Annual performance report for: SRCL, Oldham Clinical Waste Incinerator

Permit Number: EPR/ ZP3230XC

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	Stericycle Oldham The Incinerator Building Royal Oldham Hospital Westhulme Street Oldham OL12JH
Description of waste input	Clinical waste
Operator contact details if members of the public have any questions	Ashley Huddleston Plant Manager 0333 240 4318

2. Plant description

The plant consists of a single stream, rated at 850 kilograms per hour or 7446 tonnes per annum of solid wastes. The Primary Chamber utilises the rotary kiln design to provide good mixing of the waste coupled to sufficient retention time to burn the wastes to a high quality ash.

Waste is loaded mechanically into the Primary Chamber using a hydraulic lift and tip arrangement, to avoid any manual handling of the waste. The rotating action of the kiln provides good mixing of the waste, exposing fresh surfaces to combustion conditions. The combustion process is operated slightly in the sub-stoichiometric or starved air mode to produce volatile gases to fuel the Secondary Chamber while providing good burnout of the fixed carbon in the waste to produce bottom ash. The bottom ash is discharged from the end of the rotary kiln into an ash quench system to cool it rapidly, and from the ash quench pit it is discharged into storage skips. The skips of bottom ash are taken to a licensed Landfill Site for disposal as non-hazardous waste.

The combustion gases produced in the Primary Chamber then pass into the Secondary Chamber, which operates at a minimum temperature of 850ºC during start-up using non-hazardous wastes; and at a minimum temperature of 1000ºC when hazardous waste may be loaded. The Secondary Chamber provides a minimum of two seconds residence time under oxygen-rich conditions to combust any Carbon Monoxide and volatile organic compounds produced in the Primary Chamber.

The hot gases then pass through a boiler and dilution air system, which reduce the temperature from above 1000ºC to around 160ºC, before the gases pass on to the flue gas treatment (FGT) system.

In the FGT system, dry hydrated lime (Calcium Hydroxide) and powdered activated carbon are used to treat the flue gases. The lime neutralises the acid gases (Hydrogen Chloride, Hydrogen Fluoride and Sulphur Dioxide) in the flue gas, whereas the activated carbon absorbs heavy metals such as Mercury, and organic compounds such as dioxins and furans. The treated flue gases are then discharged to atmosphere via a 32 metre high stack.

3. Summary of Plant Operation

Municipal waste received	4.72 tonnes
Commercial and industrial waste received	67.12 tonnes
Hazardous waste received	4952.04 tonnes
Clinical waste received	6173.43 tonnes
Cytotoxic/Cytostatic waste received	286.72 tonnes
Waste wood (biomass) received	N/A
Refuse-derived fuel received	N/A
Solid recovered fuel received	N/A
Other waste received Radioactive	0.45 tonnes
Total waste received (processed)	6245.27 tonnes
Total plant operational hours	7398 hours
Total hours of “abnormal operation” (see permit for definition)	3.5 hrs (6 occurrences)
Total quantity of incinerator bottom ash (IBA) produced	1066.06 tonnes
Disposal or recovery route for IBA	Disposal – Valencia Waste Management Ltd, Pilsworth Quarry, Pilsworth Road, Bury BL9 8QZ
Did any batches of IBA test as hazardous? If yes, state quantity	None
Total quantity of air pollution control (APC) residues produced	377.38 tonnes
Disposal or recovery route for APC residues	Recovery – Cleansing Service Group Ltd, Liverpool Road, Cadishead, Manchester M44 5DT
Total electricity generated for export to the National Grid	N/A
Total heat produced for export (e.g. to hospital or district heating scheme)	27,932 tonnes

4. Summary of Plant Emissions

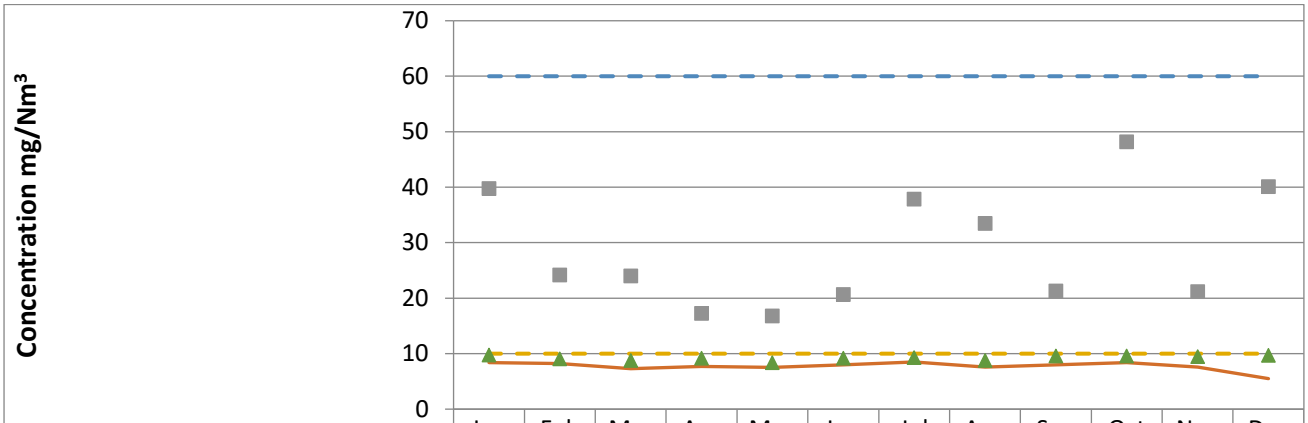
4.1 Summary of continuous emissions monitoring results for emissions to air

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

Monthly emissions summary daily ELVs o

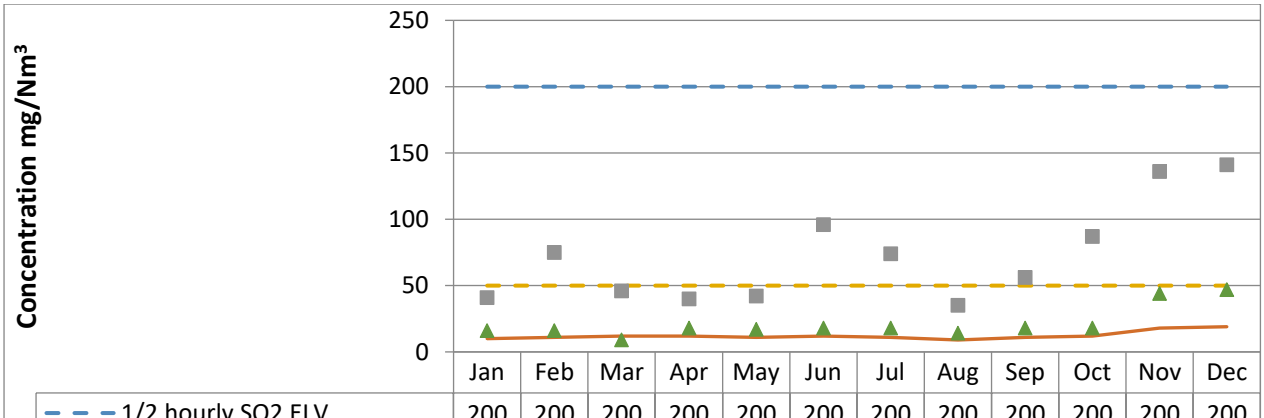
Monthly emissions summary incl half-hou

Line 1 - Hydrogen chloride



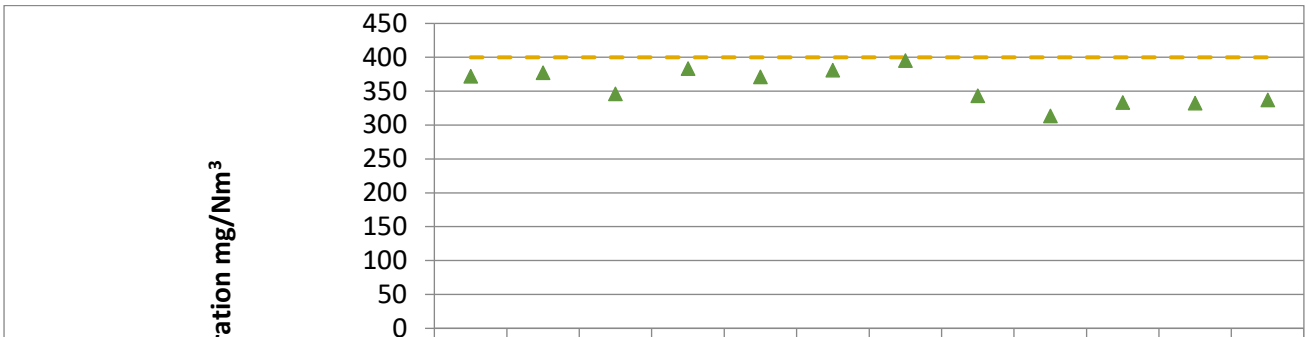
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly HCl ELV	60	60	60	60	60	60	60	60	60	60	60	60
Monthly 1/2 hourly mean	8.4	8.2	7.3	7.7	7.5	8	8.5	7.6	8	8.4	7.6	5.5
Monthly 1/2 hourly maximum	39.8	24.2	24	17.3	16.8	20.7	37.9	33.5	21.3	48.2	21.2	40.1
Daily HCl ELV	10	10	10	10	10	10	10	10	10	10	10	10
Monthly daily mean												
Monthly daily maximum	9.8	9.1	8.8	9.2	8.4	9.2	9.3	8.8	9.6	9.6	9.5	9.7

Line 1 – Sulphur dioxide



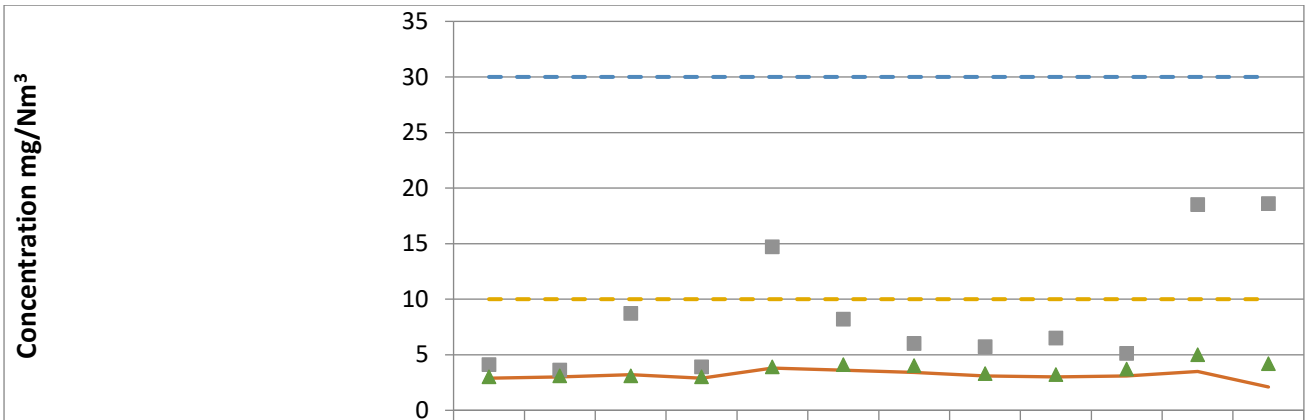
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly SO2 ELV	200	200	200	200	200	200	200	200	200	200	200	200
Monthly 1/2 hourly mean	10	11	12	12	11	12	11	9	11	12	18	19
Monthly 1/2 hourly maximum	41	75	46	40	42	96	74	35	56	87	136	141
Daily SO2 ELV	50	50	50	50	50	50	50	50	50	50	50	50
Monthly daily mean												
Monthly daily maximum	16	16	9	18	17	18	18	14	18	18	44	47

Line 1 – Oxides of nitrogen



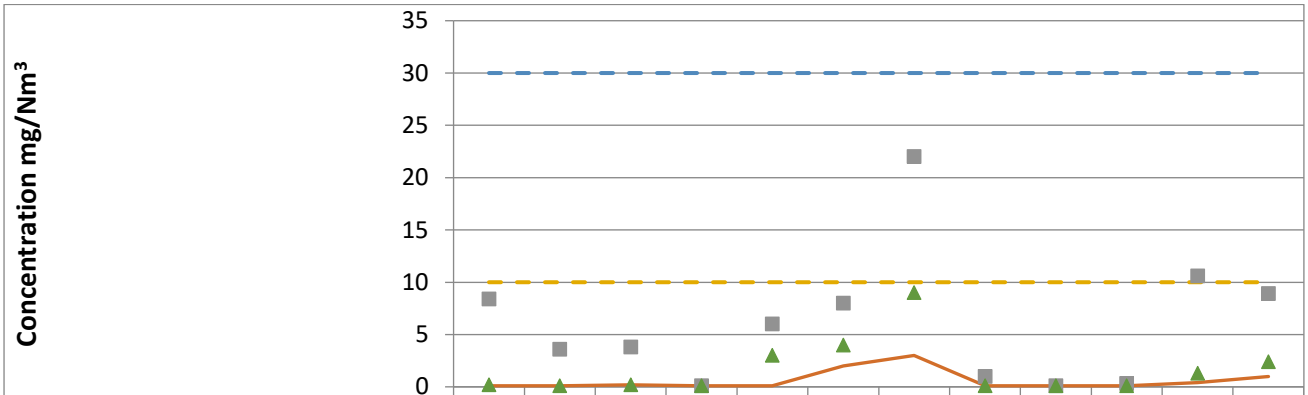
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly NOx ELV												
Monthly 1/2 hourly mean												
Monthly 1/2 hourly maximum												
Daily NOx ELV	400	400	400	400	400	400	400	400	400	400	400	400
Monthly daily mean												
Monthly daily maximum	372	377	346	383	371	381	395	343	313	333	332	337

Line 1 – Total organic carbon



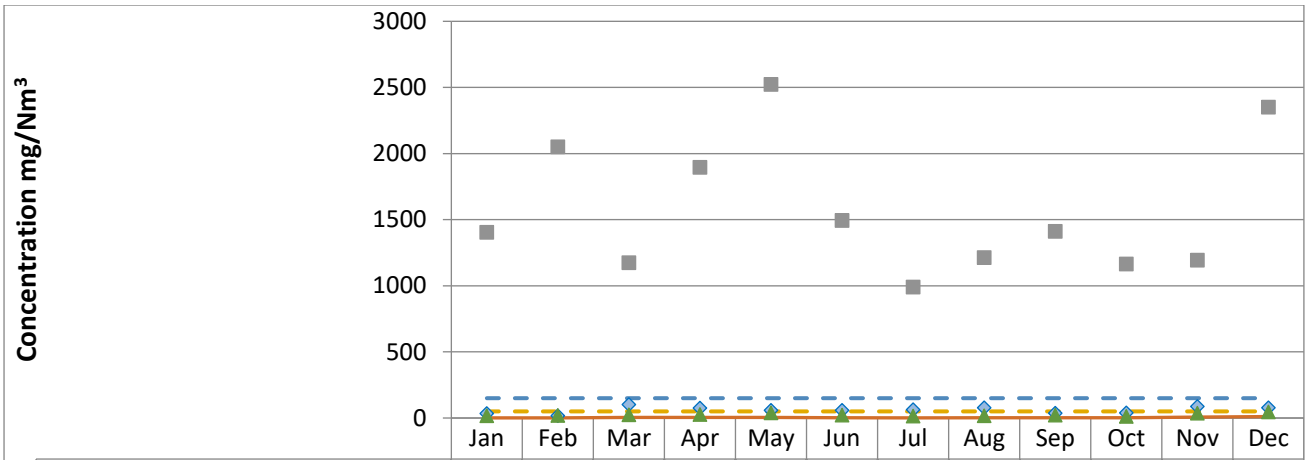
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly TOC ELV	30	30	30	30	30	30	30	30	30	30	30	30
Monthly 1/2 hourly mean	2.9	3	3.2	2.9	3.8	3.6	3.4	3.1	3	3.1	3.5	2.1
Monthly 1/2 hourly maximum	4.1	3.6	8.7	3.9	14.7	8.2	6	5.7	6.5	5.1	18.5	18.6
Daily TOC ELV	10	10	10	10	10	10	10	10	10	10	10	10
Monthly daily mean												
Monthly daily maximum	3	3.1	3.1	3	3.9	4.1	4	3.3	3.2	3.7	5	4.2

Line 1 – Particulates



	Jan	Feb	Mar	Apr	May	Jun	Jul	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	0.1	0.1	0.2	0.1	0.1	2	3	0.1	0.1	0.1	0.4	1
Monthly 1/2 hourly maximum	8.4	3.6	3.8	0.1	6	8	22	1	0.1	0.3	10.6	8.9
Daily PM ELV	10	10	10	10	10	10	10	10	10	10	10	10
Monthly daily mean												
Monthly daily maximum	0.2	0.1	0.2	0.1	3	4	9	0.1	0.1	0.1	1.3	2.4

Line 1 – Carbon monoxide



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
10 minute CO ELV (95%)	150	150	150	150	150	150	150	150	150	150	150	150
Monthly 95% 10 minute maximum	33	16	101	75	57	57	63	77	36	38	86	76
Monthly 10 minute mean	1	1	4	4	4	3	1	3	3	2	6	11
Monthly 10 minute maximum	1404	2049	1173	1896	2522	1493	990	1212	1411	1163	1193	2351
Daily CO ELV	50	50	50	50	50	50	50	50	50	50	50	50
Monthly daily mean												
Monthly daily maximum	16	20	23	26	39	22	13	17	21	12	35	45

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	
		20-22/04/22	Not Completed
Mercury and its compounds	0.05 mg/m³	0.0035 mg/m³	- mg/m³

Cadmium & thallium and their compounds (total)	0.05 mg/m^3	0.0038 mg/m^3	- mg/m^3
Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.5 mg/m^3	0.15 mg/m^3	- mg/m^3
Dioxins and furans (I-TEQ)	0.1 ng/m^3	0.0193 ng/m^3	- ng/m^3

4.3 Summary of monitoring results for emissions to water

No emissions to water are monitored from the process.

5. Summary of Permit Compliance

5.1 Compliance with permit limits for continuously monitored pollutants

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

Substance	Percentage time compliant during operation	
	Half-hourly limit	**Daily limit**
Particulates	99.99 %	100 %
Oxides of nitrogen	N/A	100 %
Sulphur dioxide	100 %	100 %
Carbon monoxide	100 % 95% of 10-min averages	100 %
Total organic carbon	100 %	100 %
Hydrogen chloride	99.95 %	100 %
Hydrogen fluoride	N/A	N/A

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

Date	Summary of notification or non-compliance	Reason	Measures taken to prevent reoccurrence
22/04/22	Dust Exceedance on Extractive Emissions Test	Exceedance of 33mg (ELV of 20) Investigation into the breach shown that there was no breach of the CEM during the periodic emission breach. There were notable peaks when reviewing the 1 minute data however when calculated to	Additional training provided to supervisors on the qualitative nature of the CEM and the live monitoring of this. This training will enthuses the requirement to monitor dust levels more closely so they are checking spikes in dust outside of the low and stable range (0-2.5mg/m3).

		make a half hourly average, this did not indicate any cause for concern because it was below the ELV. The reason for the disparity between the periodic result and the CEM is due to the qualitative nature of the CEM.	
23/05/22	Baghouse Fire ERV Opening 1/2hly Dust Exceedance	Baghouse temperature recorded 245 degrees Celsius and on visual inspection there was evidence of a fire within the baghouse so the team initiated the plants emergency stop to isolate the fire and keep it contained. This resulted in an ERV occurrence. There was no emission from the fire as it was contained within the baghouse. There was a dust exceedance shortly before the ERV was manually initiated. Upon investigation the dust exceedance was recorded Prior to the fire being identified, it appears that a bag and cage failed within the baghouse and fell into the Lime Auger (Exit Screw) and caused sparks Which resulted in the baghouse catching fire.	Entire replacement of the baghouse bags and cages, Increased frequency on the inspection regime of the bag house cages.
17/06/22	ERV Opening	Ram cylinder seal had blown causing the ERV system to go into default setting tripping the plant and opening the ERV. Supplier installed the wrong type of seal to the ram.	Replacement of ERV ram. Rams fitted with new nose seals and tested onsite/
27/06/22	ERV Opening	Plant abort button failure A Plant Abort E-Stop button failed due to the E-Stops Contactors corroding.	E-stop repaired.
04-08/08/22	Abnormal Operations	6 abnormal operation periods Total of 3.5 hours of abnormal operations due to blocked lime pipes	Increased vibration on lime silo/cleared lime supply pipe of blockage
22/08/22	ERV Opening	Plant abort button accidental activation when an operator hit it during another task.	Plant abort button to raised higher during the next shutown to prevent accidental activation again.
24/08/22	ERV Opening	Reactor Thermocouple power outage	To ensure the issue of electrical interference doesn't cause the same issue again, a 5 second delay to the

		Plant tripped via the hard wired safety chain linked to the thermocouples on the reactor tower. As a consequence, the ERV opened. Instantaneous spikes have been occurring on the thermocouples periodically. This was caused by electrical interference.	activation of the safety chain has been added. This ensures that any instantaneous spikes that return to normal within the 0-3 seconds outlined above do not trip the plant. In addition to this, an electrical contractor will: - Inspect the wiring and routing of the thermocouple cabling and solenoids to ensure best practice if being followed (that these signals only cross over at 90 degrees). - Inspect / Replace the solenoid heads with ones that have an internal varistor this is to prevent transient voltages.
10/11/22	Baghouse Fire ERV Opening	An intermittent “emergency vent damper open” proximity sensor signal was displayed on the control room SCADA computer screen. The proxitimty sensor is the equipment that monitors the open/closed status of the vent. if this signal is not active it will break the safety chain thus resulting in an actuation and relief. Whilst experiencing intermittent faults with the emergency relief vent sensors, there was a manual intervention with the ID Fan and the Open/Closed position of the ERV, with the aim to bring the ERV issues under control. During these manual interventions the ID caused elevated negative pressure within the process, thereby drawing partially combusted material through the chamber and into the bag filter chamber.	The intermittent emergency vent open position sensor was replaced. The ERV remained open and subseqient incindent occurred at 01:00 on the 10th Novemeber. (see Part A/B) All Filter Bags to be replaced. The intermittent emergency vent open/closed position sensors were replaced. Bayliss PLC system intergrators were engaged to confirm the programming logic of the start-up /shut down sequencer and recommissioning took place. The automatic start-up / shutdown process within the SCADA/PLC has been tested and does function as required. This will be used in all future abnormal operations Training plans in place for all operational staff at the Oldham facility.

5.3 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 operator or the EA	If substantiated, measures to prevent reoccurrence

None

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.
Completed 2022 • Secondary chamber has been rebricked (from halfway down) to reduce refractory failure. • Baghouse solenoid valves replaced. • New carbon screw installed in anticipation of new BAT-AEL's coming into force in Dec23. • Planned 2023 • SNCR to abate NOx emissions to new BAT-AEL coming into force in Dec 23. • Improvements to carbon dosing system to better monitor and control carbon dosing rates. • Upgrades to the lime dosing system motors to increase lime supply to the abatement plant to meet new BAT-AEL on HCL and SO2 coming into force in Dec 23.. • UPS upgrades to boiler, MCC and PLC to improve resilience (potentially 2024).

7. Details of any public liaison planned for 2023

Date and time	Description	Location
	None	

8. Other Permit form Information

Below is a summary of the information contained within forms required by permit conditions 2.4.1, 2.8.1, 4.1.3, 4.1.5 and 4.1.6.

Performance 1	Operating hours for the year Number of periods of abnormal operations Cumulative hours of abnormal operations	See section 3
Performance indicators	Total waste incinerated Electrical energy imported to site/tonne incinerated Gas consumption/tonne incinerated IBA produced/tonne incinerated APC produced/tonne incinerated Lime consumption/tonne incinerated Carbon consumption/tonne incinerated Number of ERV operations	6245.27 tonnes 66.31 kWh/tonne 88.64 kWh/tonne 170.70 kg/tonne 60.43 kg/tonne 50.41 kg/tonne 4.16 kg/tonne See section 5.2
Energy 1	Electricity (kWh, primary energy & CO2) Natural Gas (kWh, primary energy & CO2) Cumulative (primary energy, CO2 and CO2/tonne incinerated)	414,107 kWh, 1076.68 MWh, 178.07 tonnes 553,597kWh, 553.594MWh, 105.18 tonnes 1630.28 MWh, 283.25 tonnes, 0.045 tonnes/tonne
Water 1	Mains water (total & per tonne incinerated)	4,633 m3, 0.74 m3/tonne
Disposal and Recovery	Haz wate incinerated Clinical waste incinerated Cytotoxic/cytostatic waste incinerated Total waste incinerated Total waste per unit output (IBA)	See section 3 See section 3 See section 3 See section 3 5.86 tonnes per tonne IBA
Progress against EMS targets	Progress against EMS targets (required annually)	Appendix 1
Fugitive emissions	Fugitive emissions (required annually)	Appendix 2
Waste Minimisation and Water Efficiency	Waste Minimisation and Water Efficiency Audit (required every four years)	Appendix 3
Accident Management	Accident Management Plan (required every four years)	Appendix 4

Comments:

Electrical savings - Plant re-wire completed November 21. This included replacement to ancillary equipment for more energy efficient types. LED lighting upgrade in May 22 also contributed to electrical reduction.