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# DPS SOP 16

## Operations SF<sub>6</sub> Management and Leaks Control

### Revision List


Revision No.	Description	Written By/ Revised By	Date
0	First issue	K. Agius	16.09.2010
1	Updated template layout 16.1 and 16.2	N. Grech	27.04.2012
2	Updated Responsibilities, Terms and Definitions, Operative rules (pressure controls) and References sections to reflect current operational practices.	R. Briffa	16.05.2014
3			
4			

Revised by:      [signed] D. Micallef DPS Operations Engineer  [signed] S. Scicluna Environmental Coordinator	Verified by:      [signed] R. Briffa Acting Operations Manager DPS	Approved by:      [signed] I. D'Amato Acting DPS Station Manager
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## 1. Aim and Scope

The objective of this operational procedure is to specify detailed rules, times and responsibility related to SF<sub>6</sub> controls at Delimara Power Station.

This SOP defines rules to carry out controls on all bay controllers of the SF<sub>6</sub> filled switchgear.

The SOP is addressed to the Operation Section.


## 2. References

EN ISO 14001:04, clause 4.4.6

EN ISO 14001:04, clause 5.1

## 3. Terms and Definitions

RE	Responsible Engineer – Shift Operations Engineer
Block 4	Phase 3 Plant
GO CCR	Central Control Room Generation Officer
GO BLK 4	Phase 3 Generation Officer
SO CCR	Senior Operator of Central Control Room
SO Phase 3	Senior Operator of Phase 3

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## 4. Responsibilities

### Responsible Engineer (RE)

- The RE responsible for Phase 1 and Phase 2B supervises that on a daily basis, **Annex 1 - Template 16.1 - 33kV SF<sub>6</sub> Checks** and **Annex 2 – Template 16.2 – 132kV SF<sub>6</sub> Checks** are being filled in for all 132kV, 33kV and 13.8kV switchgear (associated with feeders Phase 1, Phase 2A and Phase 2B switchgear)
- The RE responsible for Phase 3 supervises that on an every shift basis, SF<sub>6</sub> checks are carried out on all Phase 3 (or Block 4) 132kV and 15kV switchgear and that results are logged on the **Phase 3 Electrical Local reading No.2 Logsheets**
- Initiates corrective measures procedure if a leak or a pressure decrease or an SF<sub>6</sub> gauge indicator showing RED is identified

### Generation Officer (GO CCR)


- Receives and evaluates the records relating to the daily controls
- Alerts RE to any suspected gas leak
- Assists Maintenance Section when checking for leaks

### Generation Officer (GO BLK 4)

- Receives, evaluates and stores the records relating to the per-shift controls
- Alerts RE to any suspected gas leak
- Assists Maintenance Section when checking for leaks

### Operation Personnel (SO CCR) & Operation Personnel (SO Phase 3)

- Logs and evaluates data in accordance with this procedure and operative instructions manuals
- Alerts GO of the respective section (GO BLK 4 or GO CCR) of any suspected gas leak

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## 5. Operative Rules

### 5.1 Pressure Controls

The pressure control is a visual check of the various switchgear compartments' pressure indicators. This shall be carried out by the Operations Section on a daily basis or per shift basis according to the section.

In the case of the feeders, Phase 1, Phase 2A and Phase 2B related switchgear, each bay controller at the 132kV, 33kV and 13.8kV switchgear bays shall have its pressure gauges monitored and readings logged in an appropriate sheet by the SO CCR.


Data shall be recorded in **Annex 1 – Templates 16.1 - 33kV SF<sub>6</sub> Checks** and **Template 16.2 - 132 kV SF<sub>6</sub> Checks** respectively and kept by the GO CCR. The daily recorded data is cross-checked against previous trends to identify any significant gas pressure variations. Suggested limits are indicated for each particular compartment (included in both templates) intended as guidelines to draw the attention of RE. The RE shall send the weekly template to the Operations Manager for filing.

In the eventuality that a bay controller's gas pressure falls significantly, the GO CCR shall inform the RE. The RE shall evaluate from the gas pressure decay rate, the urgency of the situation and initiates the procedure to take the necessary corrective measures.

In the case of Phase 3, the 132kV and 15kV switchgear are equipped with SF6 pressure colour coded indicators (green => pressure healthy, red=> low or high pressure). In the case of an SF6 gauge indicating RED on the high pressure side, this could indicate a high working temperature situation and must be reported immediately to the RE.

Data shall be recorded 2 times daily (once every shift) by the SO Phase 3 and logged in the **Electrical Local readings No. 2 Logsheet**. In the event that one of the indicators is indicating a red status, the GO BLK4 shall inform the RE. The RE shall evaluate from the gas pressure decay rate, the urgency of the situation and shall initiate the procedure to take the necessary corrective measures.

The **Electrical Local readings No. 2 Logsheet** is stored in the CCR Logsheets Locker and is to be readily available to the Operations Manager when required.

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The RE shall either request Maintenance Engineer's immediate assistance or informs Maintenance Engineer through the normal daily fault reporting system (SAP).

Maintenance Section Engineer shall instruct his personnel to intervene according to **SOP DPS 11 - Maintenance of Equipment Containing SF<sub>6</sub> Management and Leaks Control**.

## **5.2 Leak Detection**

In case the SO CCR notices a decrease in the SF<sub>6</sub> pressure in the switchgear rooms, the RE and/or the GO CCR must use the portable SF<sub>6</sub> detector found in the 33kV room to confirm the leakage or otherwise. It is suggested that if the Maintenance Personnel are present when the leak is detected, they are called for assistance during this test. The above mentioned detector is also used when the switchgear probes are removed from the VTs and a sealing cover is installed instead to test whether the cover is sealing properly. Any leaks are stopped by replacing the blanking caps.

## **5.3 Instruments Verification and/or Calibration**

### **5.3.1 SF<sub>6</sub> Leak Detector**


The SF<sub>6</sub> detector is to be verified by and as per manufacturer's recommendations by the Maintenance Section and records of this verification shall be retained by the Maintenance Manager.

## **5.4 Reporting**

Signed weekly SF<sub>6</sub> switchgear inspections are to be sent by the RE to the Operations Manager and should be available upon request.

## **6. Reference Documents**

SOP DPS 11 - Maintenance of Equipment Containing SF<sub>6</sub> (Management and Leaks Control)  
Electrical Local Reading no.2 Logsheet


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## Annex 1

Template 16.1 - 33kV SF<sub>6</sub> Checks

Date:		DATE:									Leak
	33KV switchgear	Compartment	Report	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Check
	Bay 1- Marsascala 2 (feeder 7)	Cable / Breaker	0.15 bar								
		Busbar 1A	0.15 bar								
Busbar 2		0.15 bar									
Engineer's Signature:	Bay 2 – G/T Alternator 1 (Phase 2A)	Cable / Breaker	0.15 bar								
		Busbar 1A	0.15 bar								
		Busbar 2	0.15 bar								
	Bay 3 – Freeport (feeder 5)	Cable / Breaker	0.15 bar								
	Bay 4 – Tarxien (feeder 3)	Cable / Breaker	0.15 bar								
	Bay 5 – Tarxien (feeder 1)	Cable / Breaker	0.15 bar								
	Bays 3, 4, 5	Busbar 1A	0.15 bar								
	Bays 3, 4, 5	Busbar 2	0.15 bar								
	Bay 6 – Interbus	Cable / Breaker	0.15 bar								
	Bays 6, 7, 8, 9A	Busbar 1A	0.15 bar								
	Bays 6, 7, 8, 9A	Busbar 2	0.15 bar								
Template 16.1 - DPS Operations Section: 33KV Switchgear SF <sub>6</sub> Management and Leaks Control	Bay 7 – Station Transformer	Cable / Breaker	0.15 bar								
	Bay 8 – Bus Coupler	Cable / Breaker	0.15 bar								
	Bay 9 – Main Bus Section	Cable / Breaker	0.15 bar								
	Press Nitrogen Vessel A / B	Cable Gland	5 psi								
	Bay 9 – Main Bus Section	Cable / Breaker	0.35 bar								
	Bay 10 – Station	Cable / Breaker	0.15 bar								
	Bay 11 - Interbus	Cable / Breaker	0.15 bar								
	Bay 12 – Tarxien (feeder 2)	Cable / Breaker	0.15 bar								
	Bays 9B, 10, 11, 12	Busbar 1B	0.15 bar								
	Bays 9B, 10, 11, 12	Busbar 2	0.15 bar								
	Bay 13 – For future use	Cable / Breaker	0.15 bar								
	Bays 13, 14	Busbar 1B	0.15 bar								
	Bays 13, 14	Busbar 2	0.15 bar								
	Bay 14 – Marsascala 1	Cable / Breaker	0.15 bar								
	Bay 15 – G/T Alternator 2 (Phase 2A)	Cable / Breaker	0.15 bar								
		Busbar 1B	0.15 bar								
		Busbar 2	0.15 bar								
	Bay 16 – For future use	Cable / Breaker	0.15 bar								
		Busbar 1B	0.15 bar								
		Busbar 2	0.15 bar								



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## Annex 2

Template 16.2 – 132kV SF<sub>6</sub> Checks

Date	132KV Switchgear	DATE:									Leak Check
		Compartment	Report	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
Engineer's Signature	Bay 1 – For future use	CB	5 bar								
		Arcing	7 bar								
		Cable Box	5 bar								
	Bay 2 – Block 3 Main Tx (Phase 2B)	CB	5 bar								
		Arcing	7 bar								
		Cable Box	5 bar								
	Bay 3 – For future use	CB	5 bar								
		Arcing	7 bar								
	Bay 4 – Marsa South Feeder 3	CB	5 bar								
		Arcing	7 bar								
		Cable Box	5 bar								
Template 16.2 - Operations Section: 132kv Switchgear SF <sub>6</sub> Management and Routine Leaks' Check (Page 1 of 2)	Bay 5 – Marsa South Feeder 1	CB	5 bar								
		Arcing	7 bar								
		Cable Box	5 bar								
	Bay 6 – Generator Tx 1 (Phase 1)	CB	5 bar								
		Arcing	7 bar								
		Cable Box	5 bar								
	Bay 7 – Interbus Transformer 1	CB	5 bar								
		Arcing	7 bar								
		Cable Box	5 bar								
	Bay 8 – Bus Coupler 1	CB	5 bar								
		Arcing	7 bar								
	Bay 9 – Bus Section Reserve BB	Connection Chamber	5 bar								
	Bay 10 – Bus Section Main BB	CB	5 bar								
		Arcing	7 bar								
	Bay 11 – Bus Coupler 2	CB	5 bar								
		Arcing	7 bar								
	Bay 12 – Interbus Transformer 2	CB	5 bar								
		Arcing	7 bar								
		Cable Box	5 bar								



Date	132KV Switchgear	DATE:									Leak Check
		Compartment	Report	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
Engineer	Bay 13 – Generator Tx 2 (Phase 1)	CB	5 bar								
		Arcing	7 bar								
		Cable Box	5 bar								
Engineer	Bay 14 – Marsa South feeder 2	CB	5 bar								
		Arcing	7 bar								
		Cable Box	5 bar								
Engineer	Bay 15 – Mosta Feeder	CB	5 bar								
		Arcing	7 bar								
		Cable Box	5 bar								
Engineer	Bay 16 – Interconnector to Blk 4	CB	5 bar								
		Arcing	7 bar								
		Cable Box	5 bar								
Engineer	Bay 17 – For future use	CB	5 bar								
		Arcing	7 bar								
		Cable Box	5 bar								
Engineer	Bay 18 – For future use	CB	5 bar								
		Arcing	7 bar								
		Cable Box	5 bar								
Engineer	Main Busbar A		5 bar								
	Main Busbar B		5 bar								
	Reserve Busbar C		5 bar								
	Reserve Busbar D		5 bar								
Engineer	Operator										
	13.8kV Switchgear	Compartment	Report								
			kPa								
	Gas Turbine Generator 3A	Breaker	630-								
	Gas Turbine Generator 3B	Breaker	630-								
	Steam Turbine Generator 3	Breaker	630-								