Castle Cement Ltd, Ribblesdale works

Annual performance report as required by

Condition 4.2.2

Permit EPR/BL7272IB/V009

for calendar year 2015

Annual performance report for Castle Cement Ltd, Ribblesdale works

1 Introduction

Condition 4.2.2 of EPR permit BL7272IB requires an annual performance report.

4.2.2 A report or reports on the performance of the activities of the previous year shall be submitted to the Environment Agency by 31 January (or other date agreed in writing by the Environment Agency) 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 interpretative 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 incineration plant in a format agreed with the Environment Agency. 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 A2). These are covered in detail in the response to condition 4.2.3.

The cement mills and associated equipment and the coal mills (emission points A4, A5, A7, A8, A10, A11) are the remaining major sources of emissions to air. The permit includes emission limits and specific monitoring standards for these emission points.

Table 2.1.1 below provides a summary of performance of these emission points based upon the monitoring data collected in 2015.

Emission point	Description	Daily average limit (mg/m^3)	Annual mean emission (mg/m^3)	Standard deviation (mg/m^3)
A4	Cement mills nos. 9, 10, 11 (No2 Redecam)	40	5	6.1
A5	Cement mills nos. 9, 10, 11 (No1 Redecam)	40	4	6.4
A7	Cement mill no. 7	75	13	23.1
A8	Cement mill no.8	75	13	16.8
A10	Coal mill no.4	40	2	3.2
A11	Coal mill no.5	40	1	3.9

Table 2.1.1 Summary of emissions to air for monitoring points other than A2.

There were no breaches of the emission limits from any of the cement or coal mills in 2015.

There were a total of 6 notifications of unauthorized releases from the site. These are summarized below in Table 2.1.2

Type	Short description	Date of notification
Breach of a daily ELV	Breach of hydrogen chloride limit from kiln 7 main stack, 20 mg/Nm^3 against a limit of 10 mg/Nm^3	28th July 2015
Emission of substances not controlled by emission limits	Low level emission of dust and fume from the base of kiln 7 stack	1st October 2105
Breach of a daily ELV	Breach of particulate limit from kiln 7 main stack, 36.8 mg/Nm^3 against a limit of 30 mg/Nm^3	7th October 2015
Breach of a daily ELV	Breach of sulfur dioxide limit from kiln 7 main stack, 206 mg/Nm^3 against a limit of 200 mg/Nm^3	7th October 2015
Breach of a daily ELV	Breach of hydrogen chloride limit from kiln 7 main stack, 13 mg/Nm^3 against a limit of 10 mg/Nm^3	25th Nov 2015
Breach of a daily ELV	Breach of hydrogen chloride limit from kiln 7 main stack, 33 mg/Nm^3 against a limit of 10 mg/Nm^3	17th Dec 2015

Table 2.1.2 Summary of Part A notifications for releases to air 2015.

The breach of the hydrogen chloride limit from kiln 7 resulted from running the kiln with both the raw mill and wet gas scrubber stopped. After restart of the kiln following replacement of the top of the main stack a large hole opened in the ducting to the wet gas scrubber. The raw mill continued to operate but was stopped when the airlift conveying ground limestone to the storage silo became blocked. The mill was stopped for 9 hours whilst the blockage was cleared and although the HCl emission dropped when the mill restarted it was not enough to prevent the daily emission breaching the limit. The section of ducting to the scrubber that failed was repaired and ultimately will be replaced with a new section.

The emission of low level dust and fume from the base of kiln 7 main stack occurred due to corrosion of the kiln stack where the cleaned gases from the wet gas scrubber enter the stack. The steel work in this area was repaired and the kiln put back into operation. A complete new kiln stack made of stainless steel was installed during the January 2016 overhaul.

The breach of the particulate and sulfur dioxide limits from kiln 7 stack was due to the suction line of the reverse jet pump on the wet gas scrubber becoming partially restricted. This resulted in the pump not producing sufficient pressure to atomise the reagent liquor in the gas scrubber inlet duct. This caused the sulfur dioxide scrubbing efficiency to be reduced. It also resulted in carry over of large, dried particles of the reagent liquor to the kiln stack. The restriction was successfully removed and the operation of the scrubber returned to normal. The breaches occurred following start up of the kiln and were for the 5.5 hours that the kiln operated during the day.

The breach of the hydrogen chloride limit from kiln 7 resulted from running the kiln with the wet gas scrubber stopped for 15.25 hours during the day. The scrubber was stopped for a repair to the filtrate pump in the scrubber system. During the scrubber stop time the raw mill was running except for a 72 minute period due to a blockage in the mill inlet chute. Measurements have taken place to determine the HCl content of the bypass gas; this gas passes directly up the stack when the wet gas scrubber is stopped and it may have been the source of the high HCl emission that resulted in the breach of the ELV.

The breach of the hydrogen chloride limit from kiln 7 was a result of the MCE 100 E gas analyser carrying out a zero check when the kiln was being heated up following a 3 day stop.
The composition of the stack gases at this time was very different to normal operation with a high HCl concentration. The response time for changes in HCl concentration is very long and because of the high reading of the HCl when the zero check was initiated there was insufficient time for the HCl to reach zero. When the check was completed the instrument had incorrectly set the zero. As a result the readings of HCl when the kiln was in operation were incorrect. Once the fault had been identified the instrument was re zeroed and the HCl emission returned to expected levels. Because of this fault the daily average value has been invalidated, although the high result was reported to the EA as an unauthorized release.

2.2 Emissions to water

Discharges to water from the installation are via emission points W1 and W2. Monitoring of these emission points is carried out by monthly spot monitoring. The permit includes emission limits for these emission points.

Table 2.2.1 below provides a summary of performance of these emission points based upon the monitoring data collected in 2015.

Emission point	Description	Suspended solids (mg/)		pH		Oil/grease	
		Limit	Annual Mean	Limit	Annual Mean	Limit	Mean
W1	Surface water run off, quarry drainage and cooling water	45	3.4	5 - 9	7.8	None visible	nil
W2	Surface water run off and cooling water via settling pond	45	5.0	5 - 9	7.9	None visible	nil

Table 2.2.1 Summary of emissions to water for monitoring points W1 and W2.

There were no unauthorized releases to water via W1 or W2 during 2015.

3 Condition 4.2.2 (b)

The quantity of cement kiln dust removed from site is reported quarterly by use of the Environment Agency Waste Return. In 2015 the following quantities of CKD were recycled off site as a soil conditioner.

Period	Quantity (tonnes)
1 Jan – 31 Mar	456.47
1 Apr – 30 Jun	2187.93
1 Jul – 30 Sept	1886.86
1 Oct – 31 Dec	512.82

Table 3.1 Summary of CKD removed from site

4 Condition 4.2.2 (c)

This report is produced using the agreed EA report template and is included in the following pages.

Annual performance report for Castle Cement Ltd, Ribblesdale works.

Permit number EPR/BL7272IB, variation number EPR/BL7272IB/V009

Calendar year 2015

This report is required by Chapter IV of the Industrial Emissions Directive (IED) Article 55(2): - Reporting and public information on waste incineration plants and waste co-incineration plants. 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 give account of the running of the process and the level of emissions into air and water in comparison to the emission limit values. Article 55(2) also requires that this information is made available to the public.

1. Introduction

Name of company	Castle Cement Limited, trading as Hanson Cement
Name of plant	Ribblesdale works
Permit number	EPR/BL7272IB
Address	West Bradford Road, Clitheroe, Lancashire, BB7 4QF.
Telephone	01200 422401
Contact name	N Sharpe
Position	Quality and Environment Manager
Further information	

2. Plant description

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

Limestone interleaved with shale is extracted from 2 local quarries. This material is then crushed in a dedicated crushing plant together with a number of additives to produce a raw material that is no larger than 75 mm. The crushed stone is, after homogenisation in a blending store, dried and crushed in a vertical roller mill to produce raw meal, a fine powder that is the feedstock for the cement kiln.

The raw meal is conveyed pneumatically 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 880^{o}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, petroleum coke, chipped tyres, meat and bone meal, and solid recovered fuel (SRF) a fuel made from paper, plastics, and fibrous wastes.

The calcined material enters the kiln, which is a slightly inclined tube rotating at approximately 3 r.p.m. As the kiln rotates the material moves to the discharge end undergoing a series of complex chemical reactions to produce cement clinker. To complete the required chemical reactions the material must reach a temperature in the region of 1450 ^{o}C. The thermal energy required at this point is supplied via the kiln burner, a multi-channel pipe that is permitted to use coal, petroleum coke, Cemfuel, meat and bone meal, and solid recovered fuel. The heated material leaves the kiln and is cooled to freeze 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 use or led directly to the cement mills for grinding.

The clinker is ground in one of 4 cement mills. Gypsum, desulfurisation gypsum, reclaimed plasterboard, limestone, and ferrous sulfate may also be added in the milling process to control the properties of the finished cement. The cement is transported pneumatically to storage silos before being dispatched in bulk road and rail tankers or in palletised paper or plastic sacks.

3. Summary of plant operation

a) Plant details.

One cement kiln burning waste materials operates on site, for historic reasons this is known as kiln 7.

b) Annual waste throughputs.

The amount of waste burned in 2015 is summarised in the table below.

Waste type	EWC code	Tonnes used
Cemfuel	19 02 08	16709
Chipped tyres	16 01 03	5762
Meat and bone meal (MBM)	02 02 03	8782
Solid recovered fuel (SRF)	19 02 10, 19 12 10	38488

c) Operational hours.

The total hours of operation of the kiln and the total tonnage of cement clinker produced in 2014 is summarised in the table below.

Equipment	Annual production	Operational hours
Kiln 7	Commercially confidential	Commercially confidential

The plant was shut down for maintenance in January and most of February.

d) Residues.

The following residues were produced during the year.

Residue	EWC code	Annual production
Cement kiln dust (CKD)	10 13 12	Commercially confidential

4. Summary of plant monitoring.

a) Pollutants measured.

Emissions from kiln 7 stack are monitored continuously for particulate matter, carbon monoxide, sulfur dioxide, hydrogen chloride, oxides of nitrogen, total organic carbon, and ammonia (although no emission limit is currently set for ammonia). In addition to this, periodic spot sampling is carried out for metals, dioxin and furans, dioxin like PCBs, hydrogen fluoride, and polycyclic aromatic hydrocarbons. The table below summarises the emissions measured and frequency.

Emission	Continuously	Periodically
Particulates	✓	
Carbon monoxide	✓	
Sulfur dioxide	✓	
Oxides of nitrogen	✓	
Hydrogen chloride	✓	
Total organic carbon	✓	
Ammonia	✓	
Hydrogen fluoride		✓

Mercury and its compounds		✓
Cadmium and thallium and their compounds		✓
Group III metals* and their compounds		✓
Dioxins and furans		✓
Dioxin-like PCBs		✓
Polycyclic aromatic hydrocarbons		✓

** Group III metals are antimony, arsenic, chromium, cobalt, copper, lead, manganese, nickel, and vanadium.*

b) 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.

Emission monitor	% time operating normally
Particulates	99.89
Carbon monoxide	99.86
Sulfur dioxide	99.87
Oxides of nitrogen	99.87
Hydrogen chloride	99.81
Total organic carbon	99.36
Ammonia	99.87

c) Summary of continuous emissions monitor data.

Monthly continuous emission monitor data is submitted quarterly to the Environment Agency. This information is required by the permit and shows the average daily emission result for each day of the month.

A summary of emission data is shown graphically in Appendix 1.

d) Results of periodic monitoring.

Results of periodic monitoring of emissions are shown in the table below. The permit requires that periodic monitoring is carried out in the first and second half of each year for the species listed in the table below.

	Unit	Emission limit value	1st half 2015	2nd half 2015
Hydrogen fluoride	mg/Nm^3	1	0.051	0.063
Mercury and its compounds	mg/Nm^3	0.05	0.0030	0.0018
Cadmium and thallium and their compounds	mg/Nm^3	0.05	0.0089	0.0035

Group III metals and their compounds	mg/Nm^3	0.5	0.11	0.052
Dioxins and furans (I-TEQ)	ng/Nm^3	0.1	0.0084	0.0018
Dioxin like PCBs (WHO-TEQ)	ng/Nm^3	No limit applies	0.00028	0.00026
Polycyclic aromatic hydrocarbons (total)	mg/Nm^3	No limit applies	<0.652	<0.0395

5. Summary of plant compliance

The plant met its nitrous oxides, carbon monoxide, and total organic carbon emission limits 100% of the time of operation. The plant met its particulates and sulfur dioxide emission limits 99.9% of the time of operation. The plant met its hydrogen chloride emission limit 99.3% of the time of operation. Details of the breaches are given in Table 2.1.2 of the response to condition 4.2.2 (a) above.

6. Summary of plant improvements.

There were no improvement conditions relating to the burning of waste materials due in 2015.

7. Summary of information made available.

Routine monitoring data reported to the Environment Agency is published in the public register. The register is held at the following addresses:

The Environment Agency
430 Birchwood Boulevard
Birchwood
Warrington
WA3 7WD

A copy of this report is also available online at www.hanson.com/uk.

A Hanson Cement/Ribble Valley Borough Council Liaison Committee meets at least twice a year. This meeting provides a forum for elected representatives of local parish and District councils to discuss any matters of concern with the company. Representatives of the Environment Agency 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, Ribblesdale Works, Clitheroe, Lancs, BB7 4QF

By e mail: enquiries@hanson.biz

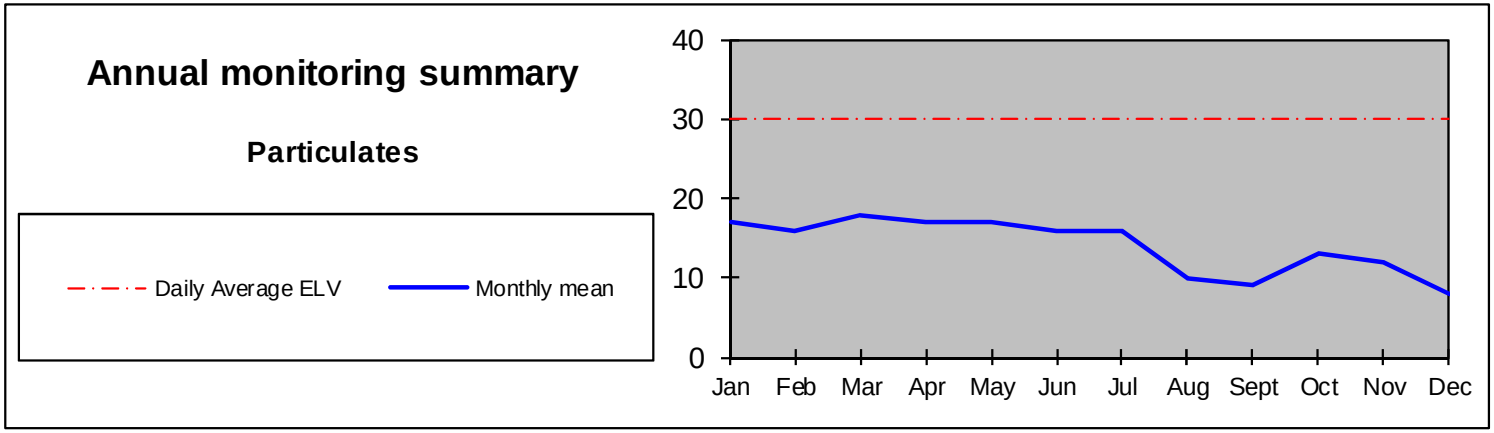
By 'phone: 01200 422401.

Appendix 1

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

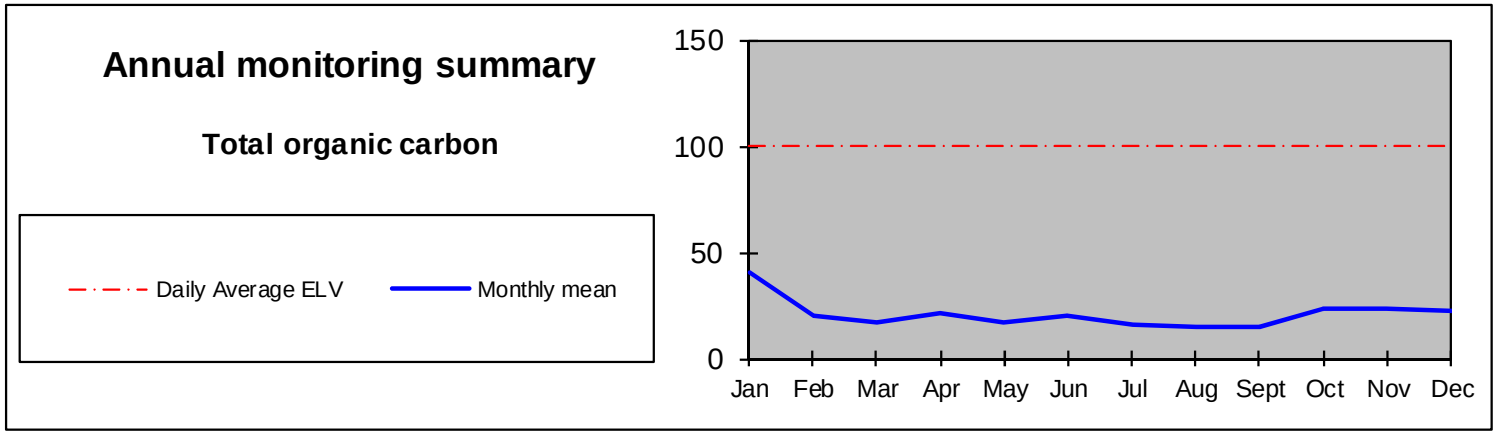
1. Particulates.
2. Total organic carbon.
3. Hydrogen chloride.
4. Carbon monoxide.
5. Sulfur dioxide.
6. Nitrogen oxides.

1. Annual monitoring summary for particulates



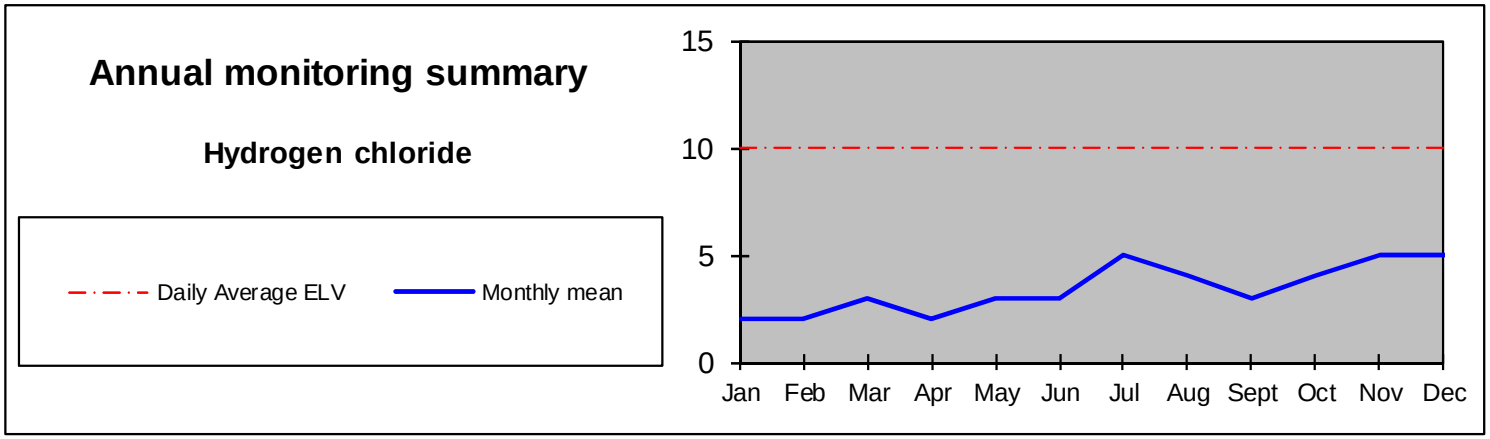
	Monthly summary		Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Daily average			Daily average ELV	30	30	30	30	30	30	30	30	30	30	30	30
	Annual daily mean	14	Monthly daily mean	17	16	18	17	17	16	16	10	9	13	12	8
	Annual daily maximum	37	Monthly daily maximum	23	26	29	26	22	26	28	27	22	37	20	29

2. Annual monitoring summary for total organic carbon.



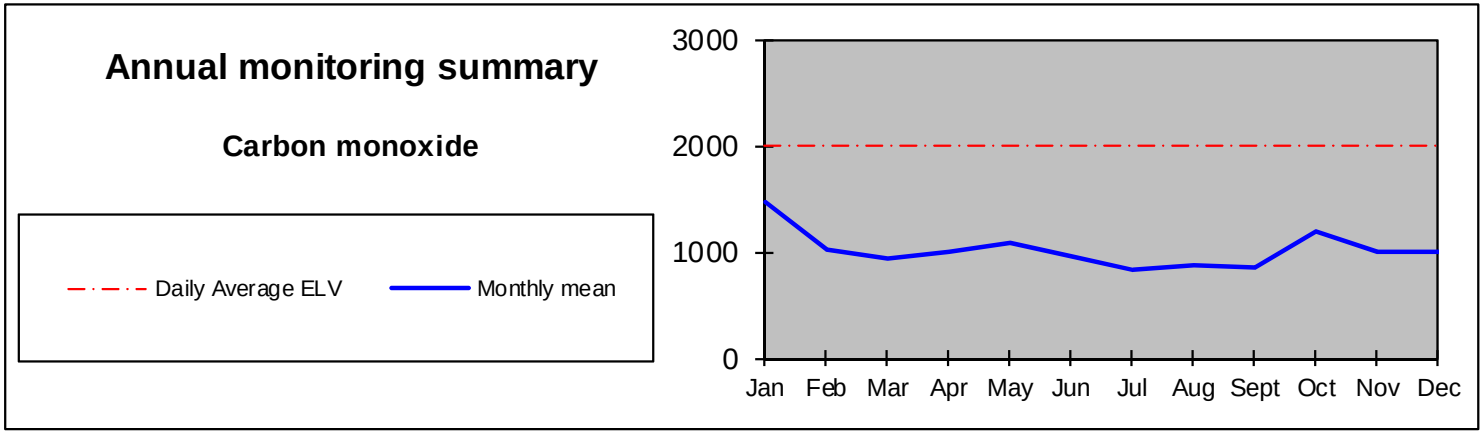
	Monthly summary		Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Daily average			Daily average ELV	100	100	100	100	100	100	100	100	100	100	100	100
	Annual daily mean	21	Monthly daily mean	40	20	17	21	17	20	16	15	15	23	23	22
	Annual daily maximum	51	Monthly daily maximum	51	23	28	33	37	29	21	18	16	38	36	34

3. Annual monitoring summary for hydrogen chloride.



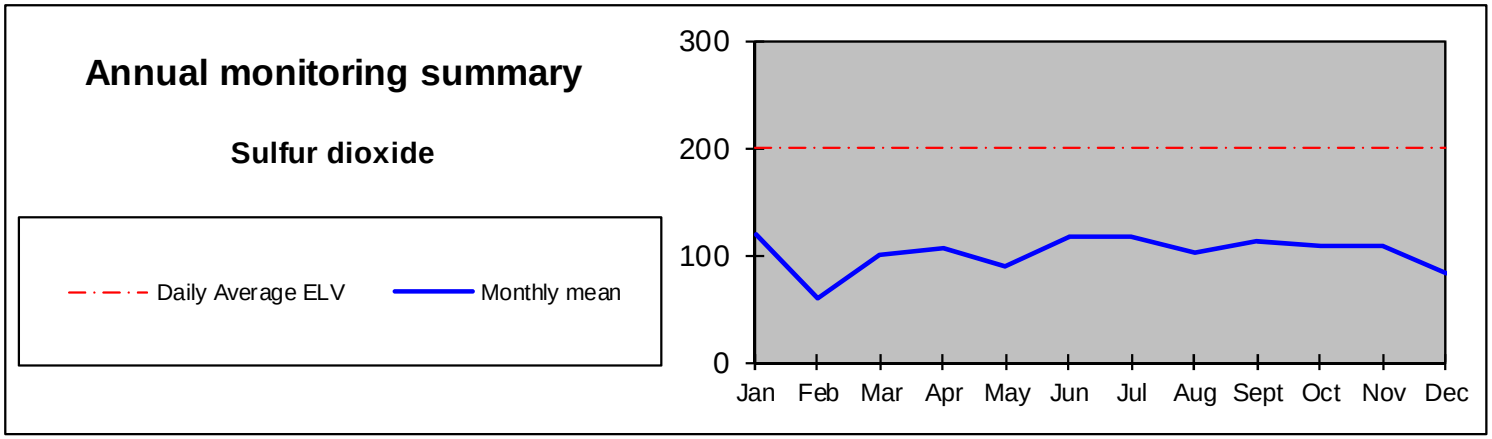
	Monthly summary		Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Daily average			Daily average ELV	10	10	10	10	10	10	10	10	10	10	10	10
	Annual daily mean	3	Monthly daily mean	2	2	3	2	3	3	5	4	3	4	5	5
	Annual daily maximum	20	Monthly daily maximum	4	4	6	5	7	9	20	9	8	10	13	10

4. Annual monitoring summary for carbon monoxide.



	Monthly summary		Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Daily average			Daily average ELV	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
	Annual daily mean	1017	Monthly daily mean	1464	1011	928	1008	1079	965	836	863	855	1182	1001	1009
	Annual daily maximum	1875	Monthly daily maximum	1875	1410	1473	1485	1802	1425	1104	1222	1176	1872	1773	1504

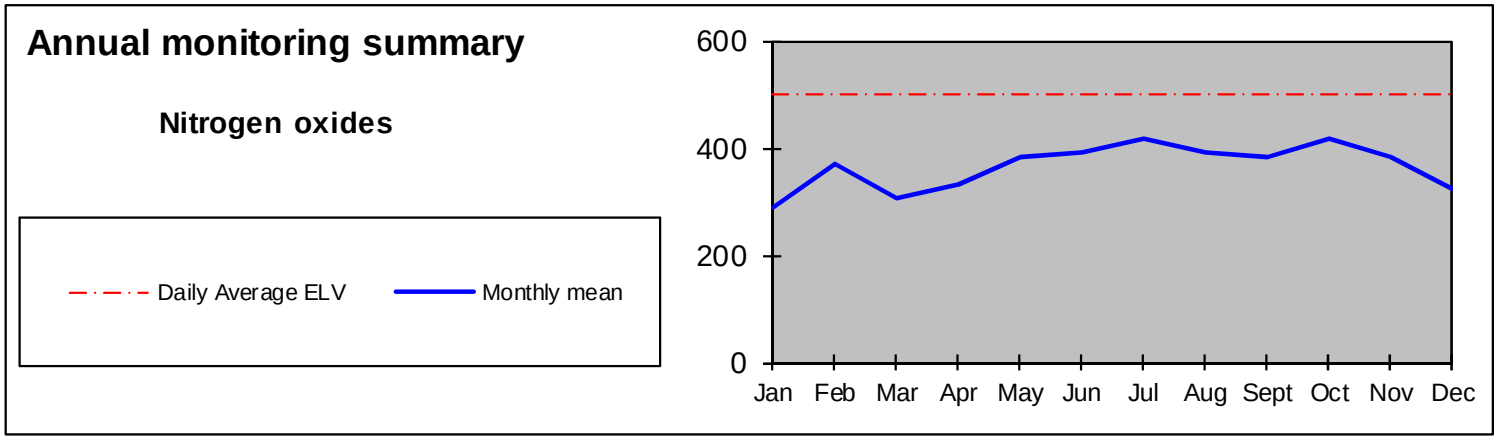
5. Annual monitoring summary for sulfur dioxide.



	Monthly summary		Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Daily average			Daily average ELV	200	200	200	200	200	200	200	200	200	200	200	200
	Annual daily mean	102	Monthly daily mean	119	60	100	106	89	117	116	102	113	108	109	84
	Annual daily maximum	315	Monthly daily maximum	168	138	148	167	139	193	315*	190	192	206	196	142

* The annual daily maximum occurred during a day without the wet gas scrubber running

6. Annual monitoring summary for nitrogen oxides.



	Monthly summary		Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Daily average			Daily average ELV	500	500	500	500	500	500	500	500	500	500	500	500
	Annual daily mean	365	Monthly daily mean	290	371	305	330	385	392	416	390	383	415	384	322
	Annual daily maximum	495	Monthly daily maximum	350	429	358	397	462	461	495	451	460	491	487	390