

Annual performance report for Castle Cement Ltd, Ribblesdale works.

Permit number EPR/BL7272IB, variation number EPR/BL7272IB/V007

Calendar year 2011

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°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°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, 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 despatched in bulk road and rail 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 2011 is summarised in the table below.

Waste type	EWC code	Tonnes used
Cemfuel	19 02 08	19028
Chipped tyres	16 01 03	7597
Meat and bone meal (MBM)	02 02 03	20058

c) Operational hours.

The total hours of operation of the kiln and the total tonnage of cement clinker produced in 2011 is summarised in the table below.

Equipment	Annual production	Operational hours
Kiln 7	639926 tonnes	6514 hours

The plant was shutdown for 2 weeks in January to carry out some of the annual maintenance work. The major maintenance for the year was carried out during a 6 week shutdown that took place from mid March to the end of April.

d) Residues.

The following residues were produced during the year.

Residue	EWC code	Annual production
Cement kiln dust (CKD)	10 13 12	3637 tonnes

The material is conditioned with water before being recycled off site by MWH Byproduct.

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 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	100

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	1 st half 2011	2 nd half 2011
Hydrogen fluoride	mg/Nm ³	1	<0.38	<0.054
Mercury and its compounds	mg/Nm ³	0.05	0.0013	0.0024
Cadmium and thallium and their compounds	mg/Nm ³	0.05	0.0023	0.0093
Group III metals and their compounds	mg/Nm ³	0.5	0.067	0.062
Dioxins and furans (I-TEQ)	ng/Nm ³	0.1	0.0039	0.0036
Dioxin like PCBs (WHO-TEQ)	ng/Nm ³	No limit applies	0.00040	0.00047
Polycyclic aromatic hydrocarbons (total)	mg/Nm ³	No limit applies	<0.23198	<5.1175

5. Summary of plant compliance

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

There was a breach of the sulfur dioxide emission limit on 9th May 2011 when the daily average emission was 209 mg/Nm³. 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 the audible alarms for high emissions not being configured correctly following an upgrade to the monitoring software. Although the high emission was identified during a routine check and adjustments made to the process to reduce the sulfur dioxide emission, because the high emission had not been detected early enough in the day it was not possible to bring the daily average emission within limits. Following this all the audible alarms were checked for correct operation and additional visual checks of emission levels introduced.

There was a breach of the nitrous oxide emission limit on 20th September 2011 when the daily average emission was 813 mg/Nm³. 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. Cemfuel is known to help reduce nitrous oxide formation due to the water content in the fuel and the lower temperature of the flame produced. Although adjustments were made during the day to reduce the nitrous oxide emission it was not possible to remain below the daily limit. The issue of continuity of supply has been discussed with the supplier of the fuel.

6. Summary of plant improvements.

There were no improvement conditions relating to the burning of waste materials due in 2011. An extensive refurbishment took place to the gas conditioning system and the kiln electrostatic precipitators during the kiln major maintenance in March and April in order to continue to meet the particulate emission limit value.

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

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.biz

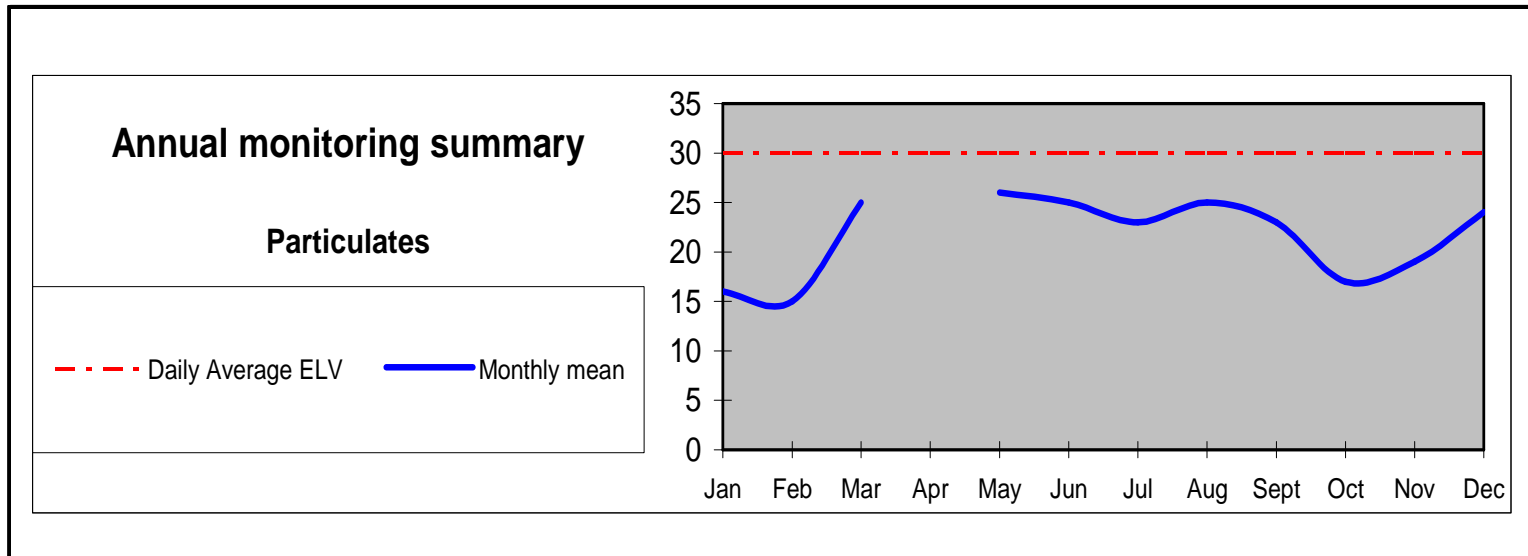
By 'phone: 01200 422401.

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.

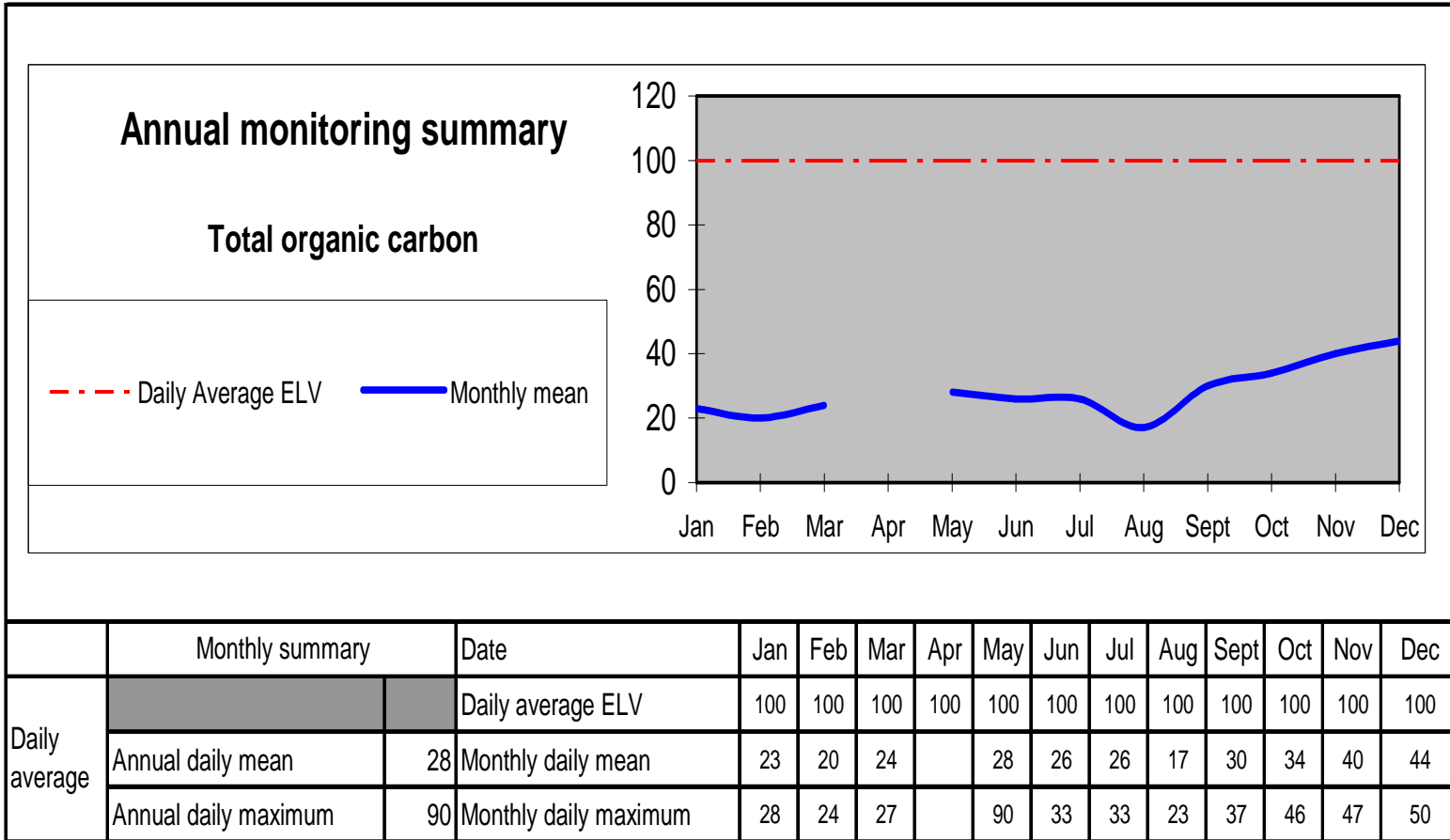
1. Annual monitoring summary for particulates



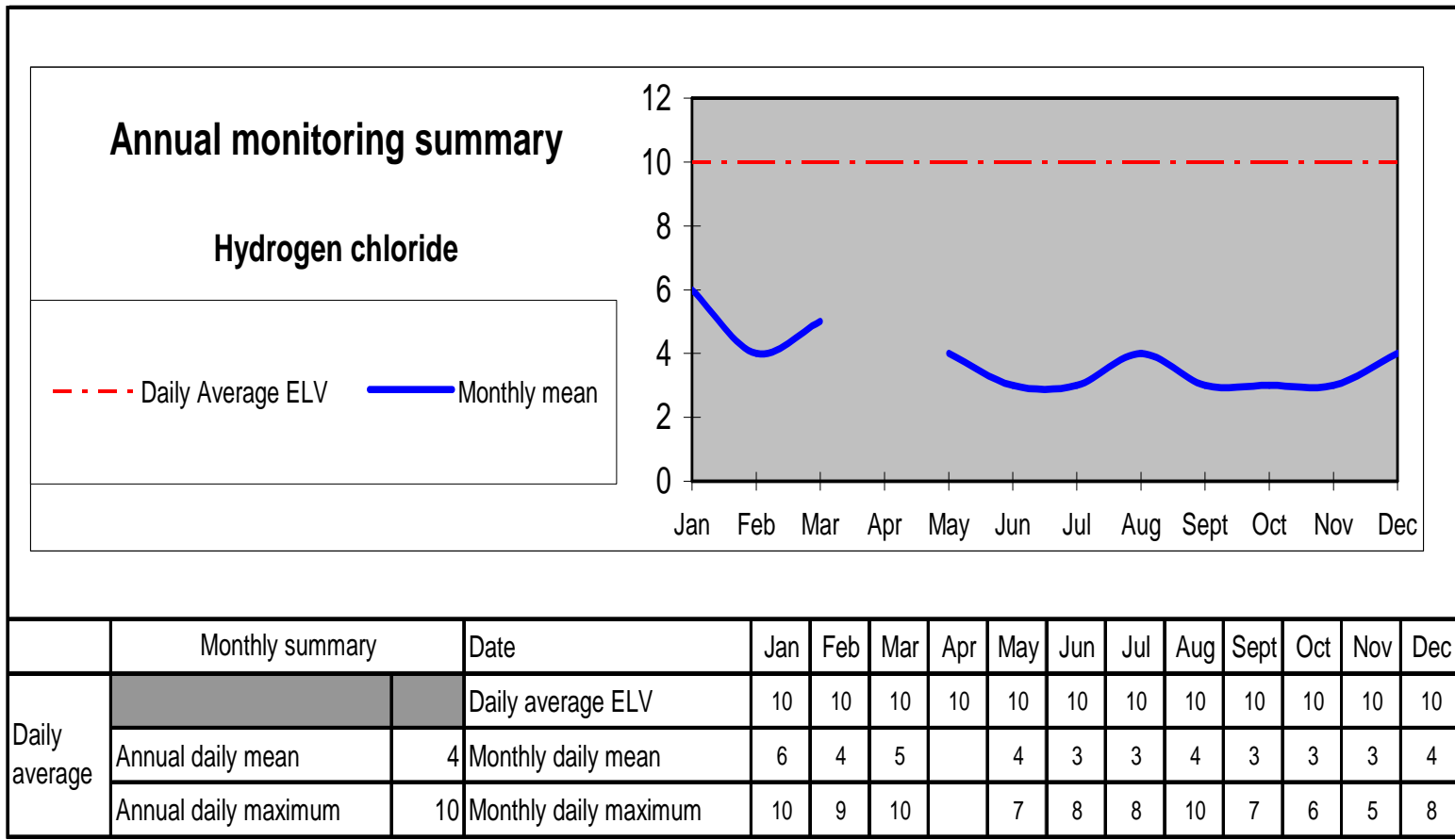
Monthly summary		Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	
Daily average		Daily average ELV	30	30	30	30	30	30	30	30	30	30	30	30	
	Annual daily mean	22	Monthly daily mean	16	15	25		26	25	23	25	23	17	19	24
	Annual daily maximum*	63	Monthly daily maximum	26	22	30	0	29	29	27	30	30	29	27	63

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

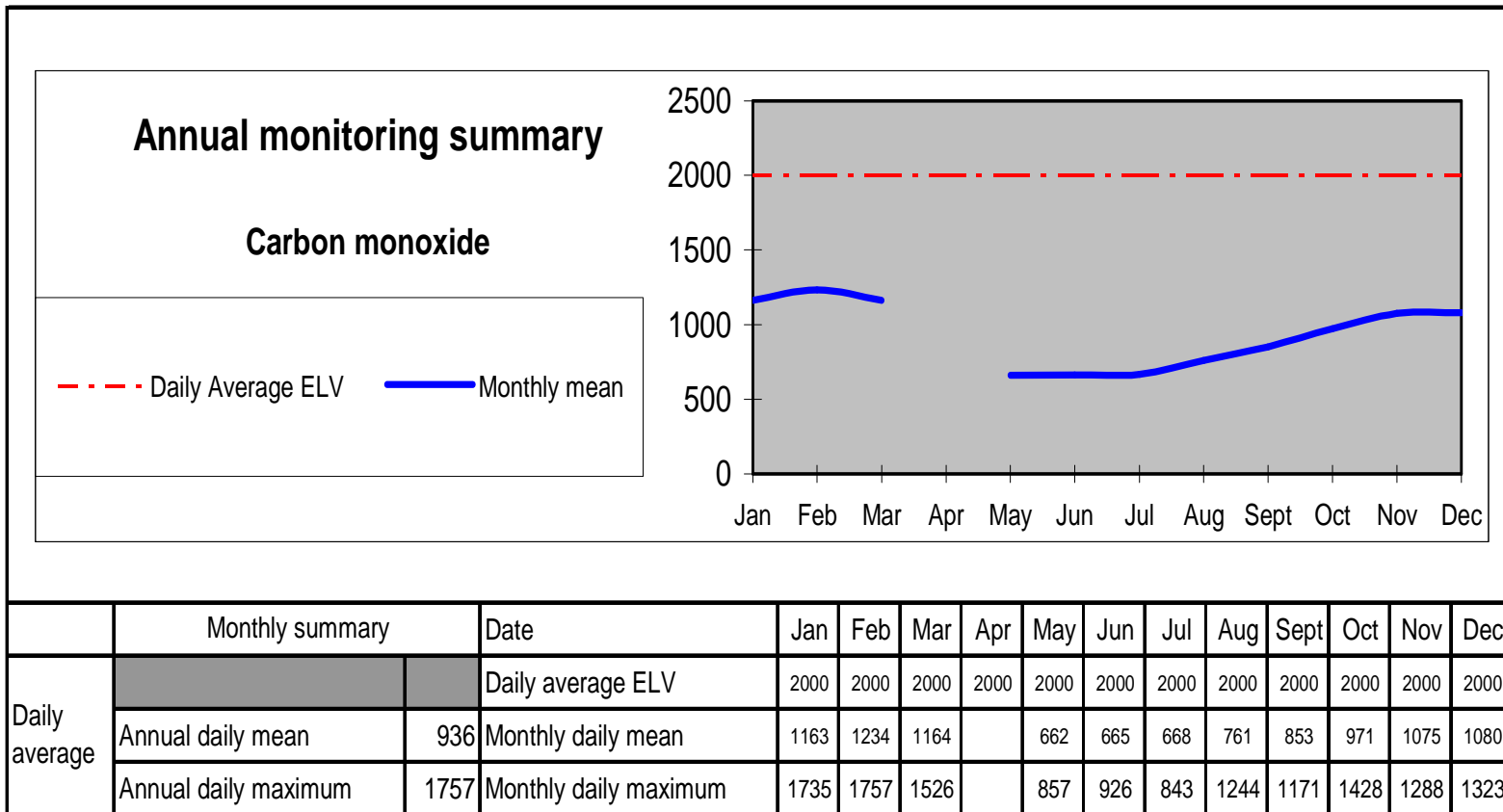
2. Annual monitoring summary for total organic carbon.



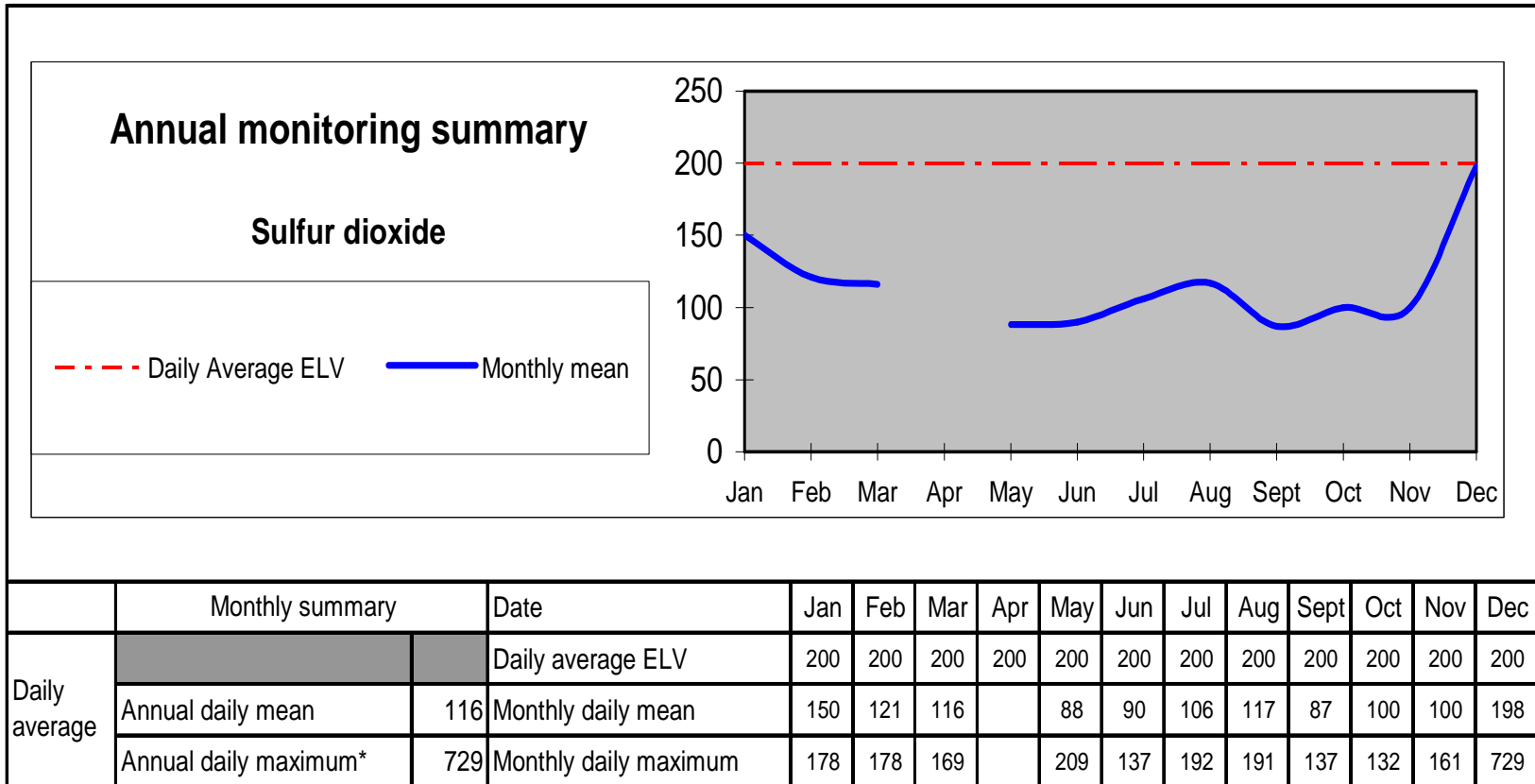
3. Annual monitoring summary for hydrogen chloride.



4. Annual monitoring summary for carbon monoxide.



5. Annual monitoring summary for sulfur dioxide.



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

6. Annual monitoring summary for nitrogen oxides.

