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## SOP-040





# Procedure for Seawater Discharge Analysis (Coordinated)

**Last Review Details – Refer to QPulse for full history**

Review Comments	Review Owner	Date
<QPulse_DocLastReviewDetails>		12/12/2018





**Latest Revision Details – Refer to QPulse for full history**

Revision number	Revision Details
2	Included extra words for sampling point SPD41 and for sampling point SPD32 in Clause 6.1” and extra details included in points 20 and 22 for a clearer explanation of the process

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## 1 Aim and scope

To determine the method for the collection of seawater discharge samples, analysis of laboratory results of the samples collected, calculation of total annual concentrations and total annual quantities of contaminants discharged from the main seawater discharge outlets. Reporting of these concentrations and total annual quantities discharged as per IPPC Framework permit and EPRTTR reporting obligations for the Main seawater discharge outlets marked as Points 1,2,3 and 4 according to the IPPC Framework permit IP 0002/07 (latest revision), which outlets are common to any two or to all three operators operating at Delimara Power Station, and their corresponding sampling points marked as SPXXN (where XX is either D3 or D4 and N is 1,2, 3 etc.) Sampling points are intermediate points leading to the main seawater discharge outlets. Seawater discharge samples can be collected from these points either when the main discharge point is inaccessible or else when deeper investigations are needed especially when readings at the main seawater discharge outlets yield high results which are above the specified emission limit values. Collection of seawater discharge samples from sampling points has an added advantage in that the sample collected is being discharged from one particular plant only and hence aids in traceability of results.

## 2 References

IPPC Permit IP 0002/07 – Framework Permit (latest revision)





ISO 5667-1: 2020

ISO 5667-3:2018

ISO 5667-7:1993

ISO 5667-10:2020

ISO 5667-14:- 2014

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### 3 Terms and Definitions

D3PG	Delimara 3 Power Generation Ltd
EGM	ElectroGas Malta Ltd
ENE	Enemalta plc
ERA	Environmental Resources Authority
IPPC	Integrated Pollution Prevention and Control
SP	Sampling point
ELV	Emission Limit Value

### 4 Responsibilities

**IPPC Coordinator** co-ordinates between the three operators (ENE, D3PG and EGM) operating at the DPS site and the local authority and works out the total annual seawater discharge concentrations and total annual quantities to be reported in the annual environmental report of the IPPC permit and EPRT report which reports are to be sent to the local authority

**Chemist** sets the annual schedule for sample collection according to the requirements of the IPPC permit, informs IPPC coordinator when the sampling will be carried out, collects the samples, and sends them to the laboratory for analysis and compares the results with the ELVs quoted in the IPPC permit

**Operations/Dispatch Engineer** keeps a record of the cooling water pumps flow on a monthly basis and sends this data to the IPPC coordinator





**Station Responsible** responsible for the day-to-day running of the plant and has the authority to implement any necessary corrective actions

**Plant Representative** nominated person representing the plant and the station responsible

### 5 Frequency

As a minimum, the frequency of collection of seawater discharge samples shall be as per schedule in IPPC permit.

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

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## 6 Detailed Procedural Rules

### 6.1 Collection of Samples

- 1) All main seawater discharge points and all sampling points (SP) are to be clearly labelled for easy identification.

For coordinated reporting there are four (4) main seawater discharge points.

These are:

- Point 1
- Point 2
- Point 3
- Point 4

Since the discharge from these 4 main points is made up of a combination of discharges resulting from the operations of 2 or 3 operators, six (6) sampling points were introduced prior to these main outlets. Samples shall also be collected from these intermediate points. The laboratory analysis results for the samples collected from the sampling points, will be referred to for deeper analysis when the laboratory results for the samples from the main discharge points exhibit high readings for any parameter/s.

The six sampling points are the following:

SPD41

SPD42





SPD31

SPD32

SPD33

SPD34

- 2) The chemist coordinating the collection of the samples is to inform the IPPC coordinator at least 1 day ahead when the water samples will be collected. The IPPC coordinator in turn will inform all 3 operators of this activity.
- 3) Each operator is to take note of the operations being carried out during the period that samples are to be collected
- 4) The frequency for the collection of samples from the main seawater discharge points 1 to 4 as per IPPC Framework permit, is shown in ANNEX1. The sampling frequency can be increased

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according to the results obtained during a particular quarter. The higher the number of samples analysed during the year the better since this would give a more realistic picture of the makeup of the water being discharged at the mentioned outlets throughout the year.





- 5) Samples are to be collected from the main outlets as well as from the various sampling points across the DPS site, on the same day and with a short time span between them. Where possible all outlets should be tested in Q1 so that a profile of the water being discharged can be drawn up for the main outlets. If a particular outlet is dry during the quarter when samples are being collected, then this has to be recorded as such and sampling for that outlet is to be referred to the next quarter.
- 6) The temperature and pH shall be measured and recorded for Discharge Point 4 and Seawater inlet (Blank). The parameters of the latter will be used as reference.
- 7) The monthly Cooling Water Pumps (CWP's) flow is required in order to calculate the annual seawater flow. The monthly flow is to be recorded by the Operations/Dispatch Engineer and is to be sent to the IPPC coordinator whenever this is requested by the latter.

## 6.2 Analysis of lab results

- 8) The chemist will carry out a comparison check, between the results obtained from the external laboratory for the samples taken from the main discharge outlets to the emission limit values specified in the IPPC permit. Refer to Annex 2.
- 9) If a parameter from the main discharge points exhibits a high value or is on the high side of the emission limit value, then the result of the respective sampling point/s associated to that outlet is/are to be analysed in more detail.

For the main discharge points that have more than 1 sampling point leading to them, the results for all sampling points associated to that outlet are to be compared with each other and then with those of the main discharge point itself. The plant generating the high concentration levels at the main discharge point will be identified from the results of the respective sampling point.

- 10) The chemist is to send the results and comments (if any) to the IPPC coordinator.
- 11) The IPPC coordinator after consulting with the chemist is to notify the station responsible Plant representative of each plant - Enemalta, D3PG and ElectroGas of the results and may ask for deeper investigations.
- 12) When a parameter/s for any outlet exceed/s the emission limit value (ELV) for that quarter, sampling from that point will be repeated during the next session until the result obtained is below the emission limit value (ELV).
- 13) If the concentration of any parameter/s remains consistently on the high side or exceeds the emission limit value, the IPPC coordinator will issue a request to the station responsible or plant representative to carry out a root-cause analysis to identify the cause of the problem and state which corrective actions will be implemented to correct it.
- 14) A trend analysis should also be carried out by the IPPC coordinator to identify whether the concentration levels at a particular outlet remained stable or if there were any changes over a period of time. Anomalous results which would have been identified during the quarter when these occurred would be marked as such.

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### 6.3 Reporting

15) The IPPC coordinator is responsible to report the water discharge analysis results for the main discharge points 1,2,3, and 4 to the authority as follows:

- (i) IPPC Quarterly report – measured concentration of parameters, temperature and pH
- (ii) IPPC Annual environmental report – measured concentration of parameters, temperature pH and flow for 4 quarters and total quantities discharged in kgs at each discharge point
- (iii) EPRT - The total quantities discharged at the main outfall in kgs

The total quantity discharged for each contaminant is obtained by calculating the average concentration for each contaminant from the quarterly readings and multiplying the result with the total annual flow for that outlet.

16) For Discharge Point 4 since the seawater being discharged at this outlet, is the seawater that entered the plant through the seawater inlet and which already contains a certain level of contamination, the actual concentration of contaminants at that outlet is obtained by subtracting the concentration of that parameter at the seawater inlet referred to as “blank”, from the concentration of that same parameter resulting at the Main Outfall. The resultant concentration referred to as “net concentration” gives the actual concentration level of contaminant resulting from the operation of the plant/s. These outlets are referred to as “process discharge points”.

17) For Discharge Point 3 or any discharge point where there is no seawater flow, the concentration of each parameter at the outlet is given directly by the concentration of the sample. These outlets are referred to as “non-process discharge points”.





18) Where the concentration of the parameter quoted in the laboratory analysis report is not an absolute value but is a range e.g. <10µg, then the concentration for that contaminant is taken to be half that range ie 5µg

19) The absolute value for the total quantity of contaminant discharged at any outlet is obtained by multiplying the concentration of that parameter with the total annual flow at that discharge point.

20) For Discharge Point 4, the total volume of wastewater discharged from this point is calculated by multiplying the CWP flow rate for each respective pump by the total number of hours that the pumps were in operation for the whole year, and then adding together the total annual volume for each pump to get the total overall volume of wastewater discharged at the main outfall.

21) For Discharge Point 3 the total wastewater discharged is worked out by multiplying the overall area from where the water being discharged is collected with the annual rain fall. In this case this means the total fuel oil bunds area multiplied by the annual rainfall.





22) The concentrations and annual quantities discharged for the respective year are to be reported to the authority by the IPPC coordinator on specific templates, by not later than end of March of the following year for EPRT reporting and end of June of the following year for the IPPC Annual Environmental report.

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## 7 Reference documents

CER-001 DPS Framework IPPC Permit.



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
## Annex 1





Parameter	Point 1 Quay	Point2 Side of seawater intake	Point 3 Oil Interceptor Tank Farm	Point 4 Main Outfall
Flow	-	-	Calculated rainfall x area	Quarterly Seawater pumps flow
pH	On sampling	On sampling	On sampling	Quarterly
Temperature	On sampling	On sampling	On sampling	Quarterly
BOD	X1	X1	X1	X1
Total Nitrogen	X1	X1	X1	X4
Phosphorus	X1	X1	X1	X1
Chlorine Dioxide	X1	X1	X1	X4
Arsenic	X1	X1	X1	X4
Cadmium	X1	X1	X1	X4
Chromium	X1	X1	X1	X2
Copper	X1	X1	X1	X4
Lead	X1	X1	X1	X4
Mercury	X1	X1	X1	X2
Nickel	X1	X1	X1	X4
Tin	X1	X1	X1	X1
Vanadium	X1	X1	X1	X1
Zinc	X1	X1	X1	X2
Total Petroleum Hydrocarbons	X1	X1	X1	X2
Tributyl Tin	X1	X1	X1	X4
Total Suspended Solids	X1	X1	X1	X1
Benzene	X1	X1	X1	X4
Benzo(a)pyrene	X1	X1	X1	X1
Benzo(b)fluoranthene, Benzo(k)fluoranthene	X1	X1	X1	X1
Benzo(g,h,i)-perylene, Indeno(1,2,3-cd)-pyrene				
C10- C13 Chloralkanes	X1	X1	X1	X1
Polychlorinated biphenyls	X1	X1	X1	X1

 Yellow Quarterly

 Green Six monthly

 White Annual

 Grey In case of oil spill only





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## Annex 2

### Discharge Point 4

Parameter	IPPC Emission limit value	Total load discharged (kgs) Net concentration x volume discharged	EPTR limits (kgs)
Flow	NA		
pH	6-10		
Temperature	8°C above marine water		
BOD	25mg/L		
Total Nitrogen	10mg/L		50,000
Phosphorus compounds as Total phosphorus	1mg/L		5,000
Chlorine dioxide and oxidants (given as chlorine)	0.3mg/L		2,000,000 (as total Cl)
Arsenic	5µg/L		5
Cadmium	0.2 µg/L		5
Chromium (Total)	0.5mg/L		50
Copper	0.5mg/L		50
Lead	1.3 µg/L		20
Mercury	0.05 µg/L		1
Nickel	8.6µg/L		20
Tin	1.0mg/L		
Vanadium	4mg/L		
Zinc	0.5mg/L		100
TPHs	5mg/L		
Tributyl tin	0.0002µg/L		1
Total Suspended Solids	35mg/L		
Benzene	8µg/L		200 (BTEX)
Benzo(a)pyrene	1.7x10 <sup>-4</sup>		
Benzo(b)fluoranthene	Sum of 2 PAHs:0.03µg/L		
Benzo(k)fluoranthene			
Benzo(g,h,i)-perylene	Sum of 2 PAHs:0.002µg/L		1
Indeno(1,2,3-cd)-pyrene			
Chloroalkanes	0.4µg/L		1
PCBs	3µg/L		0.1

**Total annual volume of waste water discharged = (Annual CWP's flow x hours of operation for ENE,D3PG,Electrogas)**

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### Discharge Point 3

Parameter	IPPC Emission limit value	Total load discharged (kgs) Net concentration x volume discharged	EPRTTR limits (kgs)
Flow	NA		
pH	6-10		
Temperature	8°C above marine water		
BOD	25mg/L		
Total Nitrogen	10mg/L		50,000
Phosphorus compounds as Total phosphorus	1mg/L		5,000
Chlorine dioxide and oxidants (given as chlorine)	0.3mg/L		2,000,000 (as total Cl)
Arsenic	5µg/L		5
Cadmium	0.2 µg/L		5
Chromium (Total)	0.5mg/L		50
Copper	0.5mg/L		50
Lead	1.3 µg/L		20
Mercury	0.05 µg/L		1
Nickel	8.6µg/L		20
Tin	1.0mg/L		
Vanadium	4mg/L		
Zinc	0.5mg/L		100
TPHs	5mg/L		
Tributyl tin	0.0002µg/L		1
Total Suspended Solids	35mg/L		
Benzene	8µg/L		200 (BTEX)
Benzo(a)pyrene	1.7x10 <sup>-4</sup> µg/L		
Benzo(b)fluoranthene	Sum of 2 PAHs:0.03µg/L		
Benzo(k)fluoranthene			
Benzo(g,h,i)-perylene	Sum of 2 PAHs:0.002µg/L		1
Indeno(1,2,3-cd)-pyrene			
C10 – C13 Chloroalkanes	0.4µg/L		1
PCBs	3µg/L		0.1

**Total annual volume of waste water discharged from Interceptor = Collection area x annual rainfall**