



Hanson Cement, Padeswood Works

Annual Report as required by

Condition 4.2.2

Permit EPR/BL1096IB

For Calendar year 2018

1. Introduction

Condition 4.2.2 of EPR Permit BL1096 requires an annual performance report.

4.2.2 A report or reports on the performance of the activities over the previous year shall be submitted to Natural Resources Wales by 31 January (or other date agreed in writing by Natural Resources Wales each year. The report(s) shall include as a minimum:

(a) a review of the results of the monitoring and assessment carried out in accordance with the permit including an interpretive review of that data;

(b) the performance parameters set out in schedule 4 table S4.2 using the forms specified in table S4.3 of that schedule.

(c) the functioning and monitoring of the plant involved with the burning of waste derived fuels, in a format agreed with Natural Resources Wales. The report shall, as a minimum requirement (as required by Chapter IV of the Industrial Emissions Directive (IED)) give an account of the running of the process and the emissions into air and water compared with the emission standards in the IED.

2. Condition 4.2.2 (a)

2.1. Emissions to Air

The main emissions to air from the installation are from the kiln via the main stack, emission point A8, the filters and stacks on the cement mills, emission points A3-A7, and the stack on the clinker cooler, emission point A9.

2.1.1. A3-A7,A9

Table 2.1 provides a summary of performance of these emission points based on the monitoring data collected during 2018. The table below outline the mean release values from each of the below emission points in 2018. All these emission limits were reduced from 30 or 50 mg/Nm³ on 9 April 2017 following improvement condition reports submitted in relation to compliance with particulate matter BATAELS set in the BAT conclusions. It should be noted that continuous emissions monitors cannot be calibrated at low (below 10 mg/Nm³) emission levels full details of this are set out in the responses to improvement conditions IC1, IC2 and IC3 submitted in 2016

Permit Reference	Description	Daily Average Limit (mg/m ³)	Annual Mean (mg/m ³)	Standard deviation
A3	Cement Mill 1	10	1	0.6
A4	Cement Mill 2	10	1	0.6
A5	Cement Mill 3	20	10	4.8
A6	Cement Mill 4	10	1	0.7
A7	Cement Mill 4 classifier	20	5	3
A9	Clinker Cooler	20	3	2.8

Table 2.1 Summary of emissions for air monitoring points other than A8 for 2018.

There was two emission breaches from the above emission points during 2018. This was on the emission point A5.

Date	End Date	Emission Point	Type
14/01/2018	14/01/2018	A5 - CM3 Filter	Particulate limit breach.
03/06/2018	03/06/2018	A5 - CM3 Filter	Particulate limit breach.

Table 2.2 Summary Schedule 5 notifications for 2018 for releases to air for emission points A3-A7,A9

2.1.2. A8

Table 2.3 provides a summary of performance of these emission points based on the monitoring data collected during 2018.

Permit Reference	Description	Daily Average Limit (mg/m ³)	Annual Mean (mg/m ³)	Standard deviation
A8	Particulates	10	2	1.4
A8	SOx	200	50	28.9
A8	NOx	450	366	25.8
A8	TOC	50	19	6
A8	HCl	10	4	1.6
A8	CO	1200	511	124
A8	NH3	70	12	3.6

Table 2.3 Summary of emissions for air monitoring points other than A8 for 2018.

There were 4 events where emission point A8 did not comply with the environmental permit, these occurred over four days throughout the year. All of these related to daily emission limit value breaches.

Each non-compliance is detailed in table 2.4 below.

Start Date	End Date	Emission Point	Type	Parameter
28/02/2018	28/02/2018	Main Stack (A8)	Main Stack non dust	HCl breach
03/03/2018	03/03/2018	Main Stack (A8)	Main Stack non dust	HCl breach
04/05/2018	04/05/2018	Main Stack (A8)	Main Stack non dust	HCl breach
18/09/2018	18/09/2018	Main Stack (A8)	Main Stack non dust	NOx Breach

Table 2.4 Summary Schedule 5 notifications for 2018 for releases to air for emission point A8

2.1.3. A11 & 12

Two further filters were added to the permit on 9 April 2017. These were the Arodo packer filter and the clinker dome filter. Indicative monitoring has been installed on each of these emission points as per the requirement of improvement condition 2 to show deterioration in filter performance. During 2018 there were no incidences where these emission points indicated non-conformance with the permit.

2.1.4. Fugitive Emissions

There were eight schedule 5 notifications submitted from the site for fugitive emissions in 2018. This is shown in the table below.

Date	End Date	Emission Point	Type
20/03/2018	20/03/2018	Kiln Flush	Kiln Flush
16/05/2018	16/05/2018	Silo 14	Fugitive dust
31/05/2018	31/05/2018	Raw mill system	Fugitive dust
27/07/2018	27/07/2018	Dust release Hot gas generating	Fugitive dust
04/08/2018	04/08/2018	361BE01 Dust release	Fugitive dust
16/08/2018	16/08/2018	kiln Inlet emissions	Fugitive dust
21/08/2018	21/08/2018	Raw MBF Dust escape	Fugitive dust
17/12/2018	18/12/2018	Kiln inlet	Fugitive dust

Table 2.5 Summary Schedule 5 notifications for 2018 for releases to air from fugitive emissions

2.2. Emissions to Water

The discharges to water from the installation are via emission point W1. There were no limit breaches from this emission point in 2018.

There was one discharge incident from the site due to a failure on the sites main water supply overflowing and flooding the coal shed. This is shown in the table below.

Date	End Date	Emission Point	Type
21/02/2018	21/02/2018	Coal Shed	Discharge

Table 2.6 Summary Schedule 5 notifications for 2018 for releases to water.

2.3. Other Releases

There was no additional incidents in 2018 other than those mentioned above.

2.4. Compliance

In 2018 there were 15 notifications of non-compliance via Schedule 5 Notifications. Table 2.8 shows this in context with previous year's levels.

Year	Notifications
2006	134
2007	89
2008	40
2009	22
2010	11
2011	23
2012	17
2013	9
2014	3
2015	9
2016	7
2017	14
2018	15

Table 2.8 Summary of total notifications since 2006.

In depth descriptions of each of non-conformance have been provided to the NRW through the Part A & Part B notifications which were sent following the incidences.

3. Condition 4.2.2 (b)

The total substitute fuels burned as displayed in the table below.

Parameter	Total Value	Units
Total Substitute Fuels Burned	Confidential	Tonnes
Total Hazardous Substitute Fuels Burned	Confidential	Tonnes

4. Condition 4.2.2 (c)

This report is produced using the standard NRW Annual WID Report template and is included in the following pages.

Annual Performance Report for Hanson Cement Padeswood Works: 2018

This report is required under the Waste Incineration Directive (WID) Article 12(2): - requirements on access to information and public participation. This requires the operator of an incineration or co-incineration plant to produce an annual report to the Regulator on the functioning and monitoring of the plant and to make this available to the public. To satisfy the requirements of the Directive the following information is provided:

1 Introduction

Name of company	Castle Cement Limited (trading as Hanson Cement)
Name of plant	Padeswood Works
Permit number	EPR/BL1096IB
Address	Padeswood, Mold, Flintshire, CH7 4HB.
Telephone	01244 550330
Contact name	Mr Elliot Wellbelove
Position	Quality and Environment Manager
Further information	<p>There was one operational kiln at the Padeswood Works in 2018. This kiln is authorised to burn Cemfuel[®], Profuel[®], SRF, MBM and chipped tyres as kiln fuels in addition to more traditional fossil fuels such as coal, petcoke and kerosene. Coal and petcoke may originate anywhere in the world.</p> <p>Cemfuel[®] is manufactured from a range of waste streams including spent solvents, paint and ink residues, spent carbon absorbers and waste oils. The individual waste producers are located around the UK. Cemfuel[®] is produced specialist waste management companies via a number of processes including distillation, fractionation, grinding, melting, dissolving, filtering and blending.</p> <p>Profuel[®] is solid fuels produced to a tight specification. It is non-hazardous and produced from wastes such as paper, board, offcuts and scrap supplied by Manufacturers. Also includes mixed fibres/plastic from Waste Processors.</p> <p>SRF is non hazardous waste produced from sorted residual wastes by mechanical and biological treatment. The SRF is shredded to typically less than 50mm size by the suppliers.</p> <p>MBM (Meat and bone Meal) is supplied from several sources in mainland Britain and Ireland. None was used in 2018.</p> <p>Chipped tyres are derived from scrap tyres and supplied by a processing facility in Manchester. None were used in 2018.</p>

Copies of this report can be obtained via the Public Register.

2 Plant description

The principal purpose of the activities at the installation is to manufacture cement.

Limestone, the main raw material, is extracted from a local quarry. This material is then crushed at the quarry in a dedicated crushing plant to a size of 95% no larger than 75 mm. The crushed stone is transported by road to the cement works where it is dried and crushed in a vertical roller mill with other minor components such as sand and pulverised fuel ash (PFA) to produce raw meal, a fine powder that is the feedstock for the cement kiln.

The raw meal is conveyed to the top of the pre heater tower. The meal is heated by the exhaust gases from the kiln as it passes down the tower until it reaches the calciner. This is a combustion chamber located between the kiln inlet and the bottom stage cyclone in which approximately 60% of the thermal energy required for the kiln is input. In the calciner the material temperature reaches ca. 900°C which results in most of the carbon dioxide in the limestone being driven off, a process called calcination. Fuels permitted to be burned in the calciner are coal, petcoke, chipped tyres, SRF, MBM and Profuel®.

The calcined material enters the kiln, which is a slightly inclined tube rotating at approximately three revolutions per minute. As the kiln rotates the material moves down to the discharge end undergoing a series of complex reactions to produce cement clinker. To complete the required chemical reactions the material must reach a temperature in the region of 1450°C. The thermal energy required at this point is supplied via the kiln burner, a co-axial pipe that is permitted to use coal, petcoke, Cemfuel®, SRF, MBM and Profuel®. The heated material leaves the kiln and is cooled to control the chemical reactions; the heat recovered is used as combustion air in the kiln and calciner. The cooled clinker is then directed to a purpose built store for later grinding in the cement mills.

The clinker is transported from the storage facility by a series of conveyor belts and transferred to the cement mill feed hoppers. The clinker is dosed, along with gypsum, limestone and other minor additives which control the properties of the finished cement to the cement mills. There are four cement mills, which grind the material to a required fineness. Each mill is equipped with fabric filters which minimise releases of dust to air. Upon exiting the mills cement is transported pneumatically to storage silos before being despatched in bulk road tankers.

A packing facility is also operational at the works which allows the packing of the final cement into either 25kg paper or plastic bags.

3 Summary of plant operation

3.1 Plant details.

One cement kiln with the capacity to burn waste materials operates on site: for historic reasons this is known as kiln 4. The kiln is rated to produce ca. 950,000 tonnes per annum of cement clinker, although the actual production would be closer to 820,000 tonnes per annum inclusive of plant shutdowns.

The tonnage of cement produced is dependent on the clinker incorporation in the final product but approximates to 10% greater than the clinker production.

3.2 Annual waste throughputs.

The amount of waste burned in 2018 is summarised in the table 3.2 below.

Waste type	EWC code	Tonnes used
Cemfuel®	19 02 08	Confidential
SRF	19 12 10	Confidential

Table 3.2: Amount of waste burned in 2018

3.3 Operational hours

The total hours of operation of the kiln and the total tonnage of cement clinker produced in 2018 is summarised in the table below.

Equipment Kiln 4	Annual production 2018 Confidential	Operational hours 2018 Confidential
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The annual shutdown of the kiln took place from the beginning of 1st January to 10th February during which time the major maintenance to the plant took place. There was also a minor shutdown in October detailed in the table below.

Start	Stop	Comments
01/01/2018	10/02/2018	Planned shutdown
07/04/2018	23/04/2018	Planned shutdown

Table 3.3, Shutdown periods 2018

3.4 Residues

The only residue which is produced by the kiln is bypass dust.

3,006 tonnes of bypass dust was sent off-site in 2018 for use as either as a land conditioning product or for further treatment.

4 Summary of plant monitoring.

4.1 Pollutants measured.

Emissions from kiln 4 main stack (point A8) are monitored continuously for particulate matter, carbon monoxide, sulphur dioxide, hydrogen chloride, oxides of nitrogen, total organic carbon and ammonia. In addition to the continuous monitoring, periodic monitoring is carried out for

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hydrogen fluoride, a range of metals, persistent organic pollutants, and other more volatile organic species. The following summarises the emissions measured and the frequency.

Pollutants Measured	Continuously	Periodically
Particulate matter	✓	
Total Organic Carbon (TOC)	✓	
Hydrogen chloride	✓	
Carbon monoxide	✓	
Sulphur dioxide	✓	
Oxides of nitrogen (NO & NO ₂ expressed as NO ₂)	✓	
Ammonia	✓	
Hydrogen fluoride		✓
Cadmium & thallium and their compounds (total)		✓
Mercury and its compounds		✓
Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)		✓
Dioxins / furans (I-TEQ)		✓
Dioxins / furans (WHO-TEQ) Humans / Mammals / fish / birds.		✓

Table 4.1, Emissions measured from A8 and the frequency

4.2 Availability of continuous emissions monitors.

The percentage of time during the year when the kiln was in operation that the continuous emission monitors were operating normally is summarised in the table below.

Continuous emission monitor	% Time operating normally
Particulates	99.7
Carbon monoxide	99.7
Sulphur dioxide	99.7
Oxides of nitrogen	99.7
Hydrogen chloride	99.7
Total organic carbon	99.7

Table 4.2, Emission monitors operating percentage

4.3 Summary of Continuous Emissions Monitor data.

Continuous emission data is submitted monthly to the Natural Resources Wales. This information is required by permit EPR/BL1096 and provides the daily average emission concentration for the month, the maximum daily mean concentration, the number of days in the month the relevant limit was exceeded for each pollutant and the number of invalid hours.

A summary of emission data is shown graphically and in tabulated form in Appendix 1

4.4 Results of periodic monitoring.

Results of periodic monitoring of emissions are shown in the table below (routine biannual monitoring only – additional fuel trial data was accumulated and reported separately).

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Substance / Parameter	Emission Limit Level	Result /Nm ³		Test Method ⁽²⁾
		First 6 Months	Second 6 Months	
Hydrogen Fluoride	1mg/Nm ³ over minimum 1 hour period	<0.026 mg/Nm ³	<0.021 mg/Nm ³	ISO 15713
Cadmium & thallium and their compounds (total)	0.05mg/Nm ³ over minimum 30 min, max 8 hr period	0.0015 mg/Nm ³	0.0003 mg/Nm ³	EN 14385
Mercury and its compounds	0.05mg/Nm ³ over minimum 30 min, max 8 hr period	0.034 mg/Nm ³	0.019 mg/Nm ³	EN 13211
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, and V and their compounds (total)	0.5mg/Nm ³ over minimum 30 min, max 8 hr period	0.0038 mg/Nm ³	0.044 mg/Nm ³	EN 14385
Dioxins / Furans (I-TEQ) ⁶	0.1ng/Nm ³ over minimum 6hr, max 8 hr period	0.0073 ng/Nm ³	0.036 ng/Nm ³	EN 1948
Dioxins / Furans (WHO – TEQ Humans/ Mammals) ⁶	No Limit	0.0070 ng/Nm ³	0.034 ng/Nm ³	EN 1948
Dioxins / Furans (WHO – TEQ Fish) ⁶	No Limit	0.0074 ng/Nm ³	0.032 ng/Nm ³	EN 1948
Dioxins / Furans (WHO – TEQ Birds) ⁶	No Limit	0.024 ng/Nm ³	0.15 ng/Nm ³	EN 1948

Table 4.4, Results of periodic monitoring of emissions 2018

5 Summary of plant compliance.

For continuously monitored emissions from the kiln 4 stack (Point A8) the plant met its Total organic carbon, carbon monoxide, sulphur dioxide and particulate matter emission limit values (ELV's) 100% of the time.

There were 4 days where daily ELVs on emission point A8 breached the environmental permit, this was composed of one NOx and three HCL. Dates and details of these are listed in the emissions to air section above.

6 Summary of plant improvements.

There were no improvement conditions relating to the burning of waste materials due in 2018.

Summary of information made available.

Monthly emission data reported to the Natural Resources Wales is published in the public register. The register is held at the following address:

Natural Resources Wales
Chester Road
Buckley
Mold
CH7 3AJ

Hanson Cement Liaison Committee meetings are held quarterly on the second Monday of the month. This meeting provides a forum for local residents, local groups and elected representatives of local parish and District councils to discuss matters of concern with the company. Representatives of Natural Resources Wales also attend this meeting.

The 2018 Hanson UK Sustainability report can be downloaded via the website at <http://www.hanson-sustainability.co.uk>

Hanson Cement operates an 'open door' policy enabling members of the public to contact the company to arrange a visit to the site or obtain information. The company can be contacted by the following methods:

By post: Hanson Cement, Padeswood Works, Padeswood, Mold, Flintshire, CH7 4HB.

By e-mail: enquiries@hanson.com

By telephone: 01244 550330

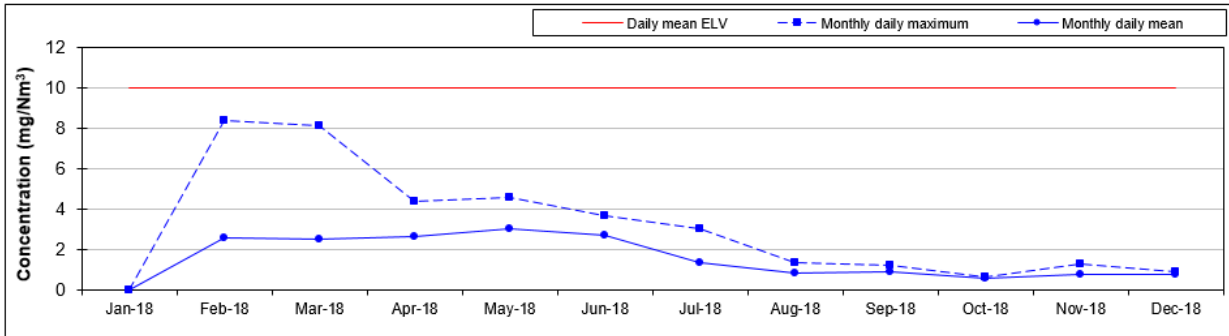
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Appendix 1

The graphs show the annual emission to air of the continuously monitored pollutants:

Particulate matter.

Pollutant: Particulate Matter

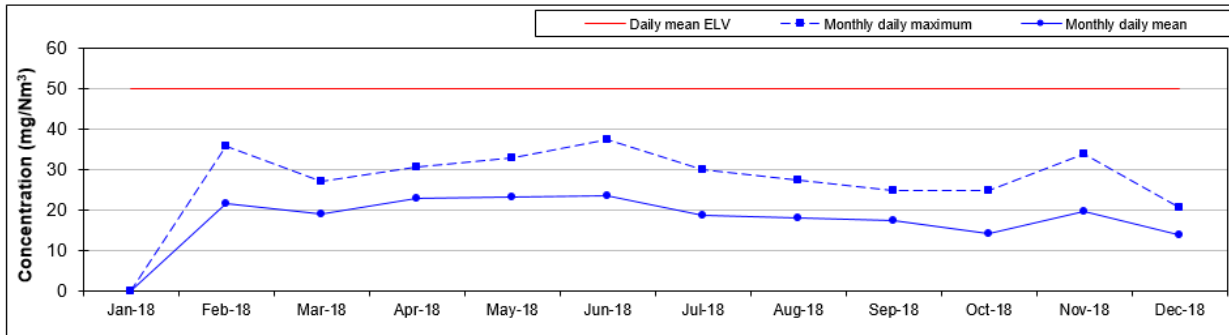


Annual Summary		Month	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Daily mean	Daily mean ELV		10	10	10	10	10	10	10	10	10	10	10	10
	Annual daily maximum	8	0	8	8	4	5	4	3	1	1	1	1	1
	Annual daily mean	2	3	2	3	3	3	3	1	1	1	1	1	1

Exceedences		Month	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Daily Limit			0	0	0	0	0	0	0	0	0	0	0	0

TOC as total organic carbon.

Pollutant: TOC



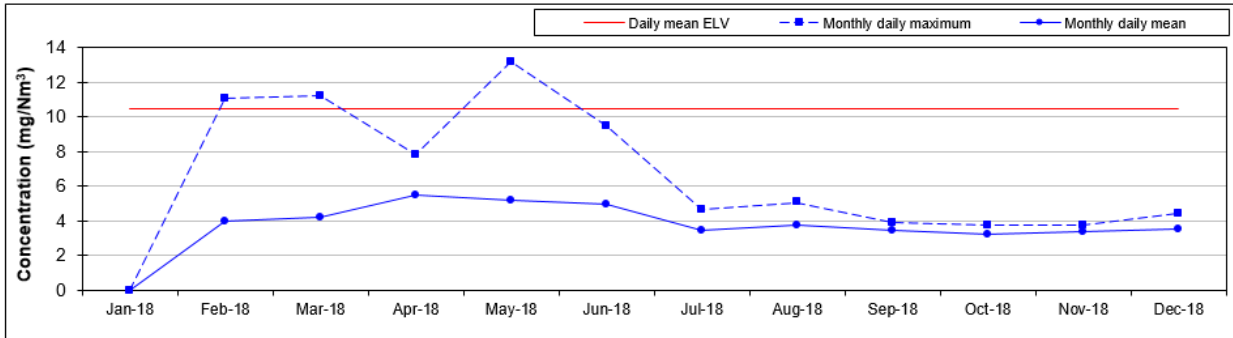
Annual Summary		Month	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Daily mean	Daily mean ELV		50	50	50	50	50	50	50	50	50	50	50	50
	Annual daily maximum	38	0	36	27	31	33	38	30	28	25	25	34	21
	Annual daily mean	19		22	19	23	23	24	19	18	17	14	20	14

Exceedences		Month	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Daily Limit			0	0	0	0	0	0	0	0	0	0	0	0

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Hydrogen chloride.

Pollutant: HCL



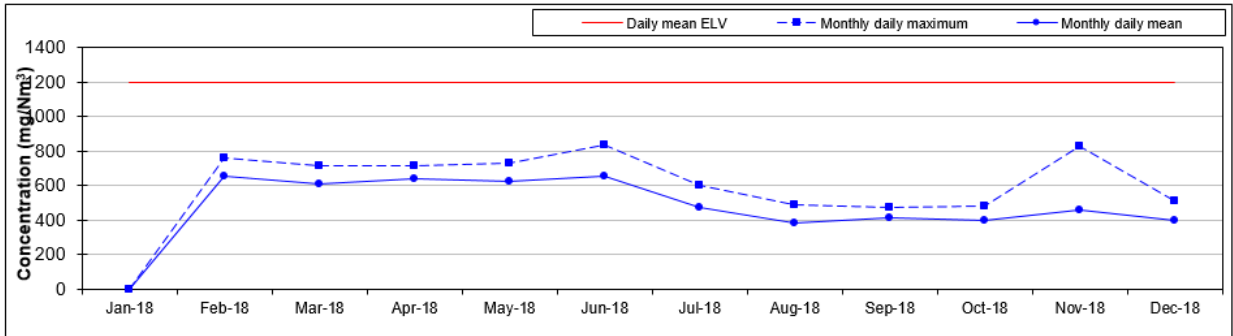
Annual Summary		Month	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Daily mean	Annual daily maximum	13	0	11	11	8	13	10	5	5	4	4	4	4
	Annual daily mean	4	0	4	4	5	5	5	3	4	3	3	3	4
	Monthly daily maximum		0	11	11	8	13	10	5	5	4	4	4	4
	Monthly daily mean		0	4	4	5	5	5	3	4	3	3	3	4

Exceedences

Daily Limit	0	1	1	0	1	0	0	0	0	0	0	0	0	0
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Carbon monoxide.

Pollutant: CO



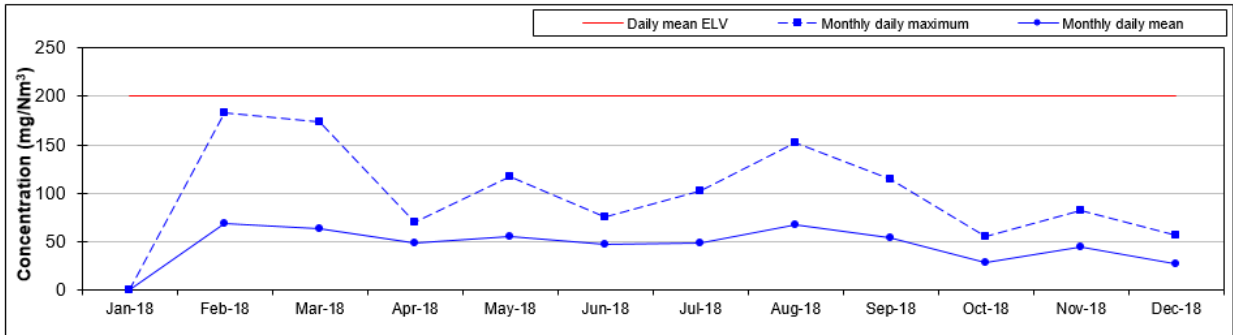
Annual Summary		Month	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Daily mean	Annual daily maximum	838	0	761	714	714	730	838	604	488	477	481	829	514
	Annual daily mean	511	0	655	613	637	629	654	472	385	415	400	461	401
	Monthly daily maximum		0	761	714	714	730	838	604	488	477	481	829	514
	Monthly daily mean		0	655	613	637	629	654	472	385	415	400	461	401

Exceedences

Daily Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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Sulphur dioxide.

Pollutant: SOx



Annual Summary		Month	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Daily mean	Annual daily maximum	184	0	184	174	70	117	75	103	152	114	55	83	56
	Annual daily mean	50	0	69	64	48	55	46	49	67	54	28	44	27
	Monthly daily maximum		0	184	174	70	117	75	103	152	114	55	83	56
	Monthly daily mean		0	69	64	48	55	46	49	67	54	28	44	27

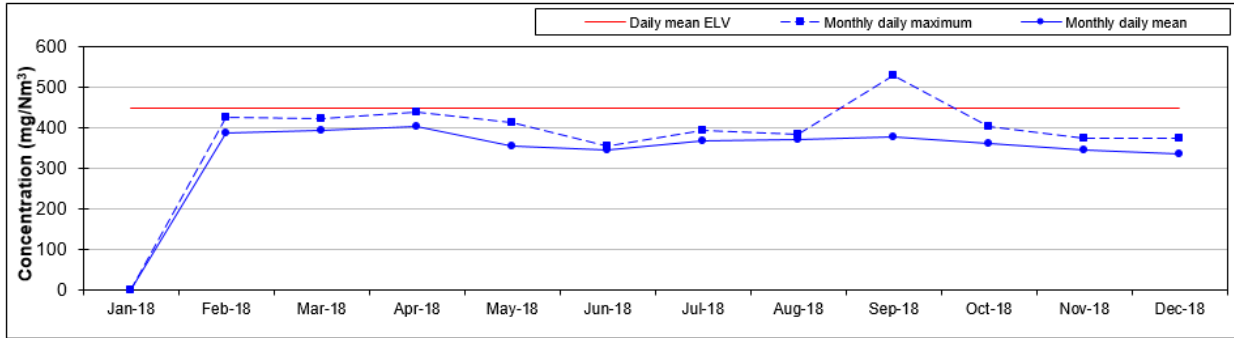
Exceedences

Daily Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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Oxides of nitrogen.

Pollutant: NOx



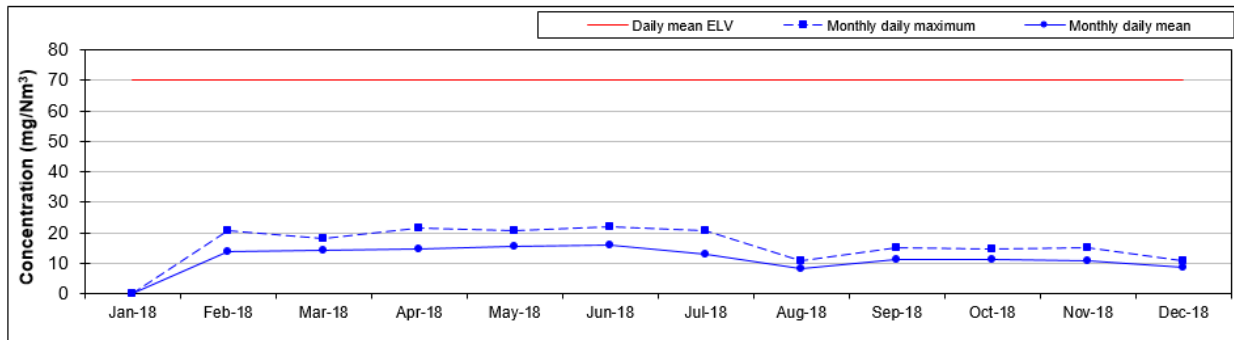
Annual Summary		Month	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Daily mean	Daily mean ELV		450	450	450	450	450	450	450	450	450	450	450	450
	Annual daily maximum	531	0	426	422	438	413	355	394	384	531	403	374	374
	Annual daily mean	366	389	395	402	356	346	371	378	361	345	336	336	

Exceedences

Daily Limit	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	
	0	0	0	0	0	0	0	0	0	1	0	0	0

Ammonia , NH3

Pollutant: Particulate Matter



Annual Summary		Month	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Daily mean	Daily mean ELV		70	70	70	70	70	70	70	70	70	70	70	70
	Annual daily maximum	22	0	21	18	22	21	22	11	15	15	15	11	
	Annual daily mean	12	14	14	15	15	16	13	8	11	11	11	9	

Exceedences

Daily Limit	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
	0	0	0	0	0	0	0	0	0	0	0	0