

2022 Annual Performance Report for

Tarmac Cement & Lime Ltd

Aberthaw Works

V1 23rd January 2023

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Tarmac Cement and Lime Aberthaw Works

Introduction

Tarmac Cement & Lime 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 & Lime 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 14th February – 17th March 2022.

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	46970.69		26.19
Petroleum coke	0.00		-
Process Fuel Oil	502.74		40.71
Tyre fluff	0.00	0.00%	-
Tyres	5480.28	9.08%	27.56
SRF 1	6430.62	7.97%	20.77
Polychip	3885.14	7.73%	32.87
Premixed sludge*	12.90	0.02%	25.12

*WDF trial

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.

During the combustion of WDFs the continuous monitoring equipment at Aberthaw Works was operating normally for 100% of the kiln operating time.

Summary emissions data from the continuous monitoring system is attached as Appendix I; 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 2022 routine extractive monitoring was carried out for particulates in March and September.

The gaseous testing in March and December 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 AST calibration check on the 25th – 26th May 2022, all components except NO_x on the duty passed the requirements of the standard, the test team had enough data to generate a new calibration function which passed the requirements of the standard.

A full particulate QAL 2 calibration was completed between 28th – 31st March 2022, with no follow on work required. In line with the standard an AST will be performed in 2023.

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.

ABB the instrument manufacturer is in the process of creating an additional QAL3 process, this system will be fully operational in 2023 and will supplement the site checks.

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 3 schedule 5 notifications during 2022.

Summary of 2022 Schedule 5 Notifications

- See Appendix IV

Availability of Information

Copies of this report may be requested from Tarmac by contacting Daniel Bound, Environmental Coordinator on telephone number 07483 397697 or via email at daniel.bound@tarmac.com

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 \(naturalresources.wales\)](http://naturalresources.wales) Information on Tarmac can be found on the company website: [http://www. tarmac.com/](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 24 th March and 2nd December. (QAL 2 25th March 2021)
	ABB Automation Products (Standby Gaseous CEM)	ACF5000 measuring system	Sira MC160309/05	Last compliance 24 th March and 2nd December. (QAL 2 25th March 2021)
A1 (KILN)	Durag Particulate CEM	D-R320	Sira MC140253/01	Last compliance check: 8 th November 2021 (last QAL 2 March 2022)
A2 (CEMENT MILL)	PCME Particulate CEM	DT990	Sira MC 050049/03	Last compliance/calibration check: 22 nd September 2022
A3 (CEMENT MILL)	Durag Particulate CEM	DR800	Sira MC080123/02	Last compliance/calibration check: 22 nd September 2022

BS EN 14181 summary
QAL 2 Duty system - 25th March 2021

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	$y = 1.4424x + 0.0000$	Pass	0 to 51.8 mg/m ³	N/A	$y = 1.4424x + 0.0000$
Oxides of Nitrogen (as NO ₂)	Yes	Procedure A	$y = 1.0446x - 6.9973$	Pass	0 to 484 mg/m ³	N/A	$y = 1.0446x - 6.9973$
Sulphur Dioxide	Yes	Procedure A	$y = 1.0303x - 3.5775$	Pass	0 to 430 mg/m ³	N/A	$y = 1.0303x - 3.5775$
Carbon Monoxide	Yes	Procedure A	$y = 1.0961x - 33.0936$	Pass	0 to 2596 mg/m ³	N/A	$y = 1.0961x - 33.0936$
Hydrogen Chloride	Yes	Procedure A	$y = 0.1150x + 3.1552$	Pass	0 to 6.44 mg/m ³	N/A	$y = 0.1150x + 3.1552$
Ammonia	Yes	Procedure A	$y = 0.8864x + 2.2853$	Pass	0 to 66.4 mg/m ³	N/A	$y = 0.8864x + 2.2853$
Water Vapour (% v/v)	Yes	Procedure B	$y = 1.0023x + 0.0000$	Pass	0 to 18.5 % v/v	N/A	$y = 1.0023x + 0.0000$
Oxygen (D) (% v/v)	Yes	Procedure A	$y = 1.0332x + 0.4133$	Pass	0 to 12.4 % v/v	N/A	$y = 1.0332x + 0.4133$

QAL 2 standby system – 25th March 2021

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	$y = 1.3206x + 0.0000$	Pass	0 to 48.9 mg/m ³	N/A	$y = 1.3206x + 0.0000$
Oxides of Nitrogen (as NO ₂)	Yes	Procedure A	$y = 1.0471x - 6.8880$	Pass	0 to 484 mg/m ³	N/A	$y = 1.0471x - 6.8880$
Sulphur Dioxide	Yes	Procedure A	$y = 1.0202x - 0.6741$	Pass	0 to 439 mg/m ³	N/A	$y = 1.0202x - 0.6741$
Carbon Monoxide	Yes	Procedure A	$y = 1.1085x - 29.9384$	Pass	0 to 2587 mg/m ³	N/A	$y = 1.1085x - 29.9384$
Hydrogen Chloride	Yes	Procedure A	$y = 0.0612x + 3.2516$	Pass	0 to 5.50 mg/m ³	N/A	$y = 0.0612x + 3.2516$
Ammonia	Yes	Procedure A	$y = 0.9735x + 1.1458$	Pass	0 to 65.9 mg/m ³	N/A	$y = 0.9735x + 1.1458$
Water Vapour (% v/v)	Yes	Procedure B	$y = 1.0358x + 0.0000$	Pass	0 to 18.5 % v/v	N/A	$y = 1.0358x + 0.0000$
Oxygen (S) (% v/v)	Yes	Procedure A	$y = 1.0385x + 0.8553$	Pass	0 to 12.4 % v/v	N/A	$y = 1.0385x + 0.8553$

Particulate matter QAL 2: 28th – 31st March 2022

Results of QAL2 Testing			
1.	AMS Range	=	0 – 20 mg/m ³
2.	EN 14181 Calibration Function ($y=a+bx$)	=	$y = -5.439 + 1.219 \times x$ mg/m ³
3.	EN 14181 Calibrated Range	=	0 – 19.50 mg/m ³ (offset by -0.56 mg/m ³)
4.	Calibration Valid Range, using Calibrated AMS Data	=	0 – 9.81 mg/Nm ³
5.	Extrapolation of Valid Calibration Range, using Surrogates	=	Not Applicable
6.	Test of Variability	=	Pass

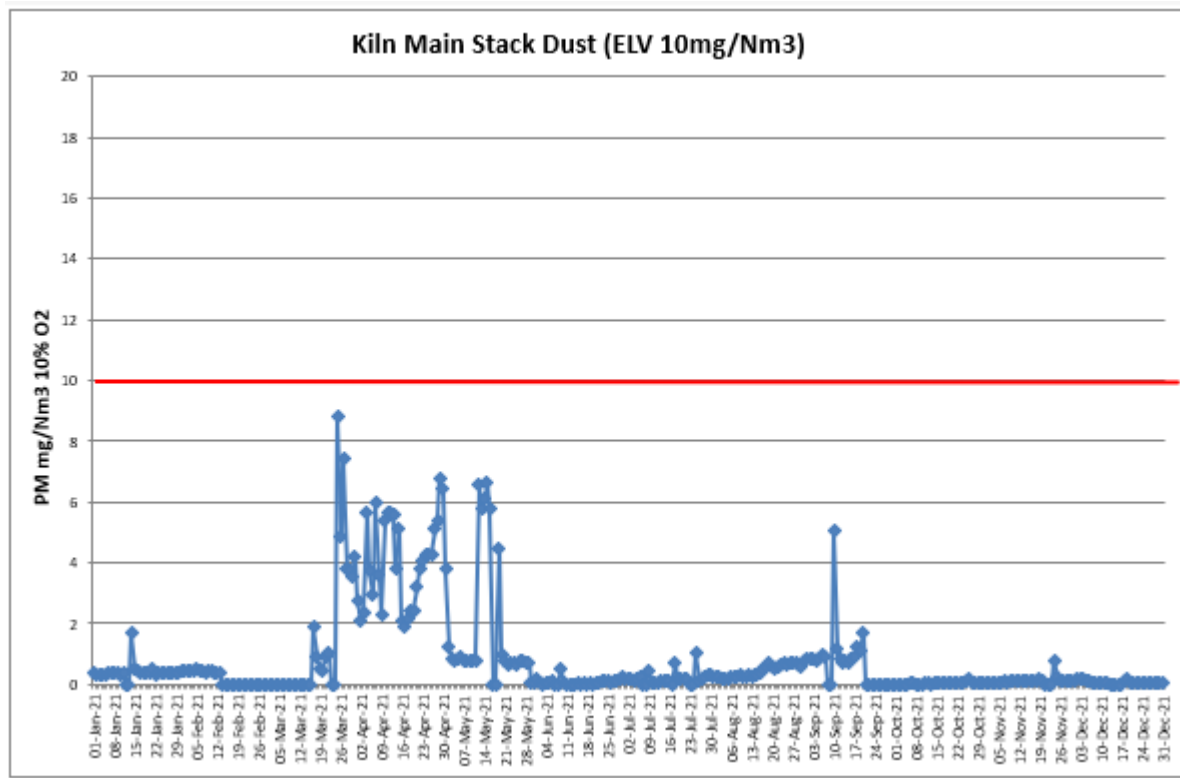
QAL 3 alarm and warning limits

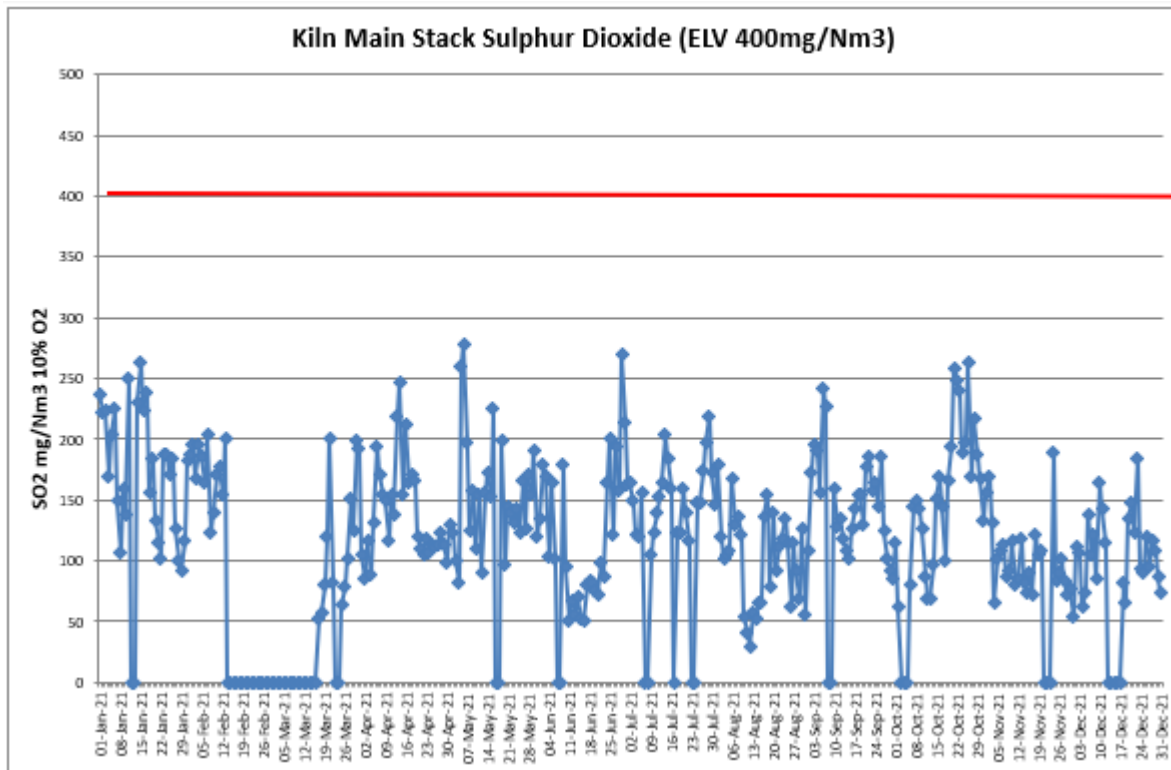
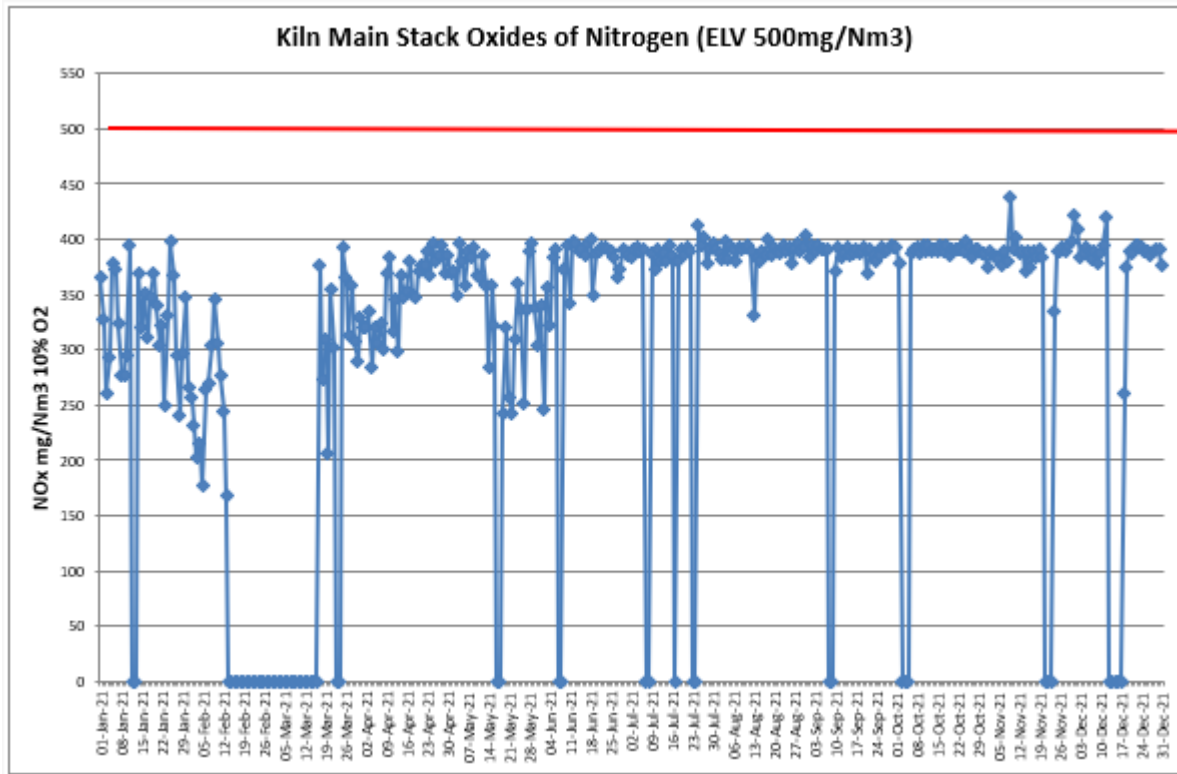
As per the guidance in the BS EN 14181 standard the S_{AMS} is generated by the use of zero and span data, the action alarm for all of the control charts is set at 2 S_{AMS} and the warning limit set at 1 S_{AMS} .

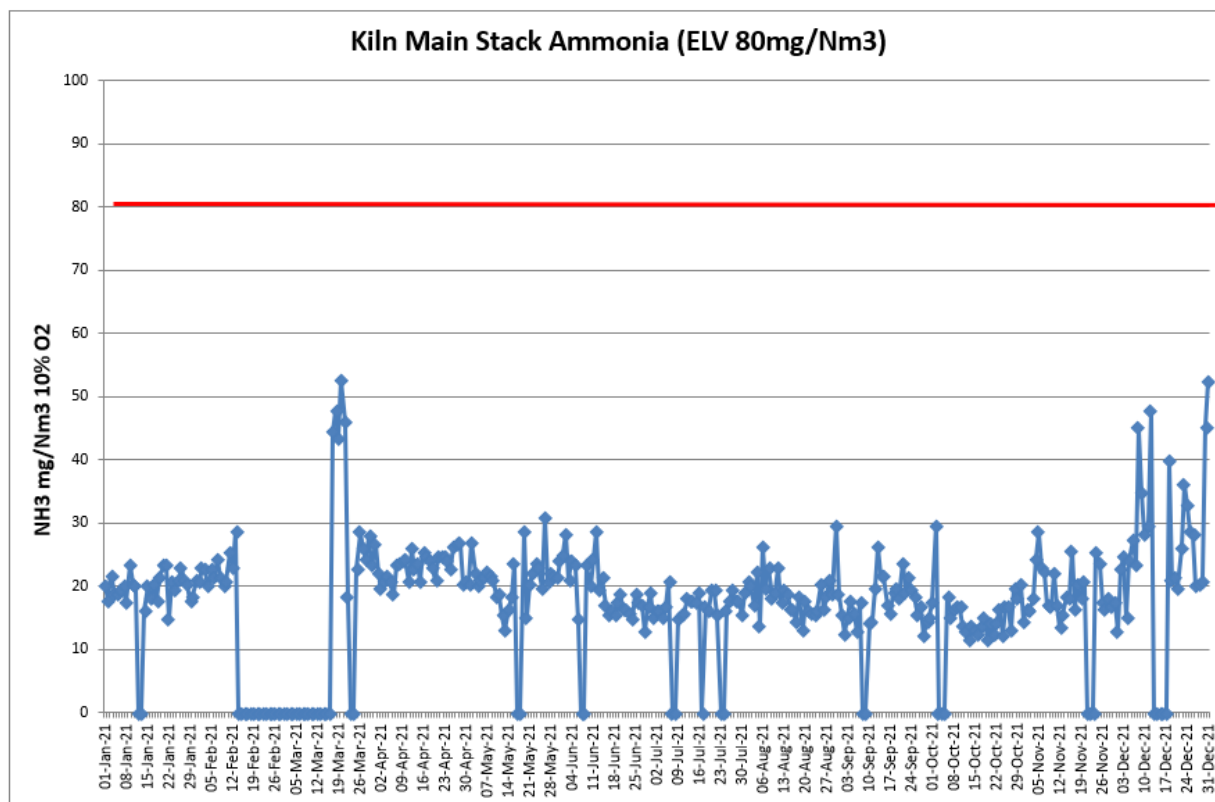
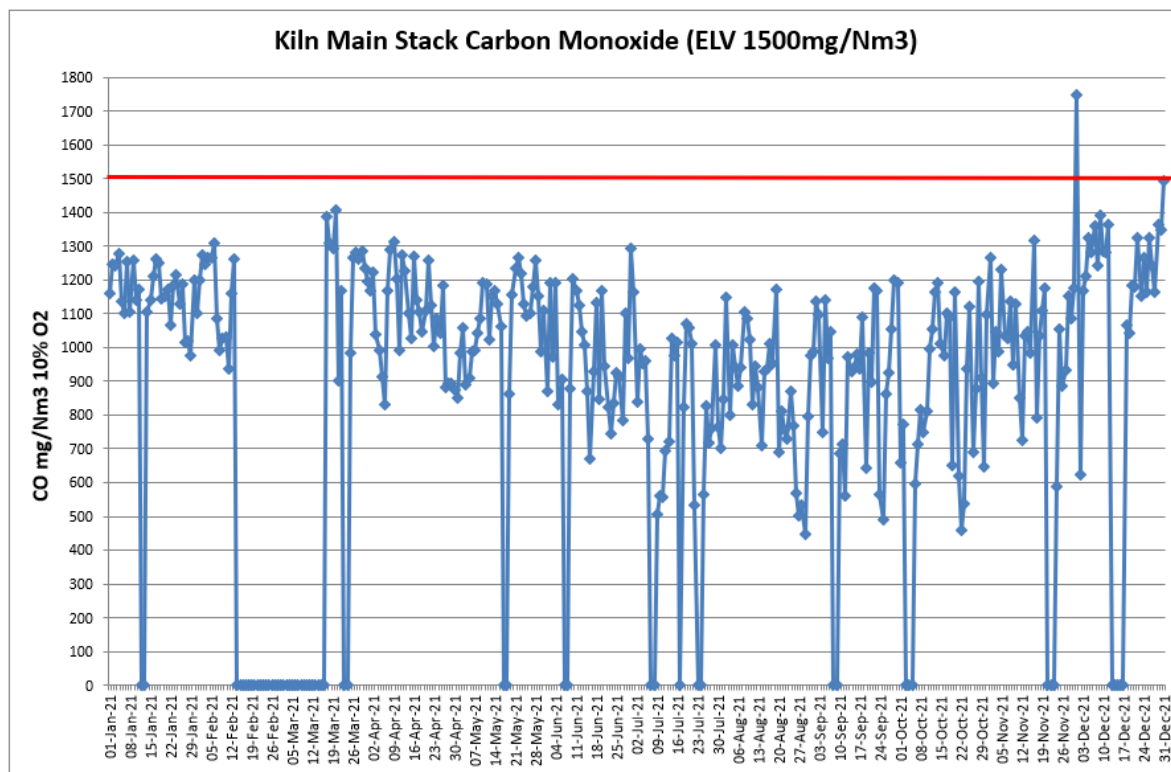
Full records of the QAL 2, AST and QAL 3 data are stored on site and available for discussion.

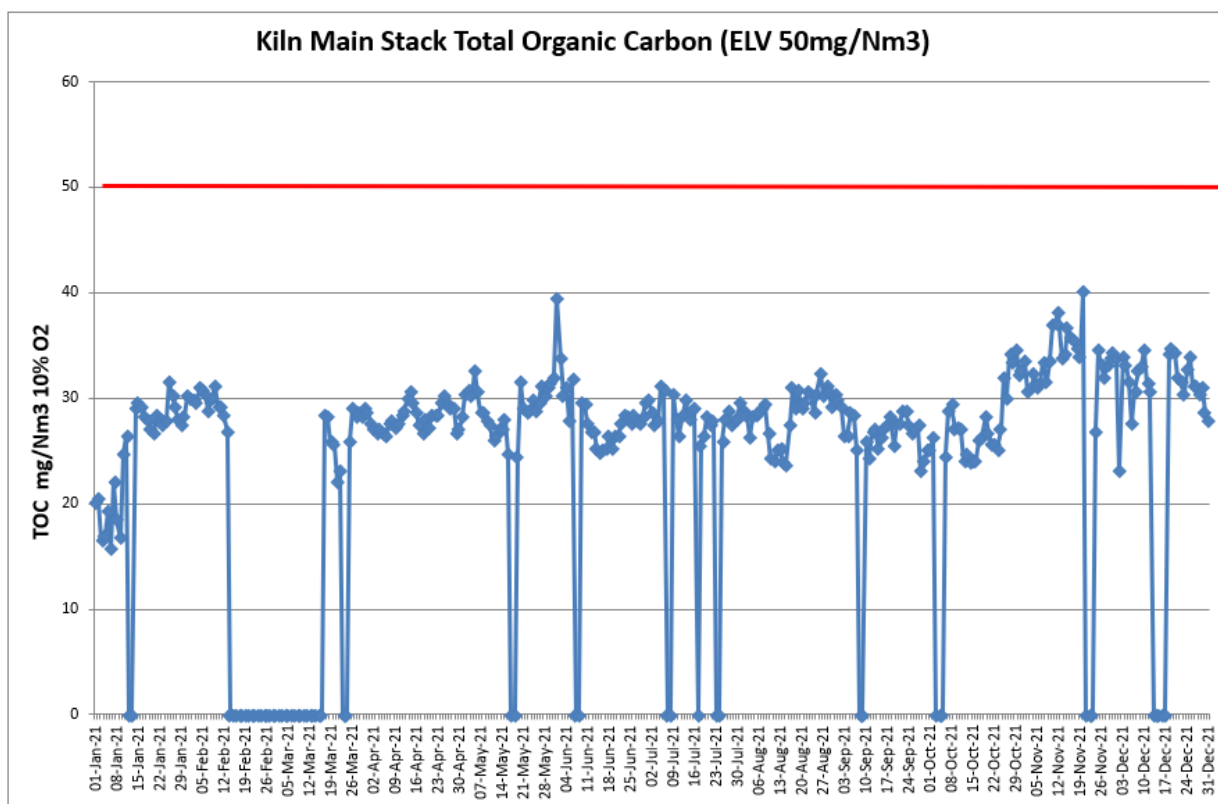
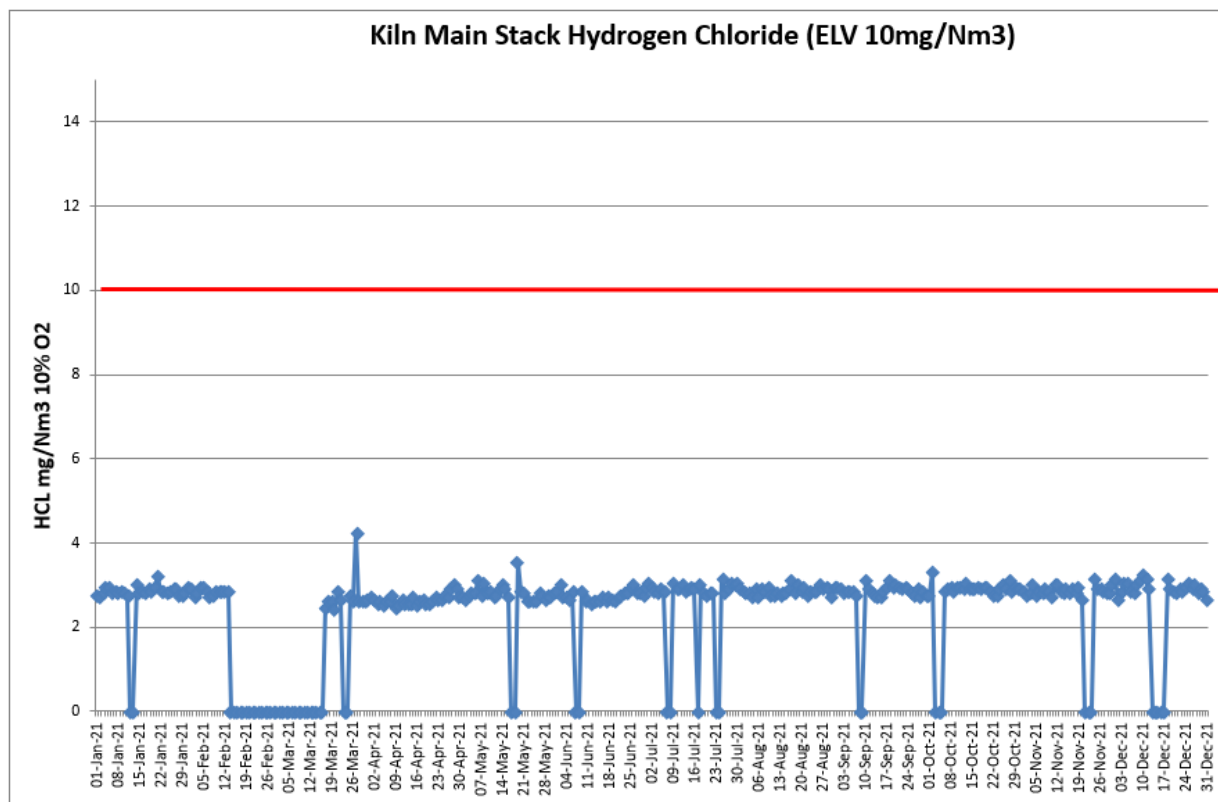
Appendix II

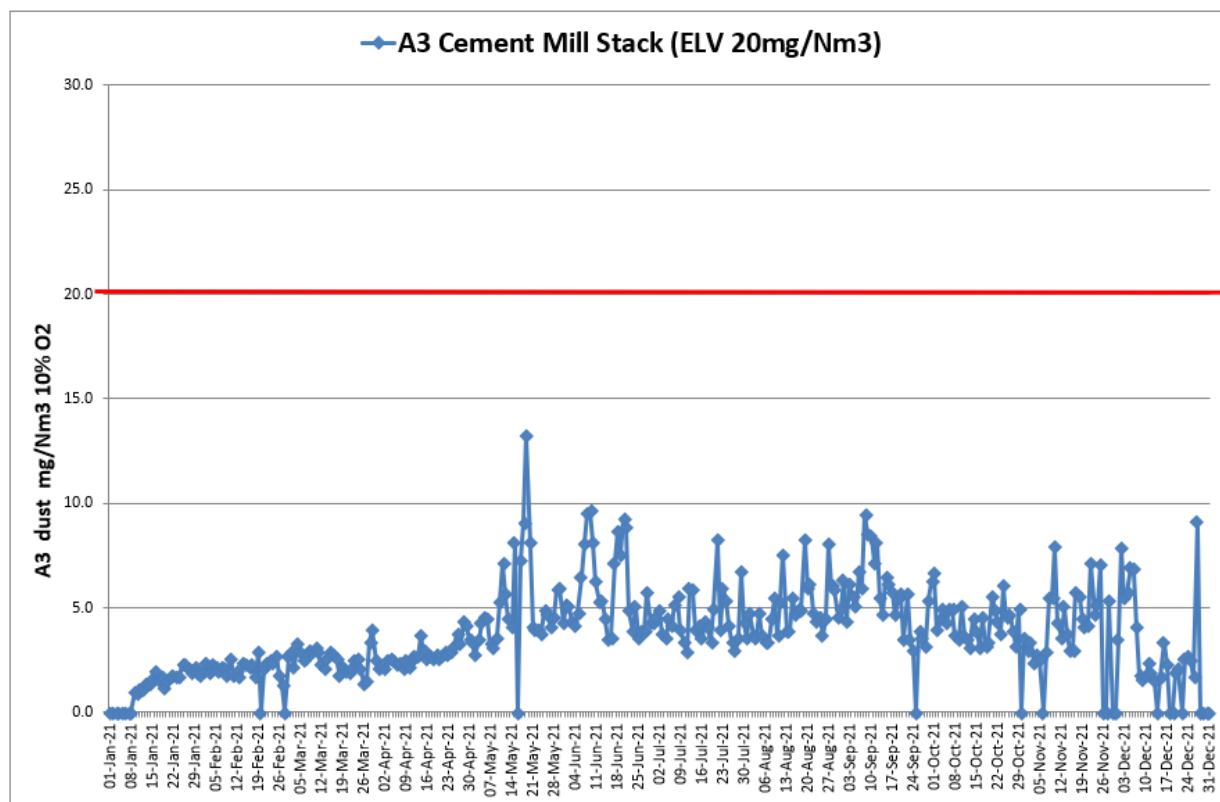
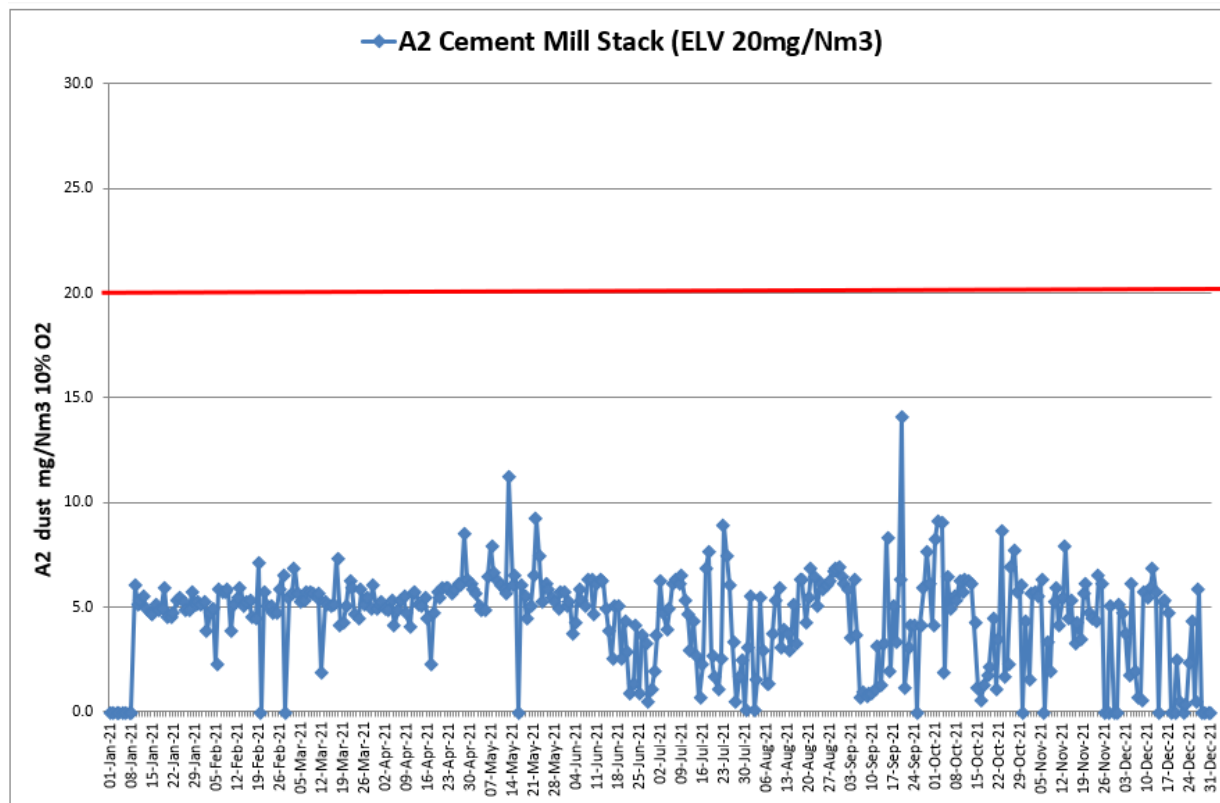
Continuous Emissions Monitor Results











Appendix III
Periodic Monitoring Results

Species	Limit mg/m3	Kiln 1 Test 1 mg/m3	Kiln 1 Test 2 mg/m3
Mercury	0.05	0.006	0.02487
Cadmium and Thallium	0.05	0.013	0.002
Group III Metals	0.5	0.043	0.029
Hydrogen Fluoride	1	<0.06	0.06
Dioxins and Furans	0.1*	0.0203	0.0027

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

Appendix IV

Summary of all Schedule 5 Reports submitted in 2022

22/03/2022 Kiln dust release

Localised dust release following kiln stop after maintenance issue following startup after shutdown period. Received two complaints from East Aberthaw residents on same day about dust on cars. One of the residents claimed to have seen dust at site entrance less than 1 hour after the time of the kiln stop.

22/04/2022 Fugitive dust emissions from quarry

Localised dust release from crushed limestone storage area affecting E Aberthaw due to NE wind.

Low stock levels of crushed limestone in under dome storage area following bank holiday weekend lead to partial removal of top of established mound of material that acted as a barrier on west side to prevent throughflow of wind below dome.

Low stock levels and recent high turnover of staff in quarry lead to misunderstanding of necessity for retaining height of mound of material on west side of under dome storage area. Quarry staff made aware of requirement to retain material bund. Dust suppression equipment now in place to act as backup.

Complimentary clean of cars and windows has been offered to E Aberthaw residents.

30/07/2022 Release of lime particulates

On the morning of 30/07/2022 at 05:59 a coupling connection broke free on an abatement system used to control SO₂ emissions which blows hydrated lime from a storage hopper along plastic hoses into the preheater tower. This caused the dust to be released to atmosphere.

The system was shut down within 15 minutes of the issue being noted. The shift team reconnected the pipe and secured the clips, and an extra fixing was added to the pipe to prevent it slipping off the connection area if the connections become loose again.

All neighbours in Burton Hill we're contacted/visited and arrangements made to clean their vehicles which were affected by fallout of the released material.