



# **Hanson Cement, Padeswood Works**

**Annual Report as required by**

**Condition 4.2.2**

**Permit EA/EPR/BL1096IB/V013**

**For Calendar year 2016**

## 1 Introduction

Condition 4.2.2 of PPC Permit BL1096 requires an annual performance report. This condition is specified in Variation V012:

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.

The table below outline the mean release values from each of the below emission points in 2016.

Table 2.1 provides a summary of performance of these emission points based on the monitoring data collected during 2016.

Permit Reference	Description	Daily Average Limit (mg/m <sup>3</sup> )	Annual Mean (mg/m <sup>3</sup> )	Standard deviation
A3	Cement Mill 1	30	0.38	1.22
A4	Cement Mill 2	30	1.04	0.80
A5	Cement Mill 3	30	5.85	4.06
A6	Cement Mill 4	30	4.86	7.23
A7	Cement Mill 4 classifier	30	5	5.32
A9	Clinker Cooler	50	5.69	5.53

Table 2.1 Summary of emissions for air monitoring points other than A8 for 2016.

There were no emission breaches from the above emission points during 2016.

There were four events where emission point A8 breached its daily limits and these occurred over seven days throughout the year. These are detailed in the table 2.2 below.

Date	Emission Point	Type	Daily limit - mg/Nm3	Daily Average - mg/Nm3
02/01/2016	A8	Particulate limit breach	10	11.3
13/02/2016	A8	Particulate limit breach	10	12.8
14/02/2016	A8	Particulate limit breach	10	11.8
26/08/2016	A8	Particulate limit breach	10	13.58
27/08/2016	A8	Particulate limit breach	10	17.3
28/08/2016	A8	Particulate limit breach	10	13.76
24/11/2016	A8	Particulate limit breach	10	11.36

Table 2.2 Summary Part A notifications for 2016 for releases to air.

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

The breaches above were resolved through a series of bag changes and inspections on the main bag filter and in several cases through the stopping of the kiln in order to carry out repair work. Further maintenance work is to be carried out during the January 2017 shutdown.

## 2.2 Emissions to Water

The discharges to water from the installation are via emission point W1. There were no limit breaches in 2016.

## 2.3 Compliance

In 2016 there were 4 notifications of non-compliance via Schedule 5 Notifications. Table 2.3 shows this in context with previous year's levels. All of the non-compliances are as shown in table 2.2 above and relate to excess particulate emissions on the kiln.

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

Table 2.3 Summary of total notifications since 2006.

**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	36805	Tonnes
Total Hazardous Substitute Fuels Burned	11628	Tonnes

**3 Condition 4.2.2 (c)**

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

**Annual Performance Report for Hanson Cement Padeswood Works: 2016**

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 (currently trading as Hanson Cement)
Name of plant	Padeswood Works
Permit number	EA/EPR/BL1096IB/V013
Address	Padeswood, Mold, Flintshire, CH7 4HB.
Telephone	01244 550330
Contact name	Mr Robert Keough
Position	Quality and Environment Manager
Further information	<p>There was one operational kiln at the Padeswood Works in 2016. This kiln is authorised to burn Cemfuel<sup>®</sup>, Profuel<sup>®</sup>, 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<sup>®</sup> 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<sup>®</sup> is produced specialist waste management companies via a number of processes including distillation, fractionation, grinding, melting, dissolving, filtering and blending.</p> <p>Profuel<sup>®</sup> and SRF are solid fuels produced to a tight specification. Non-hazardous, they are produced from wastes such as paper, board, offcuts and scrap supplied by Manufacturers. Also includes mixed fibres/plastic from Waste Processors.</p> <p>MBM (Meat and bone Meal) is supplied from several sources in mainland Britain and Ireland.</p> <p>Chipped tyres are derived from scrap tyres and supplied by a processing facility in Manchester. None were used in 2016.</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 was bought back into operation in 2015 with the addition of a new packer for 25kg plastic bags, the older paper packer was refurbished and restarted to run alongside the plastic line.

### **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 2016 is summarised in the table 3.2 below.

<b>Waste type</b>	<b>EWC code</b>	<b>Tonnes used</b>
Cemfuel®	19 02 08	11,628
MBM	02 02 03	1,101
SRF	19 12 10	24,076

Table 3.2: Amount of waste burned in 2016

#### **3.3 Operational hours**

The total hours of operation of the kiln and the total tonnage of cement clinker produced in 2016 is summarised in the table below.

<b>Equipment</b>	<b>Annual production 2016</b>	<b>Operational hours 2016</b>
Kiln 4	Confidential	Confidential

The annual shutdown of the kiln took place from the beginning of 1<sup>st</sup> January to 11th February during which time the major maintenance to the plant took place. There were also two minor shutdowns throughout the year which are detailed in the table below.

<b>Start</b>	<b>Stop</b>	<b>Comments</b>
02/01/16	11/02/16	Planned shutdown
06/05/16	12/05/16	Planned shutdown
16/09/16	10/10/16	Planned shutdown

Table 3.3, Shutdown periods 2016

#### **3.4 Residues**

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

1,854 tonnes of bypass dust was sent off-site in 2016 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, and total organic carbon. 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 <sub>2</sub> expressed as NO <sub>2</sub> )	✓	
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	99.9
Carbon monoxide	99.9
Sulphur dioxide	99.9
Oxides of nitrogen	99.9
Hydrogen chloride	99.9
Total organic carbon	99.9

Table 4.2, Emission monitors operating percentage

There were no issues with CEMs monitors during 2016.

##### 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 EA/EPR/BL1096/V013 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).

Substance / Parameter	Emission Limit Level	Result <sup>(1)</sup> mg/Nm <sup>3</sup>		Test Method <sup>(2)</sup>
		First 6 Months	Second 6 Months	
Hydrogen Fluoride	1mg/Nm <sup>3</sup> over minimum 1 hour period	0.025	<0.069	ISO 15713
Cadmium & thallium and their compounds (total)	0.05mg/Nm <sup>3</sup> over minimum 30 min, max 8 hr period	0.00094	0.0012	EN 14385
Mercury and its compounds	0.05mg/Nm <sup>3</sup> over minimum 30 min, max 8 hr period	0.014	0.022	EN 13211
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, and V and their compounds (total)	0.5mg/Nm <sup>3</sup> over minimum 30 min, max 8 hr period	0.077	0.047	EN 14385
Dioxins / Furans (I-TEQ) <sup>6</sup>	0.1ng/Nm <sup>3</sup> over minimum 6hr, max 8 hr period	0.018	0.016	EN 1948
Dioxins / Furans (WHO – TEQ Humans/ Mammals) <sup>6</sup>	No Limit	0.016	0.015	EN 1948
Dioxins / Furans (WHO – TEQ Fish) <sup>6</sup>	No Limit	0.018	0.017	EN 1948
Dioxins / Furans (WHO – TEQ Birds) <sup>6</sup>	No Limit	0.037	0.035	EN 1948

Table 4.4, Results of periodic monitoring of emissions

## 5 Summary of plant compliance.

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

There were seven days where the particulates ELV was breached in 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 2016.

**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 and Public Health Wales also attend this meeting. The MPA waste derived fuels code of practice was discussed with the liaison committee during the year. In 2017 the company will make a variation application to incorporate the code of practice in the Padeswood works permit.

The 2016 Hanson UK Sustainability report can be downloaded via the website at [www.heidelbergcement.com/uk/en/hanson/home.htm](http://www.heidelbergcement.com/uk/en/hanson/home.htm)

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](mailto:enquiries@hanson.com)

By telephone: 01244 550330

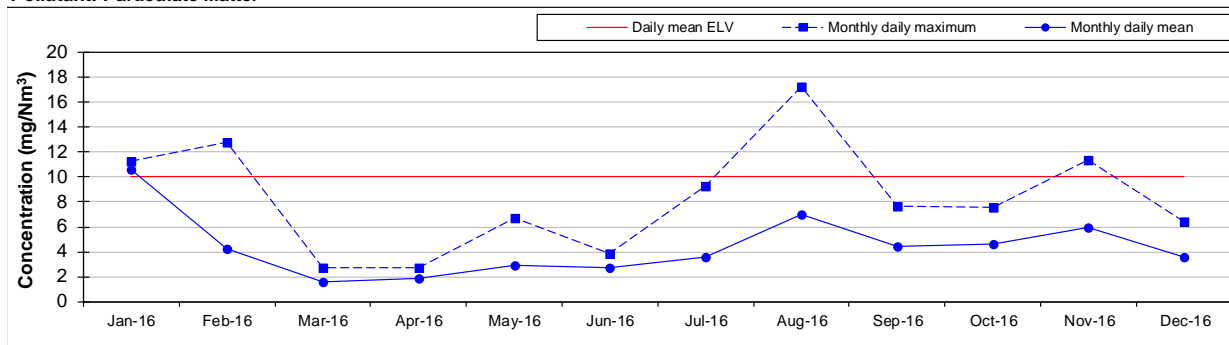
Annual Report as per Condition 4.2.2 Permit EA/EPR/BL1096IB/V013  
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## Appendix 1

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

### A1 Particulate matter.

#### Pollutant: Particulate Matter



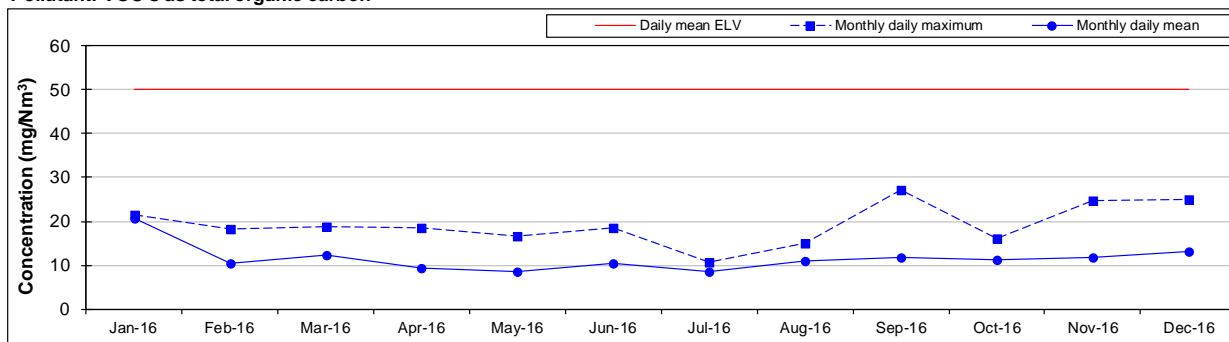
Annual Summary		Month	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16
Daily mean	Annual daily maximum	17.30	11.3	12.8	2.7	2.7	6.7	3.9	9.3	17.3	7.6	7.6	11.4	6.4
	Annual daily mean	6.08	10.6	4.3	1.6	1.9	2.9	2.7	3.6	7.0	4.4	4.6	5.9	3.6

#### Exceedences

Daily Limit	1	2	0	0	0	0	0	3	0	0	1	0
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### A2 VOC as total organic carbon.

#### Pollutant: VOC's as total organic carbon



Annual Summary		Month	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16
Daily mean	Annual daily maximum	27.2	21	18	19	18	17	19	11	15	27	16	25	25
	Annual daily mean	11.6	21	10	12	9	9	10	8	11	12	11	12	13

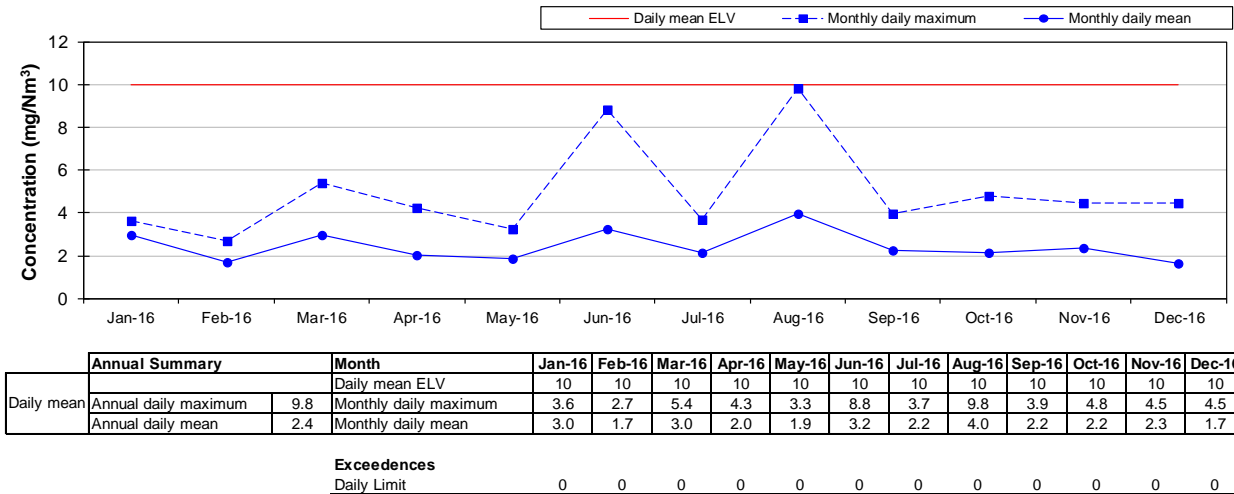
#### Exceedences

Daily Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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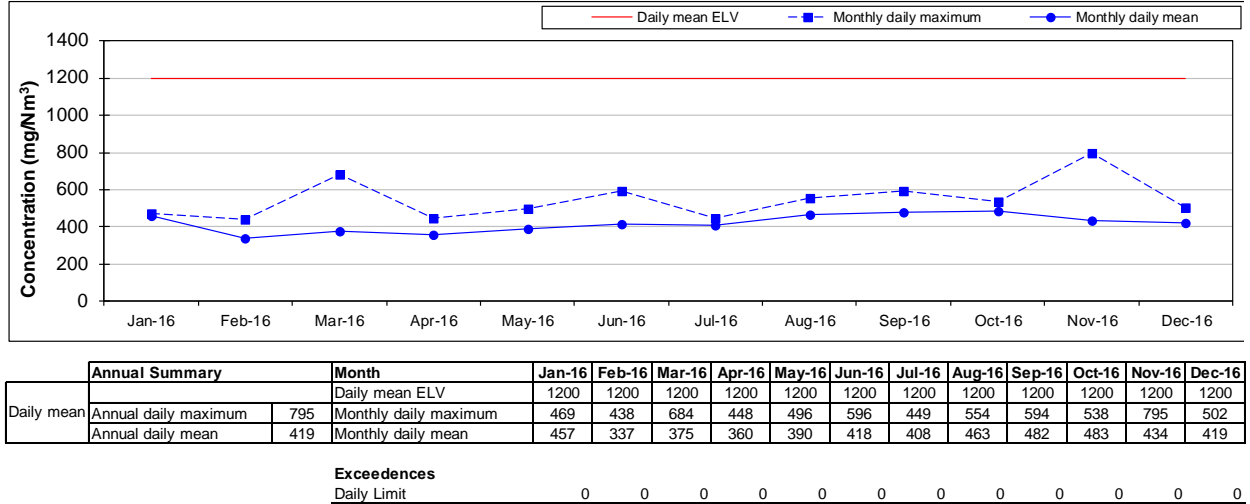
A3 Hydrogen chloride.

Pollutant: Hydrogen chloride



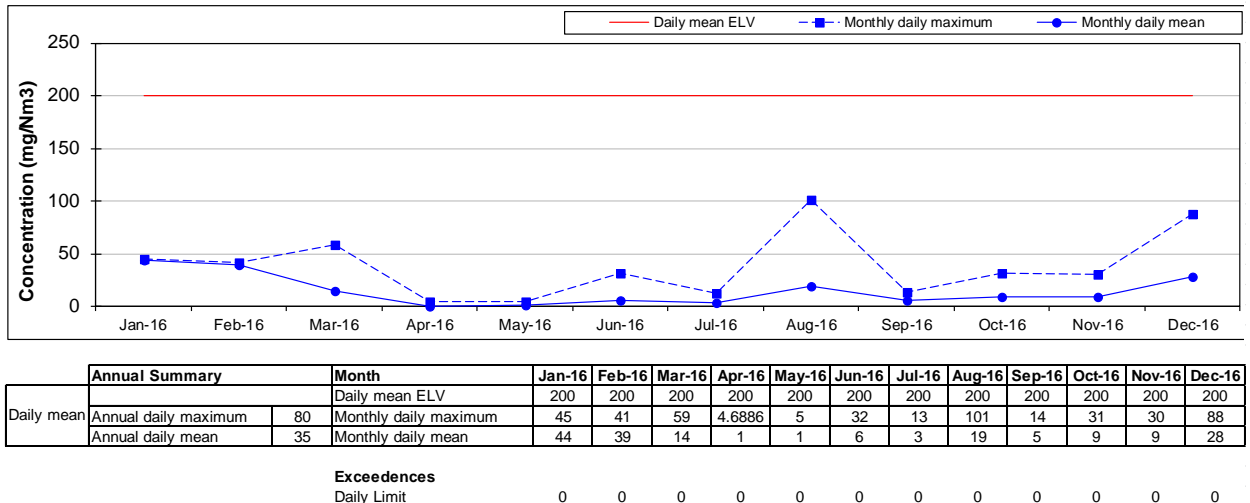
A4 Carbon monoxide.

Pollutant: Carbon monoxide



A5 Sulphur dioxide.

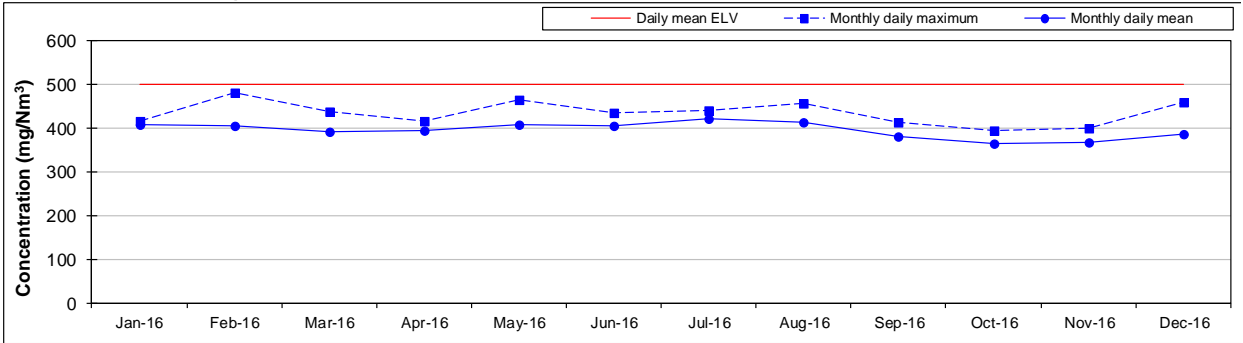
Pollutant: Sulfur Dioxide



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A6 Oxides of nitrogen.

Pollutant: Oxides of nitrogen



Annual Summary		Month	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16
Daily mean	Daily mean ELV		500	500	500	500	500	500	500	500	500	500	500	500
	Annual daily maximum	482	417	482	439	418	467	437	441	456	413	396	401	462
	Annual daily mean	357	409	405	392	396	409	407	424	415	382	365	367	386

Exceedences		Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16
Daily Limit		0	0	0	0	0	0	0	0	0	0	0	0