

**Annual performance report for:**  
**Avonmouth healthcare waste incinerator and transfer facility**

**Permit Number: EPR/ VP3130EF**

**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	SRCL Ltd Avonmouth Holesmouth Road Avonmouth Bristol BS11 9BP
Description of waste input	<p>The Avonmouth plant incinerates clinical waste, including clinical wastes classed as hazardous under the Hazardous Waste Regulations 2005. The bulk of the waste is produced at hospitals, but also includes smaller quantities from doctors' surgeries, dentists, health clinics, residential and nursing homes, and from medical research facilities. The hazardous wastes incinerated include infectious waste and waste containing cytotoxic or cytostatic medicines.</p> <p>The plant also incinerates small amounts of specialised wastes where it is recognised that high temperature incineration represents the best disposal option.</p>
Operator contact details if members of the public have any questions	<a href="mailto:supportuk@stericycle.com">supportuk@stericycle.com</a>

## **2. Plant description**

The Avonmouth Incinerator is designed to process 750 kilograms per hour. The permit sets an annual throughput limit of 6570 tonnes a year. The incinerator is of stepped hearth design, with three main combustion hearths and an ash box. Healthcare wastes are loaded mechanically direct from the wheeled bins used to deliver the waste, into the inspection cradle which provides the opportunity to visually inspect the waste before it is tipped into the incinerator charging hopper. Any non-conformant waste can be identified, intercepted, and reported in-line with company procedures. Errors in waste content are flagged for follow up with the waste producer

Once inspection is complete, the waste is discharged into the loading box and is pushed from there onto the first hearth where the combustion process commences. Hydraulic rams operate at intervals to push the waste along the first hearth, until it falls off the end onto the second hearth where it burns vigorously at a temperature of between 850°C and 1000 °C, where it burns out to produce an ash. This bottom ash and any remaining part-combusted waste is then pushed onto the last hearths, where the fixed carbon in the ash is further burned out. The retention time of the entire process is between 4-6 hours. The residues are then dropped into an ash quench pit at the end of the process before being transferred into a skip. Ram movements are programmed in relation to the number of bins fed.

The flue gases from the incineration process then pass through a secondary chamber, or afterburner, where any gaseous products of combustion are burned out under oxygen rich conditions. This stage is designed to destroy any carbon monoxide, volatile organic compounds, and dioxins and furans produced by the

combustion process. Ammonia in the form of urea solution is injected into the secondary chamber for further control and reduction of oxides of nitrogen emissions.

The flue gases are then cooled by directing them through a waste-heat boiler and economiser, before they pass into the final, abatement section of the process. Powdered lime (calcium hydroxide) and powdered activated carbon are added to the flue gases entering the abatement process to remove acid gases, heavy metals and residual dioxins and furans before discharge to atmosphere from the stack. The flue gases being discharged from the stack are continuously monitored for hydrogen chloride, sulphur dioxide, carbon monoxide, oxides of nitrogen, particulate matter (dust), volatile organic compounds, oxygen, ammonia, and nitrous oxide.

The incineration process produces two residues; bottom ash and spent lime.

### 3. Summary of Plant Operation

#### 3.1 Annual Production Data

Hazardous waste received	2571	Tonnes
Non-hazardous waste received	2087	Tonnes
Cytotoxic & cytostatic wastes incinerated	144	Tonnes
Total Waste Incinerated	4801	Tonnes
Total plant operational hours	7636.5	Hours
Total hours of "abnormal operation" (see permit for definition)	60	Minutes
Total quantity of incinerator bottom ash (IBA) produced	585.7	Tonnes
Disposal or recovery route for IBA	D1 - Landfill	
Did any batches of IBA test as hazardous? If yes, state quantity	None	
Total quantity of air pollution control (APC) residues produced	195.3	Tonnes
Disposal or recovery route for APC residues	D13 - Blending or mixing prior to submission to any of the operations numbered D1 to D12	
Total electricity energy generated	74789*	MWh

### 3.2 Annual performance parameters

The performance parameters for the facility were as follows:

Table S4.3 Performance parameters					
Parameter	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Units
Total waste incinerated	1,309.00	1,094.00	1,319.35	1,079.00	Tonnes
Electrical energy exported, imported and used at the installation	*74789. There were operational issues experienced with the heliex during year. Meetings held with the manufacturer to determine what repairs were required and timeframes associated to carry out necessary works.				KWh / tonne of waste incinerated
Electrical energy imported and used at the installation	17.2	31.6	26.0	29.4	KWh / tonne of waste incinerated
Mass of Bottom Ash produced	0.1	0.1	0.1	0.1	t / tonne of waste incinerated
Mass of APC residues produced	0.02	0.03	0.02	0.09	t / tonne of waste incinerated
Urea consumption	13.51	20.76	17.22	18.96	L / tonne of waste incinerated
Activated Carbon consumption	2.2	1.8	2.2	1.8	Kg / tonne of waste incinerated
Lime consumption	52.4	43.8	52.8	43.2	Kg / tonne of waste incinerated
Water consumption	2.0	0.9	0.9	2.0	m3 / tonne of waste incinerated
Periods of abnormal operation	0	0	0	1	No of occasions
Periods of operation of Emergency Relief Vent (ERV)	3	0	1	2	No of occasions

## 4. Summary of Plant Emissions

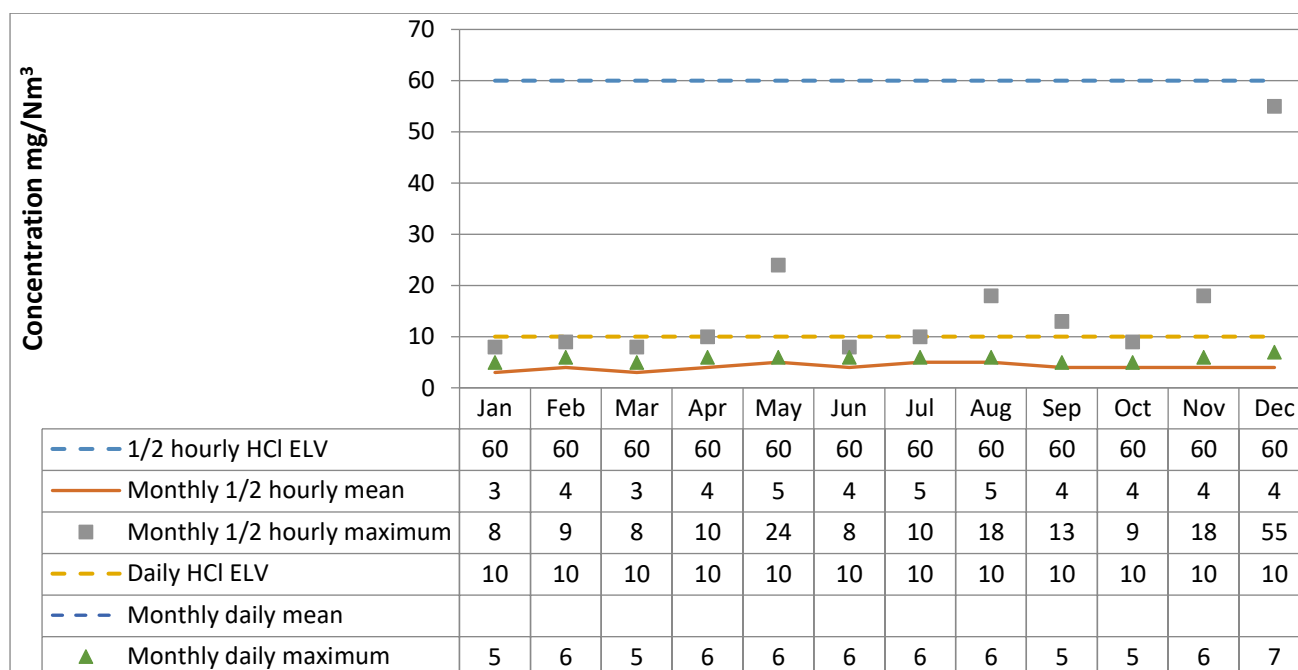
### 4.1 Summary of continuous emissions monitoring results for emissions to air

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

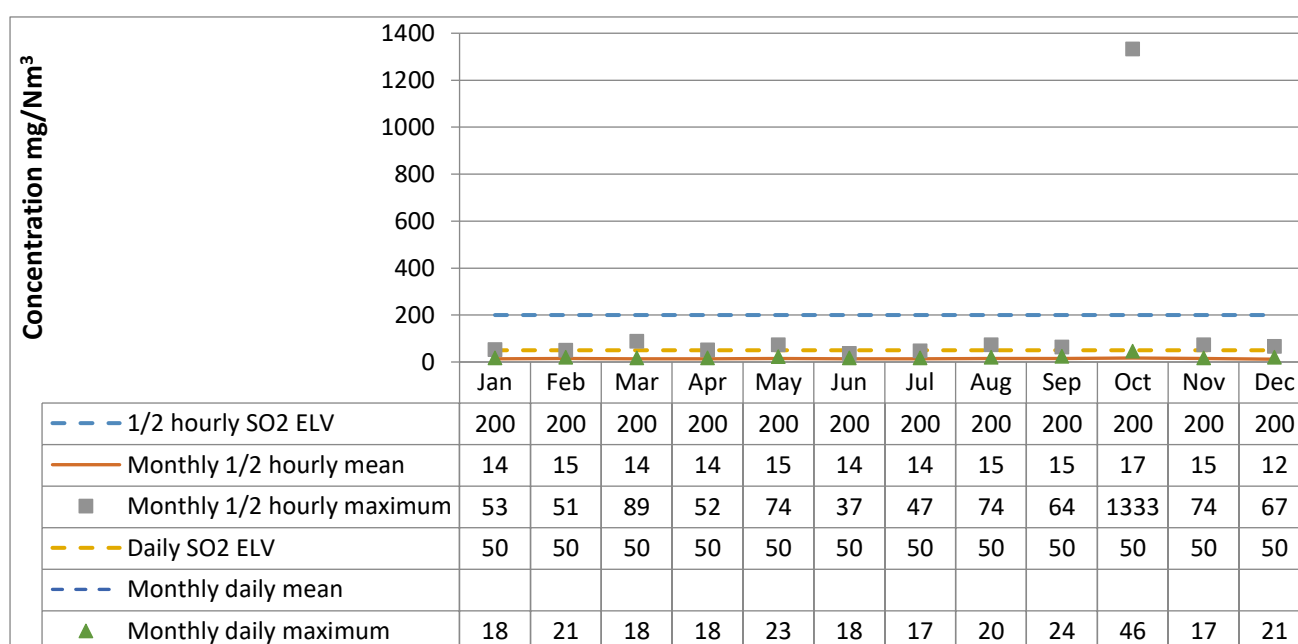


Monthly emissions  
summary incl half-hou

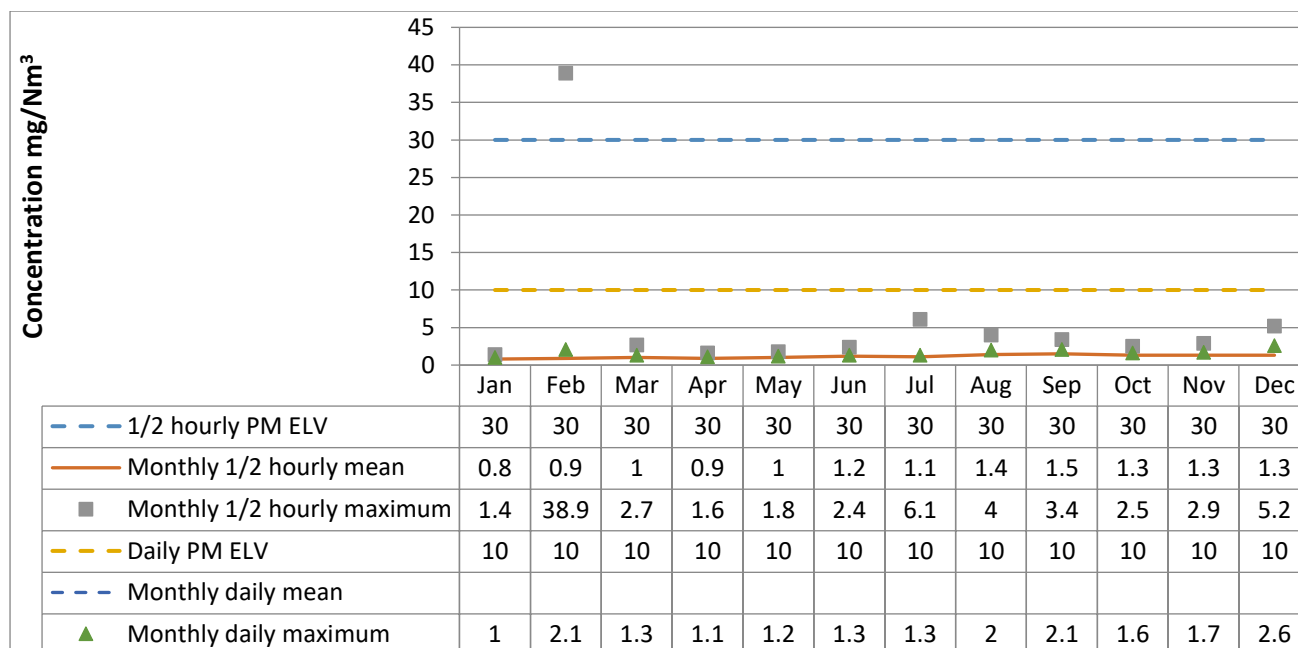
#### Hydrogen chloride



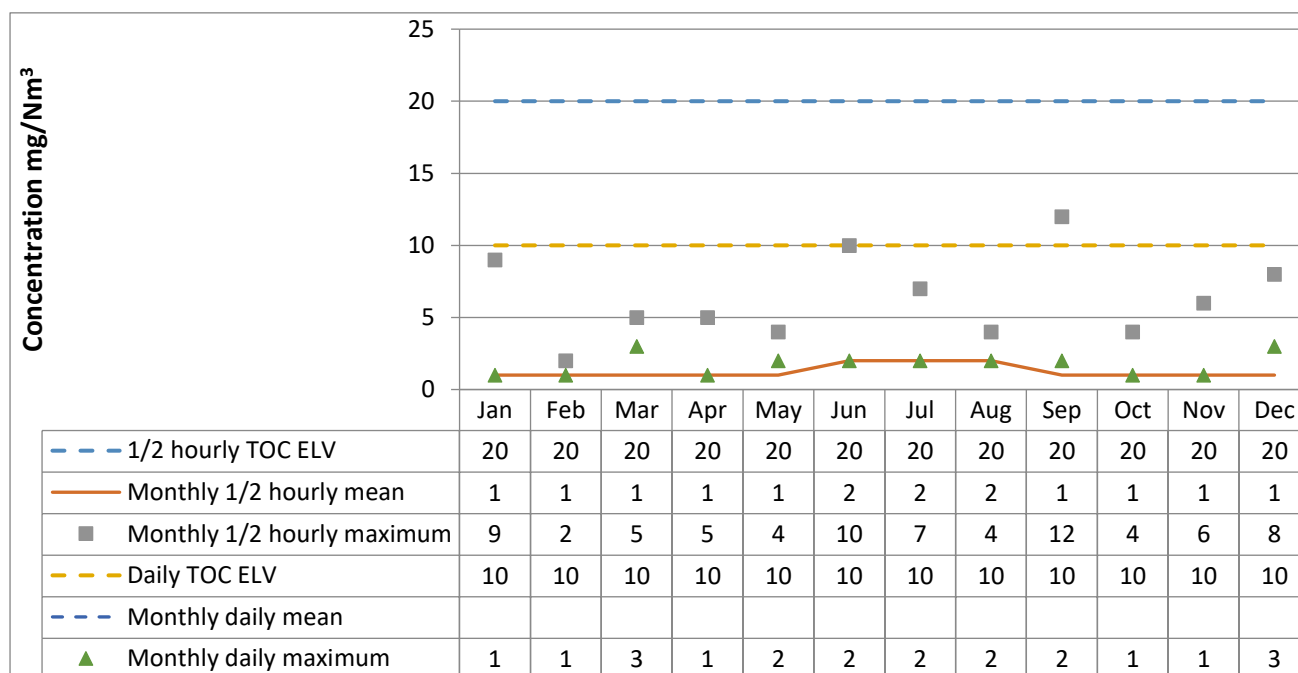
#### Sulphur dioxide



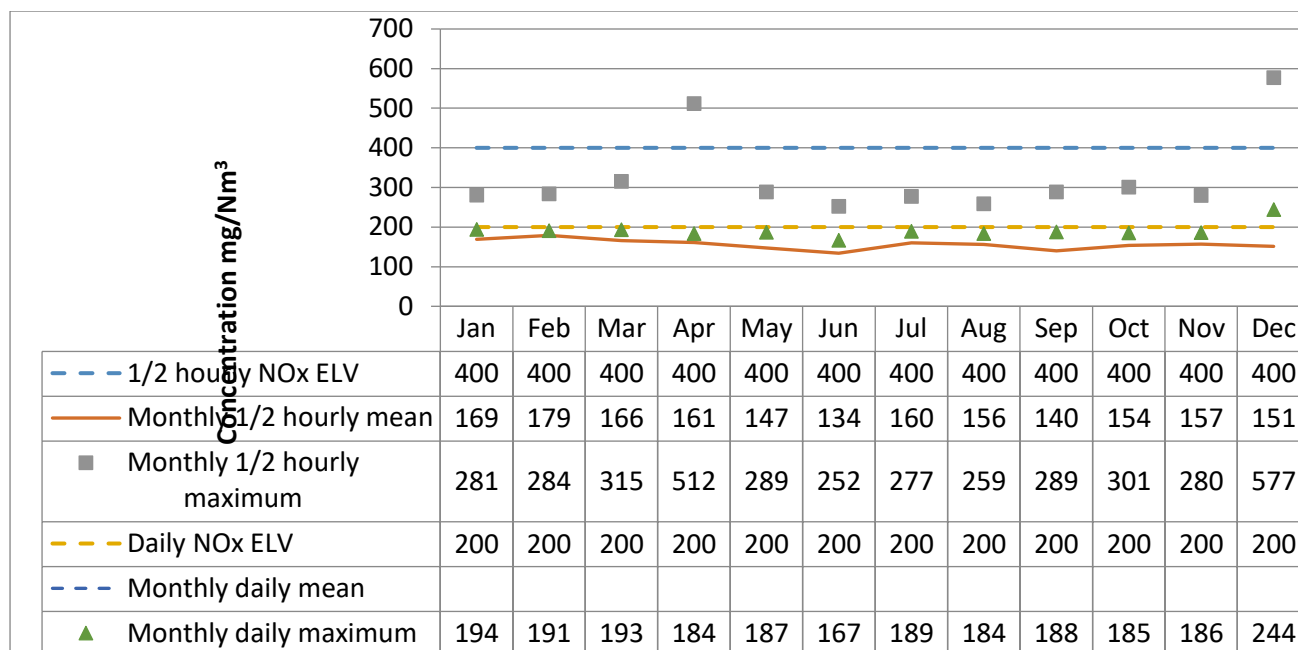
## Particulates



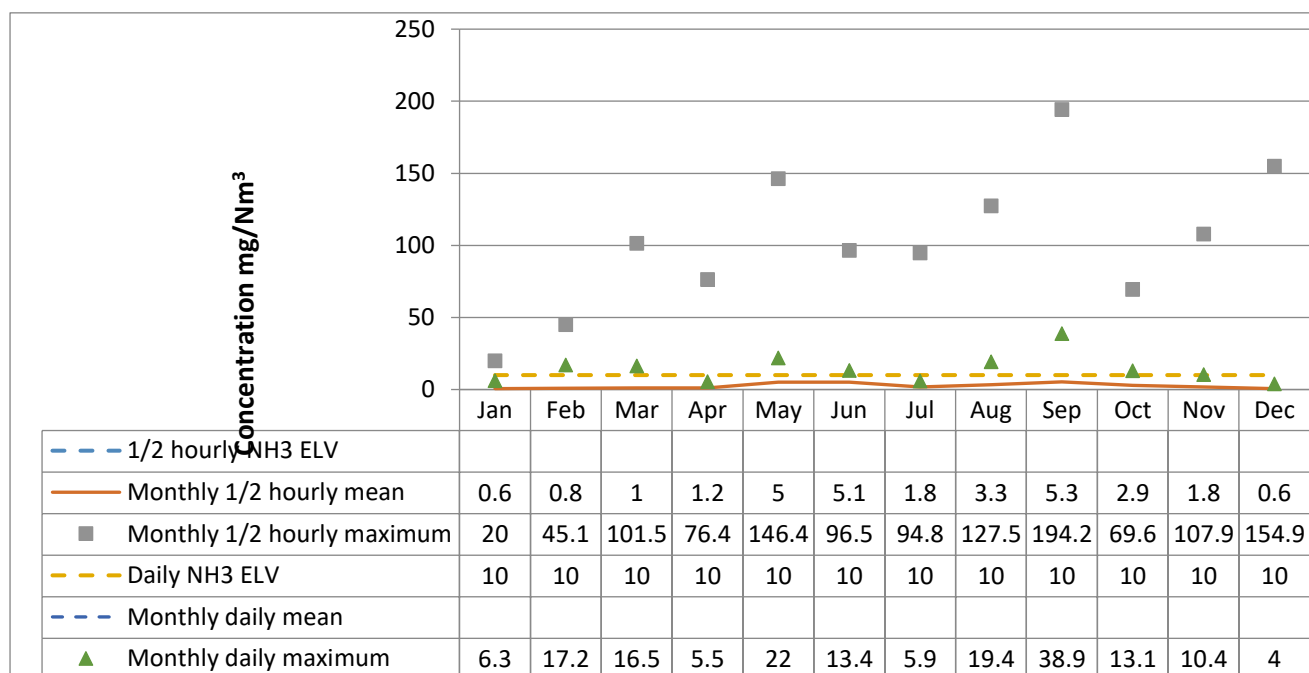
## Total organic carbon



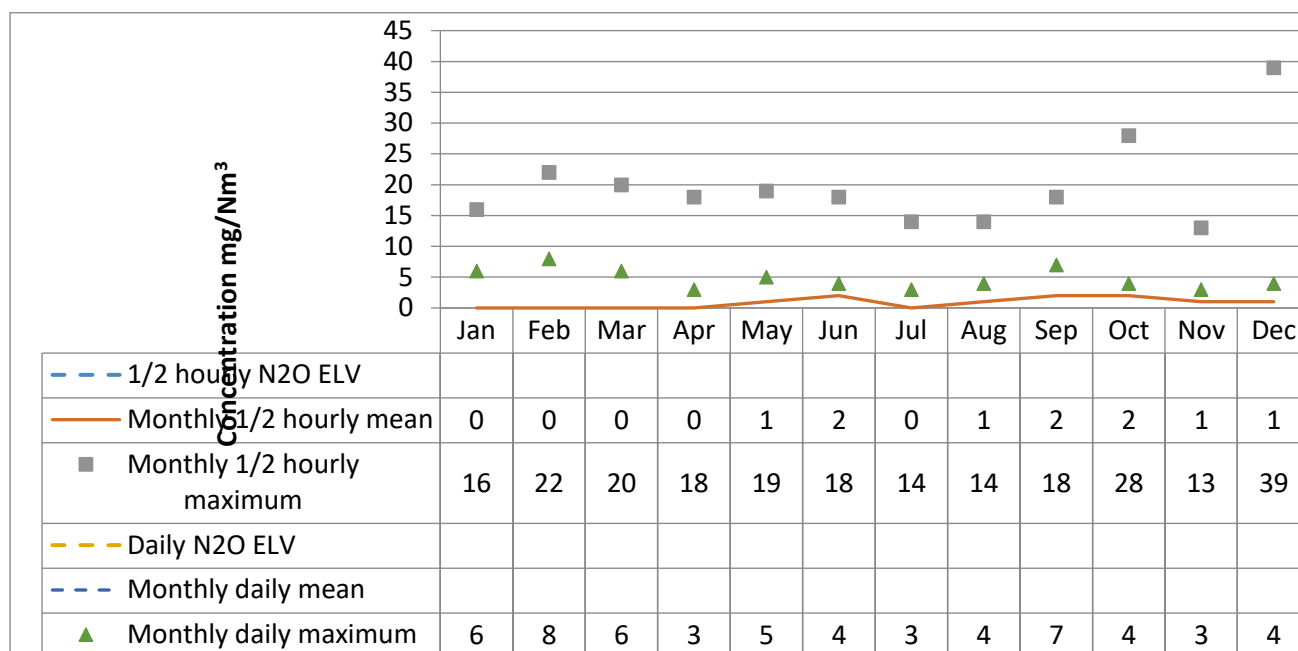
## Oxides of nitrogen



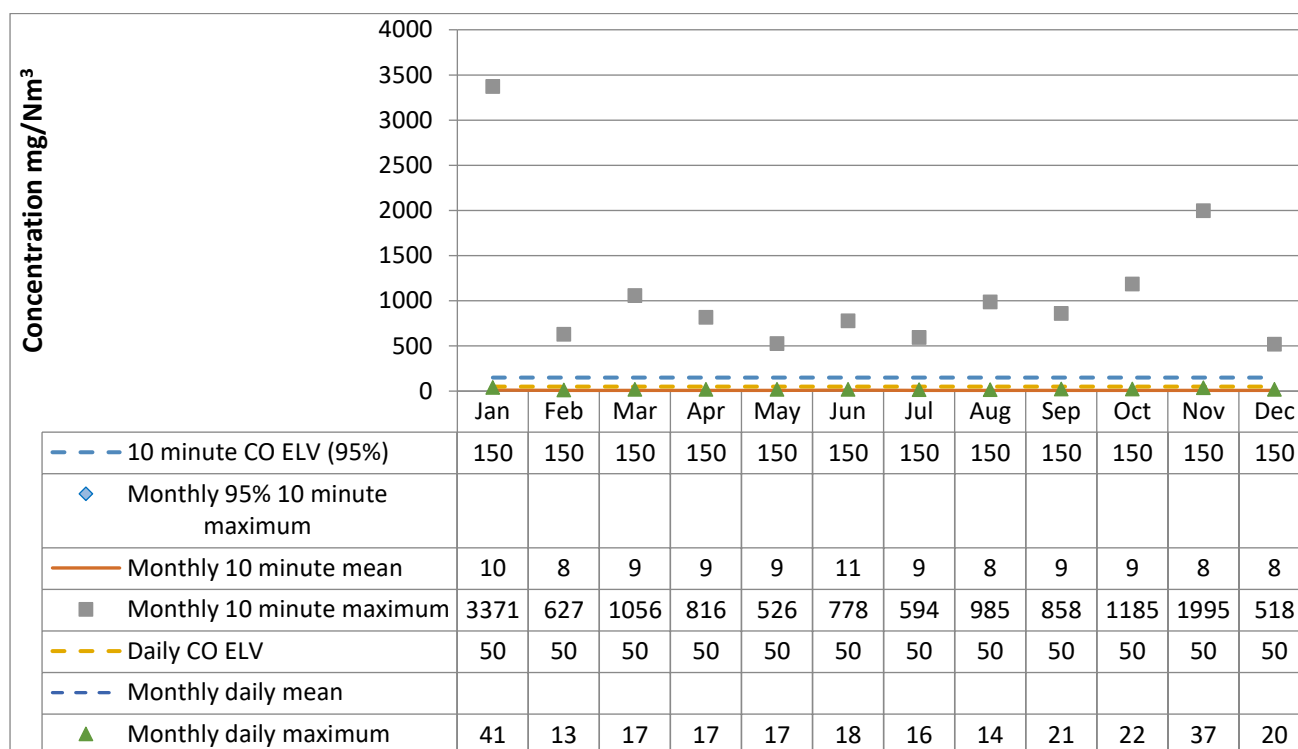
## Ammonia



## N2O



## Carbon monoxide



All emissions complied with the emission limit values in the permit, or notification made as required by the permit. See section 5.2 for details of notifications submitted.

### 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	
		1st Half	2nd half
Mercury and its compounds	0.05 mg/m <sup>3</sup>	0.0015	0.0024
Cadmium & thallium and their compounds (total)	0.05 mg/m <sup>3</sup>	0.0008	0.0007
Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds	0.5 mg/m <sup>3</sup>	0.1819	0.0194
Dioxins and furans (I-TEQ)	0.1 ng/m <sup>3</sup>	0.0011	0.0006
Hydrogen Fluoride	2 mg/m <sup>3</sup>	0.03	0.512

All emissions complied with the emission limit values in the permit.

### 4.3 Summary of monitoring results for emissions to water

There are no emissions to water from the process

### 4.4 Summary of substances not controlled by emission limits

*Condition 3.2.4 of the permit requires carry out monitoring of groundwater at least once every 5 years, and of soil at least once every 10 years, unless such monitoring is based on a systematic appraisal of the risk of contamination.*

Systematic appraisal has been undertaken at the facility, with the following noted:

- All waste arriving at the facility, is contained within sealed UN approved packages, and stored within wheeled carts.
- All surfaces within facility all fully surfaced with appropriate drainage to minimise any potential release.
- The integrity of the infrastructure of the facility is checked and recorded daily to ensure that these entry points to groundwater and soils are avoided.
- Liquids are stored in bunded areas, with drip tray/catch pots at points of use/dispensing.
- The cart/bunds are subject to regular inspection and maintenance to ensure that they are fit for purpose.
- The incineration plant is controlled by an automated PLC (programmable logic controller) system that monitors and controls all aspects of the incineration process. Providing lock-outs where the plant is outside of required operating or emission parameters.
- High level probes / alarms are fitted to lime silo plant equipment to prevent any potential overfilling etc. It should also be noted that this material is also a solid not a liquid.
- In addition to this there are emergency procedures to ensure that where spillages do occur that these are remediated immediately and reported for investigation to identify root cause. Within this period there have been no spillages or releases recorded at the facility.

## 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 * unless otherwise stated	Daily limit
Particulates	>99.99%	>99.99%
Oxides of nitrogen	>99.99%	>99.99%
Sulphur dioxide	>99.99%	>99.99%
Carbon monoxide	>99.99% (CO on 95% ile)	>99.99%
Total organic carbon	>99.99%	>99.99%
Hydrogen chloride	>99.99%	>99.99%

All emissions complied with the emission limit values in the permit, or notification made as required by the permit, See section 5.2 for details of notifications submitted

## 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
18/01/2022	ERV operation	Power disruption. ENC ordered to monitor	
26/01/2022	ERV operation	Power disruption. ENC ordered to monitor	
21/02/2022	Dust exceedance	Pressure fluctuation in primary result in disturbance in bag house	
03/03/2022	ERV Operation	External power cut	
22/04/2022	NOX	Intermittent fault on the oxygen cell.	
15/06/2022	CEMS data didn't transfer	The raw data for all parameters expect dust, and VOC could be retrieved, however VOC is also recorded the FTIR, and data has been checked and demonstrated stability in the emission profile. System update settings have been disabled.	
17/08/2022	ERV Operation	External power cut	
07/10/2022	SO2 Exceedance		
27/10/2022	Abnormal operation (SO2 – 60 minutes)	Blockage in delivery pipework. Cleared and normal operation resumed.	
05/11/2022	ERV Operation	Compressor failed resulting in operation, as the compressed air keeps the ERV shut.	
15/11/2022	ERV operation	Cable supplying the vertical door proxy was damaged which blew the fuse to the safety circuit.	
15/12/2022	Invalid day	Faults in CEMS, identified that the heated line jacket had become detached allowing the gases to crystallise in the exposed pipeline.	
23+24/12/2022	NOX	Investigation being undertaken but oxygen correction goes from 15% to >25% resulting in the exceedances	

## 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

<b>Summary of any permit improvement conditions that have been completed within the year and the resulting environmental benefits.</b>
N/A
<b>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.</b>
N/A
<b>Summary of any other improvements made to the plant or planned to be made and a summary of the resulting environmental benefits.</b>
none