

#### Generation

Nkangala District Municipality

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Attention:

Mr V Mahlangu

AND

Directorate: Air Quality Management

Services

The Chief Director:

Mr S S Maluleka

Department of Environmental Services

Private Bag X447

**PRETORIA** 

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Total number of annexes:1

# **Duvha POWER STATION**

Atmospheric Emission License 17/4/AEL/MP312/11/07

AL MANAGER

2023/01/09

DATE



# **DUVHA POWER STATION MONTHLY EMISSIONS REPORT**

Atmospheric Emission License 17/4/AEL/MP312/11/07



# 1 RAW MATERIALS AND PRODUCTS

Raw Materials	Raw Material Type	Units	Maximum Permitted Consumption Rate	Consumption Rat Jul-2022	
and	Coal Tons		1 400 000	500 606.35	
Products	Fuel Oil	Tons	5 000	3745.47	
	Product / By-	Units	Maximum Production	Production Rate	
Production	Product Name	Units	Capacity Permitted	Jul-2022	
Production Rates		Units	The state of the s		

# **2 ENERGY SOURCE CHARACTERISTICS**

Coal Characteristic	Units	Stipulated Range	Monthly Average Conten	
Sulphur Content	%	0.6 TO >1.2	0.84	
Ash Content	%	27 TO 30	27.03	

# 3 EMISSION LIMITS (mg/Nm³)

Associated Unit/Stack	PM	sox	NOx	
Unit 1	100	3500	1100	
Unit 2	100	3500	1100	
Unit 3	100	3500	1100	
Unit 4	100	3500	1100	
Unit 5	100	3500	1100	
Unit 6	100	3500	1100	

# 4 ABATEMET TECHNOLOGY (%)

Associated Unit/Stack	Technology Type	Efficiency Jul- 2022	Technology Type	SO3 Utilization Jul-2022	
Unit 1	FFP	99.9%	n/a	n/a	
Unit 4	ESP + SO <sub>3</sub>	99.3%	SO <sub>3</sub>	98.1%	
Unit 5	ESP + SO <sub>3</sub>	99.4%	SO <sub>3</sub>	98.9%	
Unit 6	ESP + SO <sub>3</sub>	99.2%	SO₃	94.7%	

Note: ESP and FFP plants do not have bypass mode operation, hence plant 100% Utilised.

# **5 MONITOR RELIABILITY (%)**

Associated Unit/Stack	PM	SO <sub>2</sub>	NO
Unit 1	95.6	80.0	80.0
Unit 4	99.7	99.8	99.8
Unit 5	99.8	99.6	99.4
Unit 6	65.2	99.7	99.7

Note: NOx emissions is measured as NO in PPM. Final NOx value is expressed as total NO2

## **6 EMISSION PERFORMANCE**

Table 6.1: Monthly tonnages for the month of July 2022

Associated Unit/Stack	PM (tons)	SO <sub>2</sub> (tons)	NO <sub>x</sub> (tons)
Unit 1	20.4	1 980	1 004
Unit 4	155.9	1 878	1 026
Unit 5	199.8	3 078	1 472
Unit 6	208.6	1 920	1 043
SUM	584.71	8 857	4 545

Table 6.2: Operating days in compliance to PM AEL Limit - July 2022

		,	,			
Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average PM (mg/Nm³)
Unit 1	23	0	0	0	0	12.1
Unit 4	11	5	3	0	8	147.6
Unit 5	17	11	2	0	13	103.9
Unit 6	16	4	3	0	7	158.3
SUM	64	23	8	0	31	

Table 6.3: Operating days in compliance to SOx AEL Limit - July 2022

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SOx (mg/Nm³)
Unit 1	24	0	0	0	0	1 185.6
Unit 4	21	0	0	0	0	1 512.2
Unit 5	30	0	0	0	0	1 626.6
Unit 6	25	0	0	0	0	1 650.3
SUM	100	0	0	0	0	

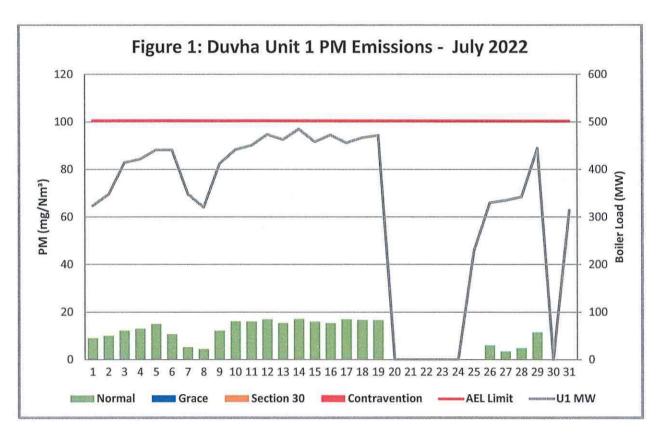
Table 6.4: Operating days in compliance to NOx AEL Limit - July 2022

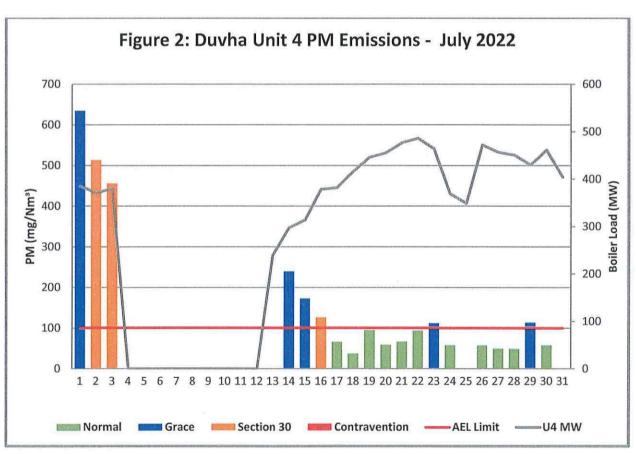
Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NOx (mg/Nm³)
Unit 1	24	0	0	0	0	592.0
Unit 4	21	0	0	0	0	819.7
Unit 5	30	0	0	0	0	769.3
Unit 6	25	0	0	0	0	899.5
SUM	100	0	0	0	0	

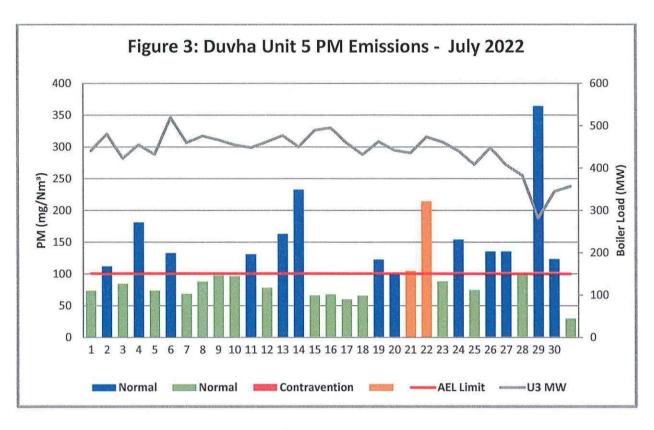
Note: NOx emissions is measured as NO in PPM. Final NOx value is expressed as total NO2

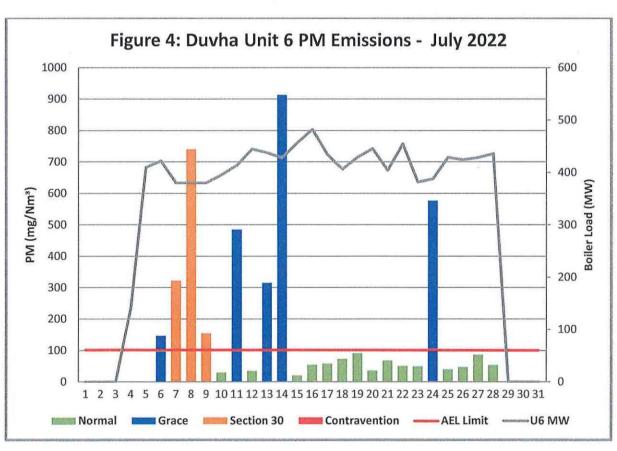
Table 6.5: Legend Description

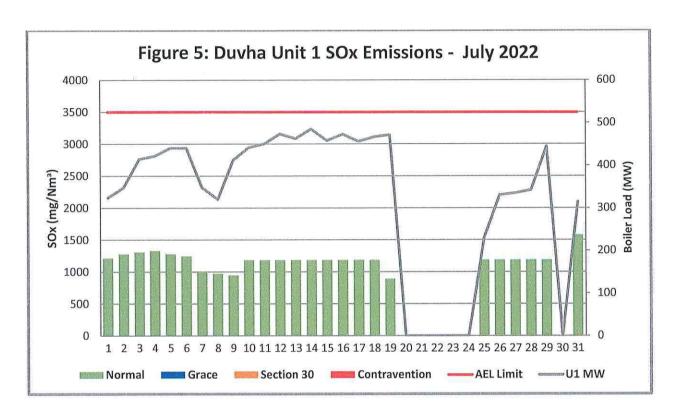
Condition	Colour	Description			
Normal	Marian Company	Emissions below Emission Limit Value (ELV)			
Grace		Emissions above the ELV during grace period			
Section 30		Emissions above ELV during a NEMA S30 incident			
Contravention		Emissions above ELV but outside grace or S30 incident conditions			

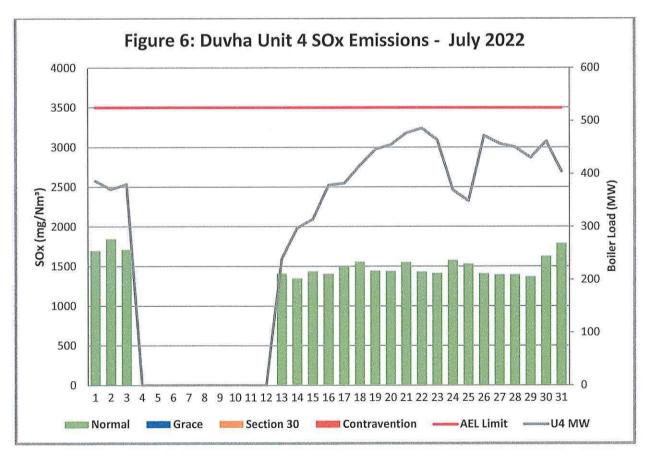


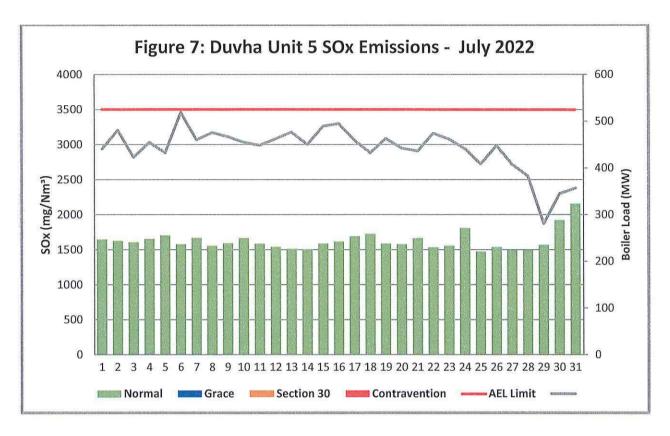


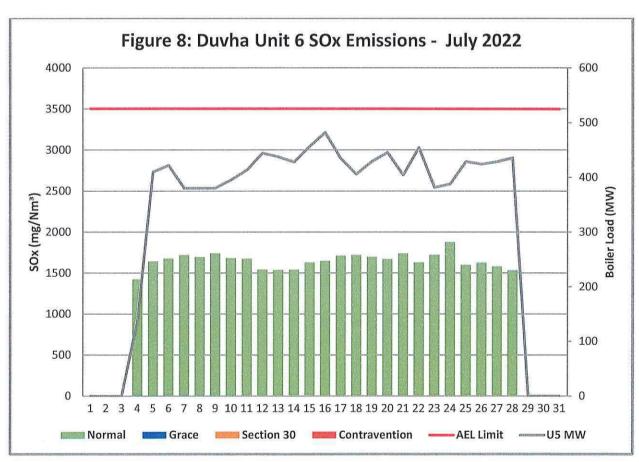


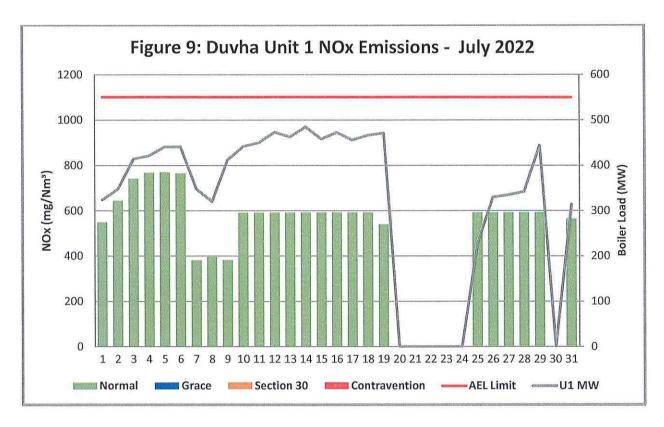


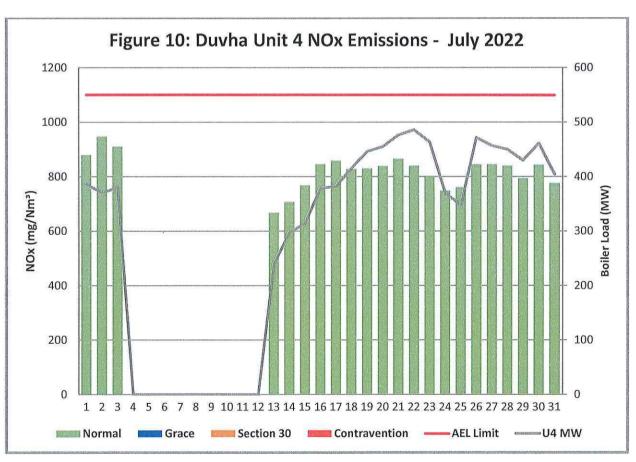


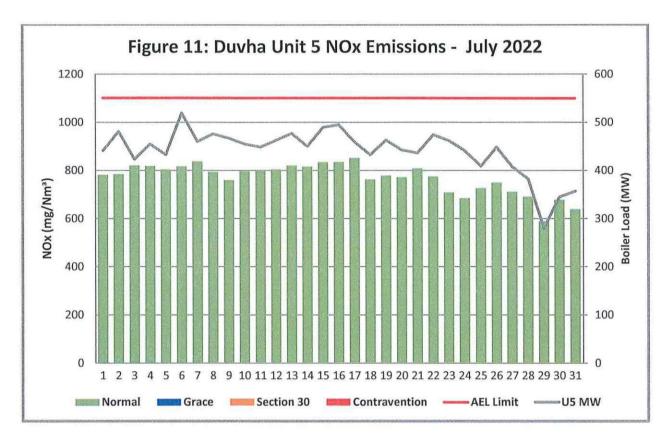


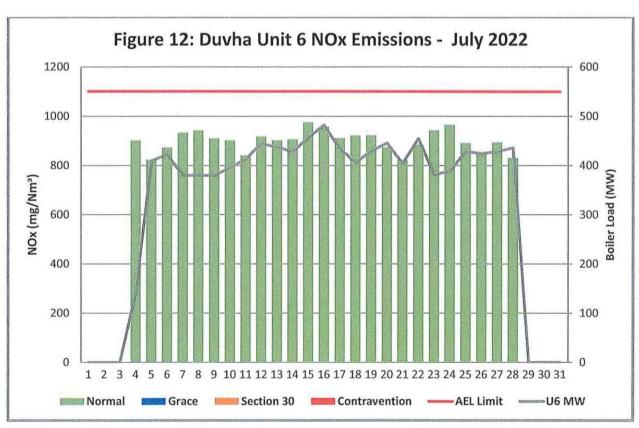












# 7 SHUT DOWN AND LIGHT UP INFORMATION

Tables 7.1: Shut-down and light-up information for the month of July 2022

Unit No.1	Ev	ent 1	Event 2		
Breaker Open (BO)	10:30 pm	2022/07/19	9:25 am	2022/07/29	
Draught Group (DG) Shut Down (SD)	11:00 am	2022/07/20	12:20 am	2022/07/30	
BO to DG SD (duration)	00:12:30	DD:HH:MM	00:14:55	DD:HH:MM	
Fires in time	12:40 pm	2022/07/25			
Synch. to Grid (or BC)	7:35 pm	2022/07/25			
Fires in to BC (duration)	00:06:55	DD:HH:MM		DD:HH:MM	
Emissions below limit from BC (end date)	not > limit	not > limit			
Emissions below limit from BC (duration)	n/a	DD:HH:MM		DD:HH:MM	

Unit No.4	Event 1		Event 2		Event 3	
Breaker Open (BO)	1:50 am	2022/07/03	BO previously	BO previously	8:00 pm	2022/07/24
Draught Group (DG) Shut Down (SD)	6:20 am	2022/07/03	n/a	n/a	10:35 pm	2022/07/24
BO to DG SD (duration)	00:04:30	DD:HH:MM	n/a	DD:HH:MM	00:02:35	DD:HH:MM
Fires in time			10:20 pm	2022/07/12	1:25 am	2022/07/25
Synch. to Grid (or BC)			5:50 am	2022/07/13	9:50 am	2022/07/25
Fires in to BC (duration)		DD:HH:MM	00:07:30	DD:HH:MM	00:08:25	DD:HH:MM
Emissions below limit from BC (end date)			12:00 am	2022/07/17	12:00 am	2022/07/26
Emissions below limit from BC (duration)		DD:HH:MM	03:18:10	DD:HH:MM	00:14:10	DD:HH:MM

Unit No.5	Event 1				
Breaker Open (BO)	9:20 am	2022/07/29			
Draught Group (DG) Shut Down (SD)	DG did not trip or SD	DG did not trip or SD			
BO to DG SD (duration)	n/a	DD:HH:MM			
Fires in time					
Synch. to Grid (or BC)					
Fires in to BC (duration)		DD:HH:MM			
Emissions below limit from BC (end date)					
Emissions below limit from BC (duration)		DD:HH:MM			

Unit No.6	Ev	ent 1	Event 2		
Breaker Open (BO)	BO previously	BO previously	10:45 pm	2022/07/28	
Draught Group (DG) Shut Down (SD)	n/a	n/a	10:40 pm		
BO to DG SD (duration)	n/a	DD:HH:MM	02:23:55	DD:HH:MM	
Fires in time	5:45 am	2022/07/04			
Synch. to Grid (or BC)	5:35 am	2022/07/05			
Fires in to BC (duration)	00:23:50	DD:HH:MM		DD:HH:MM	
Emissions below limit from BC (end date)	8:00 pm	2022/07/06			
Emissions below limit from BC (duration)	01:14:25	DD:HH:MM		DD:HH:MM	

#### **8 GENERAL**

Units 2 and 3 were offload during the month of July 2022.

#### Exceedances:

#### Unit 4:

#### 01-03/07/2022

The 72 hours allowable for a cold unit light up were exceeded from the 02<sup>nd</sup> of July 2022. A
NEMA Section 30 Emergency incident was reported to your office on 06/07/2022. The final
investigation report was submitted to your office on 15/09/2022.

#### 14-17/07/2022

The 72 hours allowable for a cold unit light up were exceeded from the 17<sup>th</sup> of July 2022. A
NEMA Section 30 Emergency incident was reported to your office on 21/07/2022. The final
investigation report was submitted to your office on 15/09/2022.

## 23/07/2022

 Electrostatic Precipitator Fields 2.3 and 3.3 were not in service due to unavailability of spares.

#### 29/07/2022

Dust Handling plant tripped and the SO3 plant tripped twice.

#### Unit 5:

## 02/07/2022

High back-end temperatures after sootblowing conducted.

## 04/07/2022

High back-end temperatures after sootblowing conducted.

#### 06/07/2022

High back-end temperatures after sootblowing conducted.

## 11/07/2022

- All Dust Handling plant slides were closed due to high silo level.
- Electrostatic Precipitator fields 1.5 was tripping on undervoltage, 4.2 was off while 1.2 was performing low.

#### 13-14/07/2022

- Right hand Dust Handling plant Aeroslides were blocked and Aeroslide fan was failing to start.
- SO3 plant kept going to "On hold mode".

#### 19-22/07/2022

The 48 hours allowable for upset conditions were exceeded from the 21<sup>st</sup> of July 2022. A
NEMA Section 30 Emergency incident was reported to your office on 25/07/2022 The final
investigation report was submitted to your office on 26/09/2022.

#### 24/07/2022

- SO3 plant injection kept fluctuating,
- SO3 plant also tripped due to low control air pressure

#### 26-27/07/2022

- · SO3 plant injection kept fluctuating,
- SO3 plant went to "On Hold" mode and kept failing to start or stop

#### Unit 6:

## 07-09/07/2022

The 72 hours allowable for a cold unit light up were exceeded from the 09<sup>th</sup> of July 2022. A
NEMA Section 30 Emergency incident was reported to your office on 25/07/2022 The final
investigation report was submitted to your office on 26/09/2022.

#### 11/07/2022

- Dust Handling plant left hand row 3 was blocked.
- SO3 plant was not injecting sulphur due damaged thermocouple pocket.

## 13-14/07/2022

SO3 plant was not injecting due low sulphur flow temperature.

#### 24/07/2022

- Dust Handling plant left hand row no 3 was blocked,
- Electrostatic Precipitator fields rows 1 and 2 were switched off due to full hoppers.

The averages Oxygen(O2) and Carbon Dioxide (CO2) data from the QAL 2 tests reports were used for reporting for Units 1, 5 and 6 due to poor performance of the O2 and CO2 gaseous monitors. These poor performances of the gaseous monitors were identified to be caused by the incorrect installation of O2 analyser. An action is being implemented to relocate all the units' O2 monitors to their own measurement port. This action will be completed no later than 31 December 2022.

The particulate matters emissions monitor reliability for unit 6 was below the 80% threshold in the month of July 2022 due to the monitor frequently drifting below 4 milliamps.

The rest of the information demonstrating compliance with the emission license conditions is supplied in the annual emission report which will be sent to your office.

# 9 and 10 Complaints and S30 Incidents Register

Refer to addendum A

Boiler Plant Engineering

Manager

21/14/2022

Date

Environmental Manager

Date

**Engineering Manager** 

**Environmental Officer** 

For:

Compiled by:

Nkangala District

Municipality

Air Quality Officer

Generation Environmental

Management

D Herbst

**B** Mccourt

Copies:

Generation Compliance Management

Generation Asset

Management

R Rampiar

E Patel

Duvha Power Station:

Engineering Manager Operating Manager Maintenance Manager

Production Manager

Boiler Engineering Manager

System Engineer Environmental Manager

## ADDENDUM TO MONTHLY EMISSIONS REPORT

#### 9 COMPLAINTS REGISTER

Table 9. Complaints for the month of July 2022

Source Code / Name	Root Cause Analysis	Calculation of Impacts / emissions associated with the incident
No complaints were rece	ived during the month of July 2022.	· · · · · · · · · · · · · · · · · · ·

#### 10 S30 INCIDENT OR LEGAL CONTRAVENTION REGISTER

To be completed in the case of a S30 incident or a legal contravention:

Unit no	Incident Start Date	Incident End Date	Incident Cause	Remedial action	S30 initial notification sent	Date S30 investigation report sent	Date DEA Acknowledgment	Date DEA Acceptable	Comments / Reference No.
Unit 4	02/07/2022	03/07/2022	Failure to do a risk assessment for the delayed project.	CORRECTIVE ACTIONS TO BE TAKEN:	06/07/2022	15/09/2022	Only reference number received	None	14/7/6/2/4/2/2168

Do a risk     assessment for     the delayed HFT     project.
Conduct training in production 28 day planning process.
North stack     monitors     reticulation to be     made available.
Source MCSIII controllers.
PREVENTATIVE ACTIONS TO BE TAKEN:  Consequence Management.
Produce QCP     for precipitator     repairs.
Create a     process that     requires risk     assessments for     delayed projects

Unit 6	09/07/2022	10/07/2022	Management failure to ensure succession planning is in place for business continuity.	Procure ash pump motors to reinstate the spares back to the required stock level of five.      Ensure that all breakers of the same scheme have all required functions.      Conduct training for electrical maintenance to address the lack in understanding of the RF process.  Preventative actions:     Group managers to reiterate the interaction between different departments when there are multi-disciplinary	25/07/2022	26/09/2022	Only reference number received	None	14/7/6/2/4/2/2186
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				actions/tasks to be performed.  • Line managers to ensure succession planning for business continuity					,
Unit 4	17/07/2022	17/07/2022	Failure to do a risk assessment for the delayed project.	CORRECTIVE ACTIONS TO BE TAKEN:  Expedite the project of installing high frequency transformers at unit 4 and 6.  Produce a consolidated general precips internal repairs program.  Do a risk assessment for the delayed HFT project.  Conduct training in production 28	21/07/2022	15/09/2022	Only reference number received	None	14/7/6/2/4/2/2183

Unit 5	21/07/2022	22/07/2022	Poor management of soot blower leading to low soot blower availability.	MSMW to be implemented for soot blowers by uploading the work packages on SAP.	25/07/2022	26/09/2022	Only reference number received	None	14/7/6/2/4/2/2185
				controllers.  PREVENTATIVE ACTIONS TO BE TAKEN:  Consequence Management.  Produce QCP for precipitator repairs.  Create a process that requires risk assessments for delayed projects					
				<ul> <li>day planning process.</li> <li>North stack monitors reticulation to be made available.</li> <li>Source MCSIII</li> </ul>					

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Verify and correct the emissions reading between VA View & DCS.
Repair the defective ESP fields 1.2 and 1.5.
Preventative actions:  Actions identified and agreed on by the soot blower Task team to be addressed to ensure soot blower availability of 70%.

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