



SOP DPS 18

Transformer Bund and Reservoir Inspection, Maintenance and Cleaning

Revision List

Revision No.	Description	Written By/Revised By	Date
0	First issue	K. Agius	27.10.2010
1	Included reference to Phase 3 transformers and made minor changes to comply with current operational procedures	S. Scicluna	23.06.2014
2			

Revised by:	Verified by:	Approved by:
[signed] S. Scicluna Environmental Coordinator	[signed] J. Zammit Acting Manager Maintenance DPS	[signed] I. D'Amato Acting DPS Station Manager



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1 Aim and Scope

The objective of this SOP is to specify detailed rules, times and responsibility related to the Inspection, Maintenance and Cleaning of transformer bunds and reservoirs at Delimara Power Station. All oil filled transformers are indicated in **Annex 3 - DPS/XZ/88 – Transformer Layouts**, available on the Enemalta Intranet Portal at location:

[Documents/Environmental Management System/Drawings/DPS](#)

2 Reference

EN ISO 14001:04, clause 4.4.6

3 Terms and Definition

SOP Standard Operating Procedure

DPS Delimara Power Station

RE Responsible Engineer – Mechanical Maintenance Engineer

PMO Plant Maintenance Officer


MP Maintenance Personnel

BLK 4 Also referred to as Phase 3

4 Responsibilities

Responsible Engineer (RE) – Mechanical Maintenance Engineer

- Defines the bund and reservoir cleaning, inspection and maintenance plan and schedules the works as per **Annex 2 - Template 18.2 – Transformer bund wall inspection dates record logbook**
- Carries out the inspection and issues instructions for cleaning and maintenance tasks
- Keeps records of **Annex 1 – Template 18.1 – Transformer bund wall and reservoir certification form** for all inspections, cleaning and maintenance tasks performed

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Plant Maintenance Officer (PMO)

- Supervises cleaning and maintenance tasks of transformer bunds and reservoirs, as instructed by the RE, in compliance with this SOP

Maintenance Personnel (MP)

- Carry out clean-up and maintenance operations in compliance with this SOP and under the supervision of the PMO.

5 Operative Rules

5.1 Transformer Bund and Reservoir Inspection and Cleaning Procedure

This section stipulates how the transformer bunds and reservoirs should be inspected and cleaned. The RE will ensure that personnel will be deployed for this specific duty as stipulated in **Annex 2 – Template 18.2 - Transformer Bund Wall inspection dates record logbook**. The MPs will carry out the works under the supervision of the PMO. The following steps are to be followed sequentially:

1. Transformer reservoirs are to be inspected and cleaned at least once yearly, preferably during the summer months, and followed by checks for water content during the rainy season.
2. Area safety should be ensured when access manholes to reservoirs are open.
3. Phase 1 and Phase 2 transformer bunds are to be kept free of debris and checked on a regular basis for leaks during transformer washing by water deluge system.
4. Phase 3 (or Block 4) transformer bunds are to be inspected for leaks by filling the bunds with water and monitoring the water level in the sump situated in the front side of the bund.
5. Suitable lay down material has to be used adjacent to the bund/reservoir to prevent oil contamination (this includes oil absorbent pads and other spill control equipment).
6. For Phase 1 and Phase 2, water pumps are to be used case of oil presence or any water found in the chambers/sumps.



7. For Phase 3, the diaphragm pumps are to be used in case of oil presence or water inside the sumps since these are permanently installed in the bund. In case of oil presence, the contaminated gravel is to be removed from the bund and disposed of as per **SOP DPS 29 – Waste Management Procedure**. An amount of new gravel should replace the contaminated gravel removed.
8. Contaminated absorbent pads are to be disposed of as per **SOP DPS 29 – Waste Management Procedure**.
9. Following cleaning, the RE shall inspect the bund and reservoir using suitable test methods, such as focused light beams or fluorescent sprays in order to identify cracks. In case of Phase 3 transformers, this should be carried out before replacing the gravel inside the bund.
10. In case cracks are identified, the RE shall take immediate actions and initiate the “Bund and Reservoir Maintenance Procedure” as per Section 5.2 below.
11. The RE shall report the state of the bund and reservoir as per **Annex 1 – Template 18.1 – Transformer bund wall and reservoir certification form**.

5.2 ***Transformer Bund and Reservoir Maintenance Procedure***

This section stipulates how the bunds should be maintained following the recommendations of the RE after the “Transformer Bunds and Reservoir Inspection and Cleaning Procedure”, as per section 5.1. The RE will ensure that personnel will be deployed for this specific duty as stipulated by this SOP. The MPs will carry out the maintenance works under the supervision of the PMO. The following steps are to be followed sequentially:

1. Manholes should be opened and the area rendered safe.
2. The cracks identified should be maintained by an appropriate method and material, approved by the RE.
3. A water resistant coat is to be applied to ensure the bunds’ and reservoirs’ water tightness.
4. Following maintenance, the RE shall inspect the work done and confirm that the identified cracks were maintained or the recommended maintenance undertaken.



5. Following the maintenance procedure, the RE shall report the works carried out on the bund and reservoir as per **Annex 1 – Template 18.1 – Transformer bund wall and reservoir certification form**.

5.3 *Reporting*

The RE is to forward the original forms of **Annex 1 – Template 18.1 – Transformer bund wall and reservoir certification form** for every inspection and maintenance intervention, to the Maintenance Manager for archiving, together with an annual **Annex 2 – Template 18.2 – Transformer bund wall inspection dates record logbook** form and retain copies for operational reference.

6 Reference Documents

SOP DPS 29 – Waste Management Procedure

SOP DPS 23 – Oil and Chemical Procurement, Storage and Handling Procedure

EP 1 - DPS Emergency Plan



7 Annex 1

Template 18.1 – Transformer Bund Wall and reservoir certification form



Template 18.1 – Transformer bund wall and reservoir certification form

Transformer bund wall / Reservoir certification form

Date: _____

Transformer bund wall / reservoir inspected (Name and Code): _____

Work performed on bund wall / reservoir (check where applicable):

Inspection ☐

Cleaning ☐

Maintenance ☐

Description of works performed and findings:

Team involved in works:

Time taken to perform task: _____

I hereby certify that the tasks explained in the above work description has been performed

Recommended next inspection date: _____

Signature (RE) _____



8 Annex 2

Template 18.2 – Transformer Bund Wall and Reservoir Inspection Dates Record
Logbook



Template 18.2 – Transformer Bund Wall and Reservoir Inspection Dates

Record Logbook

Mechanical Maintenance Transformer bund wall inspection dates record logbook for the year		Year: _____
Name of Transformer/Reservoir	Transformer Code (as per drawing DPS/XZ/88)	Date of Next Inspection
Admin Building and Workshop Transformer 1	DMC 0EC-CT3030	
Admin Building and Workshop Transformer 2	DMC 0EC-CT3031	
EHV Substation Transformer 1	DMC 0EC-CT3021	
EHV Substation Transformer 2	DMC 0EC-CT3022	
Interbus Transformer 1	DMC 0EA-CT3005	
Interbus Transformer 2	DMC 0EA-CT3009	
Generator Transformer 1 (JB)	33GT1	
Generator Transformer 2 (JB)	33GT2	
Unit Transformer 1 (Phase 1)	DMC 1EA-CT3002	
Unit Transformer 2 (Phase 1)	DMC 2EA-CT3002	
GT Station Auxiliary Transformer	DMC 0EC-CT3034	
Water Treatment Plant Transformer 1	DMC 0EC-CT3028	
Water Treatment Plant Transformer 2	DMC 0EC-CT3029	
Station Transformer 1 (Phase 1)	DMC 0EB-CT3013	
Station Transformer 2 (Phase 1)	DMC 0EB-CT3016	
Generator Transformer 1 (Phase 1)	DMC 1EA-CT3000	
Generator Transformer 2 (Phase 1)	DMC 2EA-CT3000	
Unit Auxiliary Transformer 1 (Phase 1)	DMC 1EC-CT3004	
Unit Auxiliary Transformer 2 (Phase 1)	DMC 2EC-CT3004	
Station Auxiliary Transformer 1 (Phase 1)	DMC 0EC-CT3023	
Station Auxiliary Transformer 2 (Phase 1)	DMC 0EC-CT3024	
Essential Services Transformer 1 (Phase 1)	DMC 0EC-CT3019	

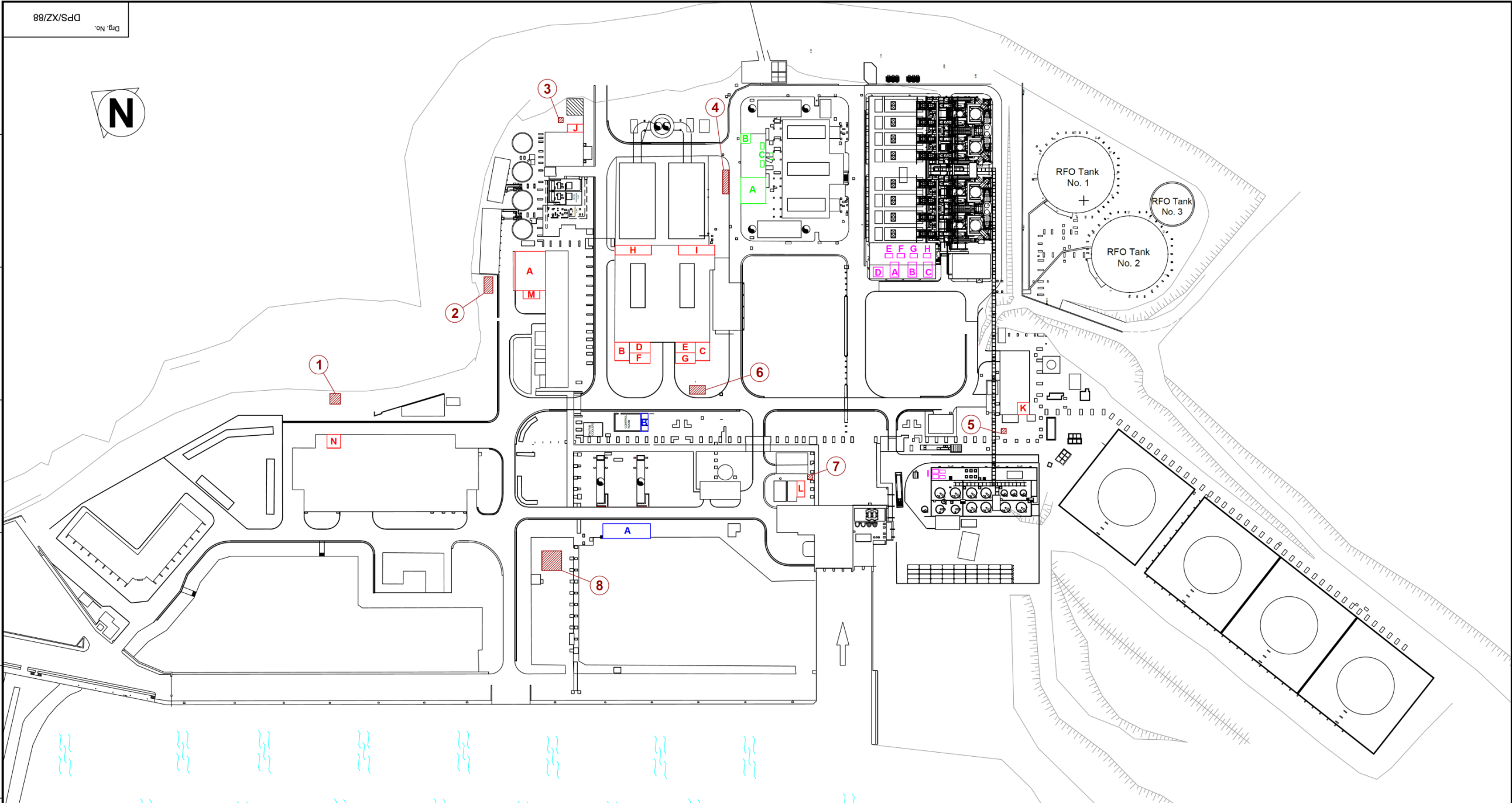


Essential Services Transformer 2 (Phase 1)	DMC 0EC-CT3020	
Unit Transformer 3 (UT3) (Phase 2B)	DMC 3EA-CT3002	
Block Main Transformer 3 (BMT 3) (Phase 2B)	DMC 3EA-CT3000	
CW and Chlorination Plant Transformer 1	DMC 0EC-CT3032	
CW and Chlorination Plant Transformer 2	DMC 0EC-CT3033	
Fuel Oil Plant Transformer 1	DMC 0EC-CT3025	
Fuel Oil Plant Transformer 2	DMC 0EC-CT3026	
Administration building & workshop transformers containment	-	
Interbus transformers and EHV transformers containment	-	
Water treatment plant transformers containment	-	
Phase 2B transformers containment	-	
Fuel oil plant transformers containment	-	
Phase 1 Transformers containment	-	
CW and chlorination transformers containment	-	
Containment Marked No.8 in Drawing DPS/XZ/88	-	
Main Block Transformer 3 (Block 4)	BAT 30	
Main Block Transformer 2 (Block 4)	BAT 20	
Main Block Transformer 1 (Block 4)	BAT 10	
Start Up Transformer (STT41) (Block 4)	BCT 10	



9 Annex 3

DPS/XZ/88 – Transformer Layouts



PHASE 1 TRANSFORMERS				PHASE 1 TRANSFORMERS				PHASE 2a TRANSFORMERS				Block 4 TRANSFORMERS				CONTAINMENT	
Trans.	Name	Code	Drg. No.	Trans.	Name	Code	Drg. No.	Trans.	Name	Code	Drg. No.	Trans.	Name	Code	Drg. No.	Area	Location
A	Interbus transformer 1	DMC0EA - CT3005	DMC/EM/20660	K	Fuel oil plant transformer 1	DMC0EC - CT3025	DMC/EC/22661	A	Generator transformer 1	GT1	D2A/EA/01000	A	Main block transformer 3	BAT 30		1	Administration building & Workshop transformers
	Interbus transformer 2	DMC0EA - CT3009	DMC/EM/20660		Fuel oil plant transformer 2	DMC0EC - CT3026	DMC/EC/22661		Generator transformer 2	GT2	D2A/EA/01000	B	Main block transformer 2	BAT 20		2	Interbus Transformers and EHV transformers
B	Station transformer 1	DMC0EB - CT3013	DMC/EB/20660	L	CW & chlorination transformer 1	DMC0EC - CT3032	DMC/EC/22661	B	Unit auxiliary transformer 1 (UAG1)	DMC1EC - CT3104	D2A/EB/01005	C	Main block transformer 1	BAT 10		3	Water treatment plant transformers
C	Station transformer 2	DMC0EB - CT3016	DMC/EB/20660		CW & chlorination transformer 2	DMC0EC - CT3033	DMC/EC/22661		Unit auxiliary transformer 2 (UAG2)	DMC1EC - CT3104	D2A/EB/01005	D	Start up transformer (STT41)	BCT 10		4	Phase 2b transformers
D	Unit transformer 1	DMC1EA - CT3002	DMC/EA/21660	M	EHV substation transformer 1	DMC0EC - CT3021	DMC/EC/22661		GT station aux. transformer (SAT2)	DMC0EC - CT3034	D2A/EB/01000	E	Unit auxiliary transformer 42	BFT 20		5	Fuel oil plant transformers containment
E	Unit transformer 2	DMC2EA - CT3002	DMC/EA/21660		EHV substation transformer 2	DMC0EC - CT3022	DMC/EC/22661					F	Unit auxiliary transformer 41	BFT 10		6	Phase 1 transformers
F	Generator transformer 1	DMC1EA - CT3000	DMC/EA/20660	N	Admin Bldg & workshop transformer 1	DMC0EC - CT3030	DMC/EC/22661					G	Unit auxiliary transformer 43	BFT 30		7	CW and chlorination transformers
G	Generator transformer 2	DMC2EA - CT3000	DMC/EA/20660		Admin Bldg & workshop transformer 2	DMC0EC - CT3031	DMC/EC/22661					H	Unit auxiliary transformer 44	BFT 40		8	Phase 2a transformers
H	Essential services transformer 1	DMC0EC - CT3019	DMC/EC/21661									I	Unit auxiliary transformer (UAT 45)	BFT 50			
	Station auxiliary transformer 1	DMC0EC - CT3023	DMC/EC/20661										Unit auxiliary transformer (UAT 46)	BFT 60			
	Unit Auxiliary transformer 1	DMC1EC - CT3004	DMC/EC/21661										Auxiliary transformer 41	BGT 10			
I	Essential services transformer 2	DMC0EC - CT3020	DMC/EC/21661										Auxiliary transformer 42	BGT 20			
	Station auxiliary transformer 2	DMC0EC - CT3024	DMC/EC/20661														
	Unit Auxiliary transformer 2	DMC2EC - CT3004	DMC/EC/21661														
J	Water treatment plant transformer 1	DMC0EC - CT3028	DMC/EC/22661														
	Water treatment plant transformer 2	DMC0EC - CT3029	DMC/EC/22661														

REV	DATE	BY	ALTERATION	CHK	APP

enemalta	
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	
TITLE	
Delimara Power Station	
Transformers	
SCALE	ISSUE
DRAWN BY	DATE
CHECKED BY	DRG. No.
APPROVED BY	DPS/XZ/88