Annual performance report for Castle Cement Ltd, Ribblesdale works.

Permit number EPR/BL7272IB, variation number EPR/BL7272IB/V006

Calendar year 2010

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 should be provided clearly in the report:

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, and meat and bone meal.

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 co-axial pipe that is permitted to use coal, petroleum coke, and Cemfuel. 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, plaster moulds, 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 despatched in bulk road tankers or in palletised paper 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 2010 is summarised in the table below.

Waste type	EWC code	Tonnes used
Cemfuel	19 02 08	20422
Chipped tyres	16 01 03	7885
Meat and bone meal (MBM)	02 02 03	22719

c) Operational hours.

The total hours of operation of the kiln and the total tonnage of cement clinker produced in 2010 is summarised in the table below.

Equipment	Annual production	Operational hours
Kiln 7	621961 tonnes	6485 hours

The annual shutdown of the kiln took place in January and February and lasted 5 weeks. During this time major maintenance to the plant took place. The plant was also stopped for 2 weeks in April into May. This downtime was due to the reduced demand for cement and some further maintenance was undertaken during this period.

d) Residues.

The following residues were produced during the year.

Residue	EWC code	Annual production
Cement kiln dust (CKD)	10-13-04	3197 tonnes

The material is conditioned with water before being recycled off site by Bi Product Recovery.

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, and total organic carbon. 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 requirement for periodic spot sampling for benzene and 1,3-butadiene has been removed from the current permit variation. 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	✓	
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	100
Carbon monoxide	100
Sulfur dioxide	100
Oxides of nitrogen	100
Hydrogen chloride	100
Total organic carbon	99.9

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.

	Unit	Emission limit value	1st half 2010	2nd half 2010
Hydrogen fluoride	mg/Nm^3	1	<0.031	0.071
Mercury and its compounds	mg/Nm^3	0.05	0.0013	0.0006
Cadmium and thallium and their compounds	mg/Nm^3	0.05	0.011	0.0019
Group III metals and their compounds	mg/Nm^3	0.5	0.26	0.24
Benzene(1)	mg/Nm^3	No limit applies	3.4	
1,3-butadiene(1)	mg/Nm^3	No limit applies	<0.0071	
Dioxins and furans (I-TEQ)	ng/Nm^3	0.1	0.010	0.021
Dioxin like PCBs (WHO-TEQ)	ng/Nm^3	No limit applies	0.0012	0.0015
Polycyclic aromatic hydrocarbons (total)	mg/Nm^3	No limit applies	<0.56838	<0.47

Note (1) : The requirement for periodic spot sampling of emissions of benzene and 1,3-butadiene was removed from the current permit variation, effective 27 July 2010.

5. Summary of plant compliance

The plant met its sulfur dioxide, hydrogen chloride, and carbon monoxide emission limits 100% of the time. The plant met its particulate emission limit 98.9% of the time, its nitrogen oxide emission limit 99.6% of the time, and its total organic compounds emission limit 99.6% of the time.

There was a breach of the particulate emission limit on 13th March2010 when the daily average emission was 42 mg/m^3. This was reported to the Environment Agency as a part A notification and followed up with a part B notification. The breach occurred due to a fault in one of the banks of the electrostatic precipitator which was traced to a blown fuse in the circuit for the heaters on the support insulators in the bank. The fuse was replaced.

There was a breach of the particulate emission limit on 5th April 2010 when the daily average emission was 44 mg/m^3. This was reported to the Environment Agency as a part A notification and followed up with a part B notification. The breach occurred due to low kV on the centre bank of the electrostatic precipitator. The kiln was shutdown and an internal inspection of the electrostatic precipitator revealed that three collector plates had come loose and were causing a short to earth. The plates were removed from the precipitator to prevent a re occurrence.

There was a breach of the particulate emission limit on 7th June 2010 when the daily average emission was 33 mg/m^3. This was reported to the Environment Agency as a part A notification and followed up with a part B notification. The breach occurred due to failure of the service and standby water pumps supplying water to the gas conditioning tower. A repair was carried out to one of the pumps and it was restarted. However, although the instantaneous emission returned to normal, during the time the pumps had been off the dust emission was high enough to result in the average emission for the day breaching the limit.

There was a breach of the nitrogen oxides emission limit on 4th August 2010 when the daily average emission was 838 mg/m^3. This was reported to the Environment Agency as a part A notification and followed up with a part B notification. The breach occurred due to limited availability of Cemfuel for use on the kiln and increased burning of coal, and a problem with a transport air blower. Additional air was supplied by use of a second blower.

There was a breach of the particulate emission limit on 7th October 2010 when the daily average emission was 32 mg/m^3. This was reported to the Environment Agency as a part A notification and followed up with a part B notification. The breach was related to ongoing issues with the electrostatic precipitator and a mechanical fault on part of the gas conditioning tower. Repairs were carried out to the conditioning tower and the emission returned to acceptable levels.

There was a breach of the total organic carbon emission limit on 12th October 2010 when the daily emission was 130 mg/m^3. This was reported to the Environment Agency as a part A notification and followed up with a part B notification. Although changes to the process, notably fuel, were made during the day there were no changes seen in the TOC emission. From this it was concluded that the breach was related to the raw materials extracted from the quarry and being processed at the time and not due to the combustion process.

6. Summary of plant improvements.

There were no improvement conditions relating to the burning of waste materials due in 2010.

7. Summary of information made available.

Monthly emission 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

Environmental Services
Ribble Valley Borough Council
Council Offices
Church Walk
Clitheroe
BB7 2RA

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.com

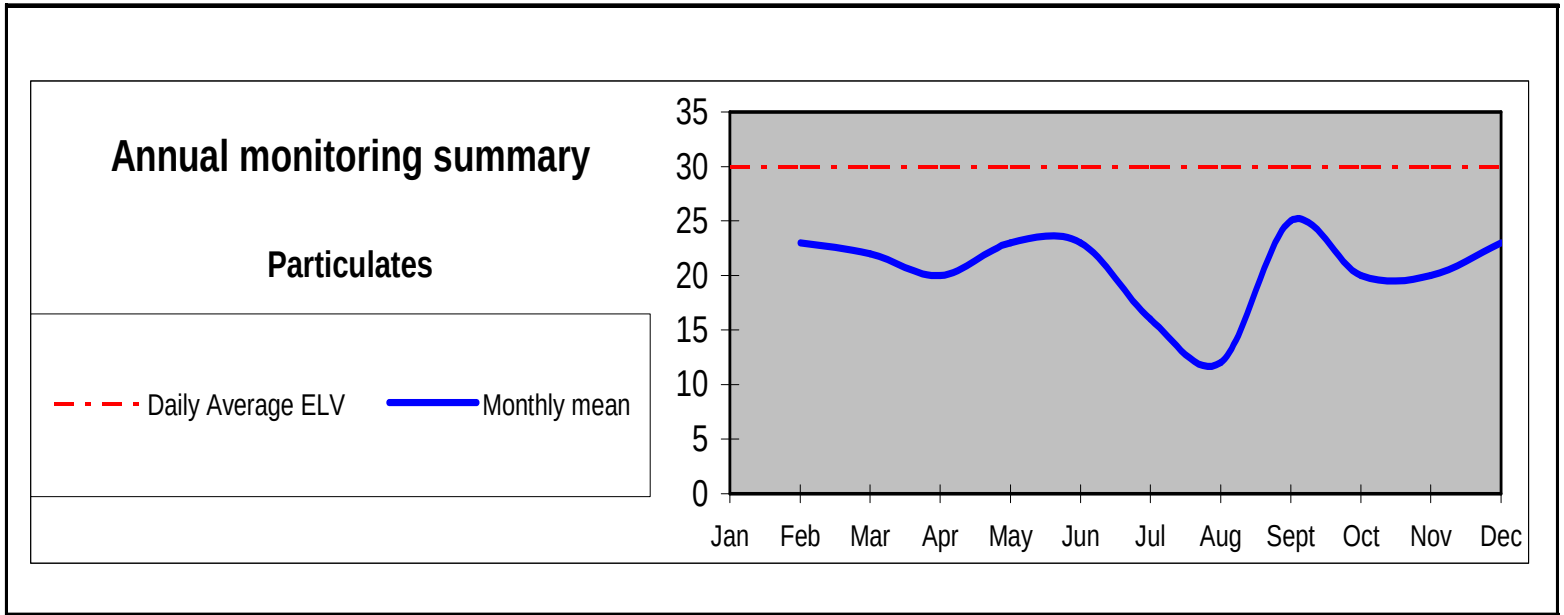
By 'phone: 01200 422401.

Appendix 1

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

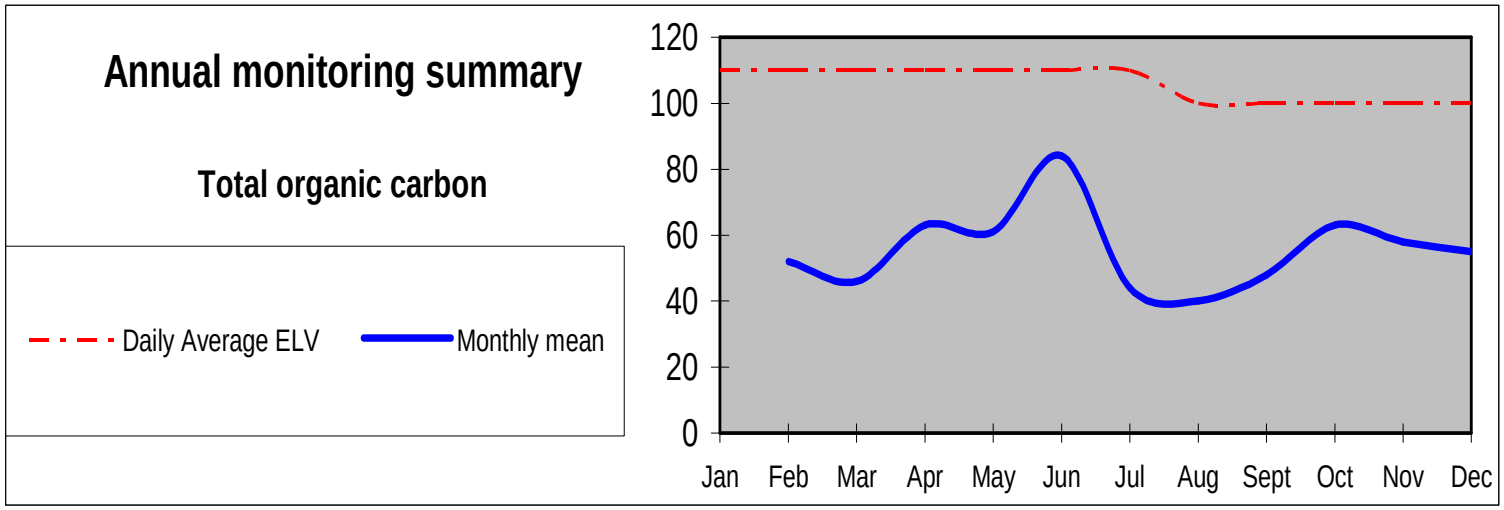
1. Particulates.
2. Total organic carbon.
3. Hydrogen chloride.
4. Carbon monoxide.
5. Sulfur dioxide.
6. Nitrogen oxides.

1. Annual monitoring summary for particulates



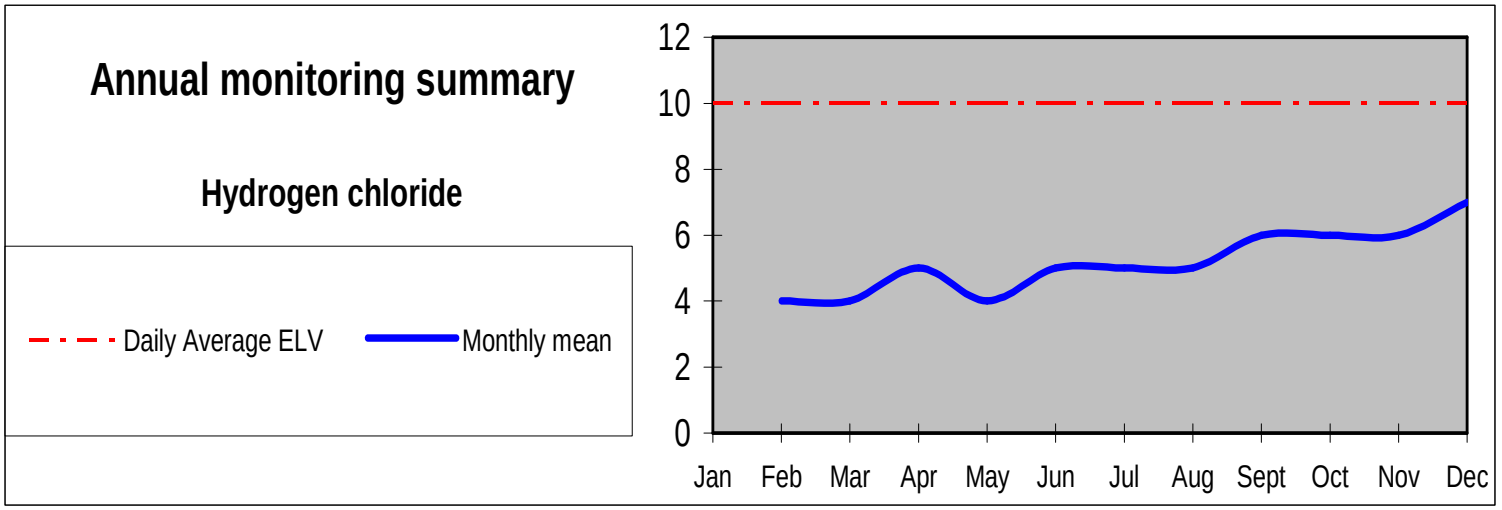
	Monthly summary		Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Daily average			Daily average ELV	30	30	30	30	30	30	30	30	30	30	30	30
	Annual daily mean	21	Monthly daily mean		23	22	20	23	23	16	12	25	20	20	23
	Annual daily maximum	44	Monthly daily maximum		29	42	44	30	33	27	17	27	32	29	31

2. Annual monitoring summary for total organic carbon.



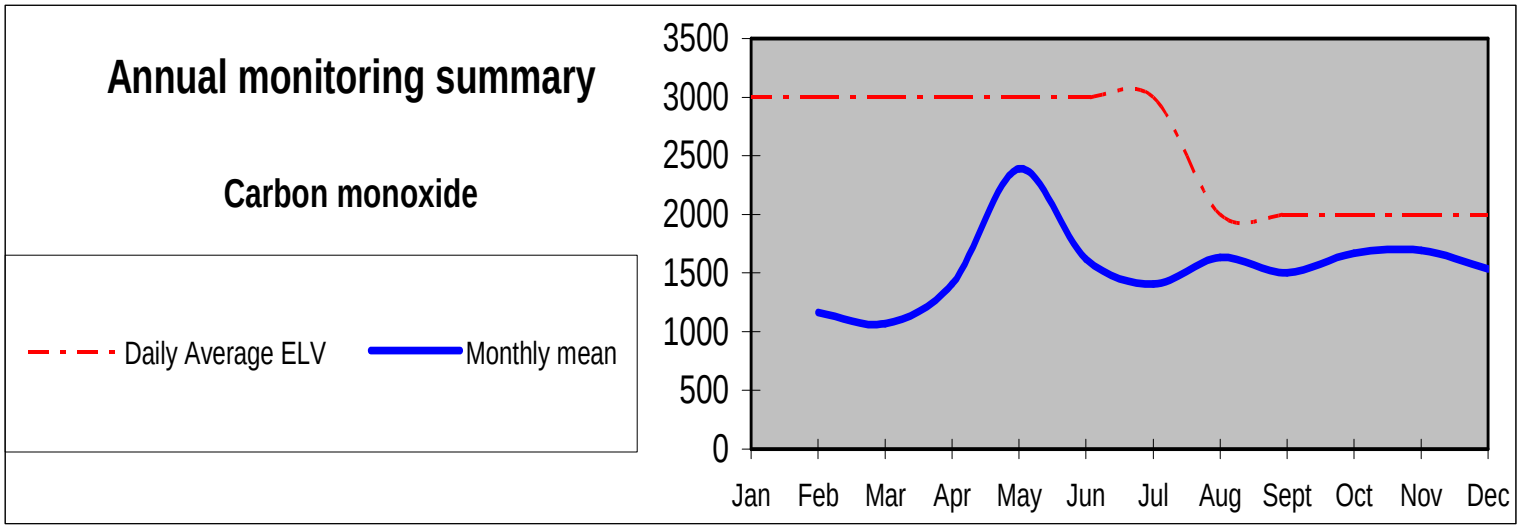
	Monthly summary		Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Daily average			Daily average ELV	110	110	110	110	110	110	110	100	100	100	100	100
	Annual daily mean	56	Monthly daily mean		52	46	63	61	84	44	40	48	63	58	55
	Annual daily maximum	130	Monthly daily maximum		72	67	98	85	110	67	63	67	130	97	94

3. Annual monitoring summary for hydrogen chloride.



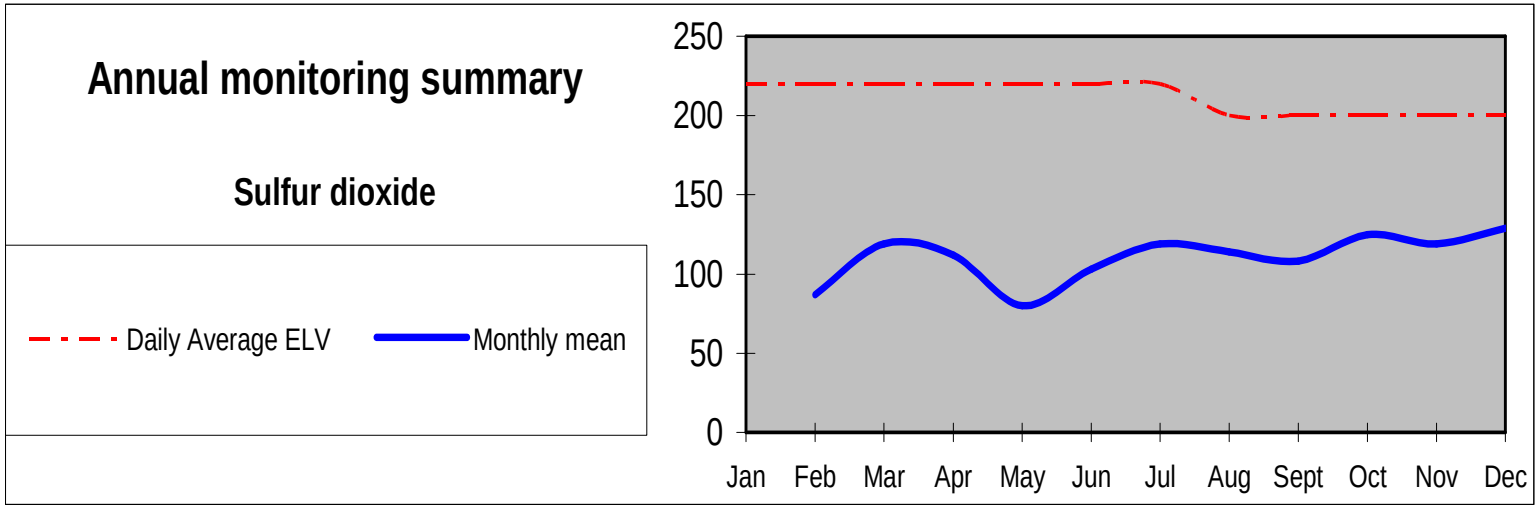
	Monthly summary		Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Daily average			Daily average ELV	10	10	10	10	10	10	10	10	10	10	10	10
	Annual daily mean	5	Monthly daily mean		4	4	5	4	5	5	5	6	6	6	7
	Annual daily maximum	11	Monthly daily maximum		7	8	9	8	8	8	9	9	8	10	11

4. Annual monitoring summary for carbon monoxide.



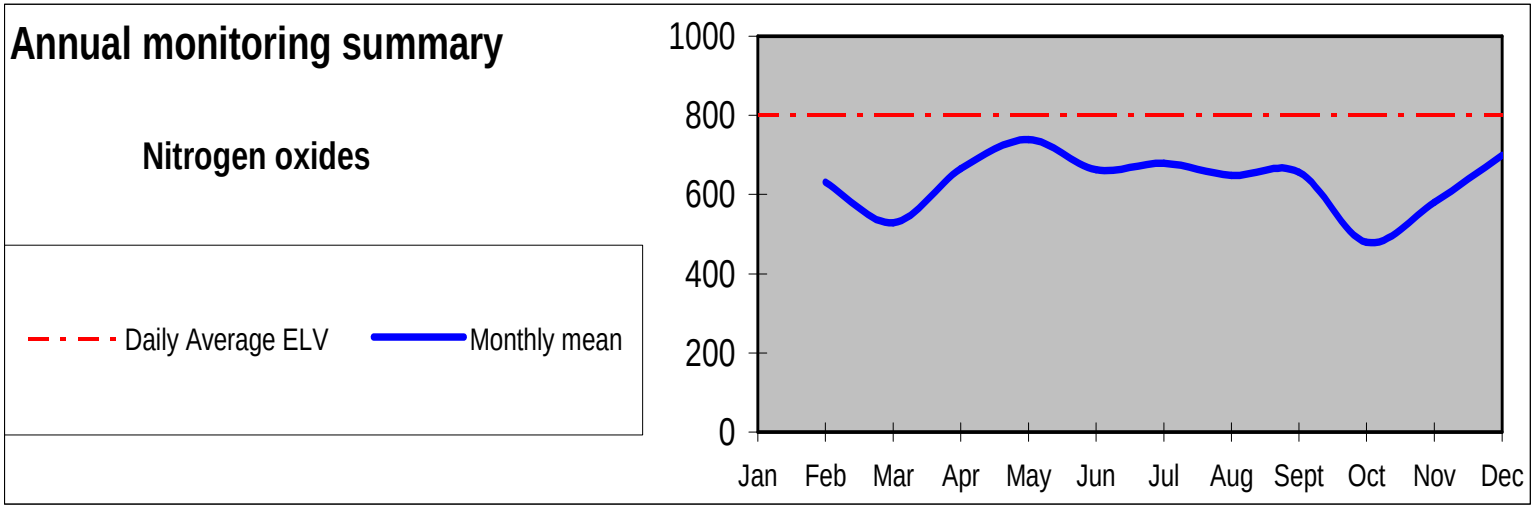
	Monthly summary		Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Daily average			Daily average ELV	3000	3000	3000	3000	3000	3000	3000	2000	2000	2000	2000	2000
	Annual daily mean	1553	Monthly daily mean		1163	1068	1408	2388	1622	1407	1631	1500	1670	1696	1533
	Annual daily maximum	2830	Monthly daily maximum		1510	1358	2477	2830	2526	2201	1952	1890	1907	1966	1992

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	220	220	220	220	220	220	220	200	200	200	200	200
	Annual daily mean	110	Monthly daily mean		87	119	112	80	103	119	114	108	125	119	129
	Annual daily maximum	208	Monthly daily maximum		152	208	158	142	148	181	145	136	198	167	195

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	800	800	800	800	800	800	800	800	800	800	800	800
	Annual daily mean	634	Monthly daily mean		631	529	665	739	663	679	649	657	480	581	699
	Annual daily maximum	838	Monthly daily maximum		725	650	791	791	770	768	838	742	667	746	794