l	<0,1	EPA 8260
Hexachlorobutadiene	µg/l	<0,1	EPA 8260
1,2 Dichloroethane	µg/l	<0,1	EPA 8260
Trichloroethylene	µg/l	<0,1	EPA 8260
Chloroform	µg/l	<0,1	EPA 8260
Carbon Tetrachloride	µg/l	<0,1	EPA 8260
Tetrachloroethylene	µg/l	<0,1	EPA 8260
Pentachlorophenol	µg/l	<0,1	EPA 8260
HYDROCARBONS			
Hydrocarbons <C8	µg/l	<10	EPA 8015
Hydrocarbons (C8 to C32)	µg/l	<10	EPA 8015
ETALS			
Arsenic	µg/l	<1	EPA 7060 A
Cadmium	µg/l	<0,6	APAT-CNR-IRSA M. 3120 B Man 29/2003
Chromium	µg/l	<0,6	APAT-CNR-IRSA M. 3150 B1 Man 29/2003
Copper	µg/l	<0,6	APAT-CNR-IRSA M. 3250 B Man 29/2003
Lead	µg/l	<1	EPA 3010 A 1992 +7421 1986
Mercury	µg/l	<0,5	EPA 7473
Nickel	µg/l	<1	APAT-CNR-IRSA M. 3220 B Man 29/2003
Silver	µg/l	<0,2	EPA 200.8
Tin	µg/l	<3	APAT-CNR-IRSA M. 3280 Man 29/2003
Zinc	µg/l	<5	EPA 7950

The results refer to the sample as received
n.r. = not detected

Il Direttore
Dr. Ettore Bordonaro

CE.FI.T. S.r.l. Sede Centrale e Laboratori: v.le Lido, 108/A, 96012 Avola (SR)
Tel. 0931/564220 - Fax 0931/561551 P.I. 00977590892
E-mail:cefit@tin.it - Cap. Soc. €52.000,00

ANALYTICAL REPORT

ID. Number	:	**0504017** **Date: 19 - May - 2006**
PURCHASER	:	The Chairman Enemalta Corporation
ADDRESS	:	Central Administration Building - CHURCH Wharf, Marsa HMR 01 MALTA
SAMPLE	:	**Water - Sample N° 4 CONDENSER (T3,4+7) COOLING WATER OUTLET**
Samping date	:	**04 - May - 2006**
Start of analyses	:	**04 - May - 2006** **End of analyses: 19 - May - 2006**

PARAMETERS	UNIT OF MEASURE	RESULTS	ANALYTICAL MATHOD
BOD5	mg/l	66,1	APAT-CNR-IRSA M. 5120 Man. 29/2003
COD	mg/l	152	APAT-CNR-IRSA M. 5130 Man. 29/2003
Fluorides	µg/l	<20	UNICHIM 876
Total Kjedahl Nitrogen	mg/l	14	APAT-CNR-IRSA M. 5030 Man. 29/2003
Total Phophorus	mg/l	<0,05	UNICHIM 876
Total Suspended Solids	mg/l	<0,05	APAT-CNR-IRSA M. 2090 Man. 29/2003
Benzene	µg/l	<0,1	EPA 8260
Ethylbenezene	µg/l	<0,1	EPA 8260
o-m-p Xilene	µg/l	<0,1	EPA 8260
Toluene	µg/l	<0,1	EPA 8260
CHLORINATED			
1,2,3 Trichlorobenzene	µg/l	<0,1	EPA 8260
1,2,4 Trichlorobenzene	µg/l	<0,1	EPA 8260
Hexachlorobenzene	µg/l	<0,1	EPA 8260
Hexachlorobutadiene	µg/l	<0,1	EPA 8260
1,2 Dichloroethane	µg/l	<0,1	EPA 8260
Trichloroethylene	µg/l	<0,1	EPA 8260
Chloroform	µg/l	<0,1	EPA 8260
Carbon Tetrachloride	µg/l	<0,1	EPA 8260
Tetrachloroethylene	µg/l	<0,1	EPA 8260
Pentachlorophenol	µg/l	<0,1	EPA 8260
HYDROCARBONS			
Hydrocarbons <C8	µg/l	<10	EPA 8015
Hydrocarbons (C8 to C32)	µg/l	<10	EPA 8015
METALS			
Arsenic	µg/l	<1	EPA 7060 A
Cadmium	µg/l	<0,6	APAT-CNR-IRSA M. 3120 B Man 29/2003
Chromium	µg/l	<0,6	APAT-CNR-IRSA M. 3150 B1 Man 29/2003
Copper	µg/l	<0,6	APAT-CNR-IRSA M. 3250 B Man 29/2003
Lead	µg/l	<1	EPA 3010 A 1992 +7421 1986
Mercury	µg/l	<0,5	EPA 7473
Nickel	µg/l	<1	APAT-CNR-IRSA M. 3220 B Man 29/2003
Silver	µg/l	<0,2	EPA 200.8
Tin	µg/l	<3	APAT-CNR-IRSA M. 3280 Man 29/2003
Zinc	µg/l	<5	EPA 7950

The results refer to the sample as received

n.r. = not detected

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Attachment 11

Marsa Power Station Emergency Plan & Safety Procedures

Enemalta
Marsa Power Station

Emergency Plan
FIRE - INJURY - OIL SPILL

Status:	**Final**
Reference:	**99/80/97**
Last revision dated:	**4 January 2007**
Maintained by:	**Ing M Falzon**
Revised by:	**Ing M Falzon**
Approved by:	**Manager MPS** **Ing E Gauci**
Printed on:	

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Marsa Power Station
Emergency Plan
FIRE - INJURY - OIL SPILL

INTRODUCTION

The plan is intended to set up standard procedures in the event of emergencies, allocating responsibilities and the immediate action to be taken in the event of fire, injury, oil or chemical spill, in order to minimise the consequences of any incident.

The plan will ensure that all efforts are co-ordinated through one point and to a common aim.

Aims

Ensuring safety of personnel (plant personnel, public, response personnel)
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

Limitations

The scope of this plan is limited to fire, injury, chemical or oil spillages. However the principles involved are adaptable to other emergencies.

DEFINITIONS

Control Centre

The *main* ***control centre*** is to co-ordinate all emergency activities.
The **main control room** is to act as the ***control centre.*** The ***control centre*** is normally manned by the senior plant operator and Generation Officer (GO). During an emergency, the senior plant operator is to act as the emergency controller until one of the 'nominated persons' for this job takes over.
All calls in case of an incident are to be routed to the ***control centre*** by radio, telephone, or runner.
The ***control centre*** is to make all calls to outside agencies. There is to be no delay in summoning Fire Brigade or Ambulance if necessary.
The ***control centre*** is to be immediately informed of any incident.

Control Room Numbers are 220 / 21232932 (DDI 22980xxx)

New Control Room 438

Standby Control Centre

Should the main control centre be endangered a standby control centre will be set up in the security gatehouse.

Security Numbers 319 / 569 (DDI 22980xxx)

Emergency Controller

The ***Emergency Controller*** has the overall responsibility for directing the company efforts during an emergency.
It is essential to realise that the emergency controller must act as a fixed reference point to co-ordinate the actions taken by different agencies.

Nominated Personnel

Shift Charge Engineer (B Station engineer) (SCE)
Shift Charge Engineer (Extension engineer)
If none of the above are available, the control room GO / senior person on site is to assume these duties until arrival of one of the nominees.
In extended emergencies it is advisable that Manager MPS or A/M Maintenance take over the role, the SCE will then concentrate on the plant operations. It is important that the manager attending informs the SCE upon handover, and gets all the relevant information.

Control room Operator / Communications Officer

The control room operator is shift GO (Control Room) During an emergency he is to act as the Communications Officer. Prior to the arrival of the Emergency Controller, he is to undertake these functions as well.
The control room operator is to function even outside emergencies, as the initial emergency calls are received at this point.

Forward Control Point

This to be set up as close as possible to the incident scene (with due regard to safety), such that a clear overview of the incident is possible. The *forward control point* must

have continuous communication (radio / telephone / cell phone) with the *main **control centre.***

The forward controller is the leader of the emergency team. The CPD fire brigade will normally rendezvous at this point, depending on the extent of incident.

Forward Controller (Emergency Team Leader)

This person is responsible for the action at the site of the incident and will concentrate on resolving the actual incident.

This role will normally be handled by the Extension shift engineer.

PE (III) Fire & Safety may take over this role on arrival, on agreement with the emergency controller.

Emergency Team

The emergency team consists of shift personnel who have been specially trained in fire fighting, first aid or pollution control. The senior person is to be nominated emergency team leader, and is normally to take the role of *forward controller*

In the case of oil spills, during day/evening the maintenance section will assign staff on an ad-hoc basis.

Nominated Personnel

See Appendix D: Emergency Team

Rendezvous point (RVP)

The default RV points for responding services will be the Main Gate, Alternate RV's will be the other two gates (Jesuit Hall and New Annexe). Given the site's limited space and access, a flexible approach will be required. A possible dispersal area for emergency vehicles is the new annexe. During an incident this will be co-ordinated with CPD and Ambulance senior officers.

Traffic control

Due to the amount of vehicles responding a one way system is to be set up; entrance through main gate and exit through new annexe.

Casualty clearing area

In the event of an accident with several injured, those injured will receive initial treatment on site prior to dispatch to hospital.

Depending upon the number of injured the casualty clearing area would initially be located at the clinic. This can be extended to the nearby garage then to the main administration block (ground floor)

Assembly point

A designated gathering point to group personnel in specified areas. Assembly points are designated by signs. Operational personnel and emergency team members are assigned to specific assembly points related to their duties.

In any case should an assembly point become endangered personnel are to proceed to the nearest assembly point, advising the *emergency controller*.

Assembly Points – Emergency team

The on-site emergency team shall meet at the control room or as directed by the emergency controller.

Assembly Points - non essential personnel

Assembly points for non essential personnel:
Administration & workshop personnel including visitors: Near Canteen (Alternate: General Stores)
Generation plant - Mechanics Garage
Tank Area – Tank men's office

Alerting

The fire alarm sounder will be the main signal in case of an emergency. The fire alarm will summon the emergency team and start evacuation of non-essential personnel.
At the discretion of the emergency controller, other means may be used for alerting personnel for less serious incidents, e.g. pager, telephone.

Fire Alarm

The all clear or alarm test will be indicated by three bursts of the alarm signal, each not longer than five seconds.
A continuous sounding of the alarm will indicate an emergency situation.

Operations Personnel

All personnel in the operations section not forming part of the emergency team.

Maintenance Personnel

All personnel in the maintenance section not forming part of the emergency team

Communications Officer (Media)

The communications officers (media) will deal with press, media and other outside enquiries. The procedure in the manual "Addressing Communications re. Unplanned & Planned Electricity Supply Interruptions and other Emergencies" is to be followed.
The communications officers (media) are to be informed as soon as possible during an incident.

Other Personnel / Non essential personnel

Those persons who are not essential to the running of plant or who do not have specific duties during the emergency.

Contractors

Contractors working on site must be briefed on safety procedures.

Visitors

All visitors are to report to the main assembly point and identify themselves to the senior officer at the point.

Civil Protection Department (CPD)

Responsible for fire fighting and rescue operations, emergency planning and handling of major incidents.
CPD can be contacted through the general emergency number

Civil Protection (Fire Brigade) **112**

ACTION TO BE TAKEN

This section describes the actions to be taken by the persons defined above.

Emergency Controller

Upon hearing the alarm he is to proceed to the control centre and take charge of the situation. He is to remain in the control room throughout the emergency. He is to instruct other staff in the required actions.

General actions:

- Contact other agencies required (Police, pollution control, etc.)
- Contact Enemalta personnel as required (See Appendix E: Notifications)
- Act as co-ordinator with other agencies, briefing them on arrival and arranging for their disposition.
- Ensure availability of resources and personnel during the emergency
- Ensure that necessary action is taken to protect personnel and plant.
- Shut down plant involved.
- Maintain normal operations of unaffected plant

Above all, the Emergency Controller is act as a fixed reference point for all responding agencies, and is to direct Enemalta's efforts towards a safe resolution of the incident.

Specific actions

Fire

Ensure Enemalta Fire Section and Fire Brigade have been called

Fire / Police 112

Fire Section 21657196 (after 19:00 use on call roster)

Ensure evacuation of affected areas
Direct emergency team

Injury

Ensure ambulance has been contacted

Ambulance 112

Fire Section 21657196

Direct emergency team to required action
Inform relatives of casualty
Inform district police if injury is serious

Police 112

Inform H& S section

Health & Safety 407 DDI22980 407

Spill inside plant

Assess situation
Ensure further spillage is halted
Direct emergency team to required action
Contact PCCU

PCCU 21250694 / 79494641

Contact Harbourmaster if spillage may reach sea

MMA (turretta) 21241363

Contact pollution sub-contractor if required

Cassar SR 21244500 79494145

Spill at quay

Assess situation
Ensure further spillage is halted
Direct emergency team to required action
Contact PCCU
Contact Harbourmaster
Contact pollution sub-contractor if required

Control Room Operator / Communications Officer

Alert members of the emergency team and the emergency controller
Assist the Emergency Controller with communications, within and outside the plant.
Log all actions during an emergency.
Non – emergency communications (e.g. press, general public etc) are to be referred to the Communications Officers (media) and call centre in accordance with the relevant procedure.

Fire

Call Enemata Fire Section and fire brigade immediately, informing operator of:
- Exact Location
- Type of incident
- Hazards on site

Sound fire alarm
Alert emergency controller and emergency team
Alert Security (main gate) and advise them of expected actions.

Injury inside plant

Call Enemalta Fire Section and SLH Ambulance immediately, informing operator of:
- Access to site
- Number of casualties
- Emergency services already alerted, on site or required

Alert emergency controller and emergency team
Alert Security (main gate) and advise them of expected actions.

Fuel Spill

Call Enemalta Fire Section and Civil Protection immediately if a hazard to personnel exists.
Alert emergency controller and emergency team.
Alert workshop (if available)
Emergency controller will alert outside agencies after assessment of situation.
PCCU must be informed of any significant spill.
MMA must be informed of any significant spill in the sea.

Chemical spill / release

Call Enemalta Fire Section and CPD immediately if a hazard to personnel exists.
Alert emergency controller and emergency team.
Alert Enemalta Fire Section
Emergency controller will alert outside agencies after assessment of situation.

Emergency Team

The emergency team will be alerted to an emergency situation by the emergency controller by fire alarm, radio, pager or telephone. Upon receiving the call members of

the emergency team are to rendezvous in the control room. Members of the emergency team engaged in critical operations are to ensure their plant is made safe and handed over before proceeding to the control centre. They are to take action as required by the emergency controller. To ensure fire pump is running and kept fuelled. Assist emergency services upon their arrival.
The senior person is to be nominated emergency team leader.
Provide initial response to an incident
Assist and provide backup to the Fire section / Civil Protection when they arrive.
To carry out actions as necessary to control the emergency, under the direction of the *emergency controller*

Fire

Collect protective clothing and equipment
The senior member is to act as emergency team leader
One member is to be assigned to fire pumps
Proceed to scene of fire
Attempt to control fire with available means
Assist fire brigade upon their arrival

Injury inside plant

Collect protective clothing and equipment
Proceed to casualty
Assist casualty as required
Assist ambulance personnel

Spill inside plant

Collect protective clothing and equipment
Proceed to spill
Ensure all pumping has stopped
Ensure any drains are closed
Attempt to isolate source
Attempt to contain spill
Proceed with recovery of spilled fuel

Spill at quay

Collect protective clothing and equipment
Proceed to spill
Request assistance if necessary
Ensure all pumping has stopped
Attempt to isolate source
Attempt to contain spill
Proceed with recovery of spilled fuel

Operations Personnel

Proceed immediately to their assigned post of duty by a safe route.
Where operators are assigned to an area of plant rather then a specific unit, operators will assemble near the panel of the closest unit.
Report to their superior officer
Remain available.
If their normal place of duty has been affected they are to go to the nearest assembly point and report to the emergency controller.
Generation Officer is to:

- conduct roll call as per daily work assignment
- ensure any members of the *emergency team* are dispatched, and their duties delegated to others.
- ensure normal operations continue, as far as possible.
- report status to emergency controller.

Where personnel are operating critical plant, they are to ensure that all machinery has been made safe and any transfer operations halted

Personnel not involved in the emergency operations are to remain accessible as they may be required by the emergency controller.

No. 8 Unit GO

Maintain normal operations as far as possible.

Ensure that suitable persons have been assigned to start up & monitor fire pumps (Deluge systems) and advise emergency controller of any problems.

Evaporators / Fuel Oil GO

Maintain normal operations as far as possible.

Ensure that suitable persons have been assigned to start up & monitor fire pumps (Hydrant) and advise emergency controller of any problems.

Security Guards

Control traffic in coordination with police

No vehicles except emergency vehicles are to enter the plant. The emergency vehicles are to be directed to the rendezvous point as indicated by the emergency controller.

Maintain clear access, ensuring all gates are kept clear. If necessary police are to be called to assist.

Upon declaration of emergency a one way system is to be implemented with all vehicles entering through main gate and leaving though new annexe. Non essential vehicles, even if normally authorised, are to be diverted past "Blue Sky"

In major incidents the security guards are to ask for reinforcements as required.

First Aiders

First aiders are to assemble near clinic if safe, and report to emergency controller.

In a serious incident hospital staff will direct medical operations, Enemalta first aiders to assist.

Maintenance Personnel

Upon hearing the fire alarm all personnel are to proceed to their workshop.

They are to remain at their post unless directed to do so by the STO.

Senior TO will conduct roll call as per daily work assignment, and report to emergency controller.

Personnel not involved in the emergency operations are to remain available as the emergency controller may require them.

Where personnel are working on critical plant, they are to ensure that all machinery has been made safe before leaving.

Isolate any electrical supplies

Isolate any valves that have been opened

Isolate & make safe any hazardous equipment

If hot work was in progress, advise emergency controller

(In case of any work relating to the fire protection systems, it is essential that operation is restored as a priority.)

Proceed to assembly point.
Report to roll-call officer.
Remain available to provide assistance as required by emergency controller.

Tankmen

Stop any transfers safely
Close valves including separator and bund drains
Ensure that all machinery has been made safe
Assemble at their office
Report to Emergency Controller

Mechanics

Standby at Garage and wait for instructions
Assist as necessary.
Provide transport for material / personnel as necessary.

Administration

The administration block will only be evacuated if endangered.
In emergencies which are not affecting this block, personnel are to remain at their usual offices and stand by for instructions from the emergency controller.
Upon hearing the alarm, proceed to the assembly point.
Escort any visitors to safety
Conduct roll-call of all personnel and report to emergency controller.

Recorders

Responsible for assisting with roll call and identifying any missing personnel.
To notify emergency controller of any missing persons.
To take record of personnel leaving site
Prepare contact information for emergency controller in case of injuries.
Recorder is not to contact relatives of personnel involved.

General Instructions for non-essential personnel

Personnel not involved in the emergency operations are to remain accessible as they may be required by the emergency controller. Under no circumstances are personnel to go home or otherwise leave the assembly point unless the emergency controller has been notified.
If the assembly point is endangered they are to collect at the nearest safe assembly point.

Other Personnel

Upon hearing the fire alarm all personnel are to proceed to their assembly point. They are to remain at this place until instructed to move by the emergency controller. If the assembly points are endangered an alternative place will be identified. The General Stores and Computer centre are possible alternatives.

Contractors

Contractors working on site are to be briefed on safety procedures. Contractors are to follow directions as indicated for Enemalta Personnel.
Make safe any work in progress
Report to assembly point near canteen.

Conduct roll call
Report to roll-call officer

Visitors

All visitors are to report to the main assembly point and identify themselves to the roll-call officer.

IMMEDIATE ACTION BY PERSONS AT SITE OF EMERGENCY

Fire inside plant

Sound nearest fire alarm
Inform control room of fire stating:
    What is involved
    Any injuries
Attempt to fight fire using available equipment, if it is safe to do so.

Fire in vehicle

Sound nearest fire alarm
Inform control room stating:
What is involved
Any injuries
Attempt to fight fire using available equipment, if it is safe to do so.
Move adjacent vehicles to a safe area if it is safe to do so.

Fire in administration block

Sound nearest fire alarm
Evacuate
Inform control room stating:
What is involved
Any injuries
Attempt to fight fire using available equipment, if it is safe to do so.

Fire at quay

Shut down all transfer operations.
Inform control room of fire stating:
    What is involved
Any injuries
Inform ship
Attempt to fight fire using available equipment, if it is safe to do so.
Set up forward control point to maintain contact with control room, pending arrival of emergency team

Injury inside plant

Check casualty and apply immediate first aid
Inform control room stating:
Name of casualty
Type of injury
Assist casualty as necessary
Unless injury is minor all operations in the vicinity are to be suspended
All machinery and plant to be left as it was at time of accident until Health & Safety have cleared to resume operation. (Except as necessary to secure area)

Spill in tank area

Inform control room stating:
Type of fuel
Approximate quantity
Whether source has been isolated

Ensure all drains are closed
Attempt to limit spread of fuel by available equipment.

Oil spill into sea (Power Station)

Shut down all transfer operations.
Inform control room of spill stating:
- Type of fuel
- Approximate quantity
- Whether source has been isolated

Attempt to limit spread of oil by available equipment.
Set up forward control point to maintain contact with control room

Oil spill into sea (Menqa or diesel tank)

Shut down all transfer operations.
Inform control room of spill stating:
- Type of fuel
- Approximate quantity
- Whether source has been isolated

Contact ship
Attempt to limit spread of oil by available equipment.
Set up forward control point to maintain contact with control room

Chemical spill / release

Shut down all transfer operations.
Inform control room of spill stating:
- What has been spilled
- Approximate quantity
- Whether source has been isolated or is continuous.

Contact ship (if involved)
Attempt to limit spread of chemical by available equipment if safe to do so.
Set up forward control point to maintain contact with control room

COMMUNICATIONS

In all cases outside help is to be contacted only by the control room operator. Police, ambulance or other outside assistance is only to be contacted directly by onsite personnel if communication with the control room is lost.

Good communications are the keystone of good management. Their importance is even greater during an emergency.

The chart in appendix F indicates how the organisation should work.

Communication facilities available are

Telephone
Portable Radio
Site Pagers
Security/Fire Section radio
Cellular phone
Skytel Pager

It is important to realise that we are placing too much reliance on mobile phones. In an emergency, especially one which is affecting the national power grid, the mobile phone network is likely to fail. Even if the electricity supply is stable, the mobile phone networks are liable to being congested due to extraordinary traffic. The use of alternative means especially private radio is essential in such cases.

Communications with the Media and General Public

Enemalta's Public Relations Office has drawn up a "MANUAL: Addressing Communications re. Unplanned & Planned Electricity Supply Interruptions and other Emergencies"

This manual covers press and general public relations during emergencies such as power interruptions, but is also applicable to other emergency situations, such as fires or explosions, which will attract the media's and public's attention.

Eh Communications officers (Media) are to be informed early on immediately of any incident. The emergency controller is to brief them on the situation providing as much information as possible.

The Communications officers (Media) will handle all (Non-emergency) outside communications backed up by the telephone operator and call centre.

APPENDIX A: TELEPHONE NUMBERS - ENEMALTA

Department	Work Phone [Direct line]	Work Phone [Extn.]	Mobile
Senior Staff			
Eng. P Grima			79008971
Eng. E. Gauci.	21233730	450	79008912
Eng. A. Farrugia.		499	79008913
Eng. S. Grima.	21245475	380	79008915
Eng. C. R. Sant.		804	79008914
Eng J Drago		873	79009901
Operations Staff			
Shift Engineer 1-4		210 / 643	79008918
Shift Engineer 5-9		230 / 580	79008919
Principal Chemist			
A. Meilaq.		240	79008982
Fire & Safety Officer			
Eng. M. Falzon.	21657196	837	79008973
Fire section	21657196	761 / 763	
Health & Safety Officer			
Simon Fabri	21221430	407	79847119

Department	Work Phone [Direct line]	Work Phone [Extn.]	Mobile
Generation Officers			
Control		222	79008994
Boilers		308	79008996
Turbines		458	79008995
Unit 8		223	79008997
Fuel Tanks		462	79008998
Control Room	21232932	220	
Tank Area Personnel		218	79008985
Clinic		444	
Security			
Chief security		566 / 425	79008886
Main gate		319 / 569	
Telephone Operator	21220423 / 21227103	400	

APPENDIX B: TELEPHONE NUMBERS AND CONTACT PERSON - OUTSIDE AGENCIES

Department	Name	Work Phone	Mobile
Ambulance		112	
AFM Control Centre		21824212	
Cassar Group	Charles Cassar	21244500 / 225764	99494145
Cassar Group	Anthony Cassar	21244500	99493028
Cassar Group	Joe Micallef	21244500 / 225764 / 24735	99494262
CPD Operations Centre		21462610 / 21462611	
Fire Brigade		112	
Malta Maritime Authority			
Malta Maritime Authority	Capt. David Bugeja	21232653 / 222204	99434312
Malta Maritime Authority Harbour Master	Capt. Richard Gabriele	21239010	99494312
Malta Maritime Authority PTSS		21241363/4	
Malta Maritime Authority Safety & Security	Brian Crammer	21232605	99495393
Pollution Control			
PCCU	Tony Mallia	21257027	79494641
PCCU	Mario Mangion		99448560

APPENDIX C: MATERIAL RESOURCES (IN-HOUSE)

(This chart lists the main stockpiles of equipment which may be useful in an emergency)

Spill Control Material	Spill Control Store – Near Gas Turbine	Keys from Security (break Glass)	Trailer with booms, absorbents etc.
Spill Control Material	A11 store	Stores	Absorbents
Spill Control Material	General Store	Stores	Absorbents

Fire fighting foam	Store at tank area	Break glass / Fire Section	Approx 1400 litres
Fire fighting foam	Spill Control Store – Near Gas Turbine	Keys from Security (break Glass)	Approx 300 litres foam
Fire fighting foam	Wied Dalam	Security / Fire Section	Approx. 8000 litres foam in drums
Extinguishers / Hoses / Other Equipment	Fire Section		

APPENDIX D: EMERGENCY TEAM

At present Emergency Team has not been implemented. The names of first aiders are posted at various sites around the station. The emergency team will be set up "ad-hoc" by the emergency controller from available personnel.

APPENDIX E: NOTIFICATIONS

This appendix contains lists of the persons or agencies who must be notified of incidents. Phone / Fax contact numbers are included in Appendix A: Telephone numbers - Enemalta and Appendix B: Telephone numbers and contact person - Outside Agencies

Notes:

ALL incidents MUST be reported

Any significant incidents must be reported as a priority

In the case of

Injuries requiring hospitalisation

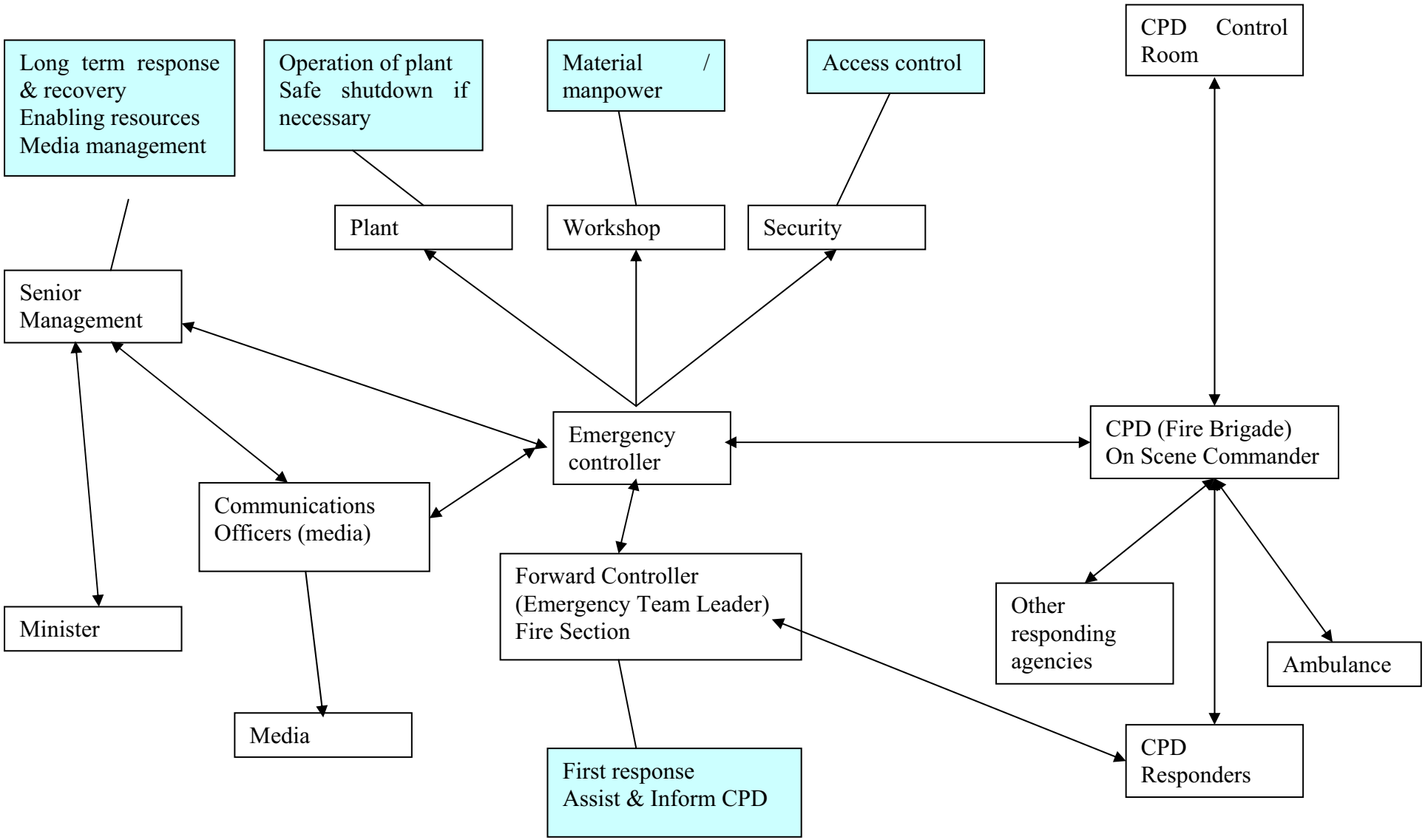
Incidents with significant financial consequences

Incident site and relevant equipment

Minor incidents must still be reported, however report may be done during normal working hours of the department concerned.

	Fire	Injury	Spill
Enemalta			
Fire & Safety Officer / Fire Section	✓	✓	✓
Duty Manager	✓	✓	✓
Health & Safety Officer		✓	
Communications Officers (Media)	✓	✓	✓
Government Agencies			
Malta Maritime Authority			✓
Pollution Control Coordinating Unit (PCCU)			✓
Occupational Health & Safety Authority		✓	
Police		✓	

APPENDIX F: EMERGENCY ORGANISATION – COMMUNICATIONS FLOW



Attachment 12

Noise Emission Level at MPS Plant Boundaries

ENEMALTA CORPORATION

MARSA & DELIMARA POWER STATIONS

NOISE READINGS LEVELS CONCERNING 3RD PARTIES WITHIN BOUNDARY LIMITS.

Report prepared and carried out by Enemalta Corporation Health & Safety Section

To:	Manager E.U Affairs
From:	Health & Safety Section
Through:	Chief H.R.& corporate Services
Date:	8th January 2007
Ref:	Compiled as document only for confidentiality purposes.
Subject:	Noise reading levels concerning 3rd parties at the boundary limits.

ENEMALTA CORPORATION

Following a formal request from Manager E.U.Affairs to submit a report of noise levels for both M.P.S. & D.P.S. was made for the prime purpose of further monitoring of high noise levels affecting 3rd parties at both Power plants boundary limits.

Readings were taken with the aid of a sound level meter with a range of 30-130dB's. (*Specifications provided with this report*). Readings took place by morning peak times and evening during silent hours. Following this exercise was not possible to sort out readings concerning both Power plants for 'noise emissions' alone as the daily activity forms also an integral part of additional noise emissions namely, vehicles at urban roads, Industrial works etc.

The wind direction was also considered and included in respective reports as wind direction enhance noise emissions to reach larger range scales.

For ease of reference two independent site plans concerning M.P.S & D.P.S. are included with this report to pinpoint sites according to respective noise readings provided.

This Noise report concerning both M.P.S. & D.P.S. covers only readings at the boundary limits intended for 3rd parties. A separate Noise Assessment report according to Legal Notice 158 of 2006 was made separately to monitor occupational places of work most vulnerable to high noise emissions within Enemalta Corporation M.P.S. & D.P.S. sites, intended for the protection of workers.

Simon Fabri
Health & Safety Officer
Enemalta Corporation

Sound level meter model – <u>Testo 816</u>

Technical Data:

Sensor: …….. Precision electret-condensor
Microphone, ½ inch

Measure range: ……30 to 130 dB (A)

Reference meas. range……30 to 130 dB (A)
Further adjustable ranges ……..70 to 105 dB (A)
50 to 85 dB (A)
30 to 65 dB (A)

Reference frequency ……... 1000 Hz

Frequency range …… 31.5 Hz to 8 KHZ

Spare impendance of microphone …….1KΩ at 1KHzΩ

Pressure drift ……. -0.008 dB/mbar

Time settings: …….. 125ms (FAST setting)
Or 1s (SLOW setting)

Accuracy:
Testo 816: …… +/- 1.0 dB (A) absolute;
+/- 1 digit corresponds with
DIN/IEC 651 class 2L

Display: …… 4 line LCD display
13 mm high

Resolution: ……...0.1 dB (A)

Battery: …… 9V block (6F 22)

Battery life: ……..15 hours (alcali-manganese)
Low battery warning

Operating temperature: …… 0 to +40°c

Storage / transport temp: ……...-20 to +70°c

Humidity: ……10 to 90 % RH,
not condensating

Housing material: ……ABS

<u>Sound level meter calibration</u>

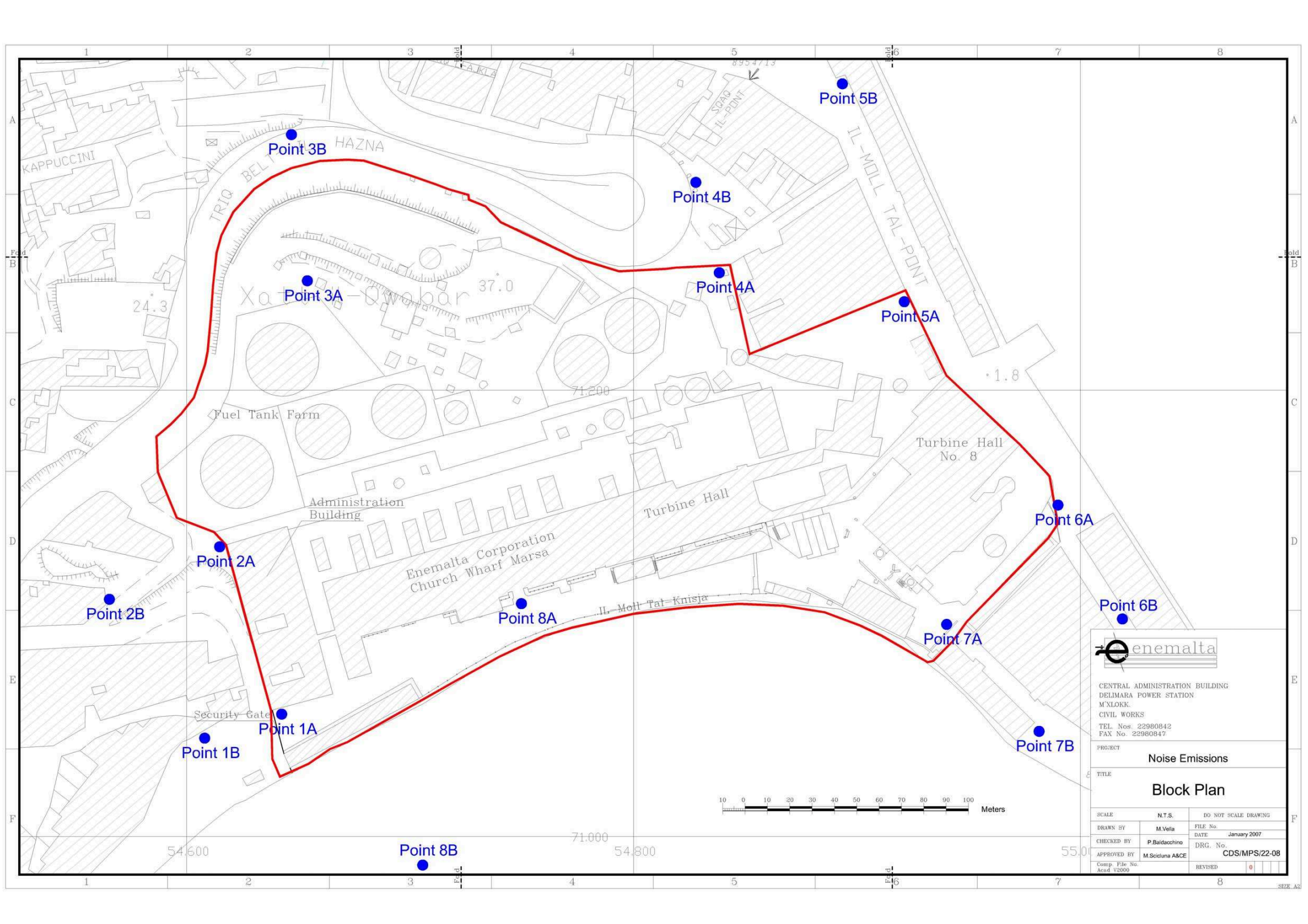
The unit is calibrated with: **Testo 0554.0009**

Sound pressure level: 94dB/104dB (adjustable)

ENEMALTA CORPORATION

MARSA POWER STATION

Report prepared and carried out by Enemalta Corporation Health & Safety Section


Point 1A
Point 1B
Point 2A
Point 2B
Point 3A
Point 3B
Point 4A
Point 4B
Point 5A
Point 5B
Point 6A
Point 6B
Point 7A
Point 7B
Point 8A
Point 8B
Fuel Tank Farm
Administration Building
Enemalta Corporation Church Wharf Marsa
Turbine Hall
Turbine Hall No. 8
IL-MOLL TAL-PUNT
Il-Moll Tal-Knisja
Security Gate
KAPPUCCINI
HAZNA
71.200
71.000
54.600
54.800
24.3
37.0
10 0 10 20 30 40 50 60 70 80 90 100
Meters
enemalta
CENTRAL ADMINISTRATION BUILDING
DELIMARA POWER STATION
M'XLOKK.
CIVIL WORKS
TEL. Nos. 22980842
FAX No. 22980847
PROJECT
Noise Emissions
TITLE
Block Plan
SCALE N.T.S.
DO NOT SCALE DRAWING
DRAWN BY M.Vella
FILE No.
DATE January 2007
CHECKED BY P.Baldacchino
DRG. No. CDS/MPS/22-08
APPROVED BY M.Scicluna A&CE
Comp. File No. Acad V2000
REVISED 0
SIZE A2

ENEMALTA CORPORATION

Health & Safety Section
Noise Level Records

Marsa Power Station.

Site Plan Number: CDS/MPS/02-08 **Ref. Point:** No. 01

Zone Address (A): Front Main Gate M.P.S.. (At boundary limits)

Readings taken during the day		**Readings taken at evening**	
Date:	**27-12-06**	**Date:**	**04-01-07**
Time:	08:30 am	**Time:**	05:10pm
Reading:	55.8 dB	**Reading:**	55.1 dB

Nearest selected area prone to noise.

Zone Address (B): Near Church (Church Wharf Marsa).

Reading:	60.1 dB	**Reading:**	48.9 dB

Zone A & B are indicated as per site plan attached with this report.

Wind Direction: NE (L/M/S)[1] **Wind Direction:** NW (L/M/S)

Zone B residential? No **Industrial?** Yes

Remarks:

Zone point (B) reading was taken during work in progress by Cassar Ship yard.

[1] L-Light, M-Moderate, S-Strong

ENEMALTA CORPORATION

Health & Safety Section
Noise Level Records

Marsa Power Station.

Site Plan Number: CDS/MPS/02-08 **Ref. Point:** No. 02

Zone Address (A): Stairs leading to Tank area M.P.S.over Corporation fuel station. (At boundary limits)

Readings taken during the day		**Readings taken at evening**	
Date:	**27-12-06**	**Date:**	**04-01-07**
Time:	08:45 am	**Time:**	05:15pm
Reading:	53.1 dB	**Reading:**	48.9 dB

Nearest selected area prone to noise.

Zone Address (B): Ballons Garage, Sannat Lane Marsa..

Reading:	51.4 dB	**Reading:**	51.3 dB

Zone A & B are indicated as per site plan attached with this report.

Wind Direction: NE (L/M/S)[1] **Wind Direction:** NW (L/M/S)

Zone B residential? No **Industrial?** Yes

Remarks:

Industrial premises were closed when readings were taken from zone point (B)

[1] L-Light, M-Moderate, S-Strong

ENEMALTA CORPORATION

Health & Safety Section
Noise Level Records

Marsa Power Station.

Site Plan Number: CDS/MPS/02-08 **Ref. Point:** No. 03

Zone Address (A): Tank area Main gate M.P.S. (At boundary limits)

Readings taken during the day		**Readings taken at evening**	
Date:	**27-12-06**	**Date:**	**04-01-07**
Time:	08:50 am	**Time:**	05:20pm
Reading:	51.5 dB	**Reading:**	56.6 dB

Nearest selected area prone to noise.

Zone Address (B): White Brothers Ltd. Triq il-Hazna Marsa.

Reading:	48.6 dB	**Reading:**	51.2 dB

Zone A & B are indicated as per site plan attached with this report.

Wind Direction: NE (L/M/S)[1] **Wind Direction:** NW (L/M/S)

Zone B residential? Yes **Industrial?** Yes

Remarks:

Zone Point (B) reading was taken from street limits.

[1] L-Light, M-Moderate, S-Strong

ENEMALTA CORPORATION

Health & Safety Section
Noise Level Records

Marsa Power Station.

Site Plan Number: CDS/MPS/02-08 **Ref. Point:** No. 04

Zone Address (A): Tank area rear Main gate M.P.S. besides flourmill at Triq Belt il-Hazna Marsa (At boundary limits)

Readings taken during the day		**Readings taken at evening**	
Date:	**27-12-06**	**Date:**	**04-01-07**
Time:	09:10 am	**Time:**	05:35pm
Reading:	59.3 dB	**Reading:**	62.6 dB

Nearest selected area prone to noise.

Zone Address (B): Opposite rear Tank area M.P.S.

Reading:	57.7 dB	**Reading:**	59.4 dB

Zone A & B are indicated as per site plan attached with this report.

Wind Direction: NE (L/M/S)[1] **Wind Direction:** NW (L/M/S)

Zone B residential? Yes **Industrial?** Yes

Remarks:

Flourmill was in operation when Zone Point (B) readings were taken

[1] L-Light, M-Moderate, S-Strong

ENEMALTA CORPORATION

Health & Safety Section
Noise Level Records

Marsa Power Station.

Site Plan Number: CDS/MPS/02-08 **Ref. Point:** No. 05

Zone Address (A): Gas Turbine M.P.S., Triq il-Moll Tal-Port, Marsa (At boundary limits)

Readings taken during the day		**Readings taken at evening**	
Date:	**27-12-06**	**Date:**	**04-01-07**
Time:	09:16 am	**Time:**	05:45pm
Reading:	64.5 dB	**Reading:**	64.3 dB

Nearest selected area prone to noise.

Zone Address (B): Marsa Regatta Club, Triq il-Moll Tal-Port, Marsa.

Reading:	57.3 dB	**Reading:**	57.2 dB

Zone A & B are indicated as per site plan attached with this report.

Wind Direction: NE (L/M/S)[1] **Wind Direction:** NW (L/M/S)

Zone B residential? No **Industrial?** Yes

Remarks:

Nil

[1] L-Light, M-Moderate, S-Strong

ENEMALTA CORPORATION

Health & Safety Section
Noise Level Records

Marsa Power Station.

Site Plan Number: CDS/MPS/02-08 **Ref. Point:** No. 06

Zone Address (A): Rear Gate M.P.S.Triq il-Moll Tal-Pont, Marsa (At boundary limits)

Readings taken during the day		**Readings taken at evening**	
Date:	**27-12-06**	**Date:**	**04-01-07**
Time:	09:20 am	**Time:**	05:50pm
Reading:	67.1 dB	**Reading:**	66.5 dB

Nearest selected area prone to noise.

Zone Address (B): Customs Depot, Triq il-Moll Tal-Port, Marsa.

Reading:	54.1 dB	**Reading:**	53 dB

Zone A & B are indicated as per site plan attached with this report.

Wind Direction: NE (L/M/S)[1] **Wind Direction:** NW (L/M/S)

Zone B residential? No **Industrial?** Yes

Remarks:

Nil

[1] L-Light, M-Moderate, S-Strong

ENEMALTA CORPORATION

Health & Safety Section
Noise Level Records

Marsa Power Station.

Site Plan Number: CDS/MPS/02-08 **Ref. Point:** No. 07

Zone Address (A): Motor Transport Stores M.P.S. Opposite Boiler No.8. (At boundary limits)

Readings taken during the day		**Readings taken at evening**	
Date:	**27-12-06**	**Date:**	**04-01-07**
Time:	09:35 am	**Time:**	06:00pm
Reading:	67.7 dB	**Reading:**	68.6 dB

Nearest selected area prone to noise.

Zone Address (B): Motor Transport Stores (Rear Depot side)

Reading:	54.2 dB	**Reading:**	51.9 dB

Zone A & B are indicated as per site plan attached with this report.

Wind Direction: NE (L/M/S)[1] **Wind Direction:** NW (L/M/S)

Zone B residential? No **Industrial?** Yes

Remarks:

Nil

[1] L-Light, M-Moderate, S-Strong

ENEMALTA CORPORATION

Health & Safety Section
Noise Level Records

Marsa Power Station.

Site Plan Number: CDS/MPS/02-08 **Ref. Point:** No. 08

Zone Address (A): Old Control Room M.P.S. (At boundary limits)

Readings taken during the day		**Readings taken at evening**	
Date:	**27-12-06**	**Date:**	**04-01-07**
Time:	09:50 am	**Time:**	06:15pm
Reading:	74 dB	**Reading:**	69.3 dB

Nearest selected area prone to noise.

Zone Address (B): refuges Open Centre, Triq Ix-Xatt il-Mollijiet Marsa.

Reading:	52.2 dB	**Reading:**	56.8 dB

Zone A & B are indicated as per site plan attached with this report.

Wind Direction: NE (L/M/S)[1] **Wind Direction:** NW (L/M/S)

Zone B residential? Yes **Industrial?** Yes

Remarks:

Nil

[1] L-Light, M-Moderate, S-Strong

Attachment 13

Draft Report on the Decommissioning of Marsa Station

Draft Report on the Decommissioning of Marsa Station.

Enemalta has committed itself with the MEPA that should the existing plant (licensed before 1st July 1987) "*fail to comply with the National Emission Reduction Plan, then any plants which are non-compliant, shall not be operated for more than 20,000 hours starting from 1st January 2008 and shall end not later than 31st December 2015*". With the present mode of plant operation this 20,000-hour limited operation period is expected to be fully utilised by April 2010 for boilers 3-6 and August 2010 for boilers 7-8. The existing plant in question is all the steam plant at Marsa. Consequently, subject to system and/or unit constrains the units at Marsa will be decommissioned between 2010 and 2015.

This decommission will take place in phases as follows:

Phase I	Shut down of Units 1 & 2
Phase II	Shut down of Units 3 & 4
Phase III	Shut down of Units 5, 6 & 7
Phase IV	Shut down of Unit 8
Phase V	Shut down of GT 9

The starting date of Phase I will depend on the commissioning of the new plant at Delimara which will not take place before 2009. While phase V may also include the re allocation of the Gas Turbine rather then the scraping of this unit.

The decommissioning of the station in general will have to take place after all the above phases have been carried out to avoid availability and reliability issues.

In parallel with these phases a 132 KV distribution Centre will have to be built and commissioned to cater for the remaining 33 KV feeders which were being supplied from the Station. The site of this DC should be such that it will not inhibit/restrict the development, if any, of the site.

Issues which will affect decommission and demolishing of all the units are the following:

a. Chimneys demolishing, may present some difficulties
b. Culvert filling
c. Asbestos ('A' Station boiler room, Boiler 2, boiler 8 chimney and Engine Room external cover.
d. The deviations of 33 KV cables, with special attention on the remaining oil filled cables.
e. Waste removal: Oil Slug Tank Farm and Turbine lubrication oils
f. Transferring of store items to Delimara
g. Re allocation of the Administration, Distribution & Development sections
h. Dismantling of certain items like circuit breakers for re utilization purposes
i. Acid Plant re allocation if required by WSC.

3245

Copy

The Palace,
Valletta.
27th October, 1936.

MALTA.

CONFIDENTIAL (2)

Sir,

I have the honour to refer to your despatch No.226 of the 1st July, 1936, on the subject of a new power station, and to inform you that I referred to the Admiral Superintendent the suggestion in paragraph 3 of your despatch that the Dockyard might be prepared to accept electricity from the Government Power Station in preference to maintaining a power station of their own. The Admiral Superintendent has informed me that the supply of current from the new power station to the Dockyard would not be advantageous to the latter unless the total cost of the power to be supplied from that station, including the cost connecting that supply to the Dockyard, of converting the existing plant and of all capital charges, were less than the working costs only of the existing Dockyard power station. It seems unlikely that this would be so. It would, however, be very desirable that the two systems should be inter-connected in order to permit of power being exchanged in any emergency and I am having the possibilities in this connexion investigated.

2. Some little time must elapse before details are available to enable the points raised by the Admiral Superintendent to be considered, but to avoid undue delay, I

The Right Honourable
W.ORMSBY GORE, P.C., M.P.,
&c., &c., &c.

I have considered it desirable to address you now on two points arising out of the proposal to construct a new power station, namely:

(a) the question of the site; and

(b) the form of supply.

3. As was stated in paragraph 3 of Sir Harry Luke's despatch No.87 of the 20th March, 1936, it is a matter of importance that the new power station should be accessible and convenient from the point of view of supply, and also, as far as possible, protected from hostile attack. A Committee representing this Government and the three Fighting Services was formed to go into this matter and they recommended that much the best site would be at the Admiralty Coal Stores in Church Wharf at the Marsa. A plan is attached. At this point a level space has been formed by removing the rock to a distance of about 200 feet inland. The rock then rises 65 feet from the sea level, increasing a little further inland to 96 feet. The proposal is that the power station should be excavated in this hill. Between 50 and 60 feet of head-room would be required for the boilers, and it has been suggested that it would expedite the work and make it more economical if the excavations were carried out from the top downwards. The proposal is to roof over the space so excavated by barrel vaulting in mass concrete or stone, and to deposit on the roof to the necessary height the spoil from the excavations. The stone on the top would be rendered solid by concrete, thus forming a power station with a high degree of protection against hostile attack. The level space in front of the rock will be utilized for offices, workshops, coal yard, etc.

4.

4. This site is undoubtedly the best available and I have initiated negotiations with the Naval Authorities in order to acquire the necessary land, preferably by means of exchange.

5. As regards the form of supply, I enclose a copy of a report by Mr. Buckley, Station Engineer, and Messrs. Fenech and Galea, Assistant Engineers, in which they recommend the adoption of the Three Phase, 50 Cycle system, and give detailed estimates as to the cost which would thereby be involved. I consider that there can be no question that the adoption of this form of supply would have many advantages, and, unless there are serious technical objections which have been overlooked, I recommend that it should be adopted. I should be grateful, however, if the comments of the technical advisers of the Crown Agents might be obtained on the various matters mentioned in Mr. Buckley's report.

6. I am advised that the structural work on the first stage of the proposal will take about 2½ to 3 years to complete, and that until this part of the work is finished, it will not be possible to commence to instal the plant. The installation, including conversion and other incidental works required, is estimated to take about two years, making a total of from 4½ to 5 years from the date of the commencement of the work until the first stage can be put into operation.

7. In paragraph 3 of Sir Harry Luke's despatch under reference, it was stated that the total cost would not be less than £100,000. The original estimate was, however, prepared very roughly, and was admittedly only a tentative one. Moreover, it was based on the belief that the

366,400

the power station would be of normal form, and the proposal to construct it in the rock at the Marsa will very materially increase the expenditure. Further, apart from the additional structural cost, more detailed inquiry has revealed that the sum required for the plant has been seriously under-estimated. The cost of the structural work on the proposal indicated above is estimated at £230,000. In addition to that, it is estimated that the plant will cost £182,600 and the distribution system £155,300, making a total of £568,000. A summary of the various items in the estimate is attached, which includes the sum of £19,000 to cover the cost of acquiring the land on the top of the rock, which is at present in private ownership.

8. I am informed that the estimates in paragraph 6 above represent the minimum time in which it will be possible to carry out the work and having regard to the numerous disadvantages of the existing power station, I consider that there should be no avoidable delay in taking in hand the work. Funds would be required roughly as under:

1st Year	....	£ 71,250
2nd Year	....	£ 68,750
3rd Year	....	£141,750
4th Year	....	£ 78,650
5th Year	....	£ 72,300
		£432,700

The balance of £135,300 to make up the total of £568,000 would be spread over, at least, a further period of five years.

9. The financing of so large an undertaking would impose a serious strain on the normal revenue of this Government

Government and, even if possible, would certainly lead to the drastic curtailment of all other activities. I should be reluctant to follow this course, and, if the scheme now submitted is adopted, I am of opinion that the most satisfactory method of financing it will be by means of a loan. I will address you on this matter at a later date when the total likely commitments of this Government have been more clearly defined.

10. In view of the large sum involved, I think it is desirable that, before any further steps are taken, a thorough inquiry should be held on the spot into both the electrical and structural aspects of the scheme. Since, however, the proposals are still in a very early stage, I would suggest that it would be preferable to have these expert reports prepared by independent persons and not by a consulting engineer, whose views might possibly be influenced by considerations other than those of most weight to this Government. In regard to the electrical proposals an expert might perhaps be obtained from the staff of the Electricity Commission. The structural proposals are of an unusual nature and I am unable to suggest any source from which an expert adviser might be obtained. The expenses in connexion with the visits of these two experts will be borne by this Government, and I should be grateful if they could be sent to Malta as soon as may be convenient. Preferably they should both be in Malta at the same time.

I have, etc.,

(Sd.) Charles Bonham Carter.

Governor.

32438

32.

Copy

REVISED ESTIMATE FOR THE ERECTION OF A NEW BOMB-PROOF POWER STATION, INCLUDING CONVERSION FROM A SINGLE-PHASE, 100-PERIODS TO A THREE-PHASE, 50-PERIODS SYSTEM OF SUPPLY.

1. Structural Works.

Excavations	£107,000	
Lining the excavations with a concrete shell	65,600	
Expropriation of private property overlying the Station and approaches	19,000	
Building offices, workshop, stores, etc.	27,000	
	£218,600	
Contingencies - about 5%	11,400	£230,000

2. Plant - 1st stage.

Turbo sets, 2 in No., 6,000 kW/M.E.R., 11 kV., .8 p.f. each at £20,000..£	40,000	
Boilers, - 3 in No., evaporative capacity 40,000 lbs/hr. M.E.R., 225 lbs/sq.in. w.p. complete with superheater, economizer and mechanically driven stokers and auxiliary equipment, at £10,000 each	30,000	
Coal and ash handling plant	7,000	
Pipe work for steam, air, and water..	7,000	
Switchgear, - main and auxiliary	9,000	
Cables, lighting, etc.	4,000	
Workshop and testing equipment	2,000	
Complete air-conditioning plant, special lighting equipment and central-control equipment (made necessary by the peculiar construction of new Power House).....	25,000	
	£124,000	
Contingencies, 10%	12,400	136,400

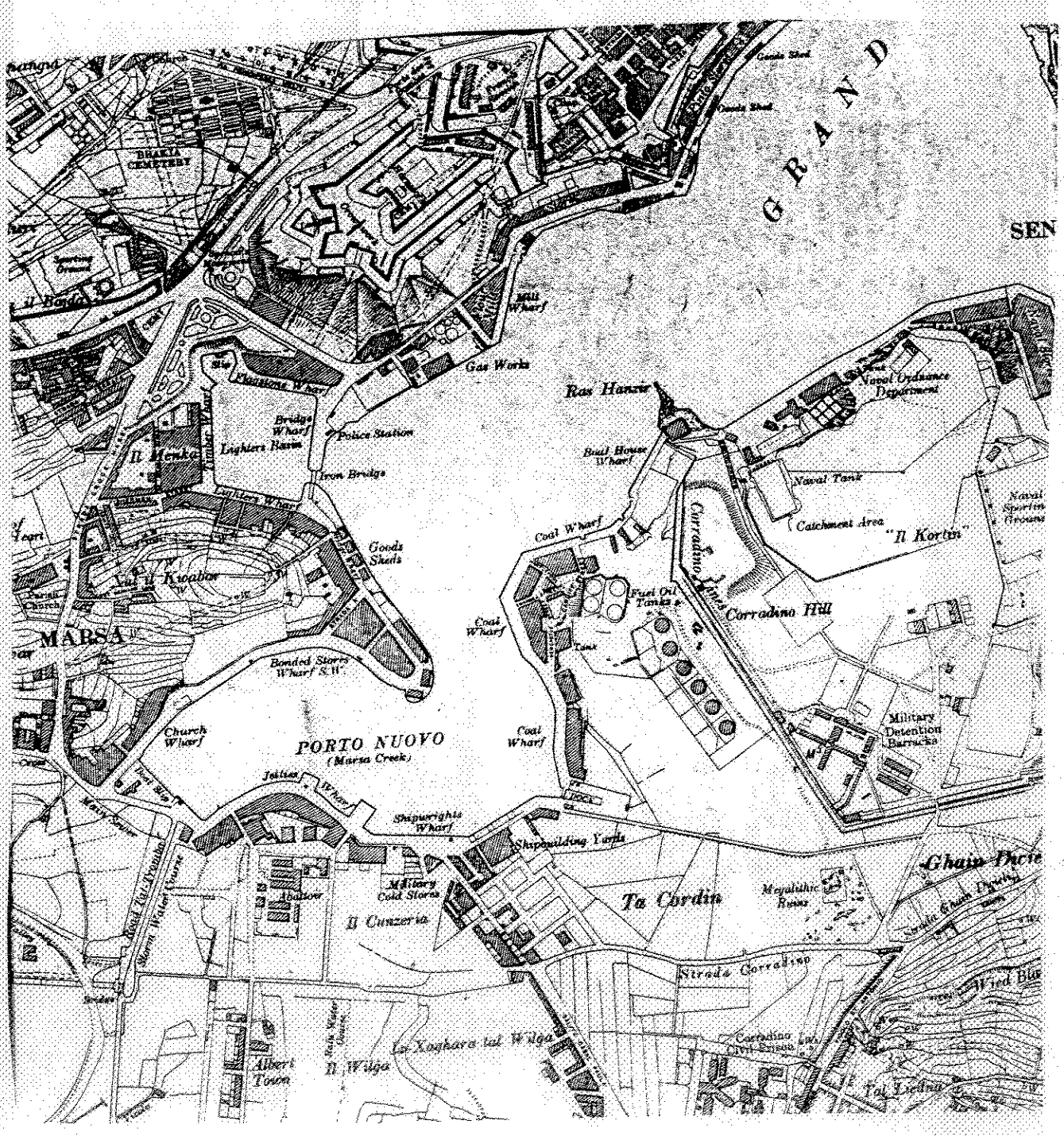
3. Distributory System.

Valletta H.T. feeders and distribution scheme	£ 27,392	
Carried forward	£27,392	£366,400

Brought forward	£ 27,392	£366,40
Conversion of L.T. bare aerial systems to the all-insulated type	£ 78,626	
Re-routing of and alterations to H.P. feeders in connection with New Power Station	21,122	
Cost of Replacements of Consumers' apparatus and other expenses incidental to conversion to the standard system of supply	28,221	
Contingencies, - (already provided for in individual items)	£155,361	£165,161

4. Plant - 2nd Stage.

Conversion of essential items of existing plant, for three-phase, 50 cycle operation	10,000	
Dismantling, transporting and re-erecting boilers, pumps, economizers, condensers and other salvable items of existing plant and machinery in new Power Station	10,000	
Pipe work for steam, water and air ...	7,000	
Switchgear, - main and auxiliary	9,000	
Cablee, lighting, etc.	4,000	
Workshop and testing equipment	2,000	
	£42,000	
Contingencies, 10%	4,200	46,200
		£567,961


GRAND
SEN
Gas Works
Ras Hanzir
Naval Ordnance Department
Naval Tank
Catchment Area
"Il Kortin"
Coal Wharf
Corradino Hill
Fuel Oil Tanks
Tank
Military Detention Barracks
Il Menka
Iron Bridge
Goods Sheds
MARSA
Bonded Stores
Wharf S.H.
PORTO NUOVO
(Marsa Creek)
Church Wharf
Coal Wharf
Shipwrights Wharf
Shipbuilding Yards
Ta Cordin
Megalithic Ruins
Il Cunzerja
Military Cold Stores
Abattoir
Strada Corradino
Albert Town
Il Wilga
Ghain Dhcie

Aerial view of the Grand Harbour in 1932 showing the Marsa area in the top left hand corner

Marsa ‘B’ Power Station site on commencement of works

Marsa ‘B’ Power Station site on commencement of works (Note entrance to the underground ‘A’ Station on the right-hand side)

Marsa ‘B’ Power Station site during foundation preparation

Attachment 14

Projected Emissions for Enemalta Power Plants

Projected Emissions for Enemalta Power Plants: 2008 -2010

The following are the estimated emissions of certain gaseous pollutants according to various scenarios of how plant is operated, and depending on the type new plant is purchased. The values have been estimated assuming the energy requirements predicted in Enemalta's Generating Plan.

Note that the fuels used are heavy fuel oil and gasoil.

The estimates take into account that plant at Marsa is operated for no longer than 20,000h after 1/1/2008. A range has been given since the emissions from the individual plants depend on the combined usage and hence the individual loading of the plants at Marsa and Delimara. Increasing the load on one plant will mean a reduction of the load on the other.

The plant is compliant with the LCPD.

Year	**Emission**	**Quantities**			
		Delimara Ranges		**Marsa Ranges**	
		From	**To**	**From**	**To**
2008	**NO_X**	3,202	2,830	2,060	2,524
	SO_2	3,516	3,523	4,994	6,132
	CO_2	1,199,968	1,100,198	787,275	966,941
2009	**NO_X**	3,267	2,938	2,293	2,706
	SO_2	3,549	3,553	5,503	6,515
	CO_2	1,202,488	1,113,928	865,803	1,025,633
2010	**NO_X**	3,428	2,748	938	1,986
CCGT Option	**SO_2**	3,239	3,675	2,261	4,829
	CO_2	1,544,539	1,347,601	356,061	761,418
	NO_X	4,401	3,520	938	1,986
SSD Option	**SO_2**	5,035	5,114	2,261	4,829
	CO_2	1,537,888	1,336,476	356,061	761,418

NOTE:

CCGT Option: ***Combined Cycle Gas Turbine*** plant operating on gasoil

SSD Option: ***Slow Speed Diesel*** plant operating on heavy fuel oil (HFO)