Annual performance report for: Derriford Incinerator Facility

Permit Number: EPR/GP3236AX

Year: 2022

This report is required under the Industrial Emissions Directive's Article 55(2) requirements on reporting and public information on waste incineration plants and co-incineration plants, which require the operator to produce an annual report on the functioning and monitoring of the plant and make it available to the public.

1. Introduction

Name and address of plant	University Hospitals Plymouth NHS Trust Derriford Incinerator Facility Derriford incinerator Derriford Road Plymouth Devon PL6 8DH
Description of waste input	Healthcare and Domestic waste
Operators contact details if members of the public have any questions	Derriford Incinerator Facility **University Hospitals Plymouth NHS Trust** Derriford Road Plymouth Devon. PL6 8DH Tel: 01752 433060

2. Plant description

The incinerator is located to the north of Plymouth and is adjacent to Derriford Hospital. The incinerator currently processes 3,500 tonnes per annum of non-hazardous and hazardous wastes, most of which is clinical.

The incinerator has a design capacity of 650kg/h with a typical operating capacity of ~510kg/h. The incinerator is fitted with air pollution control comprising of lime injection (to control emissions of sulphur dioxide and hydrogen chloride) and activated carbon (to control emissions of heavy metals and dioxins). There is also a high efficiency bag filtration system for the removal of particulate matter. There is a secondary combustion chamber that provides the required residence time of more than 2 seconds at a temperature of at least 850°C and 1000°C for cytotoxic wastes. Natural gas is used to support the combustion and to maintain the secondary temperatures.

Emissions to air are discharged via a 70-metre stack. There is an energy recovery system, and the incinerator supplies hot water to the adjacent hospital. Solid wastes produced are primary bottom ash and residues from the air pollution control system.

There is an Environmental Management System (14001 ISO) in place that is externally accredited.

There is only a small amount of effluent discharge to water and sewer. The former is uncontaminated surface water via an interceptor with the discharge to sewer primarily from the on-site bin washing activities.

There are designated European habitats located within 10km of the installation and Sites of Special Scientific Interest (SSSIs) located within 2km of the installation.

3. Summary of Plant Operation

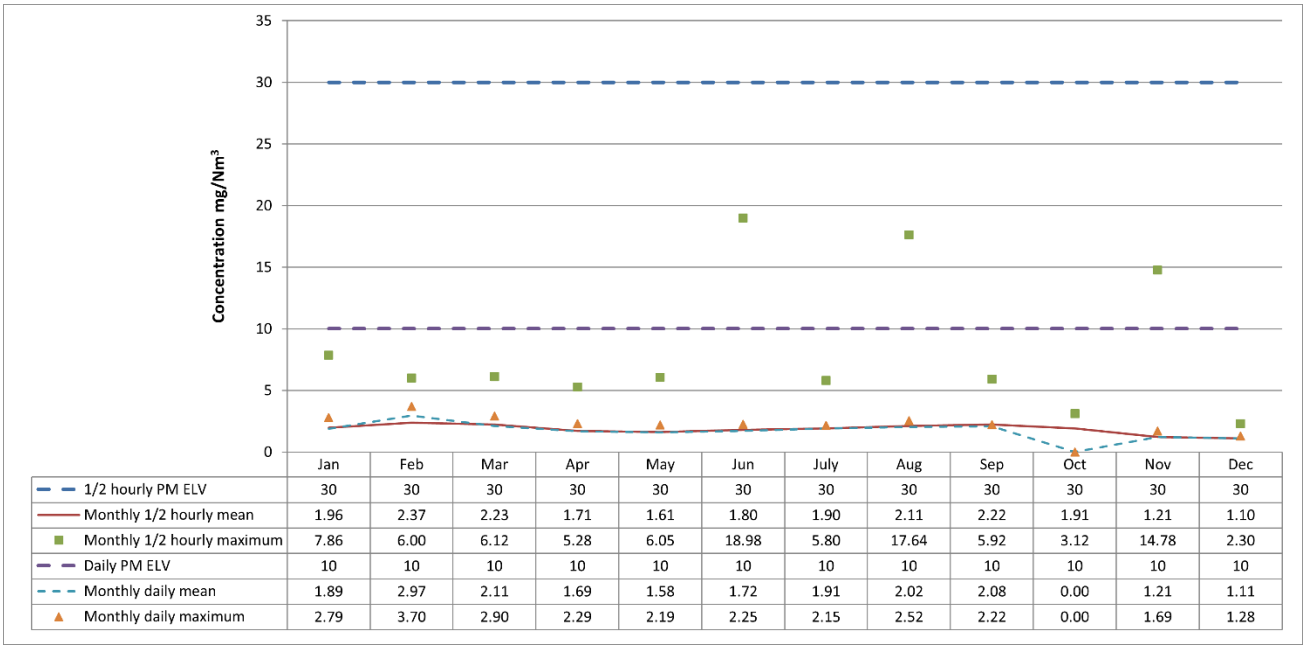
Clinical Hazardous waste received	2819.88 tonnes
Hazardous waste received	0.856 tonnes
Other waste received (Hospital domestic)	727.591 tonnes
Total waste received	3548.335 tonnes
Clinical Hazardous waste transferred	380.32 tonnes
Clinical non-hazardous waste transferred	175.49 tonnes
Municipal Hospital waste	569.68 tonnes
Total waste transferred	1125.49 tonnes
Total plant operational hours	5434 hours
Total hours of “abnormal operation” (see permit for definition)	None
Total quantity of incinerator bottom ash (IBA) produced	155.70 tonnes
Disposal or recovery route for IBA	Hills Waste Solutions Ltd Parkgate Farm Purton Swindon Wiltshire SN5 4HG
Did any batches of IBA test as hazardous? If yes, state quantity	As above (155.70)
Total quantity of air pollution control (APC) residues produced	143.64 tonnes Castle Environmental 130.84 Tonnes Castle oils ltd 12.80 Tonnes
Disposal or recovery route for APC residue Castle Environmental Treatment Centre Crompton Road Ilkeston Derbyshire DE7 4BG	Disposal or recovery route for APC residue Castle Environmental Castle Oils Ltd Long Port Stoke on Trent ST6 4PB
Total heat produced for export (e.g., to hospital or district heating scheme)	000,000 MWh

4. Summary of Plant Emissions

4.1 Summary of continuous emissions monitoring results for emissions to air

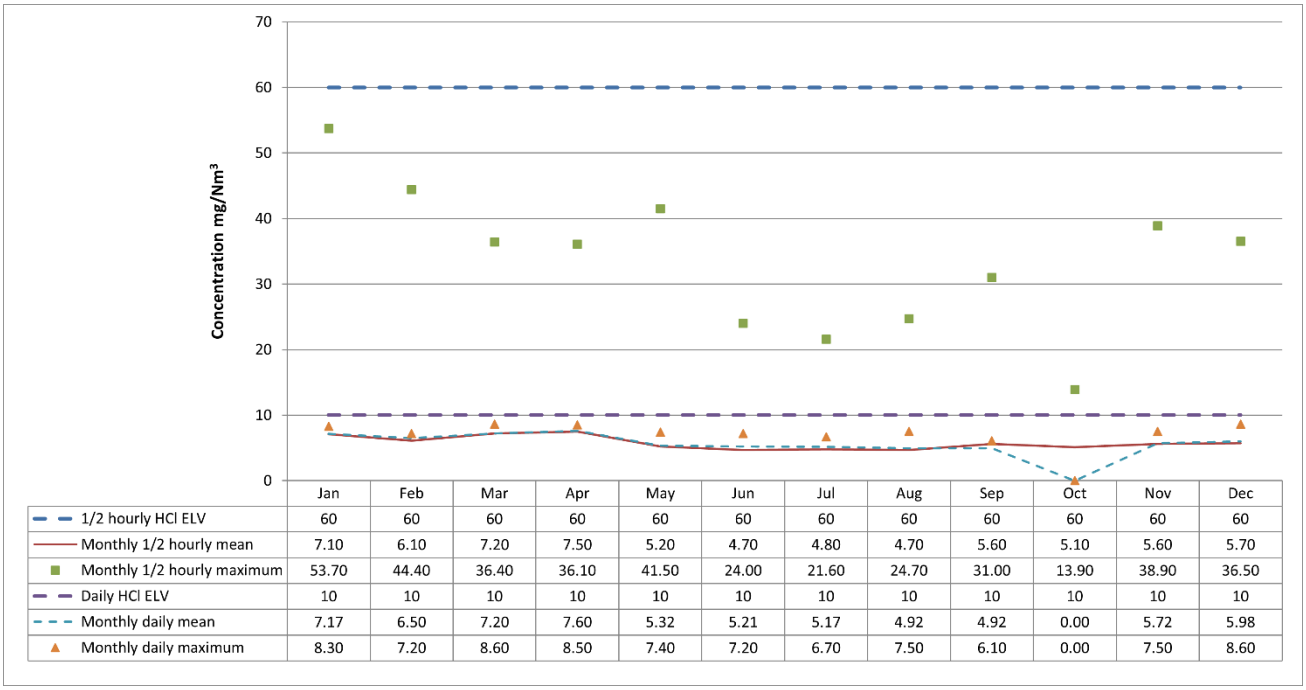
The following charts show the performance of the plant against its emission limit values (ELVs) for substances that are continuously monitored.

Line 1 – Particulates (Dust)



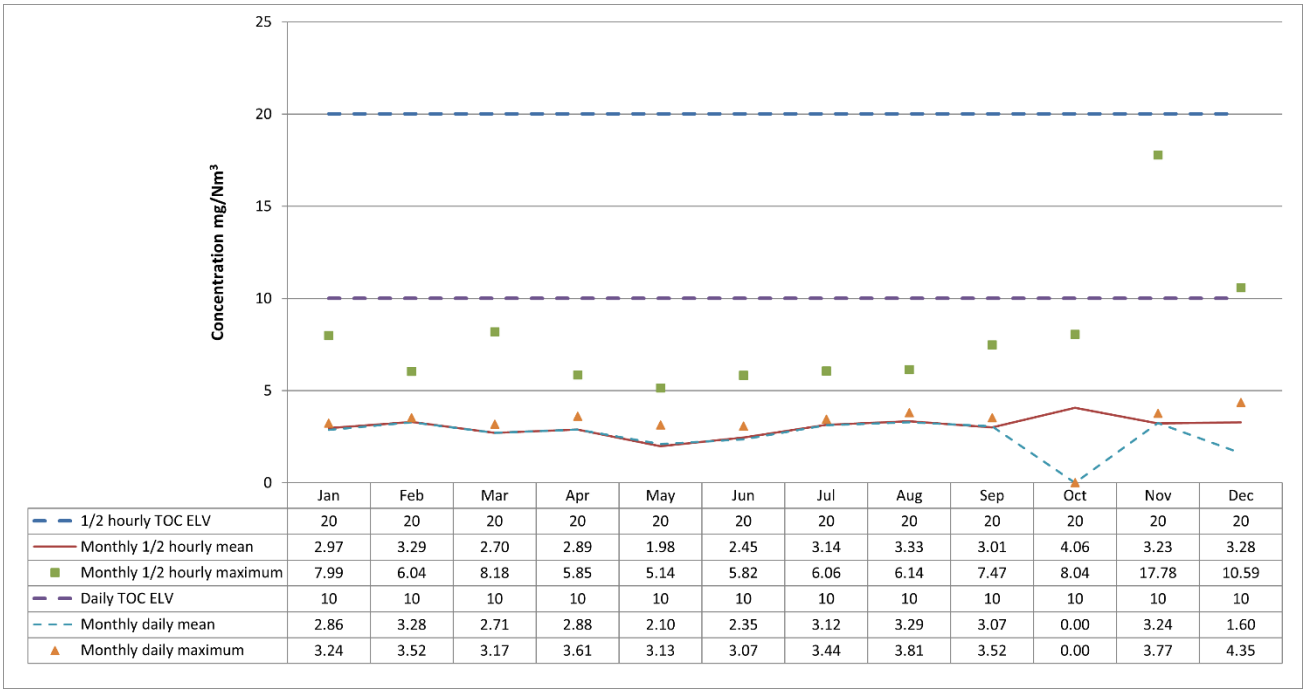
	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
1/2 hourly PM ELV	30	30	30	30	30	30	30	30	30	30	30	30
Monthly 1/2 hourly mean	1.96	2.37	2.23	1.71	1.61	1.80	1.90	2.11	2.22	1.91	1.21	1.10
Monthly 1/2 hourly maximum	7.86	6.00	6.12	5.28	6.05	18.98	5.80	17.64	5.92	3.12	14.78	2.30
Daily PM ELV	10	10	10	10	10	10	10	10	10	10	10	10
Monthly daily mean	1.89	2.97	2.11	1.69	1.58	1.72	1.91	2.02	2.08	0.00	1.21	1.11
Monthly daily maximum	2.79	3.70	2.90	2.29	2.19	2.25	2.15	2.52	2.22	0.00	1.69	1.28

Line 1 – Hydrogen Chloride (HCL)



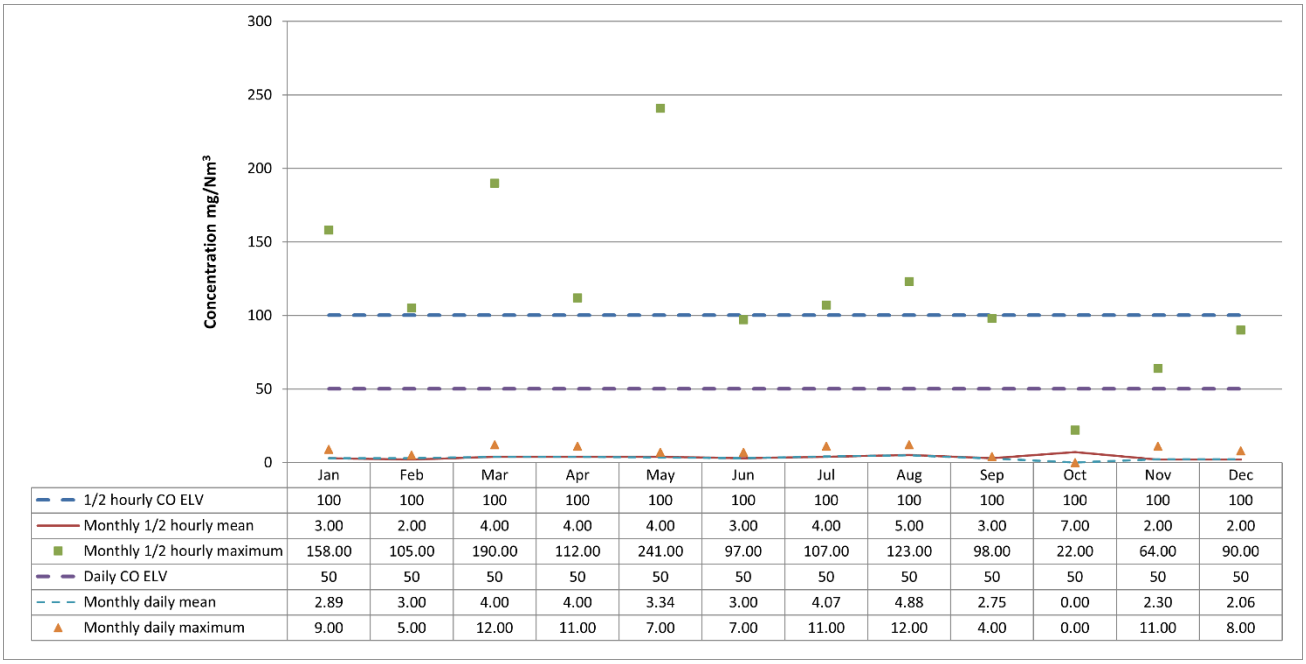
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly HCl ELV	60	60	60	60	60	60	60	60	60	60	60	60
Monthly 1/2 hourly mean	7.10	6.10	7.20	7.50	5.20	4.70	4.80	4.70	5.60	5.10	5.60	5.70
Monthly 1/2 hourly maximum	53.70	44.40	36.40	36.10	41.50	24.00	21.60	24.70	31.00	13.90	38.90	36.50
Daily HCl ELV	10	10	10	10	10	10	10	10	10	10	10	10
Monthly daily mean	7.17	6.50	7.20	7.60	5.32	5.21	5.17	4.92	4.92	0.00	5.72	5.98
Monthly daily maximum	8.30	7.20	8.60	8.50	7.40	7.20	6.70	7.50	6.10	0.00	7.50	8.60

Line 1 – Total organic carbon (TOC)



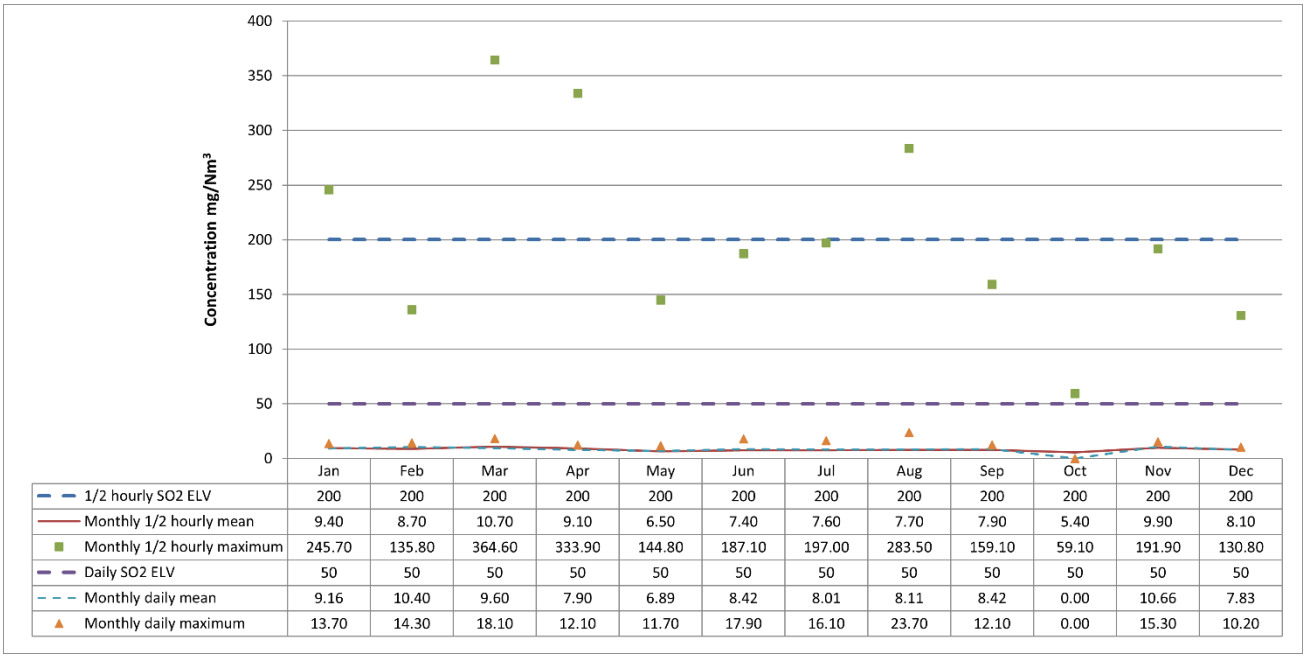
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly TOC ELV	20	20	20	20	20	20	20	20	20	20	20	20
Monthly 1/2 hourly mean	2.97	3.29	2.70	2.89	1.98	2.45	3.14	3.33	3.01	4.06	3.23	3.28
Monthly 1/2 hourly maximum	7.99	6.04	8.18	5.85	5.14	5.82	6.06	6.14	7.47	8.04	17.78	10.59
Daily TOC ELV	10	10	10	10	10	10	10	10	10	10	10	10
Monthly daily mean	2.86	3.28	2.71	2.88	2.10	2.35	3.12	3.29	3.07	0.00	3.24	1.60
Monthly daily maximum	3.24	3.52	3.17	3.61	3.13	3.07	3.44	3.81	3.52	0.00	3.77	4.35

Line 1 – Carbon monoxide (CO)



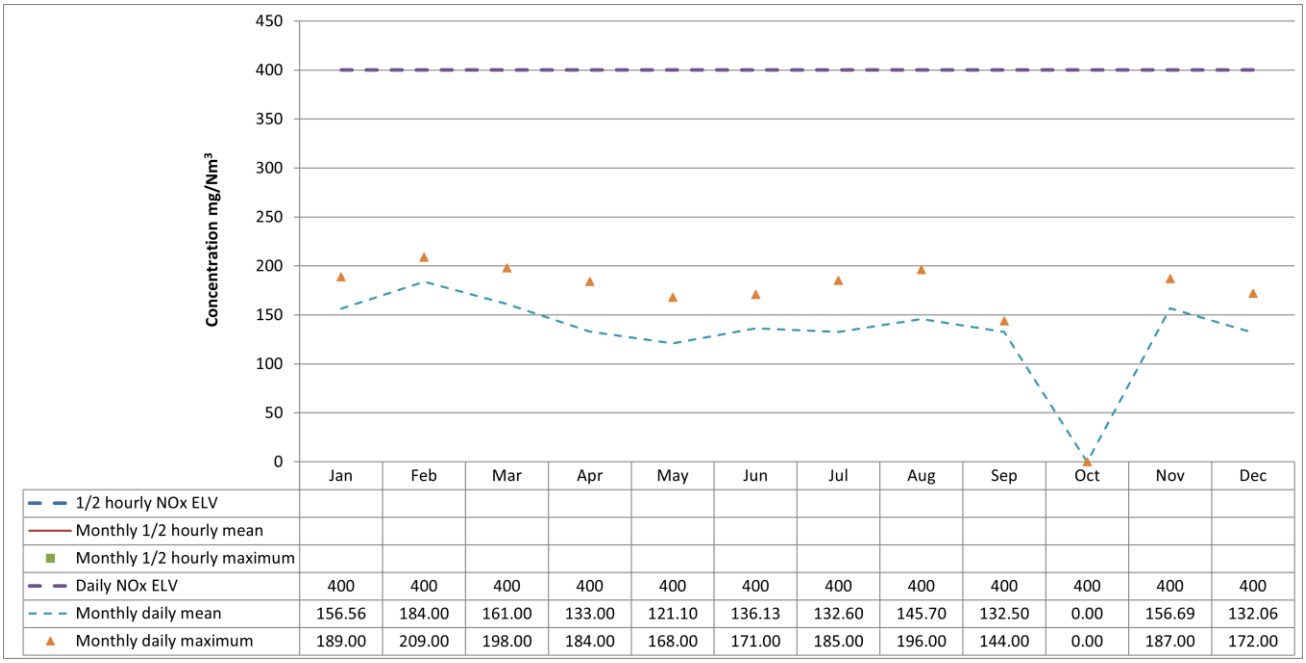
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly CO ELV	100	100	100	100	100	100	100	100	100	100	100	100
Monthly 1/2 hourly mean	3.00	2.00	4.00	4.00	4.00	3.00	4.00	5.00	3.00	7.00	2.00	2.00
Monthly 1/2 hourly maximum	158.00	105.00	190.00	112.00	241.00	97.00	107.00	123.00	98.00	22.00	64.00	90.00
Daily CO ELV	50	50	50	50	50	50	50	50	50	50	50	50
Monthly daily mean	2.89	3.00	4.00	4.00	3.34	3.00	4.07	4.88	2.75	0.00	2.30	2.06
Monthly daily maximum	9.00	5.00	12.00	11.00	7.00	7.00	11.00	12.00	4.00	0.00	11.00	8.00

Line 1 – Sulphur dioxide (So2)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly SO2 ELV	200	200	200	200	200	200	200	200	200	200	200	200
Monthly 1/2 hourly mean	9.40	8.70	10.70	9.10	6.50	7.40	7.60	7.70	7.90	5.40	9.90	8.10
Monthly 1/2 hourly maximum	245.70	135.80	364.60	333.90	144.80	187.10	197.00	283.50	159.10	59.10	191.90	130.80
Daily SO2 ELV	50	50	50	50	50	50	50	50	50	50	50	50
Monthly daily mean	9.16	10.40	9.60	7.90	6.89	8.42	8.01	8.11	8.42	0.00	10.66	7.83
Monthly daily maximum	13.70	14.30	18.10	12.10	11.70	17.90	16.10	23.70	12.10	0.00	15.30	10.20

Line 1 – Oxides of nitrogen (NOX)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly NOx ELV												
Monthly 1/2 hourly mean												
Monthly 1/2 hourly maximum												
Daily NOx ELV	400	400	400	400	400	400	400	400	400	400	400	400
Monthly daily mean	156.56	184.00	161.00	133.00	121.10	136.13	132.60	145.70	132.50	0.00	156.69	132.06
Monthly daily maximum	189.00	209.00	198.00	184.00	168.00	171.00	185.00	196.00	144.00	0.00	187.00	172.00

4.2 Summary of periodic monitoring results for emissions to air

The table below shows the results of periodically monitored substances.

Substance	**Emission limit value**	**Results**			
			22ND- 23RD June	**23th-28th Nov**	
Mercury and its compounds	0.5 mg/m³		0.0032	0.0006	
Cadmium & thallium and their compounds (total)	0.5 mg/m³		0.047	0.003	

Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.5 mg/m^3		0.24	0.042	
Dioxins and furans (I-TEQ)	0.1 ng/m^3		0.011	0.0188	

4.3 Summary of monitoring results for emissions to water

There are no emissions to water from the process [other than clean surface water].

Total suspended solids

	1st quarter March	2nd quarter June	3rd quarter September	4th quarter December
Daily/monthly ELV (mg/m^3)	N/A	N/A	N/A	N/A
Monthly maximum	N/A	N/A	N/A	N/A
Monthly average	N/A	N/A	N/A	N/A

5. Summary of Permit Compliance

The plant met its emission limits as shown in the table below.

Substance	Percentage time compliant during operation	
	Half-hourly limit (delete column if not applicable)	Daily limit
Particulates	100%	100%
Oxides of nitrogen	N/A	100%
Sulphur dioxide	99.90%	100%
Carbon monoxide	99.89%	100%
Total organic carbon	100%	100%
Hydrogen chloride	100%	100%

5.1 Summary of any notifications or non-compliances under the permit

Date	Summary of notification or non-compliance	Reason	Measures taken to prevent reoccurrence
15/01/2022	CO exceedance 1	The shift foreman (JR) reported a CO exceedance. This was caused by an unidentified item of waste within the contents of a bin which caused high levels of CO; waste feeding and rotation were stopped to allow the CO levels to deplete.	CO. Potentially high-risk waste streams are already diluted to reduce the harmful effect of emissions on the environment. Despite having copies of all consignees pre acceptance waste declarations.
18/01/2022	SO2 exceedance 2	The shift foreman (EB) reported a SO2 exceedance. This was caused by an identified item of waste within the contents of a bin which caused high levels of SO2; waste feeding and rotation were stopped, and the lime	SO2. Potentially high-risk waste streams are already diluted to reduce the harmful effect of emissions on the environment. Despite having copies of all consignees pre acceptance waste

		speed increased to combat the high levels of SO2.	declarations.
01/02/2022	CO exceedance 3	The shift foreman (EB) reported a CO exceedance. This was caused by an unidentified item of waste within the contents of a bin which caused high levels of CO; waste feeding and rotation were stopped to allow the CO levels to deplete.	CO. Potentially high-risk waste streams are already diluted to reduce the harmful effect of emissions on the environment. Despite having copies of all consignees pre acceptance waste declarations.
16/03/2022	SO2 exceedance 4	The shift foreman (GB) reported a SO2 exceedance. This was caused by an unidentified item of waste within the contents of a bin which caused high levels of SO2; waste feeding and rotation were stopped to allow the SO2 levels to deplete	SO2. Potentially high-risk waste streams are already diluted to reduce the harmful effect of emissions on the environment. Despite having copies of all consignees pre acceptance waste declarations.
16/03/2022	SO2 exceedance 5	The shift foreman (EB) reported a SO2 exceedance. This was caused by an unidentified item of waste within the contents of a bin which caused high levels of SO2; waste feeding and rotation were stopped to allow the SO2 levels to deplete	SO2. Potentially high-risk waste streams are already diluted to reduce the harmful effect of emissions on the environment. Despite having copies of all consignees pre acceptance waste declarations.
27/03/2022	CO exceedance 6	The shift foreman (EB) reported a CO exceedance. This was caused by an unidentified item of waste within the contents of a bin which caused high levels of CO; waste feeding and rotation were stopped to allow the CO levels to deplete	CO. Potentially high-risk waste streams are already diluted to reduce the harmful effect of emissions on the environment. Despite having copies of all consignees pre acceptance waste declarations.
13/04/2022	SO2 exceedance 7	The shift foreman (GB) reported a SO2 exceedance. This was caused by an unidentified item of waste within the contents of a bin which caused high levels of SO2; waste feeding and rotation were stopped to allow the SO2 levels to deplete.	SO2. Potentially high-risk waste streams are already diluted to reduce the harmful effect of emissions on the environment. Despite having copies of all consignees pre acceptance waste declarations.
19/04/2022	CO exceedance 8	The shift foreman (EB) reported a CO exceedance. This was caused by an unidentified item of waste within the contents of a bin which caused high levels of CO; waste feeding and rotation were stopped to allow the CO levels to deplete.	CO. Potentially high-risk waste streams are already diluted to reduce the harmful effect of emissions on the environment. Despite having copies of all consignees pre acceptance waste declarations.
02/05/2022	CO exceedance 9	The shift foreman (EB) reported a CO exceedance. This was caused by an unidentified item of waste within the contents of a bin which caused high levels of CO; waste feeding and rotation were stopped to allow the CO levels to deplete.	CO. Potentially high-risk waste streams are already diluted to reduce the harmful effect of emissions on the environment. Despite having copies of all consignees pre acceptance waste declarations.
04/05/2022	CO exceedance 10	The shift foreman (JR) reported a CO exceedance. This was caused by an unidentified item of waste within the	CO. Potentially high-risk waste streams are already diluted to reduce the harmful effect of emissions on the environment.

		contents of a bin which caused high levels of CO; waste feeding and rotation were stopped to allow the CO levels to deplete.	Despite having copies of all consignees pre acceptance waste declarations.
16/05/2022	CO exceedance 11	The shift foreman (BE) reported a CO exceedance. This was caused by an unidentified item of waste within the contents of a bin which caused high levels of CO; waste feeding and rotation were stopped to allow the CO levels to deplete.	CO. Potentially high-risk waste streams are already diluted to reduce the harmful effect of emissions on the environment. Despite having copies of all consignees pre acceptance waste declarations.
16/05/2022	CO exceedance 12	The shift foreman (BE) reported a CO exceedance. This was caused by an unidentified item of waste within the contents of a bin which caused high levels of CO; waste feeding and rotation were stopped to allow the CO levels to deplete.	CO. Potentially high-risk waste streams are already diluted to reduce the harmful effect of emissions on the environment. Despite having copies of all consignees pre acceptance waste declarations.
08/07/2022	CO exceedance 13	The shift foreman (EB) reported a CO exceedance. This was caused by an unidentified item of waste within the contents of a bin which caused high levels of CO; waste feeding and rotation were stopped to allow the CO levels to deplete.	CO. Potentially high-risk waste streams are already diluted to reduce the harmful effect of emissions on the environment. Despite having copies of all consignees pre acceptance waste declarations.
28/07/2022	CO exceedance 14	The shift foreman reported a CO exceedance. This was caused by an unidentified item of waste within the contents of a bin which caused high levels of CO; waste feeding and rotation were stopped to allow the CO levels to deplete.	CO. Potentially high-risk waste streams are already diluted to reduce the harmful effect of emissions on the environment. Despite having copies of all consignees pre acceptance waste declarations.
12/08/2022	CO exceedance 15	The shift foreman (BE) reported a CO exceedance. This was caused by an unidentified item of waste within the contents of a bin which caused high levels of CO; waste feeding and rotation were stopped to allow the CO levels to deplete.	CO. Potentially high-risk waste streams are already diluted to reduce the harmful effect of emissions on the environment. Despite having copies of all consignees pre acceptance waste declarations.
16/08/2022	SO2 exceedance 16	The shift foreman (GB) reported a SO2 exceedance. This was caused by an unidentified item of waste within the contents of a bin which caused high levels of SO2; waste feeding and rotation were stopped to allow the SO2 levels to deplete.	SO2. Potentially high-risk waste streams are already diluted to reduce the harmful effect of emissions on the environment. Despite having copies of all consignees pre acceptance waste declarations.

5.2 Summary of any complaints received and actions to taken to resolve them.

Date of complaint	Summary of complaint	Reason for complaint including whether substantiated by the	If substantiated, measures to prevent reoccurrence

		operator or the EA	
dd/mm/yy	N/A	N/A	N/A

6. Summary of plant improvements

Summary of any permit improvement conditions that have been completed within the year and the resulting environmental benefits.
NONE
Summary of any changes to the plant or operating techniques which required a variation to the permit and a summary of the resulting environmental impact.
NONE
Summary of any other improvements made to the plant or planned to be made and a summary of the resulting environmental benefits.
Proposed new high temperature hot water system planned for late 2023 A new Boiler, new pressurisation system and pipework enabling the incinerator to export Hot water to the Hospital. - Saving on the use of the Hospital Boilers reducing the carbon Footprint of the Hospital. **PLC rewrite May/June 2023** The old, manual outdated controls will be replaced by an up-to-date system enabling the Incinerator to run automated – when completed the Plant will be more efficient minimising The impact on the environment.