



Annual Performance Report 2023

Permit EPR/BK0825UI

Riverside Resource Recovery Facility

Cory

Year: 2023

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Version Control		
Section	Information	Date

Distribution		
Copy	Name, Role	No.

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.

Plant Description and Design

The Riverside Resource Recovery Energy from Waste facility at Belvedere in the London Borough of Bexley, uses the waste that would otherwise have gone to landfill as feedstock to generate electricity. As one of the largest operations of its kind in the UK, the facility generates c.610,000 MWh of electricity each year from processing up to 850,000 tonnes of waste through its three operating combustion lines. What's more, we use the River Thames as a green highway to move the waste from the city to the facility on our fleet of tugs and barges, removing around 100,000 truck movements a year off our capital's congested roads. By generating electricity from domestic and commercial residual waste, after recycling, we are improving resource efficiency, avoiding London's use on landfill, and achieving greater sustainability as part of London's circular economy.

With the Riverside Resource Recovery facility continuing to be fully operational, the Environment Agency has renewed the facility R1 certification; this means that the facility is classified as a recovery operation.
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Summary of Operational Processes and Procedures

The Riverside Energy from Waste facility is a 24/7 operation which is operated from a continuously manned control room. The control room operator shall ensure that the site's operations are performed to the facility design and to the strict requirements of the environmental permit.

The river operations are a key aspect of the process for Riverside, with over 85% of the waste being brought to the plant on barges along the River Thames. From the jetty, the waste containers are removed from the barges and are transported using dock tractors into the site tipping hall.

In the tipping hall the waste is tipped into one of 12 tipping bays. Each bay has a hydraulically operated door designed to minimise noise and odour during tipping. Lights on each tipping bay indicate to the drivers of the vehicles which bay is available to receive waste. The tipping bays open into a waste bunker 30m deep, 61m long and 16m wide. It can hold up to circa. 10,000 tonnes of waste, enough to fuel the plant at full capacity for five days.

The plant runs three combustion lines. The waste cranes feed each combustion line ensuring that the boilers have the required feedstock for 24 hour operation. The waste travels down the feed chutes and onto a horizontal feeder table where hydraulically operated ram feeders push the waste onto the moving grate. The grate is made up of alternate rows of fixed and moving cast steel bars that are arranged on a slope. The forward movement of these bars tumbles the waste slowly down the burning waste bed.

Primary heated combustion air is drawn from above the waste bunker and fed into the waste bed through orifices in each grate bar. This process dries the waste and provides the correct amount of air to allow good combustion of the waste. Secondary swirling air is introduced above the grate. This ensures that the gases given off by the burning waste are thoroughly mixed, resulting in a fully optimised combustion process and lower levels of toxicity in the gases leaving the combustion chamber. Ammonia is injected into the flue gas to reduce the level of Oxides of Nitrogen.

The resulting sub-product, from processing the waste, is known as Incinerator Bottom Ash (IBA) and this falls from the end of the grate into a quench bath. The IBA is collected in an ash bunker and loaded into containers by cranes and hoppers. Any oversized metal is removed and recycled and the remainder is transported on the river (circa 200,000 tonnes per annum) to our partner plant at Tilbury Docks for processing and recycling into aggregate that is primarily used within the construction industry.

The energy from the flue gases is utilised to convert water into steam via the steam drum. The steam is then further super-heated and drives the turbine/generator, producing electricity which is used to power the facility and exported to the National Grid.

Flue gases leave the boiler and pass through a reactor tower where hydrated lime, powdered activated carbon and water are injected into the swirling gas flow. These neutralise acids and capture heavy metals.

Gases from the reactor tower are then drawn into the fabric filter baghouse. The clean gases pass through the filters and the Air Pollution Control residue (APCr) collects on the outer surface of the bags. The APCr is

collected in silos.

Flue Gas is drawn through the entire process by Induced Draft Fans. The clean hot gas from the Fabric Filter is passed through a heat exchanger that heats feed water to provide an efficient process. Cooled gas is emitted via an 85 metre stack where it is discharged into atmosphere. Continuous Emissions Monitoring (CEMS) equipment continually records emissions to air.

The plant operates within a Health, Safety, Environmental and Quality Integrated Management System which is compliant with ISO 45001, ISO 14001 and ISO 9001 and is independently audited.

Operational Data

Plant Size	850,000 tonnes pa	270 MWth	85
No. of combustion lines	3	No. of Turbines:	1

Waste types received	Unit	Q1	Q2	Q3	Q4	Year Total
Household / Local Authority	tonnes	103,290	109,298	103,078	109,268	424,934
Commercial & Industrial		111,242	81,312	95,397	89,792	377,743
Hazardous		-	-	-	-	-
Clinical		-	-	-	-	-
Waste wood (biomass)		-	-	-	-	-
Refuse Derived Fuel * - H'hold/LA		-	-	-	-	-
Refuse Derived Fuel * - C&I		-	-	-	-	-
Other [Please specify]		-	-	-	-	-
Other [Please specify]		-	-	-	-	-
Other [Please specify]		-	-	-	-	-
Total waste received			214,532	190,610	198,475	199,060
Rejected Waste			8	3		11
Unprocessed waste transferred out			2,904	4,762	3,067	10,734
Total waste combusted **		214,449	177,474	193,225	205,091	790,239

Energy Usage / Export	Unit	Q1	Q2	Q3	Q4	Year Total
Power Generated	MWh	171,268	67,058	141,764	152,889	532,978
Power Exported		154,563	59,824	126,029	135,945	476,361
Power Used on site		16,704	7,234	15,735	16,944	56,617
Power Imported		27	6,427	113	170	6,737
Parasitic Load	%	9.8%	18.6%	11.2%	11.2%	11.7%
Thermal Energy Produced ***	MWh					-
Thermal Energy Exported ***						-
R1 value (if applicable)	R1	0.81	0.55	0.61	0.65	0.65

Waste Disposal & Recovery	Unit	Q1	Q2	Q3	Q4	Year Total
APC Residues - produced	tonnes	5,262	3,997	4,586	5,017	18,862
IBA - produced		45,998	38,924	41,662	41,548	168,132
Metals recycling		182	244	233	241	900
Other		-	-	-	-	-
Other		-	-	-	-	-
Other		-	-	-	-	-

Raw Material Usage	Unit	Q1	Q2	Q3	Q4	Year Total
Mains Water	ltrs	33,700,000	43,180,000	39,260,000	32,810,000	148,950,000
Other Water	ltrs					-
Ammonia	ltrs	115,623	121,432	191,377	159,117	587,549
Activated Carbon	kgs	124,380	107,900	119,800	118,580	470,660
Hydrated lime	kgs	2,256,900	1,639,720	1,920,280	1,860,320	7,677,220
Fuel oil	ltrs	189,733	792,818	365,166	428,936	1,776,652
Gas	cuf					-
Other						-

Summary

	Line/Unit	Q1	Q2	Q3	Q4	Year Total
Availability of waste combustion by line, hrs ****	1	2,061	1,572	2,141	2,089	7,862
	2	2,143	1,875	2,116	1,712	7,845
	3	2,154	1,923	1,605	2,174	7,856
Overall Availability, mean avg. of all lines, hrs		2,119	1,790	1,954	1,992	7,854
Hours of turbine operations, hrs	1	2,155	901	2,187	2,174	7,417
Hours of heat / steam export						-
Net Calorific Value of waste	MJ/kg	9.52	9.33	9.69	9.30	9.46
Abnormal Events	qty.					-
Abnormal operation	hours	-	-	-	-	-
Permit Breaches	qty.	1		2		3

MWe

%
52.9%
47.1%
-
-
-
-
-
-
-
0.0%
1.3%

KWh/te
674
603
72
9
-
-

% inputs
2.4%
21.3%
0.1%
-
-
-

kg or Ltr /te
188.49
-
0.74
0.60
9.72
2.25

89.7%
89.6%
89.7%
89.7%
84.7%
n/a
no
0.0%
yes

Summary of Plant Operations and Maintenance during the reporting year**Planned Plant Shutdowns:**

During 2023, each of the three boilers have undergone major inspections together with a common plant outage which was undertaken in April/May of 2023. The major inspection scope of works included Grate Maintenance and rectification of defects, refractory refurbishment, Boiler cleaning and Fabric filter maintenance. The driver for the common outage is to perform the required inspections under the Pressure Systems Safety Regulations 2000 (PSSR) all items registered on the written scheme were inspected, tested, and witnessed by our competent body. 2023 improvements as follows:

The Boiler improvement project continued, now being in the 3rd year of the 4-year project to replace refractory tiles with Alloy 625 weld overlay. The modification provides benefits in condition monitoring as well as reducing the temperature of the flue gas around the superheater stages, thus reducing corrosion in the long term. Three quarters of each lines furnace have now been completed. Line 1 Fabric bags were fully changed out as part of the maintenance strategy for the Bag House.

In April, planned minor turbine inspection identified damage that required an extension to the program for the machine to be repaired. The extension was 49 days.

Summary of Residue Handling for the reporting year

100% of the Incinerator Bottom Ash was transported via the River Thames to Blue Phoenix Ltd at their premises at Tilbury Docks.

The Air Pollution Control residue (APCr) was sent to two main destinations throughout 2023:

- 1) OCO Ltd in Suffolk where it was treated by Accelerated Carbonation Technology (ACT) to produce a stabilised product that is used as a component of breeze blocks.
- 2) Augean at the East Northants Resource Management Facility (ENRMF) is based at Kings Cliffe near Peterborough which operates and is monitored under strict EPR permits to ensure full compliance with all current legislation.

Metal recovered at site was sent to Goldstar Metal Trading in Cambridgeshire.

2023 Annual Reporting Performance Form 1

Permit EPR/BK0825UI

Operator: Cory

Facility: Riverside Resource Recovery Facility

Form: Performance 1

Reporting Period from:

01 January 2023

to:

31 December 2023

2023 Annual Reporting of Waste Disposal and Recovery

Waste Description	Disposal Route(s)	Disposal Tonnes	Recovery Tonnes	% / tonne of waste incinerated
1) Hazardous Wastes				
APC Residues	R05, D05	10,790.1	7,758.6	2.3%
IBA				-
				-
				-
Total Hazardous Waste		10,790.1	7,758.6	2.3%
2) Non-Hazardous Wastes				
IBA	R04		167,631.8	21.2%
Ferrous Metal				-
Process Water				-
				-
				-
Total Non-Hazardous Waste		0.0	167,631.8	21.2%
TOTAL WASTE		10,790.1	175,390.4	23.6%

Operator's comments :

2023 Annual Reporting of Water and Other Raw Material Usage

Raw Material	Usage	Unit	Specific Usage	Unit
Mains Water	148950000	m ³	188.49	m ³ /te
Total Water	148950000	m ³	188.49	m ³ /te
Urea / Ammonia	587548.64	kg	0.74	kg/te
Activated Carbon	470660	kg	0.60	kg/te
Lime / hydrated lime / Sodium Bicarb.	7677220	kg	9.72	kg/te

Operator's comments :

2023 Annual Reporting of other performance indicators

Parameter	Results by Line					Turbine 1	Turbine 2
	A1	A2	A3	A4	A5		
Operating hours for the year, hours	7862	7845	7855.5				
Number of periods of abnormal operation, qty.	0	0	0				
Cumulative hours of abnormal operation for this year, hours	0	0	0				

Operator's comments :

Signed: _____

Date: _____

2023 Annual Reporting of Energy Usage/Export

Permit EPR/BK0825UI

Operator: Cory

Facility: Riverside Resource Recovery Facility

Form: Energy 1

Reporting Period from: 01 January 2023

to: 31 December 2023

Energy Source	Energy Usage	Unit	Specific Usage (KWh/tonne incinerated)
Electricity Produced	532,978	MWh	674
Electricity Imported	6736.74	MWh	9
Electricity Exported	476,361	MWh	603
Gas Oil		tonnes	
Steam/hot water exported	0	GWh	-

Operator's comments :

Signed: _____

Date: _____

Summary of Permit Compliance

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 ^{Note 1}	
	Half-hourly limit	Daily limit
Particulates		
Oxides of nitrogen	100%	100%
Sulphur dioxide	100%	100%
Carbon monoxide	xxx% 95% of 10-min averages	100%
Total organic carbon	99.99	100%
Hydrogen chloride	100%	100%
Hydrogen fluoride	100%	100%

Summary of any notifications or non-compliances under the permit

Date	Summary of notification or non-compliance [including Line/Reference] ^{Note 2}	Reason	Measures prev reoccu
24th August 2023	Line 3 TOC half-hourly exceedance - 23.6mg/Nm3 (limit 20mg/Nm3)	Exceedance result of over-pressurisation event in the furnace due to volatile fraction of waste stream	Continue to waste to er: volatile frac
7th September 2023	Line 2 Carbon monoxide - 8 x 10min exceedances in 24hour period (limit 7.2 in 24 hours)	Exceedance result of multiple over-pressurisations events in the furnace due to volatile fractions of waste stream	Continue to waste to er: volatile frac

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

Date	Summary of complaint [including Line/Reference]	Reason *	Measures prev reoccu
27th March 2023	Black plume seen from stack	On investigation, no failure of abatement. Most probable cause was a reverse flow event through flue gas recirculation ducting.	Flue gas re damper val three opera to be inspe replaced as planned shi works at fir available of

*** including whether substantiated
operator or the EA**

ility

taken to ent rence
audit adicate tions.
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circulation ve, on all ting lines, cted and ; part of utdown st portunity.

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Summary of Plant Improvements

Summary of any efficiency improvements that have been completed within the year.

Summary of any permit improvement conditions that have been completed within the year and the resulting environmental benefits.

DeNox Trial performed in August to investigate plant capabilities of running at lower NOx set-point without adverse operational and environmental effects. Plant now operating at lower NOx set-point of 150mg/m3. Trial is to be repeated in 2024 following completion of boiler enhancement project with the potential to reduce NOx set-point further.

Fugitive Release and Pest Management Plan submitted in July 2023. This Plan details how the site shall manage any odour, noise, vibration, fugitive emissions and pest issues if they occur in the future to mitigate and minimise any impact of the event.

Dioxin & Mercury monitoring improvement condition was completed which demonstrated that dioxin and mercury emissions to air are consistently low and stable.

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.

Summary of any other improvements made to the plant or planned to be made and a summary of the resulting environmental benefits.

Details of Public & Stakeholder Liasion

Summary of events held during the reporting year.	
Date	Description
Feb-23	SchoolWork Experience event. Bexley Apprenticeship Event.
01/03/2023	Reading University Environmental Management Students - Presentation & Site Tour
24/07/23 - 28/07/23	School/College Work Experience event.
14/06/2023	Holy Trinity Primary School Eco club - site tour

List of events planned for next year	
Date	Description
27/02/2024	Reading University Environmental Management Students - Presentation & Site Tour

If you wish to be involved in the public liasion programme, please contact _____

Carbon dioxide emissions and biogenic content of waste inputs

Carbon dioxide emissions (all types of plant)

Annual mass of carbon dioxide released	tonnes	854,678
Annual mass of carbon dioxide released per tonne of waste burned	t CO ₂ / t waste	1.08
Annual mass of carbon dioxide released per MWh of energy exported	t CO ₂ / MWh export	1.79
Description of how annual carbon dioxide mass emission has been calculated. See Note 1	CO ₂ measured as part of continuous emissions monitoring system (CEMS).	

Nitrous oxide emissions (only plants which use ammonia or urea to abate NOx emissions)

Annual mass emissions of nitrous oxide	tonnes N ₂ O	0.908
Description of how annual nitrous oxide mass emission has been calculated See Note 2	N ₂ O measured as part of continuous emissions monitoring system (CEMS).	
Total annual carbon dioxide and nitrous oxide emissions. Note 3.	tonnes CO ₂ e	271

Biogenic CO₂ emissions (See Note 4)

Percentage of total carbon dioxide emissions arising from biogenic waste	%	49.8%
No. of measurements undertaken	Number	1
Description of how percentage biogenic carbon dioxide emissions have been measured or calculated. See Note 5	Qualifying percentage determined through representative waste sampling analysis	

Biogenic fraction of waste feedstock (See Note 4)

Yearly average biogenic percentage of the waste by net calorific value (NCV)	%	49.8%
If sampling undertaken, no. of samples used to ascertain average biogenic % above	Number	1

Description of how biogenic percentage (by NCV) has been calculated or estimated. See Note 6	Data from waste sampling
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Comments:

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Residue Quality Monitoring Requirements

Summary of monitoring undertaken and compliance
In 2023, the Incinerator Bottom of Ash was tested quarterly for Total Organic Carbon (TOC), Heavy Metals suite, Dioxins/Furans and Dioxin-like PCBs in line with the site permit requirements.
In 2023, The Air Pollution Control residue (APCr) was tested for Heavy Metals suite, Dioxins/Furans and Dioxin-like PCBs in line with the site permit requirements.
In 2023, the facility continued to adopt the the ESA Sampling & Testing Protocol to Assess the Status of Incinerator Bottom Ash, for the hazard assessment of IBA. The IBA remained classified as non-hazardous throughout 2023.

Commentary on any specific events	
Date & Event	Description

Residue Quality Monitoring Results			
Parameter (unit)	Limit	Normal Operation	
		Bottom ash	APC Residues
Total Organic Carbon (average %)	<3%	1.49%	
No. of Assessments Undertaken	---	4	4
No. of Hazardous Results	---	0	

Comments :

Emissions to Water

Summary of monitoring undertaken and compliance
Monthly visual assessment for visible oil or grease at three emission points for uncontaminated roof and surface water. No visible signs of oil or grease seen throughout 2023.

Commentary on any specific events	
Date & Event	Description

Emissions to Water / Sewer					
Parameter	Monitoring Frequency	Limit	Target	Max.	Average

Emissions to Air (periodically monitored)**Summary of monitoring undertaken, standards used and compliance****Results of emissions to air that are periodically monitored - oxygen reference 6%**

Substance	Ref. Period	Emission Limit Value*	Average		
			A1	A2	A3
Hydrogen fluoride	1 hr	2 mg/m ³	0.129	0.137	0.102
Cd and Th and their compounds	0.5-8hrs	0.05 mg/m ³	0.0008	0.002	0.0038
Hg and its compounds	0.5-8hrs	0.05 mg/m ³	0.0005	0.0004	0.0004
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V and their compounds	0.5-8hrs	0.5 mg/m ³	0.0184	0.0172	0.0208
Dioxins & Furans (I-TEQ)	6-8hrs	0.1 ng/m ³	0.0042	0.002	0.0053
PCBs (WHO-TEQ Humans / Mammals)	6-8hrs	None set ng/m ³	0.0008	0.0002	0.0005
PCBs (WHO-TEQ Fish)	6-8hrs	None set ng/m ³	0.00004	0.00001	0.00002
PCBs (WHO-TEQ Birds)	6-8hrs	None set ng/m ³	0.0018	0.0005	0.0008
Dioxins & Furans (WHO-TEQ Humans / Mammals)	6-8hrs	None set ng/m ³	0.0041	0.0019	0.0052
Dioxins & Furans (WHO-TEQ Fish)	6-8hrs	None set ng/m ³	0.0071	0.0019	0.0054
Dioxins & Furans (WHO-TEQ Birds)	6-8hrs	None set ng/m ³	0.0074	0.0036	0.0075
Anthanthrene	6-8hrs	None set µg/m ³	0.0011	0.0011	0.0011
Benzo(a)anthracene	6-8hrs	None set µg/m ³	0.0011	0.0011	0.0011
Benzo(a)pyrene	6-8hrs	None set µg/m ³	0.0011	0.0011	0.0011
Benzo(b)fluoranthene	6-8hrs	None set µg/m ³	0.0011	0.0011	0.0011
Benzo(b)naphtho(2,1-d)thiophene	6-8hrs	None set µg/m ³	0.0011	0.0011	0.0011
Benzo(c)phenanthrene	6-8hrs	None set µg/m ³	0.0011	0.0011	0.0011
Benzo(ghi)perylene	6-8hrs	None set µg/m ³	0.0011	0.0011	0.0011
Benzo(k)fluoranthene	6-8hrs	None set µg/m ³	0.0011	0.0011	0.0011
Cholanthrene	6-8hrs	None set µg/m ³	0.0011	0.0011	0.0011
Chrysene	6-8hrs	None set µg/m ³	0.0011	0.0011	0.0011
Cyclopenta(cd)pyrene	6-8hrs	None set µg/m ³	0.0011	0.0011	0.0011
Dibenzo(ai)pyrene	6-8hrs	None set µg/m ³	0.0011	0.0011	0.0011
Dibenzo(ah)anthracene	6-8hrs	None set µg/m ³	0.0011	0.0011	0.0011
Fluoranthene	6-8hrs	None set µg/m ³	0.0011	0.0011	0.0011
Indeno(123-cd) pyrene	6-8hrs	None set µg/m ³	0.0011	0.0011	0.0011
Naphthalene	6-8hrs	None set µg/m ³	0.0011	0.0011	0.0011

Comments :



Emissions to Air (continuously monitored)

Summary of monitoring undertaken, standards used and compliance
All substances listed below are continuously monitored in line with the requirements of the Environmental permit. Oxides of Nitrogen (ISO 10849), Particulate Matter (BS EN 13284-2), Total Organic Carbon (BS EN 12619), Hydrogen Chloride, Sulphur Dioxide (BS 6069-4.4)

Results of emissions to air that are continuously monitored (maximum and average values for each line) - oxygen reference 11%												
Substance	Reference Period	Emission Limit Value**	A1		A2		A3		A4		A5	
			Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.
Oxides of nitrogen	Daily mean	180 mg/m ³	169.7	165.6	169.2	158.8	169.5	158.4				
	½ hourly mean	400 mg/m ³	169.7	165.4	169.2	158.2	169.4	158				
Particulates	Daily mean	5 mg/m ³										
	½ hourly mean	30 mg/m ³										
Total Organic Carbon	Daily mean	10 mg/m ³	0.3	0.2	1	0.9	0.4	0.3				
	½ hourly mean	20 mg/m ³	0.4	0.2	1	0.9	0.4	0.3				
Hydrogen chloride	Daily mean	8 mg/m ³	4	2.5	4.5	1.9	4.3	2.5				
	½ hourly mean	60 mg/m ³	4	2.6	4.5	1.9	4.4	2.6				
Sulphur dioxide	Daily mean	40 mg/m ³	2.2	0.7	7.4	2.3	8.6	2.7				
	½ hourly mean	200 mg/m ³	2.3	0.7	7.4	2.5	8.6	2.9				
Carbon monoxide	Daily mean	50 mg/m ³	17.8	14	17.7	14.7	17.7	14.7				
	95%ile 10-min avg *	150 mg/m ³	17.5	14.2	17.7	14.8	17.8	15.1				
Ammonia	Daily mean	15 mg/m ³	3.4	1.2	1.6	1	1.9	1.1				
Comments :												
Following EA guidance and approval in July 2015, RRRL now monitor particulate emissions qualitatively as opposed to quantitatively. The particulate data is now												

reported in mA (milliamps) and the reporting range of the instrument is 4mA to 20mA.

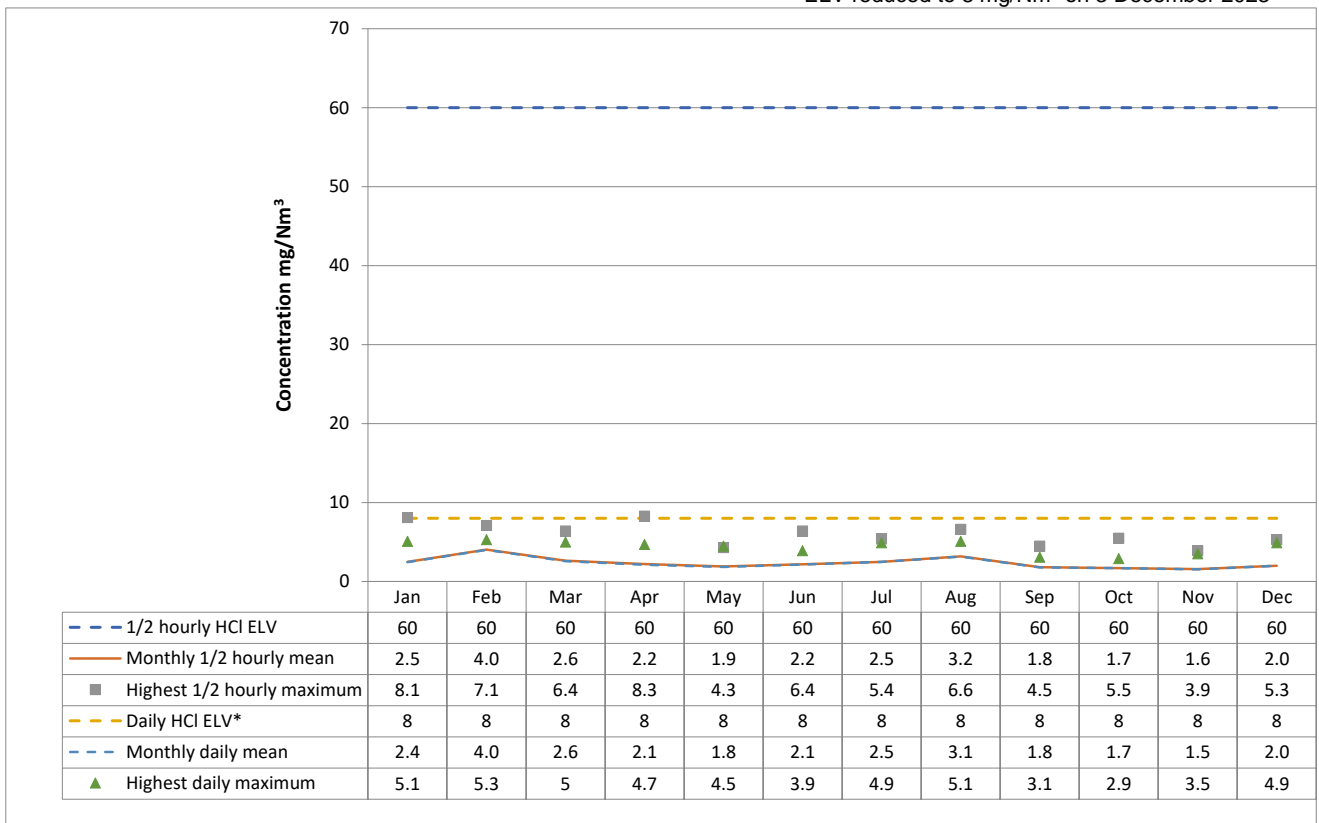
Monitoring of Hydrogen Chloride emissions

Whole Installation

See Notes in Cell Q3

mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
	1/2 hourly HCl ELV	Monthly 1/2 hourly mean	Highest 1/2 hourly maximum	Daily HCl ELV*	Monthly daily mean	Highest daily maximum
2023						
Jan	60	2.5	8.1	8	2.4	5.1
Feb	60	4.0	7.1	8	4.0	5.3
Mar	60	2.6	6.4	8	2.6	5
Apr	60	2.2	8.3	8	2.1	4.7
May	60	1.9	4.3	8	1.8	4.5
Jun	60	2.2	6.4	8	2.1	3.9
Jul	60	2.5	5.4	8	2.5	4.9
Aug	60	3.2	6.6	8	3.1	5.1
Sep	60	1.8	4.5	8	1.8	3.1
Oct	60	1.7	5.5	8	1.7	2.9
Nov	60	1.6	3.9	8	1.5	3.5
Dec	60	2.0	5.3	8	2.0	4.9

* ELV reduced to 8 mg/Nm³ on 3 December 2023



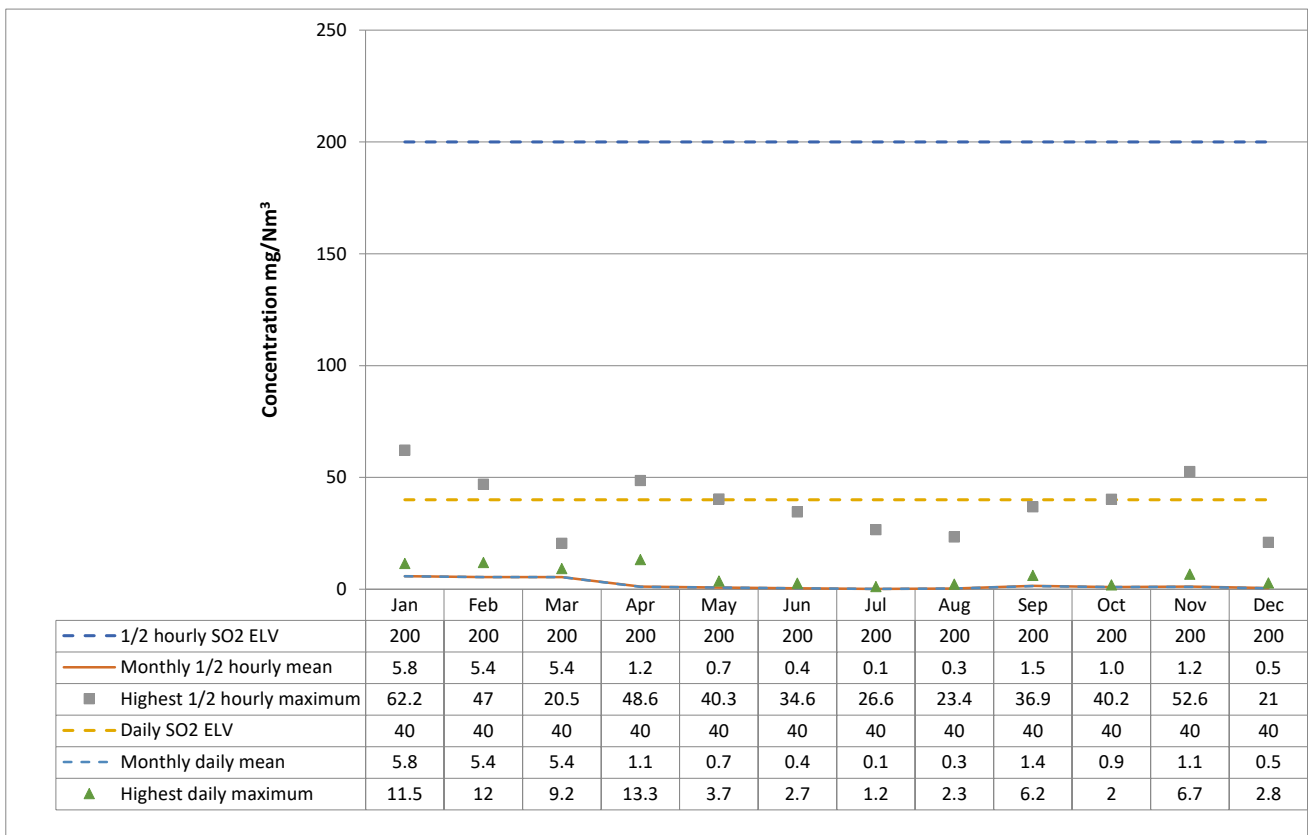
Comments :

Monitoring of Sulphur dioxide emissions

Whole Installation

See Notes in Cell Q3

2023	1/2 Hourly Reference Periods			Daily Reference Periods		
	1/2 hourly SO2 ELV	Monthly 1/2 hourly mean	Highest 1/2 hourly maximum	Daily SO2 ELV	Monthly daily mean	Highest daily maximum
Jan	200	5.8	62.2	40	5.8	11.5
Feb	200	5.4	47	40	5.4	12
Mar	200	5.4	20.5	40	5.4	9.2
Apr	200	1.2	48.6	40	1.1	13.3
May	200	0.7	40.3	40	0.7	3.7
Jun	200	0.4	34.6	40	0.4	2.7
Jul	200	0.1	26.6	40	0.1	1.2
Aug	200	0.3	23.4	40	0.3	2.3
Sep	200	1.5	36.9	40	1.4	6.2
Oct	200	1.0	40.2	40	0.9	2
Nov	200	1.2	52.6	40	1.1	6.7
Dec	200	0.5	21	40	0.5	2.8



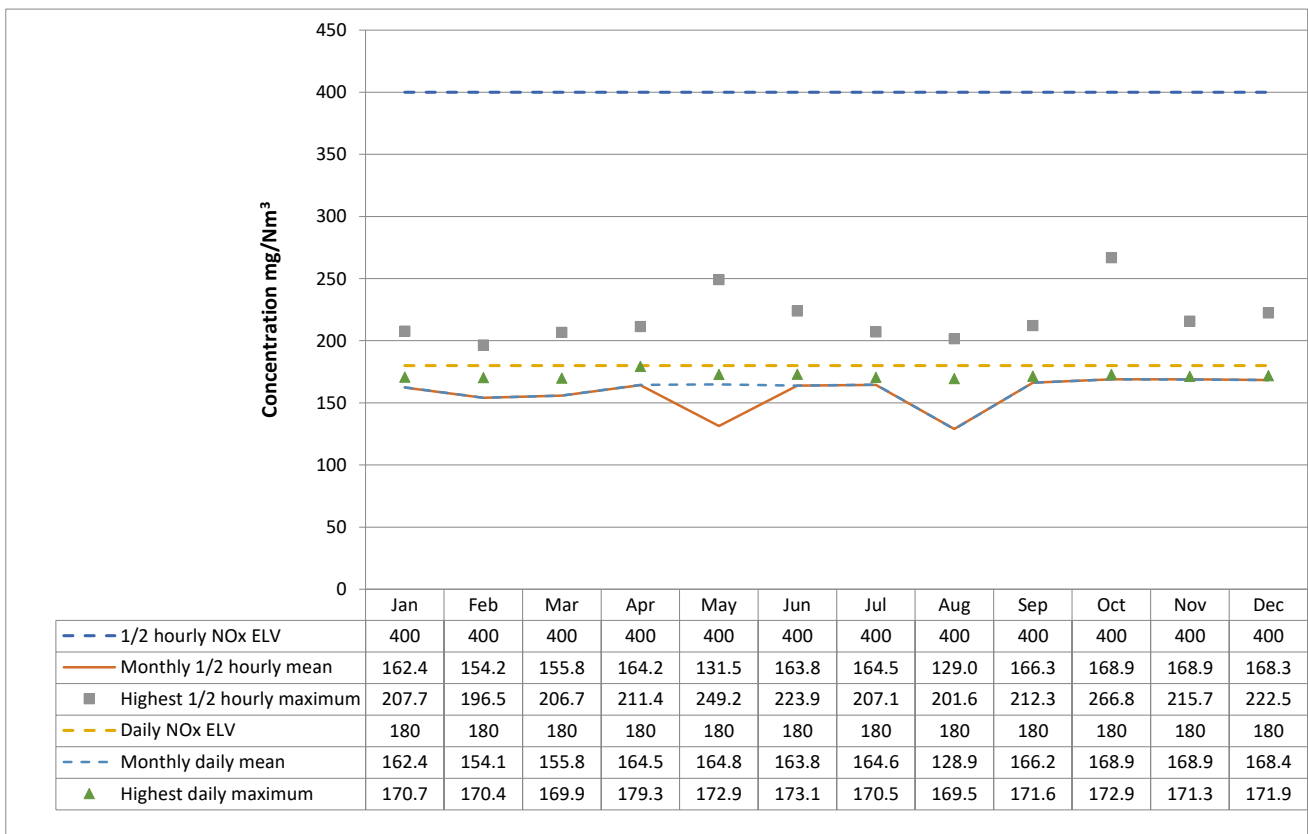
Comments :

Monitoring of Oxides of Nitrogen emissions

Whole Installation

See Notes in Cell Q3

2023	1/2 Hourly Reference Periods			Daily Reference Periods		
	1/2 hourly NOx ELV	Monthly 1/2 hourly mean	Highest 1/2 hourly maximum	Daily NOx ELV	Monthly daily mean	Highest daily maximum
Jan	400	162.4	207.7	180	162.4	170.7
Feb	400	154.2	196.5	180	154.1	170.4
Mar	400	155.8	206.7	180	155.8	169.9
Apr	400	164.2	211.4	180	164.5	179.3
May	400	131.5	249.2	180	164.8	172.9
Jun	400	163.8	223.9	180	163.8	173.1
Jul	400	164.5	207.1	180	164.6	170.5
Aug	400	129.0	201.6	180	128.9	169.5
Sep	400	166.3	212.3	180	166.2	171.6
Oct	400	168.9	266.8	180	168.9	172.9
Nov	400	168.9	215.7	180	168.9	171.3
Dec	400	168.3	222.5	180	168.4	171.9

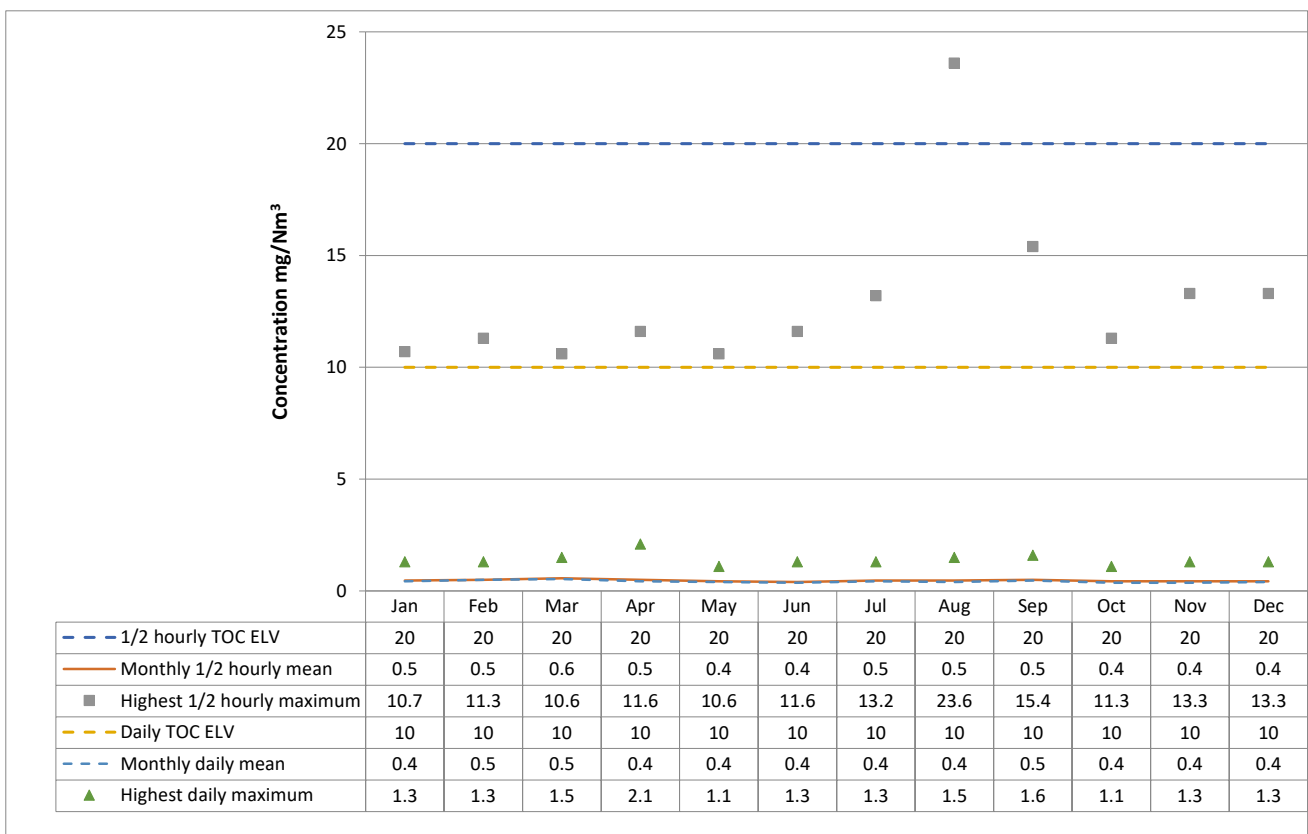


Comments :

Monitoring of Total organic carbon emissions Whole Installation

See Notes in Cell Q3

mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
	1/2 hourly TOC ELV	Monthly 1/2 hourly mean	Highest 1/2 hourly maximum	Daily TOC ELV	Monthly daily mean	Highest daily maximum
2023						
Jan	20	0.5	10.7	10	0.4	1.3
Feb	20	0.5	11.3	10	0.5	1.3
Mar	20	0.6	10.6	10	0.5	1.5
Apr	20	0.5	11.6	10	0.4	2.1
May	20	0.4	10.6	10	0.4	1.1
Jun	20	0.4	11.6	10	0.4	1.3
Jul	20	0.5	13.2	10	0.4	1.3
Aug	20	0.5	23.6	10	0.4	1.5
Sep	20	0.5	15.4	10	0.5	1.6
Oct	20	0.4	11.3	10	0.4	1.1
Nov	20	0.4	13.3	10	0.4	1.3
Dec	20	0.4	13.3	10	0.4	1.3



Comments :

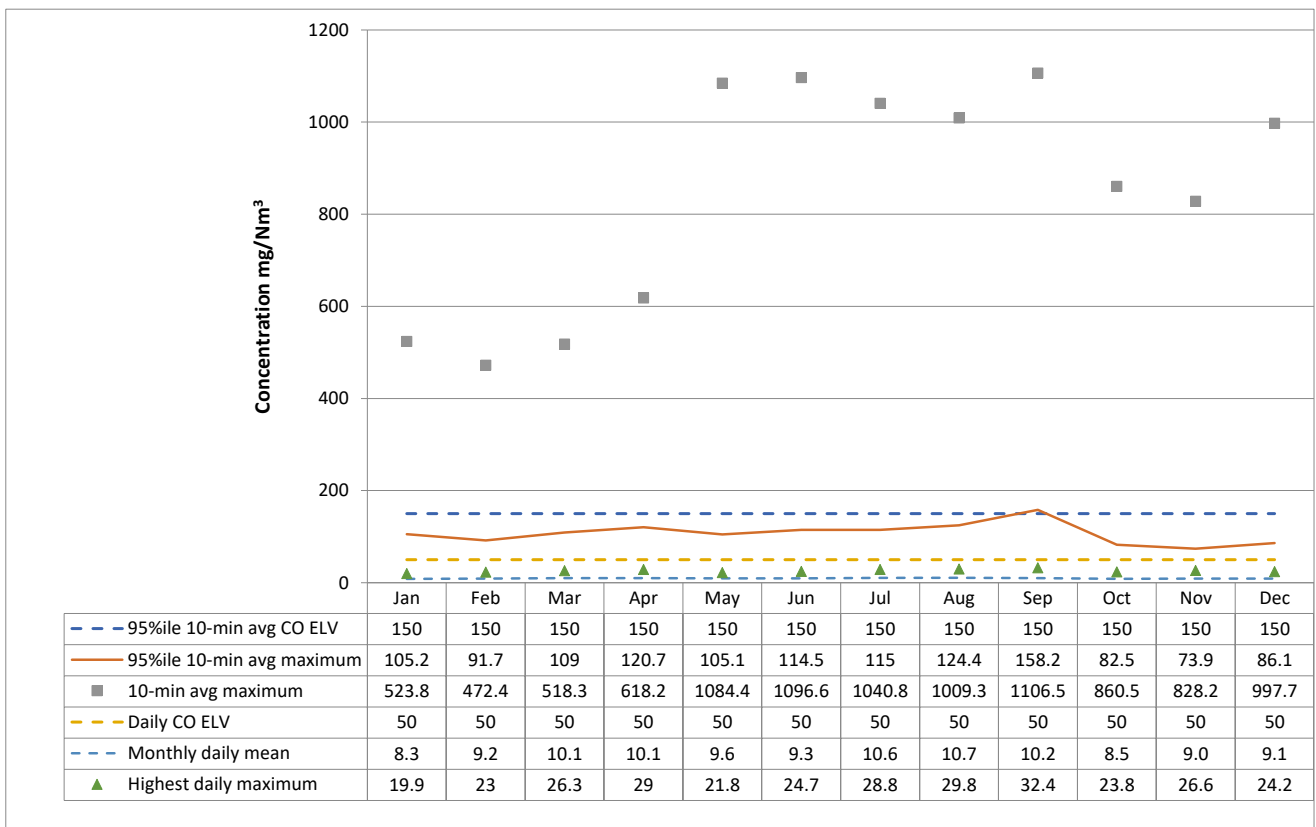
Monitoring of Carbon Monoxide (10-minute avg)

Whole Installation

See Notes in Cell S3

Please complete this tab for your plant if you have 10-minute average CO ELVs; otherwise, leave it blank and complete the CO 0.5 hourly tab

2023	10-minute Reference Periods				Daily Reference Periods		
	95%ile 10-min avg CO ELV	95%ile 10-min avg maximum	Monthly CO 10-min avg mean	10-min avg maximum	Daily CO ELV	Monthly daily mean	Highest daily maximum
Jan	150	105.2	12.8	523.8	50	8.3	19.9
Feb	150	91.7	14.1	472.4	50	9.2	23
Mar	150	109	15.2	518.3	50	10.1	26.3
Apr	150	120.7	15.1	618.2	50	10.1	29
May	150	105.1	13.7	1084.4	50	9.6	21.8
Jun	150	114.5	14.5	1096.6	50	9.3	24.7
Jul	150	115	16.4	1040.8	50	10.6	28.8
Aug	150	124.4	16.1	1009.3	50	10.7	29.8
Sep	150	158.2	16.4	1106.5	50	10.2	32.4
Oct	150	82.5	13.6	860.5	50	8.5	23.8
Nov	150	73.9	13.3	828.2	50	9.0	26.6
Dec	150	86.1	13.1	997.7	50	9.1	24.2



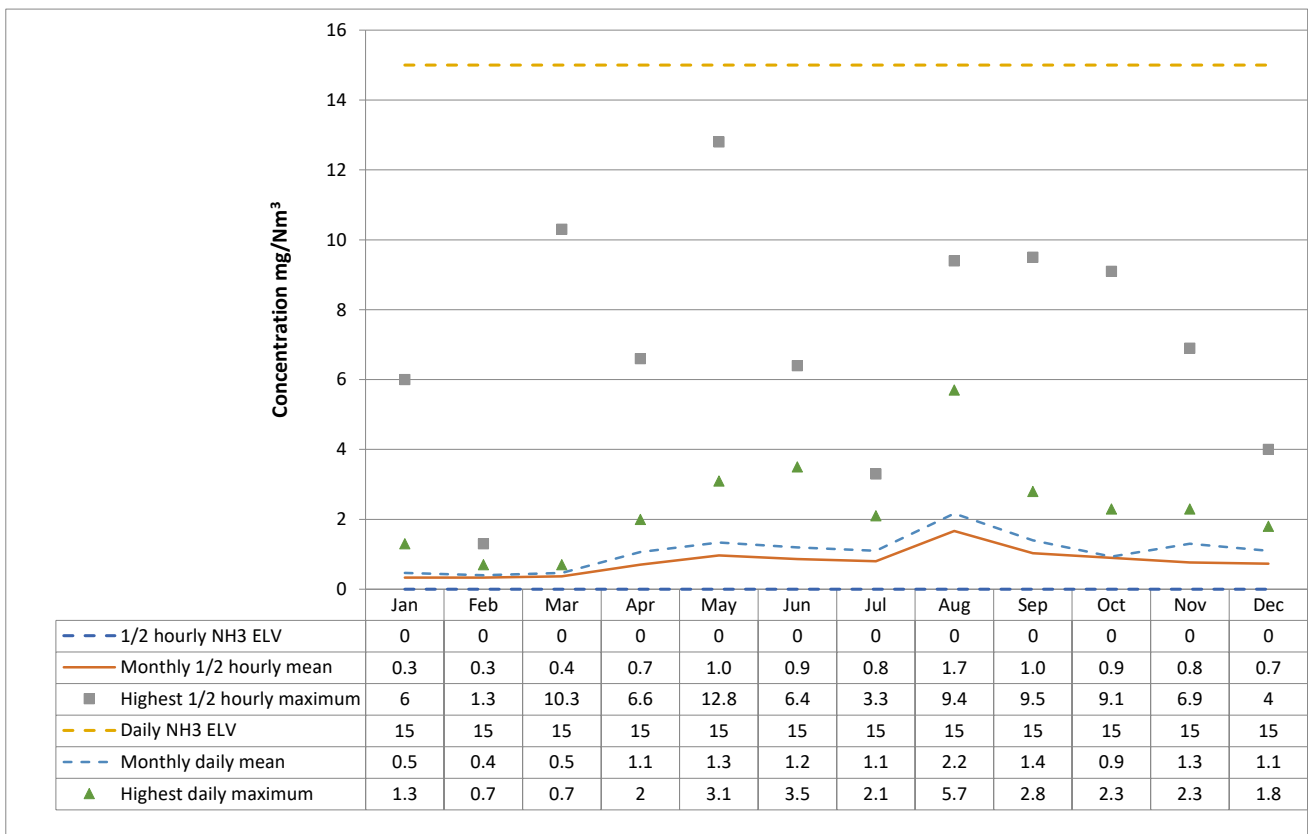
Comments :
 Environment Agency explanatory note: The 10-minute average ELV is based on the "95th percentile". In this case this means that 95% of the 10 minute averages in the relevant 24-hour period (i.e. 137) must be below 150 mg/Nm3, and 5% (i.e. 7) are allowed to be any value above 150 mg/Nm3. Whilst we expect operators to minimise CO emissions at all times, it is perfectly acceptable for the value of the maximum 10-minute average to be above 150 mg/Nm3, provided the 95th percentile ELV has been met for that period.

Monitoring of Ammonia emissions

Whole Installation

See Notes in Cell Q3

2023	1/2 Hourly Reference Periods			Daily Reference Periods		
	1/2 hourly NH3 ELV	Monthly 1/2 hourly mean	Highest 1/2 hourly maximum	Daily NH3 ELV	Monthly daily mean	Highest daily maximum
Jan	None	0.3	6	15	0.5	1.3
Feb	None	0.3	1.3	15	0.4	0.7
Mar	None	0.4	10.3	15	0.5	0.7
Apr	None	0.7	6.6	15	1.1	2
May	None	1.0	12.8	15	1.3	3.1
Jun	None	0.9	6.4	15	1.2	3.5
Jul	None	0.8	3.3	15	1.1	2.1
Aug	None	1.7	9.4	15	2.2	5.7
Sep	None	1.0	9.5	15	1.4	2.8
Oct	None	0.9	9.1	15	0.9	2.3
Nov	None	0.8	6.9	15	1.3	2.3
Dec	None	0.7	4	15	1.1	1.8



Comments :

An indicated ELV value of zero in the table above means that no ammonia limit is/was set in the permit.