2024 Annual Performance Report for

Tarmac Cement Ltd Aberthaw Works

V1 20th January 2025

[redacted]
Environmental Coordinator
Tarmac Cement Aberthaw Works

Introduction

Tarmac Cement Ltd (the “Operator"), company registration number 66558, whose registered office is Ground Floor, T3 Trinity Park, Bickenhill Lane, Birmingham, B37 7ES operate a cement manufacturing installation at Aberthaw Cement Plant, East Aberthaw, Barry, CF62 3ZR.

The cement manufacturing activities carried out at the above installation are authorised by Permit EPR/BL3986ID issued by Natural Resources Wales, which includes permission to burn waste derived fuels (WDFs).

Condition 4.2.2 of the Permit requires the Operator to submit an annual performance report on the functioning and monitoring of the process. This report gives an account of the running of the process and the emissions into air and water compared with the emission standards in the permit.

Plant Description

The main purpose of the activities at the installation is the production and grinding of cement clinker to produce various cement products. Tarmac Cement operate one dry preheater process cement kiln at the Aberthaw site, which has the capacity to produce 565,000 tonnes of clinker per year. Tarmac Cement UK maintains registration to the ISO14001 environmental management system. Certification for ISO 50001 was achieved in November 2013.

Aberthaw Cement Plant uses traditional fossil fuels (coal, pet coke and oil) and waste derived fuels (WDFs) Polymer chip, end of life whole tyres and Solid Recovered Fuel (SRF). Polymer chip was first used as a fuel in February 2013. Whole tyres were introduced in July 2012 and SRF was first used in May 2013.

Polymer chip and SRF are introduced into the kiln along with a pulverised coal via a firing pipe at the front end of the kiln. Whole tyres are burnt in the kiln at the back end via the pre-heater tower and kiln hearth.

The WDFs replace some of the fossil fuels that are traditionally used to produce cement clinker. The use of WDFs has a number of environmental benefits including:

- Practical solution to the disposal of waste products, which are currently disposed of via conventional waste disposal methods, whilst at the same time producing a valuable product;
- Reduction in the use of finite fossil fuels;
- Contribution towards carbon reduction commitments.

No additional residues are produced as a result of using WDFs at Aberthaw Works. The fuels are combusted at approximately 1450°C at which temperature all residues are incorporated into the cement clinker.

Plant Performance

Aberthaw Cement Plant has one cement kiln, which has run throughout the year in accordance with its Environmental Permit to operate.

Planned maintenance was held from 1st January – 3rd February 2024.

Fuel usage and the percentage substitution rate of WDFs are regularly monitored. This data is submitted to NRW on the appropriate form quarterly as required by the Environmental Permit and is summarized below. The table shows the tonnes used of fossil fuels and WDFs, and the relative thermal input of each WDF as a percentage.

Fuel	Quantity burned Tonnes	Relative thermal input of waste derived fuels	Average calorific value MJ/kg
Coal	31788		20.80
Petroleum coke	0.00		-
Process Fuel Oil	724		40.73
Tyre fluff	0.00	0.00%	-
Tyres	5736	12.34%	27.52
SRF 1	16339	26.49%	19.16
Polychip	986	2.51%	26.99
Santotar	10	0.03%	40

Plant Monitoring – Emissions to Air

Two types of air emission monitoring are carried out at the main release point (stack) from the kiln. Automatic instruments (CEMs) as required by the permit to continuously monitor some emission species. A list of the CEMS used at the site is contained in Appendix I.

An independent accredited external test body monitors other emissions species every six months. The tables below summarises those species that are continuously monitored and those that are periodically monitored.

Pollutants measured	Continuously	Periodically
Particulates	x	
Oxides of Nitrogen	x	
Sulphur Dioxide	x	
Carbon Monoxide	x	
Total Organic Carbon	x	
Hydrogen Chloride	x	
Ammonia	x	
Mercury		x
Cadmium and Thallium		x
Group III Metals		x
Dioxins and Furans		x
Hydrogen Fluoride		x

Continuously monitored species are controlled to a limit based on the average of a 24-hour period (12:00-12:00). The daily averages are compared to the 24-hour limit and reported to NRW on a quarterly basis.

Summary emissions data from the continuous monitoring system is attached as Appendix 1; this is based on the same data that is supplied to NRW on a quarterly basis.
Periodically monitored species are tested using techniques and procedures that meet European and National Standards. These include all species listed above and particulates on the cement mills. The results of this monitoring are compared directly to the limit prescribed in the permit and

are reported to NRW. The 2024 routine extractive monitoring was carried out for particulates in March and September.

The gaseous testing was carried out in May and October for the remaining routine requirements, all testing performed by independent, UKAS & MCERTS accredited third party organisations.

The kiln gaseous CEMs were subject to a full BS EN 14181 QAL2 calibration check on the 14th – 16th May 2024. Site are working with the external testing organisation to improve the HCl CEM vs SRM correlation. This work is continuing into 2025.

A full particulate QAL 2 calibration was completed between 23rd – 26th March 2024. Although the calibration was successful, and owing to low dust readings at the time, the valid calibration range was low, this will be revisited during the next AST to extend the calibration range.

Zero and span checks (QAL3) are made at site level on a weekly and monthly basis to ensure that the analysers are performing within the specified ranges and that they continue to operate effectively. Trained personnel conduct these checks and the records are kept on site.

Plant Monitoring – Emissions to Water

Monthly samples of water are taken from the site's operational discharge point (W1) and are sent to an external UKAS accredited laboratory for analysis for suspended solids, pH and oils and greases. The results of the analysis are compared to the ELVs specified in the permit.

Plant Compliance

Aberthaw cement plant submitted 1 schedule 5 notification during 2024.

Summary of 2024 Schedule 5 Notifications

- See Appendix IV

Availability of Information

Copies of this report may be requested from Tarmac by contacting [redacted], Environmental Coordinator on telephone number [redacted] or via email at [redacted]

Further information can be requested directly from Natural Resources Wales by calling the general enquiries line, 0300 065 3000.

Public Registers are available online at The NRW Online Public Registers website: Public register - Customer Portal (naturalresources.wales) Information on Tarmac can be found on the company website: http://www. tarmac.com/

Appendix I Continuous Emissions Monitors

TARMAC CEMENT ABERTHAW WORKS – ENVIRONMENTAL PERMIT EPR/BL3986ID

SUMMARY OF CEMS

LOCATION	MAKE	MODEL	MCERTS CERTIFICATE	STATUS
A1 (KILN)	ABB Automation Products (Duty Gaseous CEM)	ACF5000 measuring system	Sira MC160309/05	Last compliance check: 23rd October 2024 (QAL 2 16th May 2024)
	ABB Automation Products (Standby Gaseous CEM)	ACF5000 measuring system	Sira MC160309/05	Last compliance check: 23rd October 2024 (QAL 2 16th May 2024)
A1 (KILN)	Durag Particulate CEM	D-R320	Sira MC140253/01	Last compliance check: 23rd September 2024 (last QAL 26th March 2024
A2 (CEMENT MILL)	PCME Particulate CEM	DT990	Sira MC 050049/03	Last compliance/calibration check: 23rd September 2024
A3 (CEMENT MILL)	Durag Particulate CEM	DR800	Sira MC080123/02	Last compliance/calibration check: 23rd September 2024

BS EN 14181 summary

QAL 2 Duty system – 14th – 16th May 2024

Parameter	Calibration Function derived from QAL2?	EN 14181 Procedure used to Derive the Calibration Function	Calibration Function Derived	Result of Variability Test	Valid Calibration Range @ REF Conditions	Range after Surrogate Extension @ REF Conditions	Calibration Function to Apply to the Data Acquisition Handling Software (See Conclusions)
Total VOCs	Yes	Procedure A	y = 1.4536x - 1.3094	Pass	0 to 52.0 mg/m³	N/A	y = 1.4536x - 1.3094
Oxides of Nitrogen (as NO_2)	Yes	Procedure A	y = 1.0627x + 2.5898	Pass	0 to 720.6 mg/m³	N/A	y = 1.0627x + 2.5898
Sulphur Dioxide	Yes	Procedure A	y = 1.0184x + 2.2329	Pass	0 to 279.8 mg/m³	0 to 400 mg/m³	y = 1.0184x + 2.2329
Carbon Monoxide	Yes	Procedure A	y = 0.9868x + 3.4118	Pass	0 to 984.5 mg/m³	0 to 1500 mg/m³	y = 0.9868x + 3.4118
Hydrogen Chloride	Yes	Procedure A	y = 0.1023x + 4.6353	Pass	0 to 8.2 mg/m³	N/A	y = 0.1023x + 4.6353
Ammonia	Yes	Procedure A	y = 0.7628x + 1.6141	Pass	0 to 37.9 mg/m³	0 to 54.3 mg/m³	y = 0.7628x + 1.6141
Water Vapour (% v/v)	Yes	Procedure A	y = 0.9914x - 0.0815	Pass	0 to 17.1 % v/v	N/A	y = 0.9914x - 0.0815
Oxygen (D) (% v/v)	Yes	Procedure A	y = 1.0172x - 0.3123	Pass	0 to 22.9 % v/v	N/A	y = 1.0172x - 0.3123

QAL 2 standby system – 14th – 16th May 2024

Parameter	Calibration Function derived from QAL2?	EN 14181 Procedure used to Derive the Calibration Function	Calibration Function Derived	Result of Variability Test	Valid Calibration Range @ REF Conditions	Range after Surrogate Extension @ REF Conditions	Calibration Function to Apply to the Data Acquisition Handling Software (See Conclusions)
Total VOCs	Yes	Procedure B	y = 1.2078x + 0.0000	Pass	0 to 49.7 mg/m³	N/A	y = 1.2078x + 0.0000
Oxides of Nitrogen (as NO_2)	Yes	Procedure A	y = 1.0350x + 4.6797	Pass	0 to 718.3 mg/m³	N/A	y = 1.0350x + 4.6797
Sulphur Dioxide	Yes	Procedure A	y = 1.0188x + 7.3978	Pass	0 to 274.6 mg/m³	0 to 400 mg/m³	y = 1.0188x + 7.3978
Carbon Monoxide	Yes	Procedure A	y = 1.0132x + 1.0967	Pass	0 to 1007.7 mg/m³	0 to 1500 mg/m³	y = 1.0132x + 1.0967
Hydrogen Chloride	Yes	Procedure A	y = 0.0661x + 4.6189	Pass	0 to 8.1 mg/m³	N/A	y = 0.0661x + 4.6189
Ammonia	Yes	Procedure A	y = 0.7796x + 1.5728	Pass	0 to 39.7 mg/m³	0 to 55.1 mg/m³	y = 0.7796x + 1.5728
Water Vapour (% v/v)	Yes	Procedure A	y = 0.9514x - 0.1775	Pass	0 to 17.0 % v/v	N/A	y = 0.9514x - 0.1775
Oxygen (S) (% v/v)	Yes	Procedure A	y = 1.0094x + 0.6729	Pass	0 to 20.7 % v/v	N/A	y = 1.0094x + 0.6729

Particulate matter duty system QAL 2: 23th – 26th March 2024

Results of QAL2 Testing

1.	AMS Range	=	0 – 20 mg/m³
2.	EN 14181 Calibration Function ($y=a+bx_i$)	=	y = -5.000 + 1.250 x_i mg/m³
3.	EN 14181 Calibrated Range	=	0 – 20.00 mg/m³ (offset by 0.00 mg/m³)
4.	Calibration Valid Range, using Calibrated AMS Data	=	0 – 2.00 mg/Nm³
5.	Extrapolation of Valid Calibration Range, using Surrogates	=	Not Applicable
6.	Test of Variability	=	Pass

Particulate matter standby system QAL 2: 23th – 26th March 2024

Results of QAL2 Testing

1.	AMS Range	=	0 – 20 mg/m³
2.	EN 14181 Calibration Function ($y=a+bx_i$)	=	$y = -5.000 + 1.250\ x_i$ mg/m³
3.	EN 14181 Calibrated Range	=	0 – 20.00 mg/m³ (offset by 0.00 mg/m³)
4.	Calibration Valid Range, using Calibrated AMS Data	=	0 – 2.00 mg/Nm³
5.	Extrapolation of Valid Calibration Range, using Surrogates	=	Not Applicable
6.	Test of Variability	=	Pass

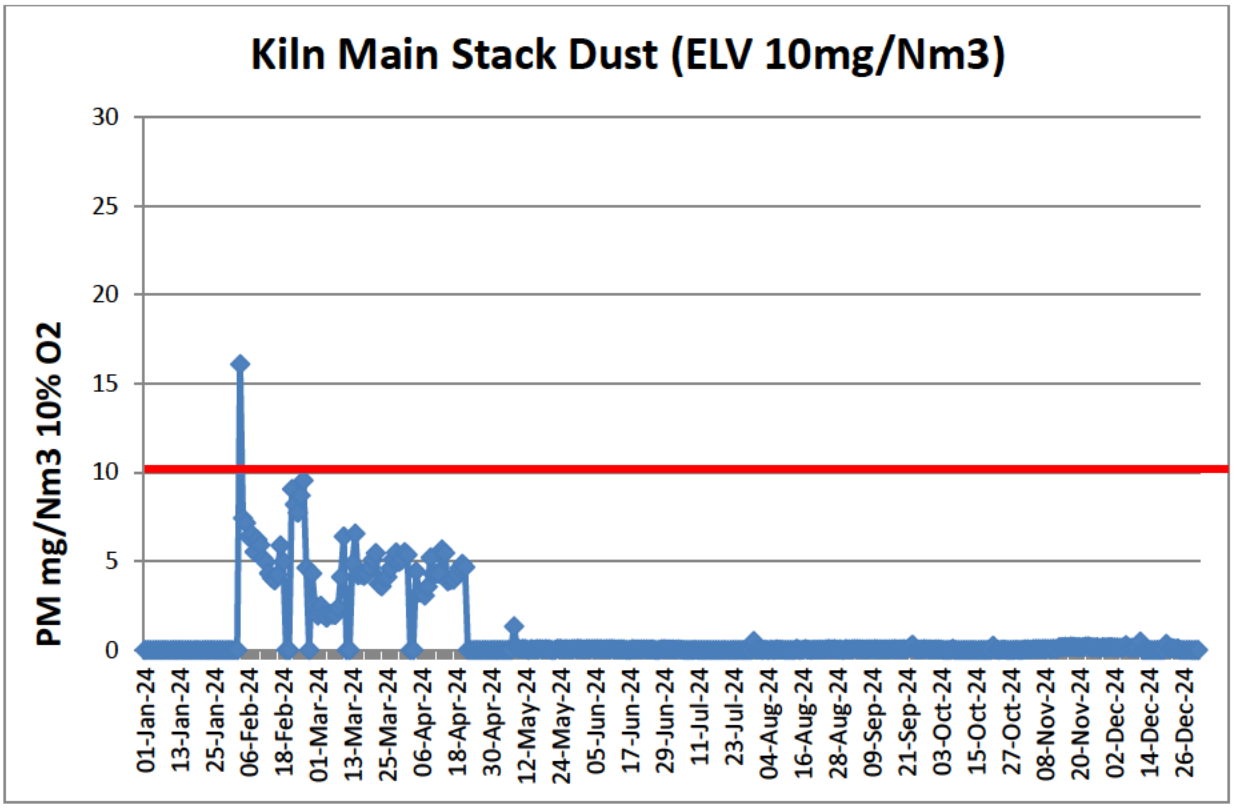
QAL 3 alarm and warning limits

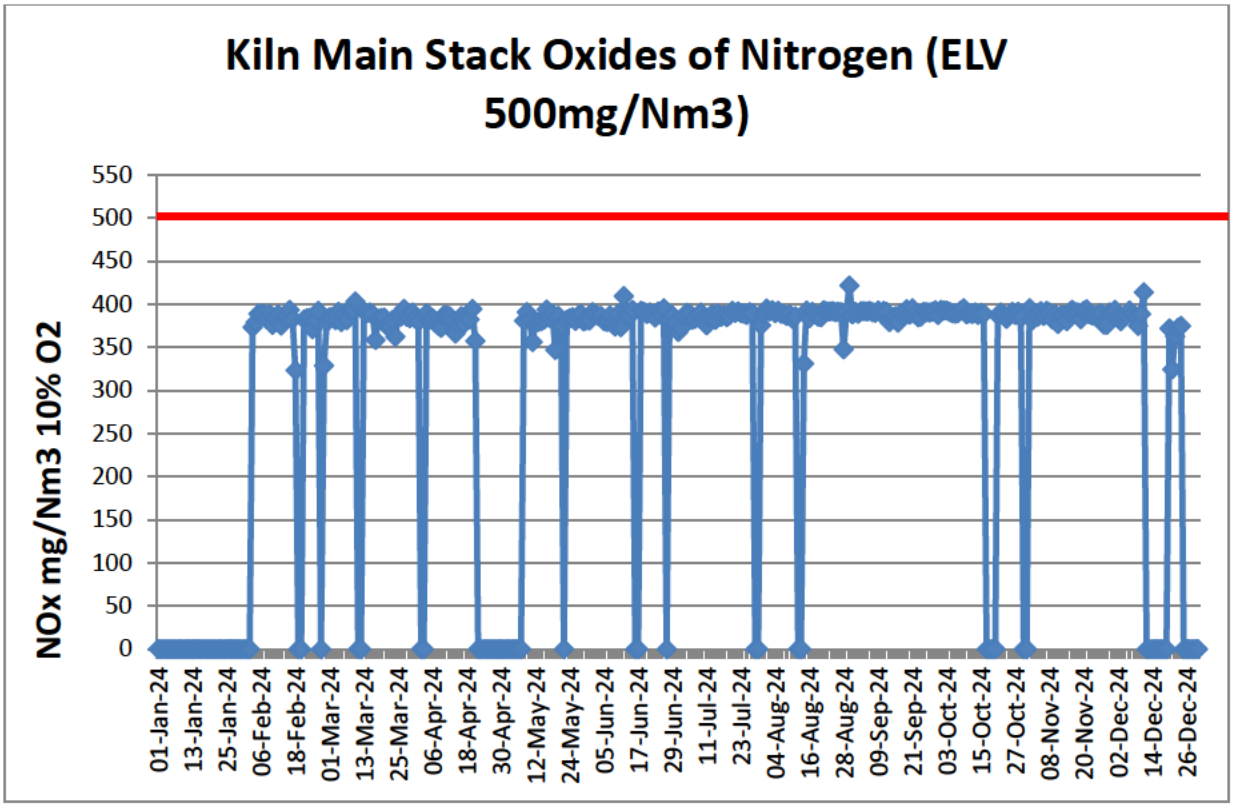
As per the guidance in the BS EN 14181standard the S_{AMS} is generated by the use of zero and span data, the action alarm for all of the control charts is set at 2 S_{AMS} and the warning limit set at 1 $S_{AMS.}$

Full records of the QAL 2, AST and QAL 3 data are stored on site and available for discussion.

Appendix II

Continuous Emissions Monitor Results




Kiln Main Stack Oxides of Nitrogen (ELV 500mg/Nm3)
NOx mg/Nm3 10% O2
550
500
450
400
350
300
250
200
150
100
50
0
01-Jan-24
13-Jan-24
25-Jan-24
06-Feb-24
18-Feb-24
01-Mar-24
13-Mar-24
25-Mar-24
06-Apr-24
18-Apr-24
30-Apr-24
12-May-24
24-May-24
05-Jun-24
17-Jun-24
29-Jun-24
11-Jul-24
23-Jul-24
04-Aug-24
16-Aug-24
28-Aug-24
09-Sep-24
21-Sep-24
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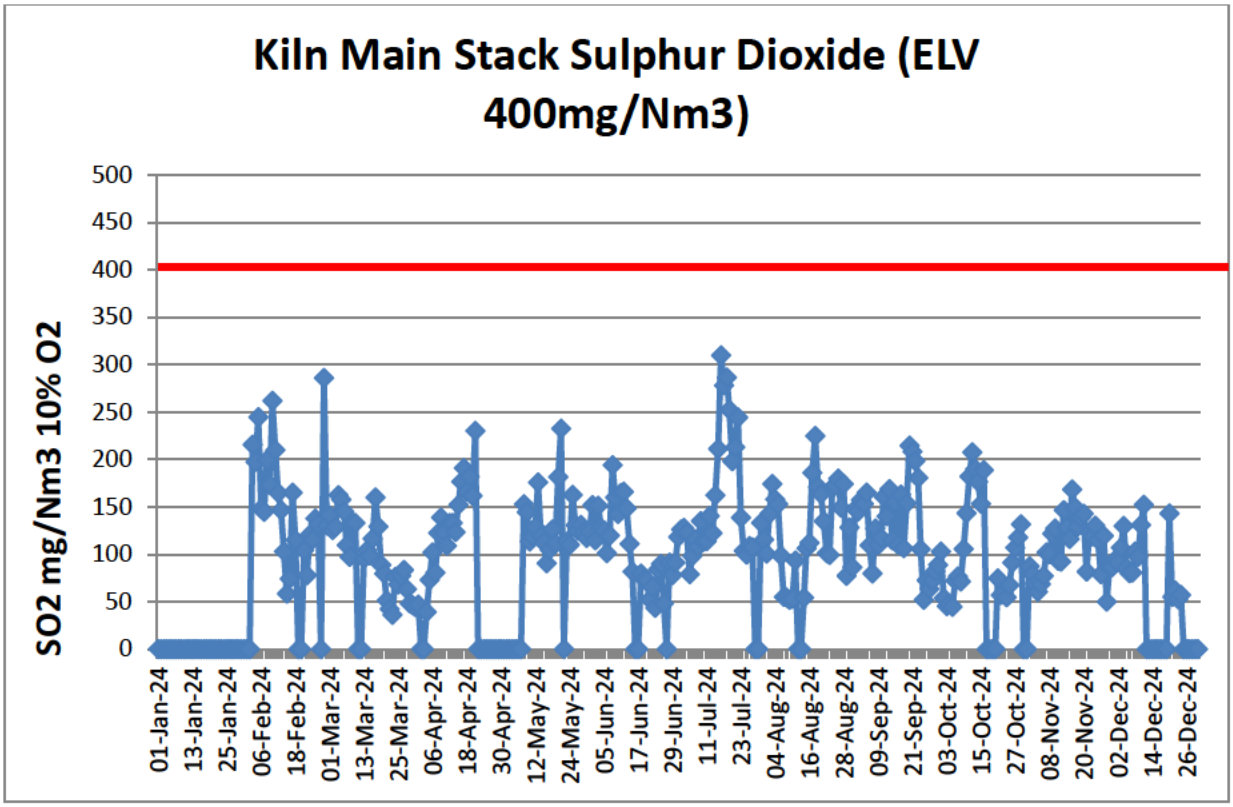
08-Nov-24
20-Nov-24
02-Dec-24
14-Dec-24
26-Dec-24


Kiln Main Stack Sulphur Dioxide (ELV 400mg/Nm3)
SO2 mg/Nm3 10% O2
500
450
400
350
300
250
200
150
100
50
0
01-Jan-24
13-Jan-24
25-Jan-24
06-Feb-24
18-Feb-24
01-Mar-24
13-Mar-24
25-Mar-24
06-Apr-24
18-Apr-24
30-Apr-24
12-May-24
24-May-24
05-Jun-24
17-Jun-24
29-Jun-24
11-Jul-24
23-Jul-24
04-Aug-24
16-Aug-24
28-Aug-24
09-Sep-24
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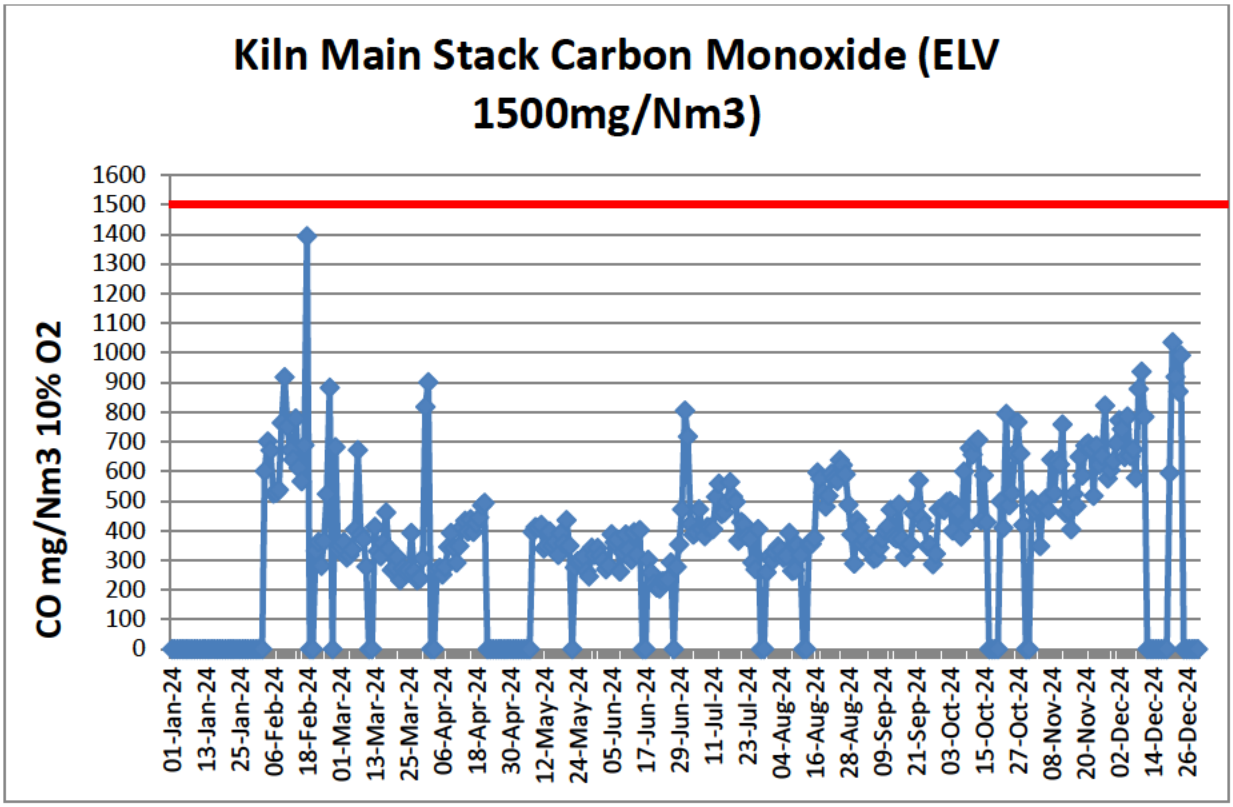
02-Dec-24
14-Dec-24
26-Dec-24


Kiln Main Stack Carbon Monoxide (ELV 1500mg/Nm3)
CO mg/Nm3 10% O2
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
01-Jan-24
13-Jan-24
25-Jan-24
06-Feb-24
18-Feb-24
01-Mar-24
13-Mar-24
25-Mar-24
06-Apr-24
18-Apr-24
30-Apr-24
12-May-24
24-May-24
05-Jun-24
17-Jun-24
29-Jun-24
11-Jul-24
23-Jul-24
04-Aug-24
16-Aug-24
28-Aug-24
09-Sep-24
21-Sep-24
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15-Oct-24
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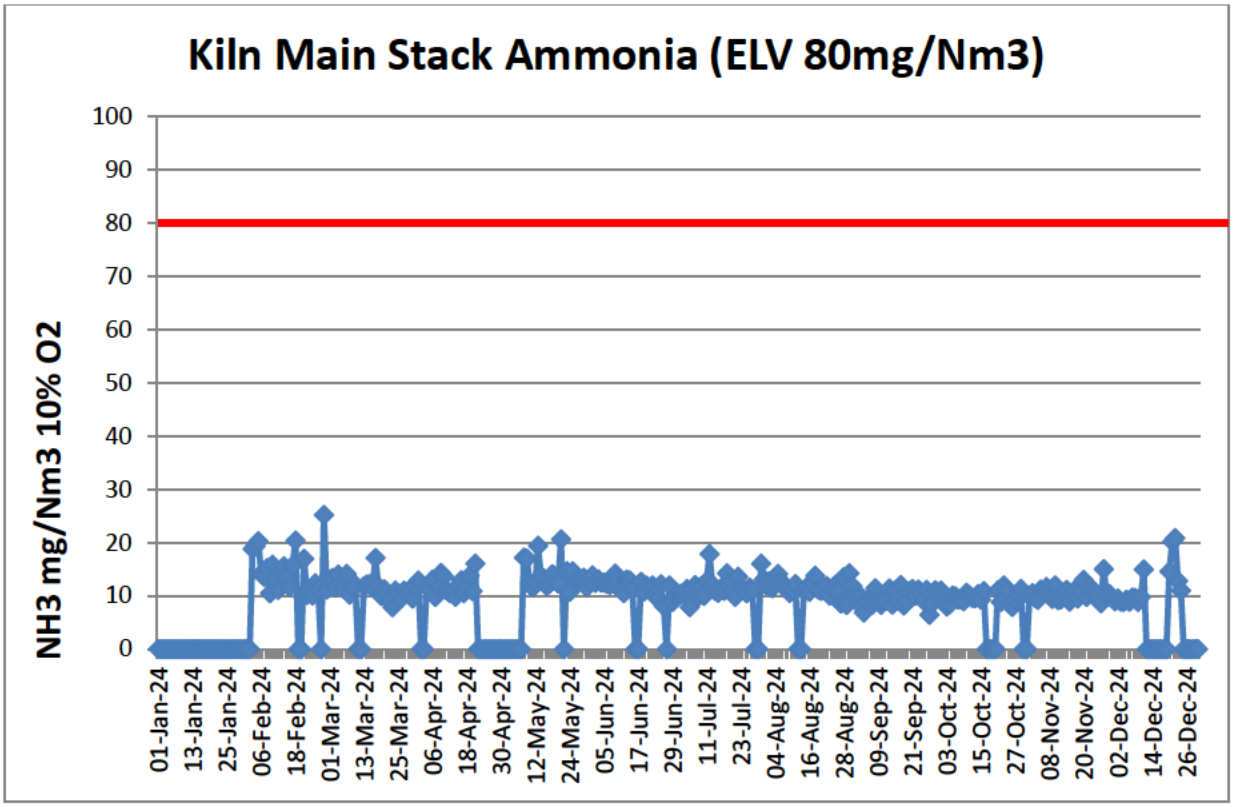
08-Nov-24
20-Nov-24
02-Dec-24
14-Dec-24
26-Dec-24


Kiln Main Stack Ammonia (ELV 80mg/Nm3)
NH3 mg/Nm3 10% O2
100
90
80
70
60
50
40
30
20
10
0
01-Jan-24
13-Jan-24
25-Jan-24
06-Feb-24
18-Feb-24
01-Mar-24
13-Mar-24
25-Mar-24
06-Apr-24
18-Apr-24
30-Apr-24
12-May-24
24-May-24
05-Jun-24
17-Jun-24
29-Jun-24
11-Jul-24
23-Jul-24
04-Aug-24
16-Aug-24
28-Aug-24
09-Sep-24
21-Sep-24
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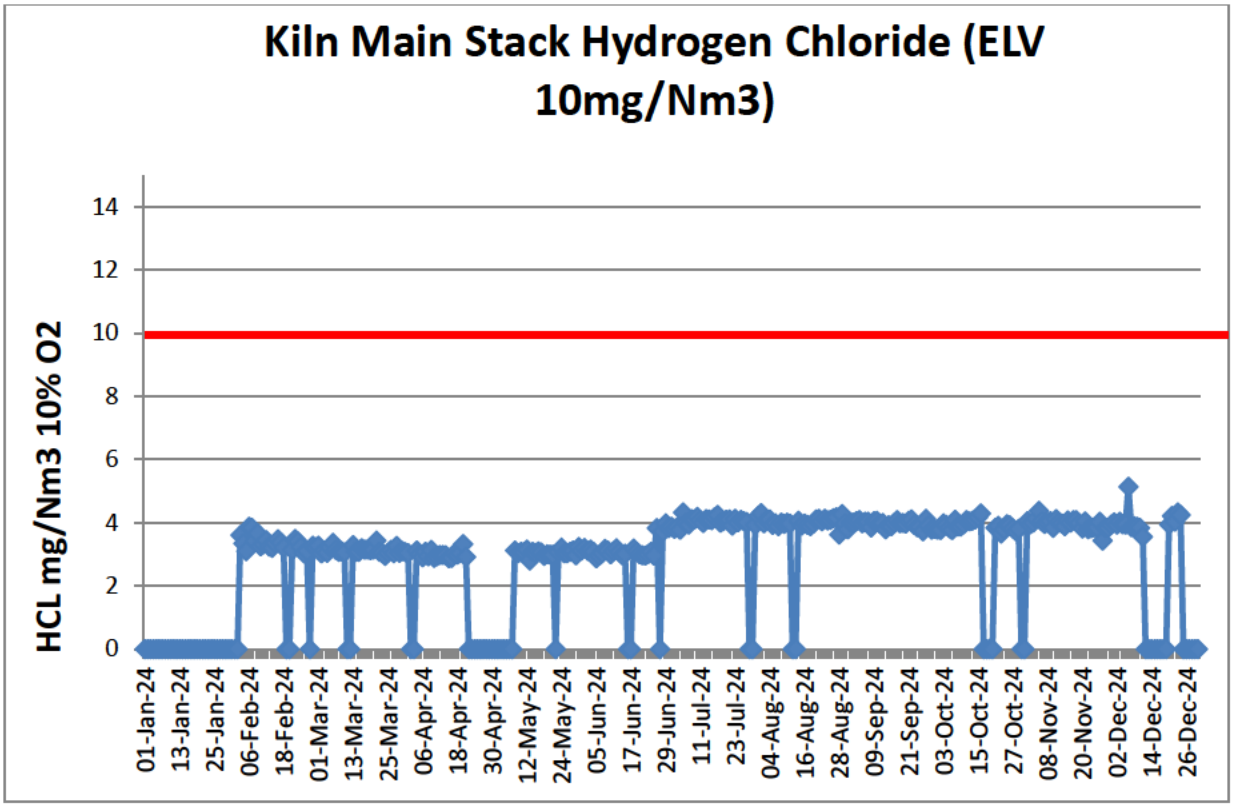
20-Nov-24
02-Dec-24
14-Dec-24
26-Dec-24


Kiln Main Stack Hydrogen Chloride (ELV 10mg/Nm3)
HCL mg/Nm3 10% O2
14
12
10
8
6
4
2
0
01-Jan-24
13-Jan-24
25-Jan-24
06-Feb-24
18-Feb-24
01-Mar-24
13-Mar-24
25-Mar-24
06-Apr-24
18-Apr-24
30-Apr-24
12-May-24
24-May-24
05-Jun-24
17-Jun-24
29-Jun-24
11-Jul-24
23-Jul-24
04-Aug-24
16-Aug-24
28-Aug-24
09-Sep-24
21-Sep-24
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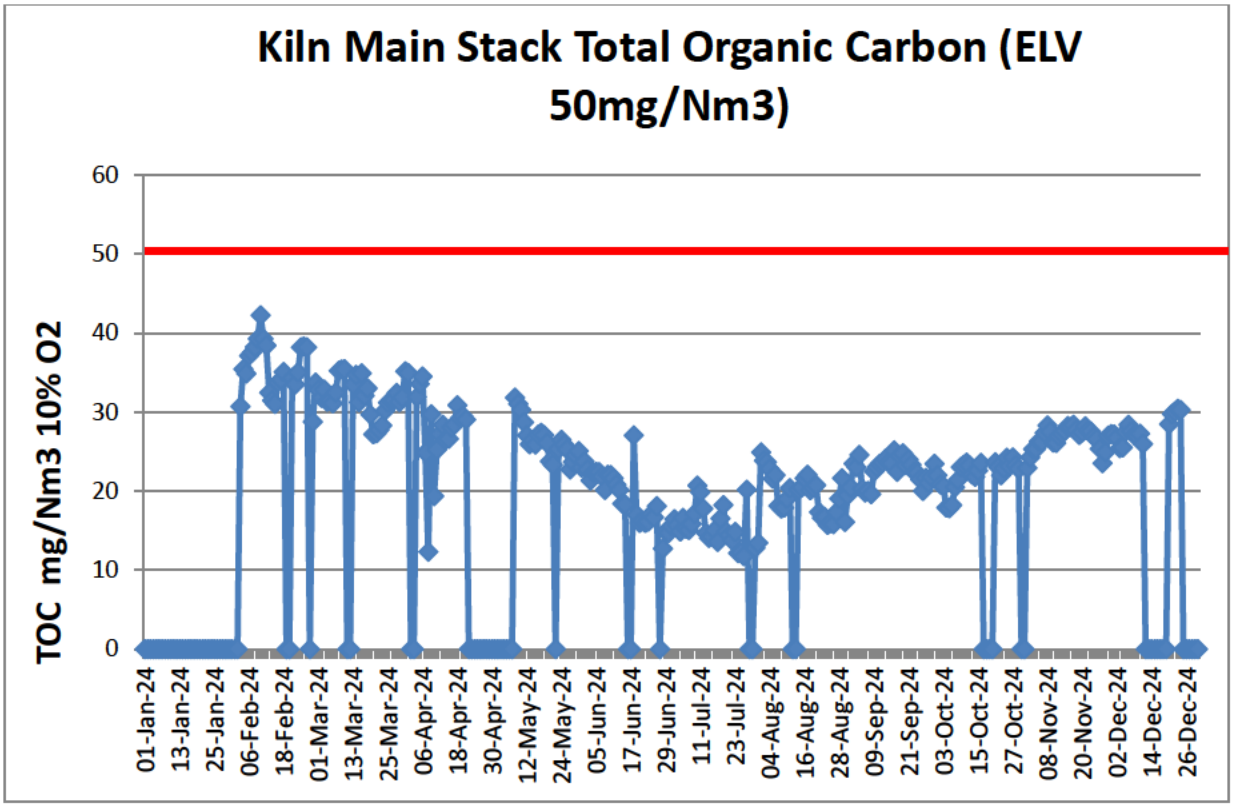
14-Dec-24
26-Dec-24


Kiln Main Stack Total Organic Carbon (ELV 50mg/Nm3)
TOC mg/Nm3 10% O2
60
50
40
30
20
10
0
01-Jan-24
13-Jan-24
25-Jan-24
06-Feb-24
18-Feb-24
01-Mar-24
13-Mar-24
25-Mar-24
06-Apr-24
18-Apr-24
30-Apr-24
12-May-24
24-May-24
05-Jun-24
17-Jun-24
29-Jun-24
11-Jul-24
23-Jul-24
04-Aug-24
16-Aug-24
28-Aug-24
09-Sep-24
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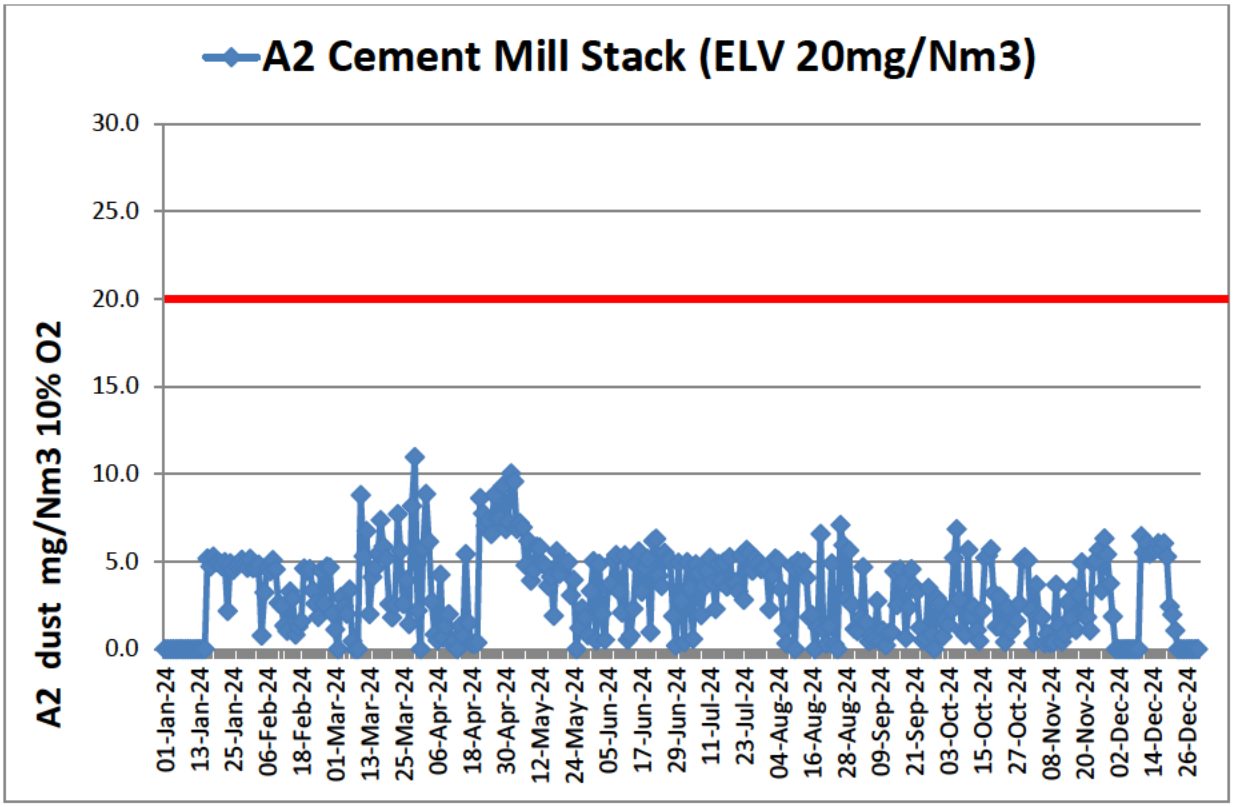
14-Dec-24
26-Dec-24


A2 Cement Mill Stack (ELV 20mg/Nm3)
A2 dust mg/Nm3 10% O2
30.0
25.0
20.0
15.0
10.0
5.0
0.0
01-Jan-24
13-Jan-24
25-Jan-24
06-Feb-24
18-Feb-24
01-Mar-24
13-Mar-24
25-Mar-24
06-Apr-24
18-Apr-24
30-Apr-24
12-May-24
24-May-24
05-Jun-24
17-Jun-24
29-Jun-24
11-Jul-24
23-Jul-24
04-Aug-24
16-Aug-24
28-Aug-24
09-Sep-24
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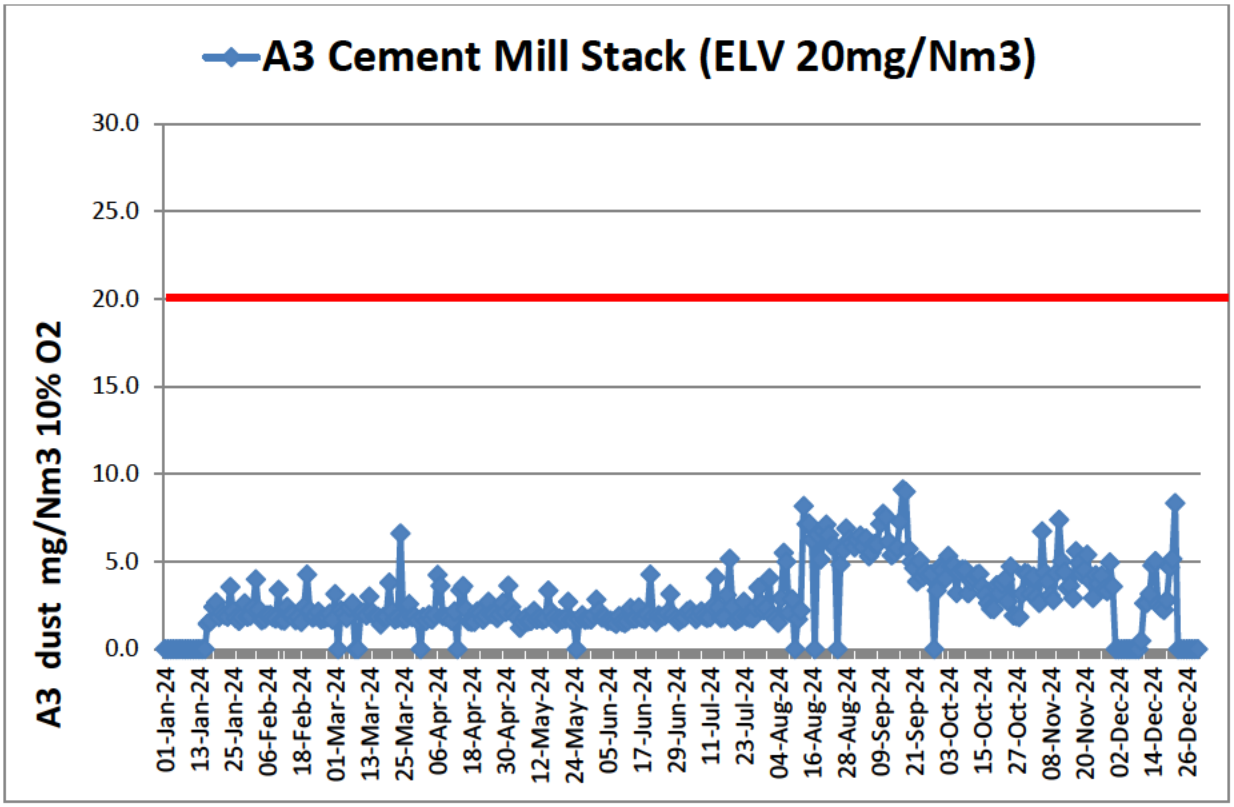
14-Dec-24
26-Dec-24


A3 Cement Mill Stack (ELV 20mg/Nm3)
A3 dust mg/Nm3 10% O2
30.0
25.0
20.0
15.0
10.0
5.0
0.0
01-Jan-24
13-Jan-24
25-Jan-24
06-Feb-24
18-Feb-24
01-Mar-24
13-Mar-24
25-Mar-24
06-Apr-24
18-Apr-24
30-Apr-24
12-May-24
24-May-24
05-Jun-24
17-Jun-24
29-Jun-24
11-Jul-24
23-Jul-24
04-Aug-24
16-Aug-24
28-Aug-24
09-Sep-24
21-Sep-24
03-Oct-24
15-Oct-24
27-Oct-24
08-Nov-24
20-Nov-24
02-Dec-24
14-Dec-24
26-Dec-24

Appendix III

Periodic Monitoring Results

Species	Limit mg/m3	Kiln 1 Test 1 mg/m3	Kiln 1 Test 2 mg/m3
Mercury	0.05	0.0027	0.0021
Cadmium and Thallium	0.05	0.0052	0.0015
Group III Metals	0.5	0.043	0.0086
Hydrogen Fluoride	1	0.21	0.065
Dioxins and Furans	0.1*	0.01	0.025

* Dioxin and Furan results in ng/m3 NATO I TEQ

Appendix IV
Summary of all Schedule 5 Reports submitted in 2024

04/02/2024 Main stack particulates breach

Prolonged kiln downtime (>1 month) caused issues with differential pressure and temperature being brought back up to correct levels. Immediate action taken following breach, including isolation of filter bag bays. Kiln taken back off line to fully investigate. No adverse environmental conditions observed. No complaints received. RCA completed 14/02/2024:

- Uncertain effect on filter bags following prolonged downtime. Revisit shutdown/restart procedure for bag filter.
- No backup data to confirm accurate readings due to one probe in operation. Backup probe on site to be commissioned.
- Filter bags not sufficiently coated with dust build up so layer of filter ‘cake’ hadn’t developed caused by low differential pressure over filter. Two bays closed to increase differential pressure and temperature which brought particulate levels back below ELV.
- 47 bags replaced in bay 2.
- Damper open: Generate work order to investigate.

Further actions taken during April de-stock included full rebag of main kiln filter, and cell plate corrosion repair.