Annual performance report for Hanson Cement Ltd, Ketton works.

Permit number BM0486IT / LP3532SL

Calendar year 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 should be provided clearly in the report:

1. Introduction

Name of company	Hanson Cement
Name of plant	Ketton works
Permit number	BM0486IT
Address	Ketton Stamford Lincs PE9 3SX
Telephone	01780 720501
Contact name	T Fox
Position	Quality & Environment Manager

2. Plant description

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

Limestone and clay are extracted from an adjacent quarry. This material is then crushed in a dedicated crushing plant together with a number of minor additives to produce a raw material that is no larger than 100 mm. The crushed stone and clay is, after homogenisation in a blending store fed to a vertical roller mill to produce raw meal, a fine powder that is the feedstock for both of the cement kilns.

The site operates two kilns that for historic reasons are known as kiln 7 and Kiln 8.

Kiln 7

Remained mothballed throughout 2016.

Kiln 8

This is a “pre-calciner” kiln and was commissioned in 1986. The ground raw meal is heated in a series of cyclones by the exhaust gases from the kiln. An additional combustion chamber is located between the base of the lowest cyclone and the kiln inlet. This raises the meal temperature to 880^{o}C while providing sufficient residence time at this temperature to achieve partial calcination or decomposition of the meal (to oxides). This is achieved using a combination of coal, Profuel® and MBM. The partially reacted material then enters the kiln, a refractory lined steel tube 4.2 metres in diameter and 68 metres long. The kiln is inclined downwards from the feed end (a few degrees only) and rotates up to 4 revolutions per minute meaning that the material gradually moves towards the discharge end of the kiln undergoing complex chemical reactions to produce clinker.

The heat required for the reactions is provided by two 63 MW burners, one in the kiln burning coal, Cemfuel®, Profuel® and MBM and the second, in the pre-calciner burning coal, Profuel® and MBM. The clinker leaves the kiln via a series of moving grate coolers to a purpose built store.

The clinker is ground in one of 6 cement mills. Gypsum, waste plaster board, limestone, Tin chloride 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 or rail tankers or in palletised paper or plastic sacks.

3. Summary of plant operation

a) Plant details

Two cement kiln burning waste materials operates on site, for historic reasons these are known as kiln 7 and Kiln 8.

b) Annual waste throughputs

The amount of waste burned in 2016 is summarised in the table below.

Waste type	EWC code	Tonnes used	
		Kiln 7	Kiln 8
Cemfuel	19 02 08	0	18341
Tyres	16 01 03	0	-
Profuel	19 02 10	0	51317
Meat and bone meal (MBM)	02 02 02	0	5661

c) 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.

Equipment	Annual production	Operational hours
Kiln 7	0	0
Kiln 8	Confidential	Confidential

During the year four shutdowns occurred on the kiln system.

- January the first planned scheduled maintenance shutdown took place.
- February the kiln was shut down while a temporary section of stack was installed.
- May the kiln was shut down to enable a complete new stack to be installed.
- August the second planned schedule maintenance shut down took place.

d) Residues

The following residues were produced during the year.

Residue	EWC code	Annual production
Cement kiln dust (CKD)	10-13-12	0 t
Cement Kiln dust (CKD)	19-02-04	2703t

The material produced for EWC code 10-13-12 can be disposed of in the landfill at Grange Top Quarry (Permit Number BV14531R). The material produced for EWC code 19-02-04 is stored on site prior to being used offsite for soil conditioning.

4. Summary of plant monitoring.

a) Pollutants measured.

Emissions from kiln 7 & 8 stacks 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, Benzene, 1,3-Butadiene, 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		✓
Benzene		✓
1,3-butadiene		✓
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	
	Kiln 7	Kiln 8
Particulates	-	99.7
Carbon monoxide	-	100
Sulfur dioxide	-	100
Oxides of nitrogen	-	100
Hydrogen chloride	-	100
Total organic carbon	-	100

In 2016 the particulate analyser performance was below 100% due to two periods (totalling 20 hours) where valid analyser readings were not available. Routinely the kiln runs with two particulate analyser installed and running in parallel. This provides valid data during periods of analyser servicing and down time. The two periods occurred when the plant was running with a single particulate analyser installed. In 2106 two new particulate analysers were installed during the shutdown for the installation of the new stack.

c) Summary of continuous emissions monitor data.

Continuous emission 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	Kiln 7		Kiln 8	
		1st half	2nd half	1st half	2nd half
Hydrogen fluoride	mg/m^3	Kiln off	Kiln off	<0.24	0.039
Mercury and its compounds	mg/m^3	Kiln off	Kiln off	0.0029	0.0010
Cadmium and thallium and their compounds	mg/m^3	Kiln off	Kiln off	0.0031	0.0015
Group III metals and their compounds	mg/m^3	Kiln off	Kiln off	0.13	0.030
Benzene	mg/m^3	Kiln off	Kiln off	2.7	3.0
1,3-butadiene	mg/m^3	Kiln off	Kiln off	1.5	<0.41
Dioxins and furans (I-TEQ)	ng/m^3	Kiln off	Kiln off	0.0027	0.012
Dioxin like PCBs (WHO-TEQ)	ng/m^3	Kiln off	Kiln off	0.00082	0.0017
Polycyclic aromatic hydrocarbons (total)	mg/m^3	Kiln off	Kiln off	0.13	0.049

Summary of plant compliance

Kiln 7

Kiln off.

Kiln 8

Continuous Emission Monitoring – Breaches of the emission limits are reported to the Environment Agency within 24 hours. Routinely prior to formally reporting the breach, the site contacts the Environment Agency and discusses the cause and potential corrective actions with the relevant inspector.

During the year the limit breaches related to SO2, NOx & Particulates.

SO2 emissions are routinely controlled when required, by the injection of a specialised Lime product into the gas stream. The preventative maintenance schedule was revised with the aim of improving the equipment reliabity.

The NOx level is routinely controlled by the SNCR system; this injects Ammonia under controlled conditions, where it combines with the NOx to form water and Nitrogen. In order to protect workers from exposure to Ammonia fume in the pre-calciner tower, during planned shutdowns it is necessary to purge the kiln system of ammonia from the SNCR system. This results in elevated NOx readings on the day preceding the shutdown.

Controlling the levels of particulates has continued to be a major focus again in 2016. This will be fully resolved in April 2018 when the new bag filter is scheduled to be operational.

Periodic Emission Monitoring – All periodic monitoring results fell within the emission limits.

5. Summary of plant improvements.

The focus of plant improvement in 2016 has continued to be on controlling and lowering the level of particulate emissions. This program of work has continued into 2016 and is scheduled during the major plant shutdown in January and into the year. The program of work includes:-

i) Replacing the main stack,

ii) Replacing the backup gas analyser,

iii) The main focus has been on the project to replace the electrostatic precipitator with a bag filter. This will significantly reduce the level of particulate emissions and is scheduled for completing in April 2018.

Summary of information made available

Emission data reported to the Environment Agency is published in the public register and can be obtained from the Environment Agency.

Hanson Cement hosts a Liaison Committee that meets three times a year. This meeting provides a forum for elected representatives of local parish and District councils to discuss matters of concern with the company. Representatives of the Environment Agency also attend this meeting.

Hanson Cement operates an ‘open door’ policy where members of the public can contact the company to arrange a visit to the site or obtain information. The company can be contacted by the following methods:

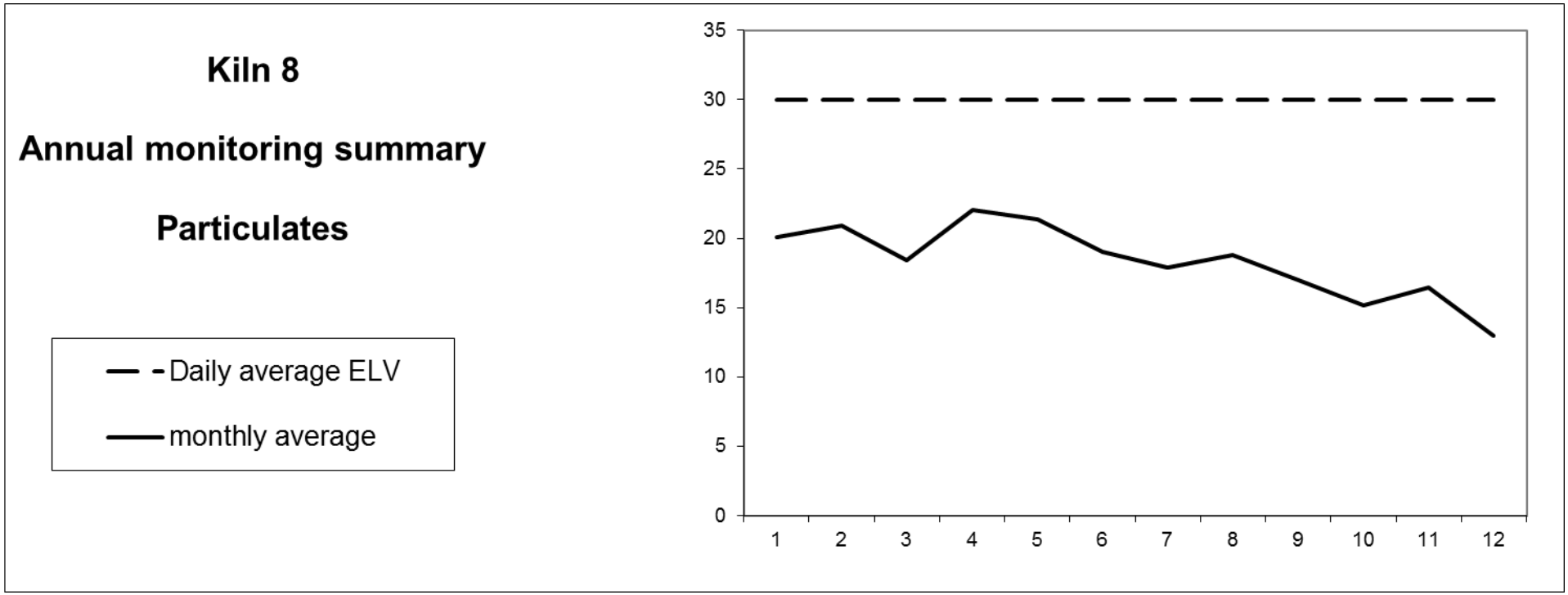
By post: Hanson Cement Ltd, Ketton, Stamford, Lincs, PE9 3SX

By e mail: enquiries@hanson.com

By ‘phone: 01780 720501

Hanson Cement plans to publish a community newsletters titled ‘Open Door’ in 2017 and this will be delivered to every household in the villages around Ketton works.

Appendix 1

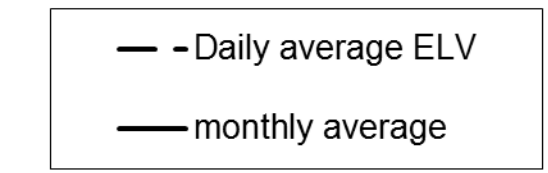


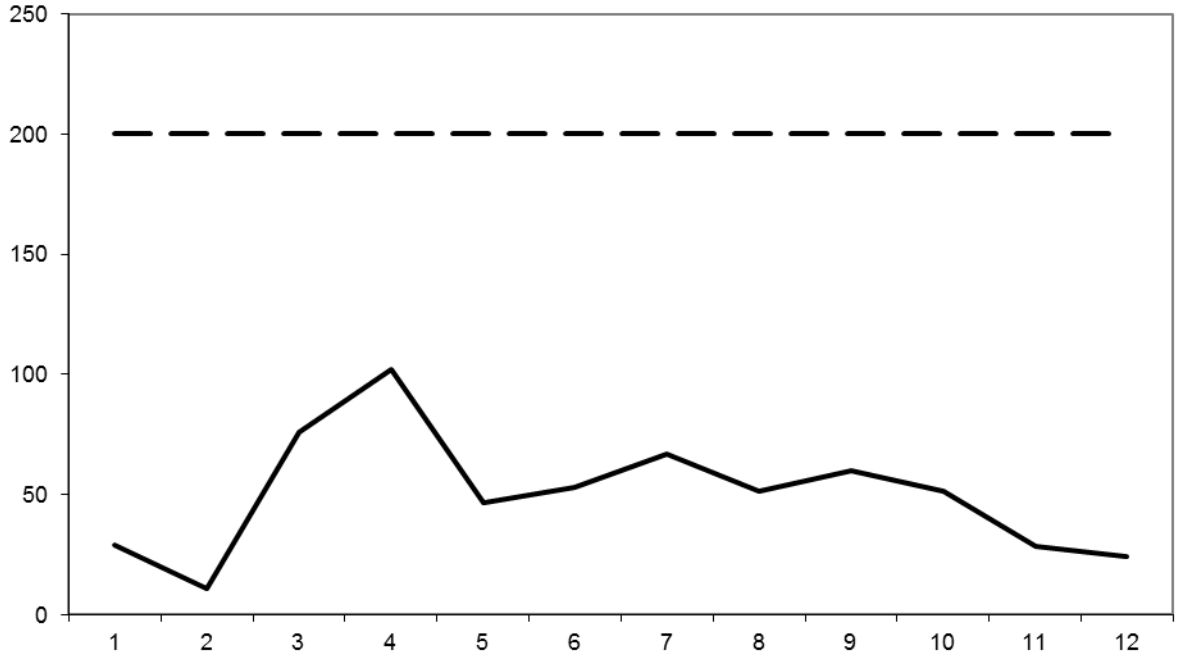
	Annual summary		Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			Daily average ELV	30	30	30	30	30	30	30	30	30	30	30	30
	Annual average	20	monthly average	20	21	18	22	21	19	18	19	17	15	16	13
	Annual maximum	42	Monthly maximum	25	29	30	29	38	42	27	26	24	22	25	19

Kiln 8

Annual monitoring summary

Sulfur dioxide



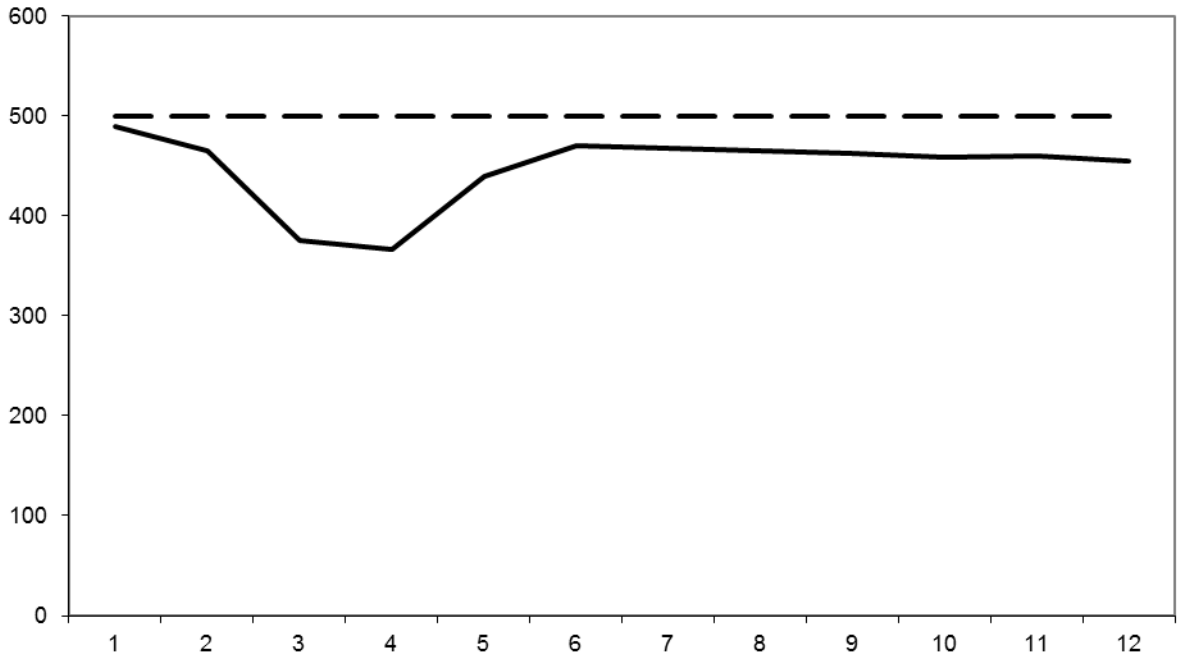


	Annual summary		Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			Daily average ELV	200	200	200	200	200	200	200	200	200	200	200	200
	Annual average	67	monthly average	29	11	76	102	46	53	67	51	60	51	29	24
	Annual maximum	266	Monthly maximum	62	26	266	225	133	150	148	146	127	158	112	87

Kiln 8

Annual monitoring summary

Nitrogen oxides

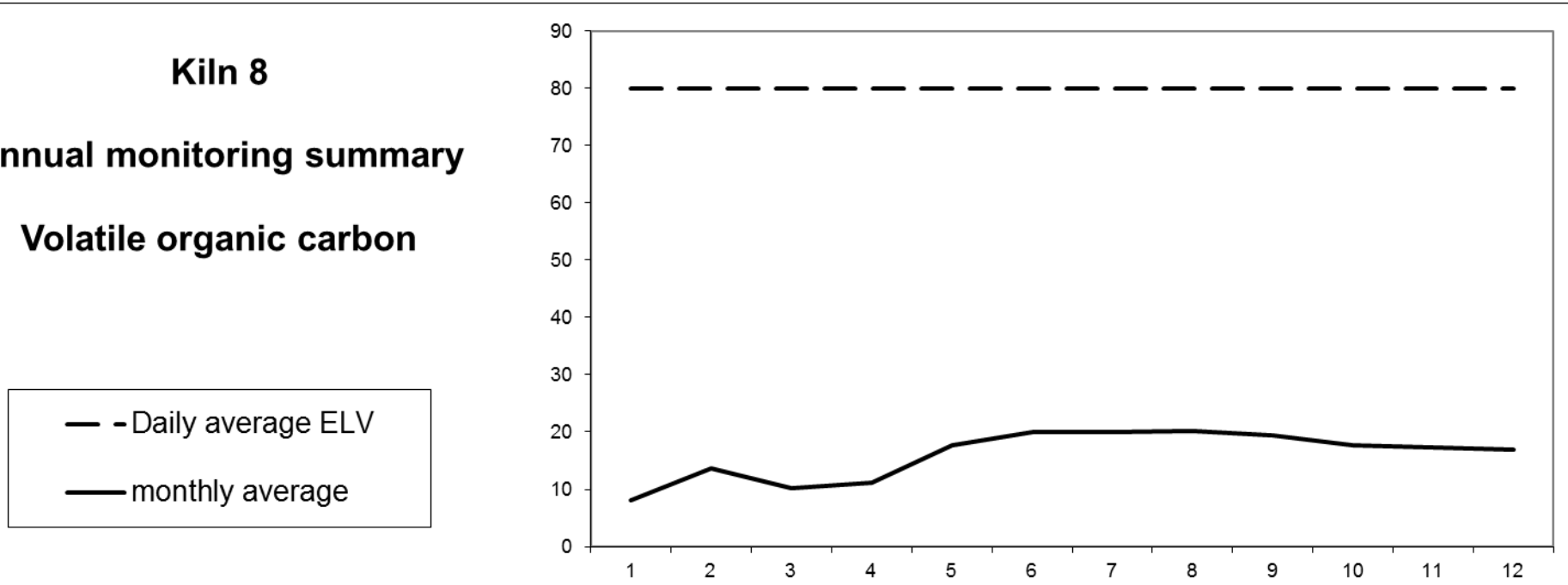


	Annual summary		Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			Daily average ELV	500	500	500	500	500	500	500	500	500	500	500	500
	Annual average	446	monthly average	489	465	376	367	439	470	467	465	463	459	460	455
	Annual maximum	682	Monthly maximum	577	483	414	468	682	483	497	478	481	487	481	484

Kiln 8

Annual monitoring summary

Volatile organic carbon

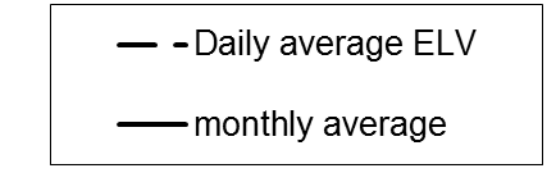


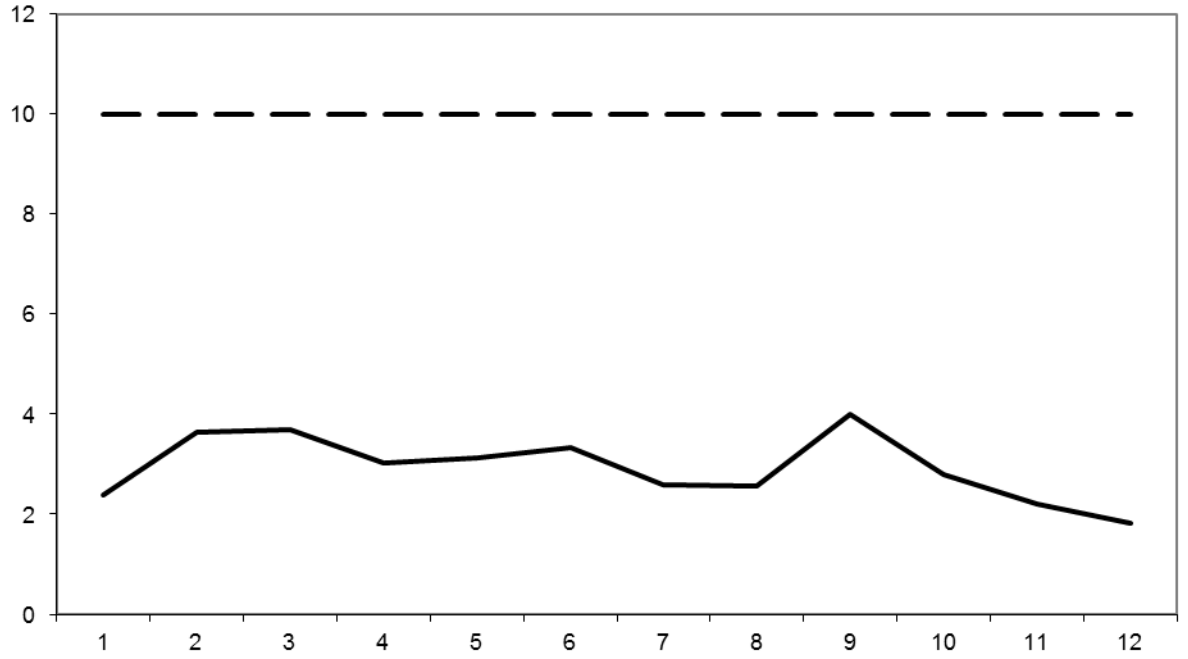
	Annual summary		Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			Daily average ELV	80	80	80	80	80	80	80	80	80	80	80	80
	Annual average	8	monthly average	8	14	10	11	18	20	20	20	19	18	17	17
	Annual maximum	24	Monthly maximum	10	16	13	14	21	24	23	23	23	21	21	19

Kiln 8

Annual monitoring summary

Hydrogen chloride



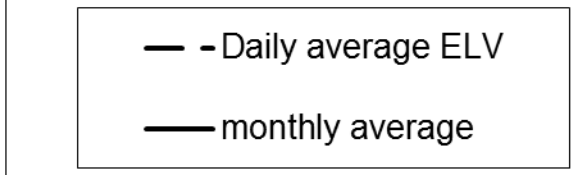


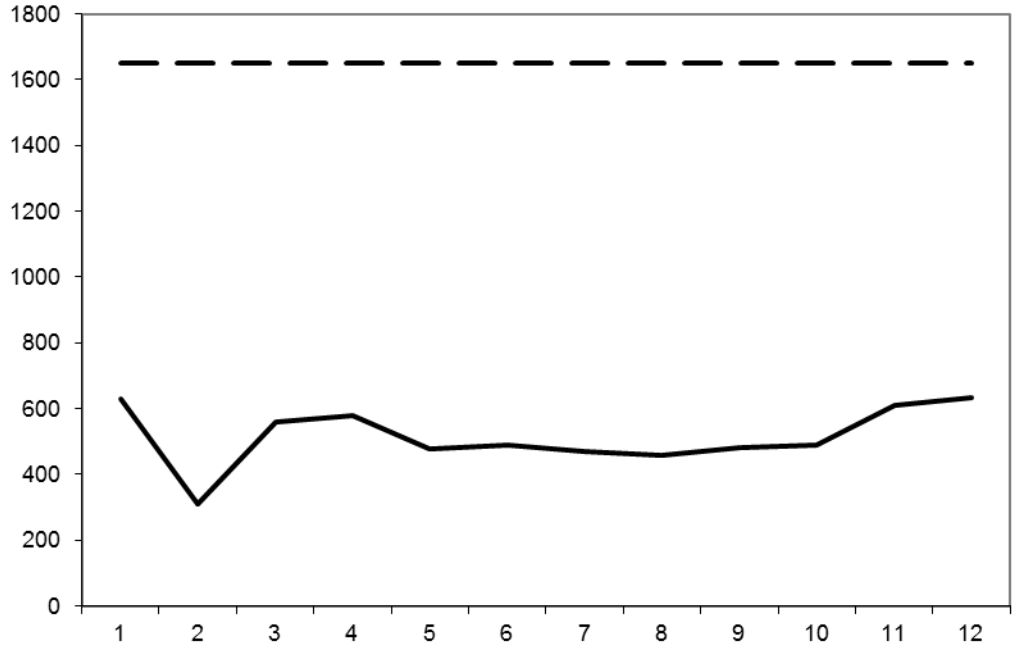
	Annual summary		Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			Daily average ELV	10	10	10	10	10	10	10	10	10	10	10	10
	Annual average	4	monthly average	2	4	4	3	3	3	3	3	4	3	2	2
	Annual maximum	9	Monthly maximum	3	6	9	8	7	6	5	6	7	6	5	7

Kiln 8

Annual monitoring summary

Carbon monoxide





	Annual summary		Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			Daily average ELV	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
	Annual average	509	monthly average	630	312	561	581	477	489	472	457	481	488	610	632
	Annual maximum	837	Monthly maximum	792	352	791	779	728	581	576	544	652	593	837	783