Hanson Cement, Padeswood Works

Annual Report as required by

Condition 4.2.2

Permit EPR/BL1096IB/V016

For Calendar year 2019

1. Introduction

Condition 4.2.2 of EPR Permit BL1096IB/V016 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 A15, the stack on the clinker cooler, emission point A9

2.1.1. A3-A7,A9, A15

Table 2.1 provides a summary of performance of these emission points based on the monitoring data collected during 2019. It should be noted that continuous emissions monitors cannot be calibrated at low (below 10 mg/Nm3) emission levels as previously advised to NRW

Permit Reference	Description	Daily Average Limit (mg/m^3)	Annual Mean (mg/m^3)	Standard deviation
A3	Cement Mill 1	10	2	0.9
A4	Cement Mill 2	10	1	0.7
A5	Cement Mill 3	20	3	2.7
A6	Cement Mill 4	10	0	0
A7	Cement Mill 4 classifier	20	0	0
A9	Clinker Cooler	20	5	2.7
A15	Cement Mill 5	10	1	0.4

Table 2.1 Summary of emissions for air monitoring points other than A8 for 2019.

In 2019 a new cement mill, cement mill 5, was commissioned. This replaces the production of cement from cement mills 1,2, and 4.
There was one emission breaches from the above emission points during 2019. This was on the emission point A5.

Date	End Date	Emission Point	Type
04/01/2019	04/01/2019	A5 - CM3 Filter	Particulate limit breach.

Table 2.2 Summary Schedule 5 notifications for 2019 for releases to air for emission points A3-A7,A9,A15

.

2.1.2. A8

Table 2.3 provides a summary of performance of this emission point based on the monitoring data collected during 2019.

Permit Reference	Description	Daily Average Limit (mg/m^3)	Annual Mean (mg/m^3)	Standard deviation
A8	Particulates	10	1	0.2
A8	SOx	200	30	13.9
A8	NOx	450	322	56.8
A8	TOC	50	13	7.3
A8	HCl	10	3	0.5
A8	CO	1200	403	74.5
A8	NH3	70	9	3.3

Table 2.3 Summary of emissions for air monitoring points other than A8 for 2019.

There were 3 events where emission point A8 did not comply with the environmental permit, these occurred over three 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	Parameter
15/08/2019	15/08/2019	Main Stack (A8)	NOx breach
28/10/2019	28/10/2019	Main Stack (A8)	NOx breach

Table 2.4 Summary Schedule 5 notifications for 2019 for releases to air for emission point A8

2.1.3. A11 & 12

Two further emission points to air are the Arodo packer filter and the clinker dome filter. Indicative monitoring has been installed on each of these emission points to show deterioration in filter performance. During 2019 there were no incidences where these emission points indicated non-conformance with the permit.

2.1.4. Fugitive Emissions

There were seven schedule 5 notifications submitted from the site for fugitive emissions in 2019. This is shown in table 2.5 below.

Date	End Date	Emission Point	Type
22/03/2019	22/03/2019	Cement Mill 5 elevator filter	Fugitive dust
29/03/2019	29/03/2019	Cooler	Fugitive dust
29/08/2019	29/08/2019	Raw Meal silo	Fugitive dust
21/09/2019	21/09/2019	Kiln outlet	Fugitive dust
23/10/2019	23/10/2019	Kiln inlet	Fugitive dust
15/12/2019	15/12/2019	Kiln outlet	Fugitive dust
23/12/2019	23/12/2019	Kiln inlet	Fugitive dust

Table 2.5 Summary Schedule 5 notifications for 2019 for releases to air from fugitive emissions

2.2. Emissions to Water

The discharges to water from the installation are via emission point W1.

Start Date	End Date	Emission Point	Parameter
25/07/2019	25/07/2019	Lagoon (W1)	Temperature

Table 2.6 Summary Schedule 5 notifications for 2019 for releases to water

2.3. Other Releases

There was no additional incidents in 2019 other than those mentioned above.

2.4. Compliance

In 2019 there were 11 notifications of non-compliance via Schedule 5 Notifications. Table 2.7 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
2019	11

Table 2.7 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 in 2019 are 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: 2019

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 Stewart Mitchell
Position	Quality and Environment Manager
Further information	There was one operational kiln at the Padeswood Works in 2019. 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. 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. 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. 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. MBM (Meat and bone Meal) is supplied from several sources in mainland Britain and Ireland. None was used in 2019. Chipped tyres are derived from scrap tyres and supplied by a processing facility in Manchester. None were used in 2019.

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 two 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.

3.2 Annual waste throughputs.

The amount of waste burned in 2019 is summarised in the table 3.2 below.

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

Table 3.2: Amount of waste burned in 2019

3.3 Operational hours

The total hours of operation of the kiln and the total tonnage of cement clinker produced in 2019 is summarised in the table below.

Equipment	Annual production 2019	Operational hours 2019
Kiln 4	Confidential	Confidential

The annual shutdown of the kiln took place from the beginning of 1st January to 29th January during which time the major maintenance to the plant took place. There was also a minor shutdown in June detailed in the table below.

Start	Stop	Comments
01/01/2019	29/01/2019	Planned shutdown
29/05/2019	15/06/2019	Planned shutdown

Table 3.3, Shutdown periods 2019

3.4 Residues

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

1,559 tonnes of bypass dust was sent off-site in 2019 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 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	99.6
Carbon monoxide	99.6
Sulphur dioxide	99.6
Oxides of nitrogen	99.6
Ammonia	99.6
Hydrogen chloride	99.6
Total organic carbon	99.6

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

Substance / Parameter	Emission Limit Level	Result /Nm^3 First 6 Months	Result /Nm^3 Second 6 Months	Test Method(2)
Hydrogen Fluoride	1mg/Nm^3 over minimum 1 hour period	0.031 mg/Nm3	<0.029 mg/Nm3	ISO 15713
Cadmium & thallium and their compounds (total)	0.05mg/Nm^3 over minimum 30 min, max 8 hr period	0.00071 mg/Nm3	0.0020 mg/Nm3	EN 14385
Mercury and its compounds	0.05mg/Nm^3 over minimum 30 min, max 8 hr period	0.034 mg/Nm3	0.045 mg/Nm3	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	0.0052 mg/Nm3	0.0076 mg/Nm3	EN 14385
Dioxins / Furans (I-TEQ)[6]	0.1ng/Nm^3 over minimum 6hr, max 8 hr period	0.044 ng/Nm3	0.0064 ng/Nm3	EN 1948
Dioxins / Furans (WHO – TEQ Humans/ Mammals)[6]	No Limit	0.039 ng/Nm3	0.0065 ng/Nm3	EN 1948
Dioxins / Furans (WHO – TEQ Fish)[6]	No Limit	0.038 ng/Nm3	0.0067 ng/Nm3	EN 1948
Dioxins / Furans (WHO – TEQ Birds)[6]	No Limit	0.19 ng/Nm3	0.019 ng/Nm3	EN 1948

Table 4.4, Results of periodic monitoring of emissions 2019

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, hydrogen chloride, ammonia, and particulate matter emission limit values (ELV's) 100% of the time.

There were 3 days where daily ELVs on emission point A8 breached the environmental permit, all were NOx limit breaches. 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 2019.

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.

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:

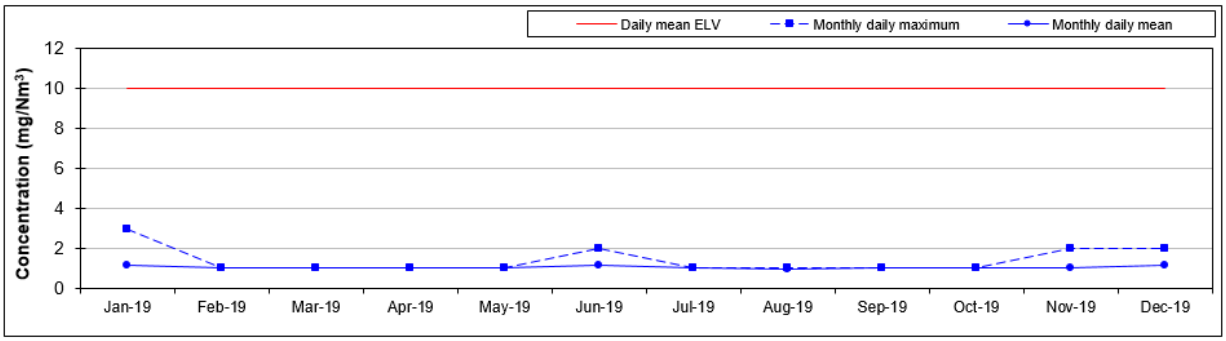
By post:	Hanson Cement, Padeswood Works, Padeswood, Mold, Flintshire, CH7 4HB.
By e-mail:	enquiries@hanson.com
By telephone:	01244 550330

Appendix 1

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

Particulate matter.

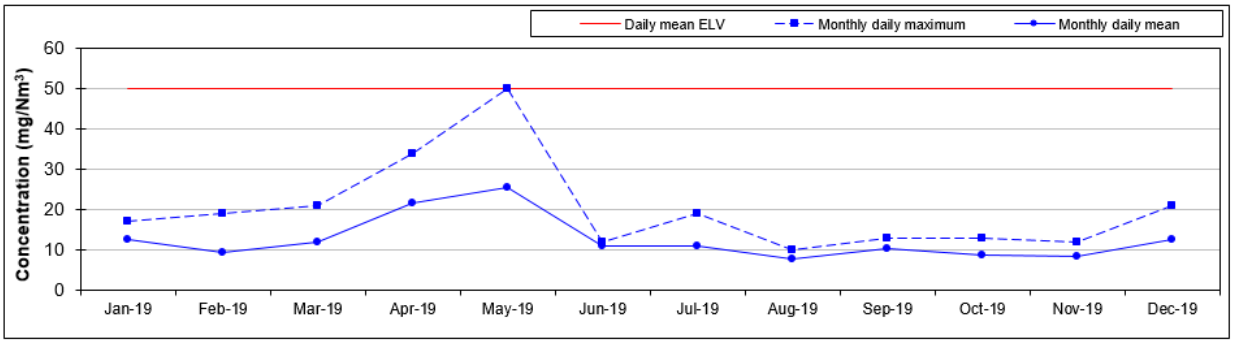
Pollutant: Particulate Matter



	Annual Summary		Month	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19
Daily mean			Daily mean ELV	10	10	10	10	10	10	10	10	10	10	10	10
	Annual daily maximum	3	Monthly daily maximum	3	1	1	1	1	2	1	1	1	1	2	2
	Annual daily mean	1	Monthly daily mean	1	1	1	1	1	1	1	1	1	1	1	1
			Exceedences												
			Daily Limit	0	0	0	0	0	0	0	0	0	0	0	0

TOC as total organic carbon.

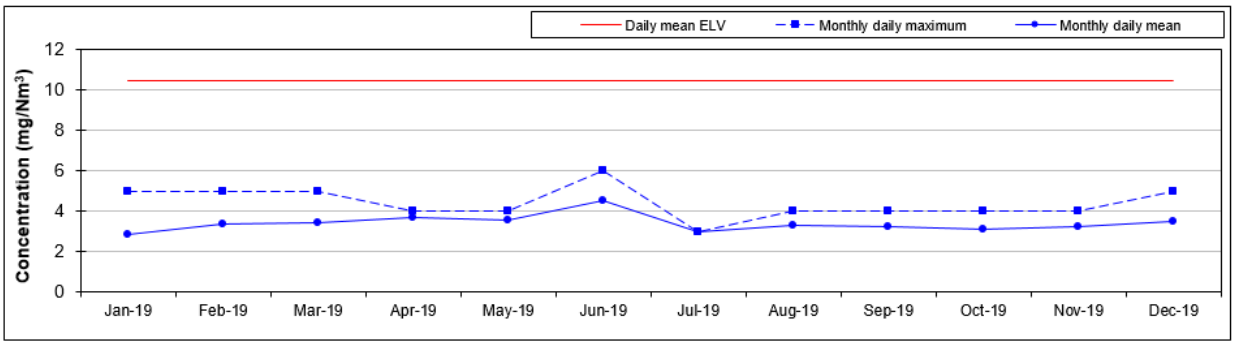
Pollutant: TOC



	Annual Summary		Month	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19
Daily mean			Daily mean ELV	50	50	50	50	50	50	50	50	50	50	50	50
	Annual daily maximum	50	Monthly daily maximum	17	19	21	34	50	12	19	10	13	13	12	21
	Annual daily mean	13	Monthly daily mean	13	10	12	22	26	11	11	8	10	9	8	12
			Exceedences												
			Daily Limit	0	0	0	0	0	0	0	0	0	0	0	0

Hydrogen chloride.

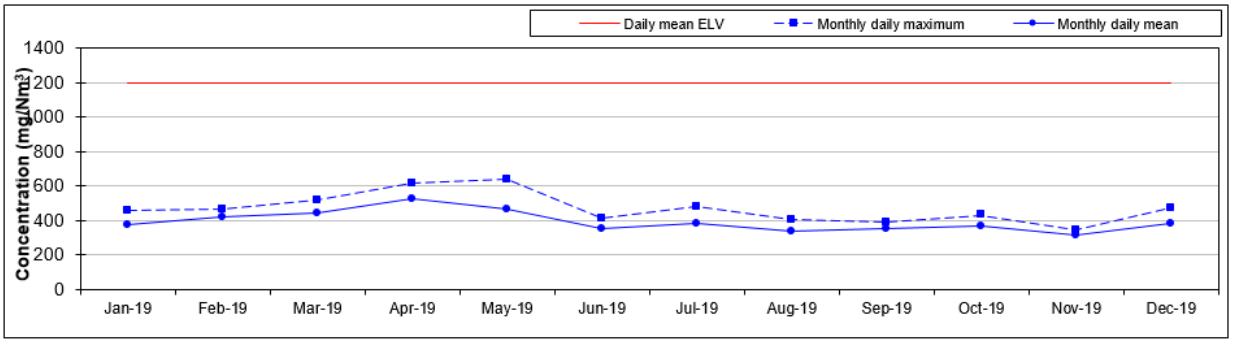
Pollutant: HCL



	Annual Summary		Month	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19
Daily mean			Daily mean ELV	10.49	10.49	10.49	10.49	10.49	10.49	10.49	10.49	10.49	10.49	10.49	10.49
	Annual daily maximum	6	Monthly daily maximum	5	5	5	4	4	6	3	4	4	4	4	5
	Annual daily mean	3	Monthly daily mean	3	3	3	4	4	5	3	3	3	3	3	3
			Exceedences												
			Daily Limit	0	0	0	0	0	0	0	0	0	0	0	0

Carbon monoxide.

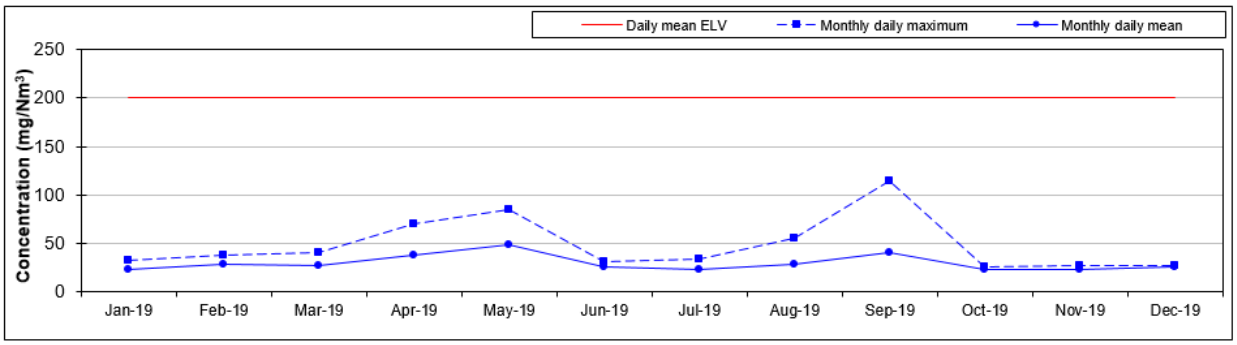
Pollutant: CO



	Annual Summary		Month	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19
Daily mean			Daily mean ELV	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
	Annual daily maximum	640	Monthly daily maximum	458	470	523	620	640	415	483	407	390	433	346	474
	Annual daily mean	401	Monthly daily mean	375	422	442	523	465	357	380	340	357	366	313	382
			Exceedences												
			Daily Limit	0	0	0	0	0	0	0	0	0	0	0	0

Sulphur dioxide.

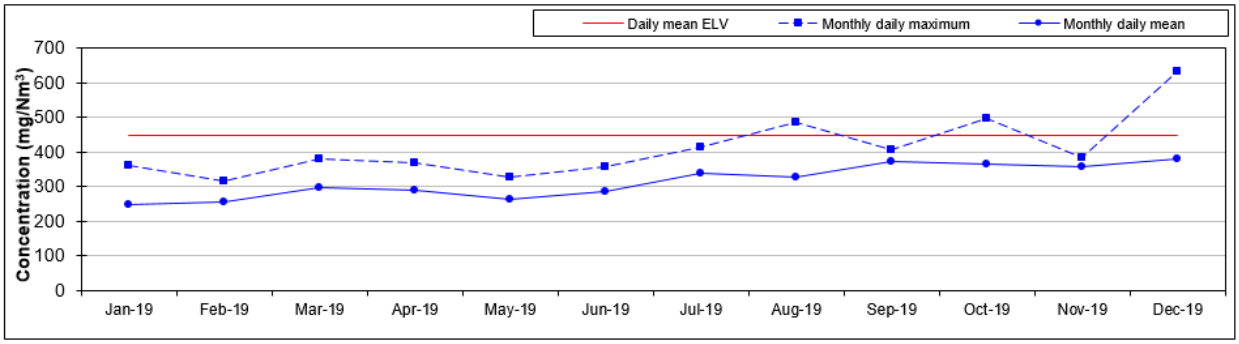
Pollutant: SOx



	Annual Summary		Month	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19
Daily mean			Daily mean ELV	200	200	200	200	200	200	200	200	200	200	200	200
	Annual daily maximum	114	Monthly daily maximum	32	37	40	70	85	31	33	55	114	25	27	27
	Annual daily mean	30	Monthly daily mean	23	28	27	38	49	25	23	28	40	22	23	25
			Exceedences												
			Daily Limit	0	0	0	0	0	0	0	0	0	0	0	0

Oxides of nitrogen.

Pollutant: NOx

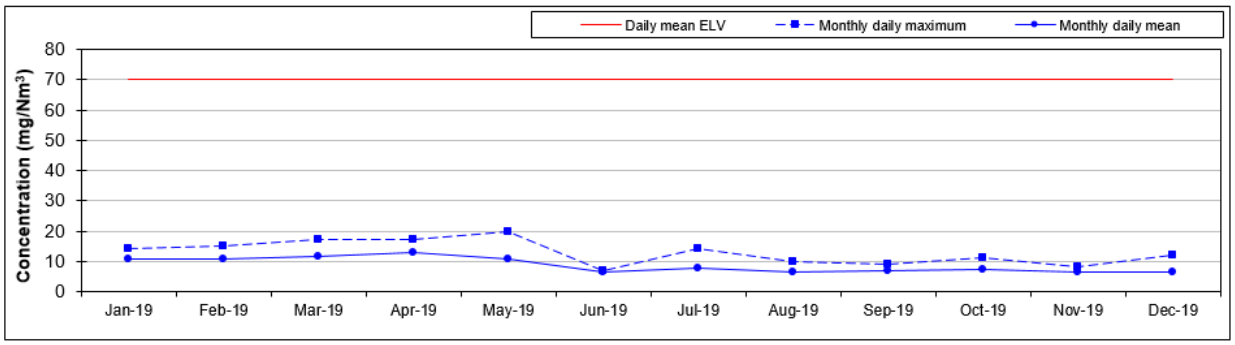


	Annual Summary		Month	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19
Daily mean			Daily mean ELV	450	450	450	450	450	450	450	450	450	450	450	450
	Annual daily maximum	633	Monthly daily maximum	363	317	381	371	328	356	414	487	405	496	386	633
	Annual daily mean	321	Monthly daily mean	249	256	299	290	265	288	338	329	373	366	359	379

Exceedences												
Daily Limit	0	0	0	0	0	0	0	1	0	1	0	1

Ammonia , NH3

Pollutant: Particulate Matter



	Annual Summary		Month	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19
Daily mean			Daily mean ELV	70	70	70	70	70	70	70	70	70	70	70	70
	Annual daily maximum	20	Monthly daily maximum	14	15	17	17	20	7	14	10	9	11	8	12
	Annual daily mean	9	Monthly daily mean	11	11	12	13	11	7	8	6	7	7	6	6

Exceedences												
Daily Limit	0	0	0	0	0	0	0	0	0	0	0	0