



Annual Performance Report 2024

Permit EPR/AB3092CV

enfinium Parc Adfer Energy Recovery Facility

enfinium Parc Adfer Operations Limited

Year: 2024

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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 Parc Adfer Energy Recover Facility (ERF) recovers value (primarily in the form of energy, but also recycled materials in the form of incinerator bottom ash aggregate and metals recovered from the incinerator bottom ash (IBA)) from up to 232,000 tonnes per annum of residual waste. The majority of the processed waste is residual Municipal Solid Waste (MSW) collected by the five local authorities which make up the North Wales Residual Waste Treatment Partnership. The balance is composed of residual commercial and industrial (C&I) waste, collected by private waste management companies. The site is located to the south east of the Dee Estuary within the Deeside Industrial Estate, 2km south west of the nearest village, Puddington.

enfinium Parc Adfer Operations Limited took control of the facility on the 19th December 2019 following completion of the construction and commissioning phases.

The installation consists of one incineration line with a capacity to incinerate 29 tonnes of waste per hour. The facility processes waste using air cooled, moving grate technology. The energy recovered from the combustion of waste is utilised (in the form of high-pressure steam) to produce electrical power through a steam turbine and generator unit.

The facility has combined heat and power (CHP) capability through a blanking flange for heat/steam export from the turbine which can be utilised upon securing a suitable customer.

The facility is designed to generate approximately 19MWe and export approximately 17MWe of electricity (assuming zero heat off-take).

Summary of Operational Processes and Procedures

Waste is delivered to the facility in covered vehicles or containers. All incoming loads are weighed on arrival at the calibrated Weighbridge prior to the waste being tipped into the enclosed waste storage bunker. Only wastes detailed in the environmental permit are accepted onto site. The waste is mixed and fed into the boiler waste feed hopper using overhead cranes. The waste travels down the feed hopper and adjoining feed chute and is pushed onto the boiler grate by ram feeders.

In the combustion unit, the waste undergoes thermal treatment in line with the requirements of European Directives on the incineration of waste. The hot gases are maintained at a minimum temperature of 850°C for 2 seconds in the presence of excess oxygen in the combustion chamber to allow complete combustion of the waste. The combustion of waste releases thermal energy which is captured by the boiler at various stages. The boiler uses this energy to turn water into high pressure dry steam. This steam is used to drive a turbine-generator which generates electricity for export to the national grid.

The flue gases are treated in order to comply with the requirements of the Industrial Emissions Directive and the site environmental permit. In addition to primary and secondary air injection, additional support for combustion is provided through tertiary air injection or flue gas recirculation. Two gas oil auxiliary burners are installed to provide heat to the combustion chamber during start up and shut down. The auxiliary burners can also be utilised to ensure the required 850°C temperature is maintained, as long as incompletely burned waste is present within the combustion chamber.

Urea is added at various stages of the boiler's combustion chamber (first pass) to reduce concentrations of Nitrogen Oxides (NOx). Hydrated Lime and Powder Activated Carbon (PAC) is used within the dry flue gas treatment (FGT) system. Hydrated lime reduces acid gas emissions whilst the activated carbon reduces mercury and the formation of dioxins/furans. The by-products from both reactions are captured in the fabric filter as Air Pollution Control Residues (APCR). Duty and standby continuous emissions monitoring systems are installed to measure the concentrations of pollutants in the flue gas. Residual flue gas emissions enter the atmosphere via the 80m stack.

Incinerator Bottom Ash (IBA) remains after the combustion of the waste. The ash is discharged from the end of the combustion grate directly into an ash quench bath. The IBA is directly discharged into the IBA storage area via belt conveyors. IBA is then stored, sampled, tested, and subsequently removed off-site for further re-processing into IBA aggregate. The off-site IBA processor removes all recoverable metals from the IBA for recycling. Fly ash from the boiler fifth pass (economiser pass) is mixed with the hazardous fly ash to form the APCR, and is conveyed to an enclosed storage silo before being transported off-site for treatment or disposal.

Air cooled condensers are installed to condense residual steam back into water for re-use in the process. Boiler blowdown, ash quench water, and surface water drainage from the IBA storage area is directed to the 160m³ wastewater pit for re-use. There are no process related emissions to the public foul sewer network. Most of the site surface water run-off collects in a 2300m³ attenuation pond before it is released to an off-site surface water brook which runs along the Eastern boundary of the site. There is also a 100,000 litre underground rainwater harvesting tank installed for capture of rainwater for re-use in the process.

The site is operated using an integrated Health, Safety, Environmental and Quality Management System. The management system has been independently certified as meeting the requirements of the ISO9001, ISO14001 and ISO45001 standards. The facility has policies and procedures in place including emergency plans, operating instructions and risk assessments. The facility also has a Computerised Maintenance Management System (CMMS) to cover all maintenance tasks and defect reporting.

Operational Data

Plant Size	232,000 tonnes pa	68 MWth	19 MWe
No. of combustion lines	1	No. of Turbines:	1

Waste types received	Unit	Q1	Q2	Q3	Q4	Year Total	%
Household / Local Authority	tonnes	28370.30	24406.29	26783.30	26175.29	105735.18	0.50
Commercial & Industrial		25959.68	19992.86	25996.56	33074.02	105023.12	0.50
Total waste received		54329.98	44399.15	52779.86	59249.31	210758.30	
Total waste combusted		53743.10	40778.30	57002.10	58893.60	210417.10	

Energy Usage / Export	Unit	Q1	Q2	Q3	Q4	Year Total	KWh/te
Power Generated	MWh	40619	31449	42669	42985	157722	750
Power Exported		36044	27793	37611	37986	139434	663
Power Used on site		4727	3866	5399	5070	19062	91
Power Imported		151	209	71	73	504	2
Parasitic Load	%	11.6%	12.2%	12.0%	11.8%	11.9%	
R1 value (if applicable)	R1					0.70	

Waste Disposal & Recovery	Unit	Q1	Q2	Q3	Q4	Year Total	% inputs
APC Residues - produced	tonnes	1,311.86	1,124.38	1,282.62	1,309.58	5,028.44	2.4%
IBA - produced		12,200.70	9,526.16	11,915.20	13,069.13	46,711.19	22.2%
Metals recycling (from IBA)		2,932.00	3,536.00	1,402.00	381.00	8,251.00	3.9%
Process water		124.86	705.92	114.77	417.22	1,362.77	0.6%
Wood		2.20	1.46	3.24	0.00	6.90	0.0%
Mixed metals (engineering works)		2.64	6.98	13.56	2.18	25.36	0.0%
Hazardous waste items (batteries, aerosols, WEEE, oily rags)		0.00	0.26	0.00	0.27	0.53	0.0%
Office Recyclables		0.12	0.16	0.03	0.00	0.31	0.0%
Rubble		0.00	48.70	0.00	0.00	48.70	0.0%
General waste		3.68	6.86	5.52	1.48	17.54	0.0%

Raw Material Usage	Unit	Q1	Q2	Q3	Q4	Year Total	kg or Ltr /te
Mains Water	ltrs	4,605,000	4,015,000	5,028,000	5,467,000	19,115,000	90.84
Urea	kgs	35,000	26,000	16,000	20,000	97,000	0.46
Activated Carbon	kgs	26,272	21,888	24,171	25,131	97,462	0.46
Lime / hydrated lime	kgs	604,000	510,000	585,000	579,000	2,278,000	10.83
Fuel oil	ltrs	73,932	8,467	52,663	24,485	159,547	0.76

Summary	Line/Unit	Q1	Q2	Q3	Q4	Year Total	
Availability of waste combustion by line, hrs	1	2,042	1,581	2,176	2,142	7,941	90.7%
Hours of turbine operations, hrs	1	2,040	1,579	2,164	2,138	7,921	90.4%
Net Calorific Value of waste	MJ/kg	9.97	10.17	10.12	9.65	9.98	
Abnormal Events	qty.	2	-	2	1	5	yes
Abnormal operation	hours	-	-	-	-	-	0.0%
Permit Breaches	qty.	-	-	-	-	-	no

Summary of Plant Operations and Maintenance during the reporting year

The facility annual maintenance outage was completed between the 11th June and 2nd July 2024. The purpose of the annual shutdown was to service and maintain all items of equipment that cannot be serviced or maintained while the plant is operating throughout the year. The shutdown included cleaning and inspection works to the Boiler and Flue Gas Treatment Plant, statutory inspections, balance of plant maintenance, Engineering Procurement and Construction Contractor defect rectification works, and any outstanding annual preventative maintenance routines, some of which are listed below:

Rope Access Cleaning
 Boiler Cleaning and Inspection
 Superheater Cleaning and Inspection
 Boiler Internal Shot blasting
 Boiler Non-Destructive Examination
 PSSR valve and pressure vessel inspections
 Refractory Repairs
 Inconel overlay welding
 Economiser Cleaning and Inspection
 Superheater and Economiser conveyor chain replacement
 Main Steam Stop Valve Inspection
 Internal Boiler Pressure Parts Inspection
 Rotating Fan Maintenance
 Bag House Damper Cleaning
 Bag House Filter Inspection
 Boiler and FGT Conveyor Maintenance inc. motor/gearbox overhaul
 Combustion Grate Maintenance
 Vibrating Table Maintenance
 Boiler Cleaning System Maintenance
 Instrumentation Calibration
 Emissions Monitoring Equipment Maintenance
 33/11kV Transformer Maintenance
 11kV/LV Transformer Maintenance
 UPS Maintenance inc battery drop test
 LV Switchboard Maintenance
 LV breaker maintenance
 DCS Maintenance
 Turbine Generator Maintenance
 Variable Speed Drive Maintenance
 FGT bag filter inspection/maintenance
 IBA Conveyor Maintenance
 Strainer Cleaning/replacement

Summary of Residue Handling for the reporting year

All of the IBA which the facility generated in 2024 was transported to Blue Phoenix Limited, Johnson's Lane IBA Recycling Facility in Widnes. The Johnson's Lane facility is permitted to accept 19 01 12 bottom ash and slag other than those mentioned in 19 01 11 under permit EPR/DP3631WQ issued by the Environment Agency. enfinium Parc Adfer Operations Limited has followed the Environmental Services Association (ESA) protocol for sampling and testing incinerator bottom ash to assess its hazard status. No exceedances of the HP4, HP8, HP7 or HP14 hazardous thresholds were reported for the 24 samples which were obtained and analysed in 2024. enfinium and Blue Phoenix agreed to revise the storage method for IBA in 2024. As a result, all IBA is now quarantined and stored in batches at Blue Phoenix, rather than at Parc Adfer, until the hazard assessment sample results for each batch are received. The off-site IBA facility processes the ash to separate coarse aggregates, fine aggregates, non-ferrous metals and ferrous metals.

Air Pollution Control Residues (APCR) were transported to Augean in Middlesbrough. Two loads were sent to alternative permitted treatment facilities for trials. APCR is discharged directly from the storage silo into bulk tankers for transportation to the recovery site. The APCR is used to construct a low permeability separation structure at the site in Middlesbrough following physico-chemical treatment to stabilise the waste. This processed is classified as a waste recovery operation as the APCR is being used as a substitute for virgin aggregates.

Date	Reason for shut-down
02/01/2024	LHS expansion joint failure.
04/01/2024	Slag fall on restart damaged grate bar run 4 zone 3.
27/02/2024	RHS expansion joint failed, grate run 2 zone 3 grate bar failure.
05/06/2024	2nd pass rear wall tube leak.
11/06/2024	Annual planned maintenance outage.
25/11/2024	Discharger blockage followed by pitstop outage for refractory repairs and ID fan power block and coupling failure

2024 Annual Reporting Performance Form 1

Permit EPR/AB3092CV

Facility: enfinium Parc Adfer Energy Recovery Facility

Operator:

Form:

enfinium Parc Adfer Operations Limited

Performance 1

Reporting Period from:

01 January 2024

to:

31 December 2024

2024 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	Augean Middlesborough (R05), Future Liverpool (D15), Augean Peterborough (D15)	43.86	4,984.58	2.4%
Hazardous waste items (oily rags, WEEE, batteries, oil filters)	Veolia Preston	0.301	0.233	0.0%
Total Hazardous Waste		44.16	4,984.81	2.4%
2) Non-Hazardous Wastes				
IBA	Blue Phoenix Widnes (R11)	0.00	46,711.19	22.2%
Process Water	LIS Haydock (D09)	1,362.77	0.00	0.6%
General Waste	Veolia Bidston (R13), Thornclyffe Flintshire (R13)	0.00	17.54	0.0%
Wood	Thornclyffe Flintshire (R13)	0.00	6.90	0.0%
Office Recyclables	Parry & Evans Deeside (R13)	0.00	0.31	0.0%
Mixed metals from engineering works	KJ Bell Scrap Merchants (R04)	0.00	25.36	0.0%
Rubble	Thornclyffe Flintshire (R13)	0.00	48.70	0.0%
Total Non-Hazardous Waste		1,362.77	46,810.00	22.9%
TOTAL WASTE		1,406.93	51,794.81	25.3%

Operator's comments :

2024 Annual Reporting of Water and Other Raw Material Usage

Raw Material	Usage	Unit	Specific Usage	Unit
Mains Water	19115	m ³	0.09	m ³ /te
Urea	97000	kg	0.46	kg/te
Activated Carbon	97462	kg	0.46	kg/te
Lime / hydrated lime	2278000	kg	10.83	kg/te

Operator's comments :

2024 Annual Reporting of other performance indicators

Parameter	Results by Line	Turbine 1
	A1	
Operating hours for the year, hours	7941	7941
Number of periods of abnormal operation, qty.	0	
Cumulative hours of abnormal operation for this year, hours	0	

Operator's comments :

Signed: _____

Date: 27/01/2025

2024 Annual Reporting of Energy Usage/Export

Permit EPR/AB3092CV

Operator: enfinium Parc Adfer Operations Limited

Facility: enfinium Parc Adfer Energy Recovery Facility

Form: Energy 1

Reporting Period from: 01 January 2024 to: 31 December 2024

Energy Source	Energy Usage	Unit	Specific Usage (KWh/tonne incinerated)	Primary Energy (note 1) KWh/PL
Electricity Produced	157,722	MWh	750	-
Electricity Imported	504	MWh	2	504
Electricity Exported	139,434	MWh	663	-
Gas Oil	195.14 (159,947 litres)	tonnes		
Steam/hot water exported	0	MWh		
Thermal energy produced	593,575	MWh		

Note 1 Conversion factor for imported electricity to primary energy = 1 (solar and wind)

Operator's comments :

Signed:

Date: 27/01/2025

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	
	Half-hourly limit	Daily limit
Particulates	100%	100%
Oxides of nitrogen	100%	100%
Sulphur dioxide	100%	100%
Carbon monoxide	100% 95% of 10-min averages	100%
Total organic carbon	100%	100%
Hydrogen chloride	100%	100%

Summary of non-compliances under the permit				
Date	Summary of non-compliance	Reason	Measures taken to prevent reoccurrence	CCS score if applicable*
				Impact Root cause
None identified				

Summary of any complaints received and actions to taken to resolve them.			
Date	Summary of complaint	Reason	Measures taken to prevent reoccurrence
04/10/2024	Odour complaint	Unjustified anonymous complaint via NRW	None required
23/12/2024	Odour complaint	Unjustified anonymous complaint via NRW	None required

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

Installation of AMESA-B Carbon 14 Continuous Sampler.

Switch from Carbohydrazide to Ammonia for Water Treatment to minimise iron buildup on the turbine blades.

Replacement of Mild Steel Boiler Tubes with Inconel Tubes to mitigate corrosion risks and prevent boiler tube failures.

Upgrade of Furnace Refractory with Advanced Refractory Technology to reduce the likelihood of boiler tube corrosion and failure.

Martin GMBH Combustion Optimisation Reviews aimed at enhancing boiler efficiency.

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

Details of Public & Stakeholder Liaison

Summary of events held during the reporting year.	
Date	Description
23/01/2024	Community Liaison Group Meeting
24/09/2024	Community Liaison Group Meeting

List of events planned for next year	
Date	Description
TBC	Community Liaison Group Meeting

If you wish to be involved in the public liaison programme, please contact antonia.cirafici@enfinium.co.uk

Carbon dioxide emissions and biogenic content of waste inputs

Carbon dioxide emissions (all types of plant)			
	Annual mass of carbon dioxide released	tonnes	218,697
	Annual mass of carbon dioxide released per tonne of waste burned	t CO ₂ / t waste	1.04
	Annual mass of carbon dioxide released per MWh of energy exported	t CO ₂ / MWh export	1.57
	Description of how annual carbon dioxide mass emission has been calculated. See Note 1	Corrected and calibrated CEMS data.	
Nitrous oxide emissions (only plants which use ammonia or urea to abate NOx emissions)			
	Annual mass emissions of nitrous oxide	tonnes N ₂ O	4.63
	Description of how annual nitrous oxide mass emission has been calculated See Note 2	Corrected and calibrated CEMS data.	
Total annual carbon dioxide + nitrous oxide emissions. See Note 3.		tonnes CO ₂ e	220,078
Biogenic CO2 emissions			
	Percentage of total carbon dioxide emissions arising from biogenic waste	%	68%
	No. of measurements undertaken	Number	Continuous
	Description of how percentage biogenic carbon dioxide emissions have been measured or calculated.	BIOMA software	
Biogenic fraction of waste feedstock			
	Yearly average biogenic percentage of the waste by net calorific value (NCV)	%	68%
	Description of how biogenic percentage (by NCV) has been calculated or estimated. See Note 6	BIOMA software	
	Yearly average biogenic percentage of the waste by mass	%	72%
	If waste sampling undertaken, no. of samples used to ascertain average biogenic percentages above	Number	None
	Description of how biogenic percentage (by mass) has been calculated or estimated.	BIOMA software	

Comments:

Residue Quality Monitoring Requirements

Summary of monitoring undertaken and compliance
Samples of IBA and APCR are taken every three months for permit compliance requirements. Two samples of IBA are analysed each month on random dates to assess the hazard status in accordance with the ESA protocol. No exceedances of hazardous thresholds have been reported in 2024. No abnormal results or exceedances of the permitted total organic carbon limit for IBA have been recorded in 2024.

Commentary on any specific events	
Date & Event	Description
2024	None to report

Residue Quality Monitoring Results			
Parameter (unit)	Limit*	Normal Operation	
		Bottom ash	APC Residues
Loss on Ignition (average %)	---	2.04	
Total Organic Carbon (average %)	<3%	1.00	
No. of Assessments Undertaken	---	24	4
No. of Hazardous Results	---	0	

Comments :

Emissions to Water

Summary of monitoring undertaken and compliance
Surface water which accumulates in the attenuation pond is visually checked at least once per week by the site SHEQ Team. Spot samples are taken to visually check for suspended solids, oils, and grease. pH and temperature measurements are also recorded. The Surface Water Attenuation Pond discharge penstock valve is usually left closed and locked, until pond levels increase to a level which indicates a release of water is required. The penstock valve is then opened slightly to allow a low velocity of surface water to discharge into the off-site brook. The site does not discharge any process waters to the surface water or foul water systems. All process waters are recycled for use as ash quenching water or transported off site via tankers for disposal.

Commentary on any specific events	
Date & Event	Description
2024	None to report

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

Emissions to Air (periodically monitored)

Summary of monitoring undertaken, standards used and compliance					
MCERTS and UKAS accredited stack emissions testing company ATESTA completed bi-annual EPR compliance stack monitoring on behalf of enfinium Parc Adfer Operations Limited in 2024. No ELV breaches were reported in the reporting period.					
In addition to the bi-annual EPR compliance stack emissions testing, one PM10 & PM2.5 survey was completed in September.					

Results of emissions to air that are periodically monitored - oxygen reference 11%					
Substance	Ref. Period	Emission Limit Value	H1	H2	Average
Hydrogen fluoride	1 hr	1 mg/m ³	<0.019	0.19	0.19
Cd and Tl and their compounds	0.5-8hrs	0.02 mg/m ³	<0.0011	0.0011	0.0011
Hg and its compounds	0.5-8hrs	0.02 mg/m ³	0.012	0.0016	0.0068
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V and their compounds	0.5-8hrs	0.3 mg/m ³	0.099	0.19	0.1445
Dioxins & Furans (I-TEQ)	6-8hrs	0.06 ng/m ³	0.045	0.06	0.0525
PCBs (WHO-TEQ Humans / Mammals)	6-8hrs	None set ng/m ³	0.0032	0.0037	0.00345
PCBs (WHO-TEQ Fish)	6-8hrs	None set ng/m ³	0.00017	0.00018	0.000175
PCBs (WHO-TEQ Birds)	6-8hrs	None set ng/m ³	0.0072	0.0069	0.00705
Dioxins & Furans (WHO-TEQ Humans / Mammals)	6-8hrs	None set ng/m ³	0.04	0.049	0.0445
Dioxins & Furans (WHO-TEQ Fish)	6-8hrs	None set ng/m ³	0.048	0.063	0.0555
Dioxins & Furans (WHO-TEQ Birds)	6-8hrs	None set ng/m ³	0.11	0.15	0.13
Anthanthrene	6-8hrs	None set µg/m ³	<0.0014	<0.0014	<0.0014
Benzo(a)anthracene	6-8hrs	None set µg/m ³	<0.0014	<0.0014	<0.0014
Benzo(a)pyrene	6-8hrs	None set µg/m ³	<0.0014	<0.0014	<0.0014
Benzo(b)fluoranthene	6-8hrs	None set µg/m ³	<0.0014	<0.0014	<0.0014
Benzo(b)naptho(2,1-d) thiophene	6-8hrs	None set µg/m ³	<0.0014	<0.0014	<0.0014
Benzo(c)phenanthrene	6-8hrs	None set µg/m ³	<0.0014	<0.0014	<0.0014
Benzo(ghi)perylene	6-8hrs	None set µg/m ³	0.0064	0.0024	0.0044
Benzo(k)fluoranthene	6-8hrs	None set µg/m ³	<0.0014	<0.0014	<0.0014
Cholanthrene	6-8hrs	None set µg/m ³	<0.0014	<0.0014	<0.0014
Chrysene	6-8hrs	None set µg/m ³	0.0019	0.0023	0.0021
Cyclopenta(cd)pyrene	6-8hrs	None set µg/m ³	<0.0014	<0.0014	<0.0014
Dibenzo(ai)pyrene	6-8hrs	None set µg/m ³	<0.0014	<0.0014	<0.0014
Dibenzo(ah)anthracene	6-8hrs	None set µg/m ³	<0.0014	<0.0014	<0.0014
Fluoranthene	6-8hrs	None set µg/m ³	0.048	0.093	0.0705
Indeno(123-cd) pyrene	6-8hrs	None set µg/m ³	<0.0014	<0.0014	<0.0014
Naphthalene	6-8hrs	None set µg/m ³	0.24	0.2	0.22
Comments :					

Emissions to Air (continuously monitored)

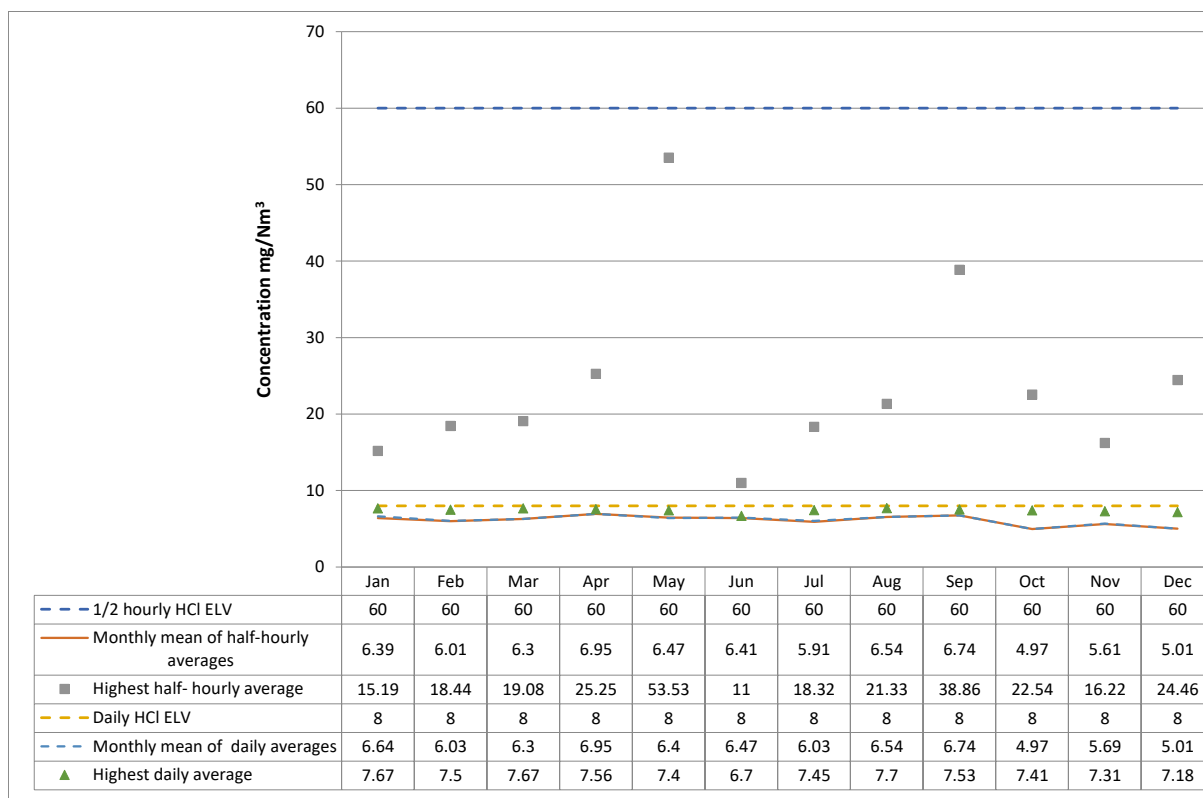
Summary of monitoring undertaken, standards used and compliance	
HCl, SO ₂ , Particulates, NO _x , TOC, CO and NH ₃ all have limits set out in the Environmental Permit; these pollutants are continuously monitored by the CEMS in compliance with EN14181. O ₂ , CO ₂ , stack flow and water vapour are also continuously monitored by the CEMS.	
HCl, SO ₂ , NO _x , TOC, NH ₃ , CO, CO ₂ and water vapour are extractive monitored using ENVEA MIR FT CEMS (MCERTS number CSA MC040031/12). TOC is extractive monitored using ENVEA Graphite 52M CEMS (MCERTS number Sira MC060082/11). Particulate is monitored in-situ using ENVEA PCME QAL 181 CEMS (MCERTS number CSA MC090152/05). Oxygen (wet) is measured using ABB Endura AZ20 / AZ30 (MCERTS Sira MC110191/04) Temperature and Pressure are monitored and recorded using PCME Stackflow 200 (MCERTS Sira MC160315/03).	
All instruments are QAL1 compliant. An Annual Surveillance Test (AST) survey was completed in March 2024. The duty flow meter QAL2 factor was amended on 30th April 2024 following the March AST and subsequent QAL2. Weekly reports are generated and reviewed to assess the number and percentage of readings which have fallen outside of the valid calibration range. QAL3 tests are completed each week on both the duty and standby analysers by the site EC&I Technicians. There is a service agreement in place with CEMS service provider ENVEA, which includes emergency callouts.	

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	
			Max.	Avg.
Oxides of nitrogen	Daily mean	180 mg/m ³	176.19	167.15
	½ hourly mean	400 mg/m ³	230.06	167.13
Particulates	Daily mean	5 mg/m ³	0.33	0.25
	½ hourly mean	30 mg/m ³	0.79	0.25
Total Organic Carbon	Daily mean	10 mg/m ³	0.65	0.00
	½ hourly mean	20 mg/m ³	9.74	0.00
Hydrogen chloride	Daily mean	8 mg/m ³	7.70	6.15
	½ hourly mean	60 mg/m ³	53.53	6.11
Sulphur dioxide	Daily mean	40 mg/m ³	33.34	10.91
	½ hourly mean	200 mg/m ³	130.02	10.96
Carbon monoxide	Daily mean	50 mg/m ³	21.71	4.95
	95%ile 10-min avg *	150 mg/m ³ *	105.98	4.98
Ammonia	Daily mean	10 mg/m ³	0.62	0.22
Comments :				

Monitoring of Hydrogen Chloride emissions

Whole Installation

2024	1/2 Hourly Reference Periods			Daily Reference Periods		
mg/Nm ³	1/2 hourly HCl ELV	Monthly mean of half-hourly averages	Highest half-hourly average	Daily HCl ELV	Monthly mean of daily averages	Highest daily average
Jan	60	6.39	15.19	8	6.64	7.67
Feb	60	6.01	18.44	8	6.03	7.5
Mar	60	6.3	19.08	8	6.3	7.67
Apr	60	6.95	25.25	8	6.95	7.56
May	60	6.47	53.53	8	6.4	7.4
Jun	60	6.41	11	8	6.47	6.7
Jul	60	5.91	18.32	8	6.03	7.45
Aug	60	6.54	21.33	8	6.54	7.7
Sep	60	6.74	38.86	8	6.74	7.53
Oct	60	4.97	22.54	8	4.97	7.41
Nov	60	5.61	16.22	8	5.69	7.31
Dec	60	5.01	24.46	8	5.01	7.18

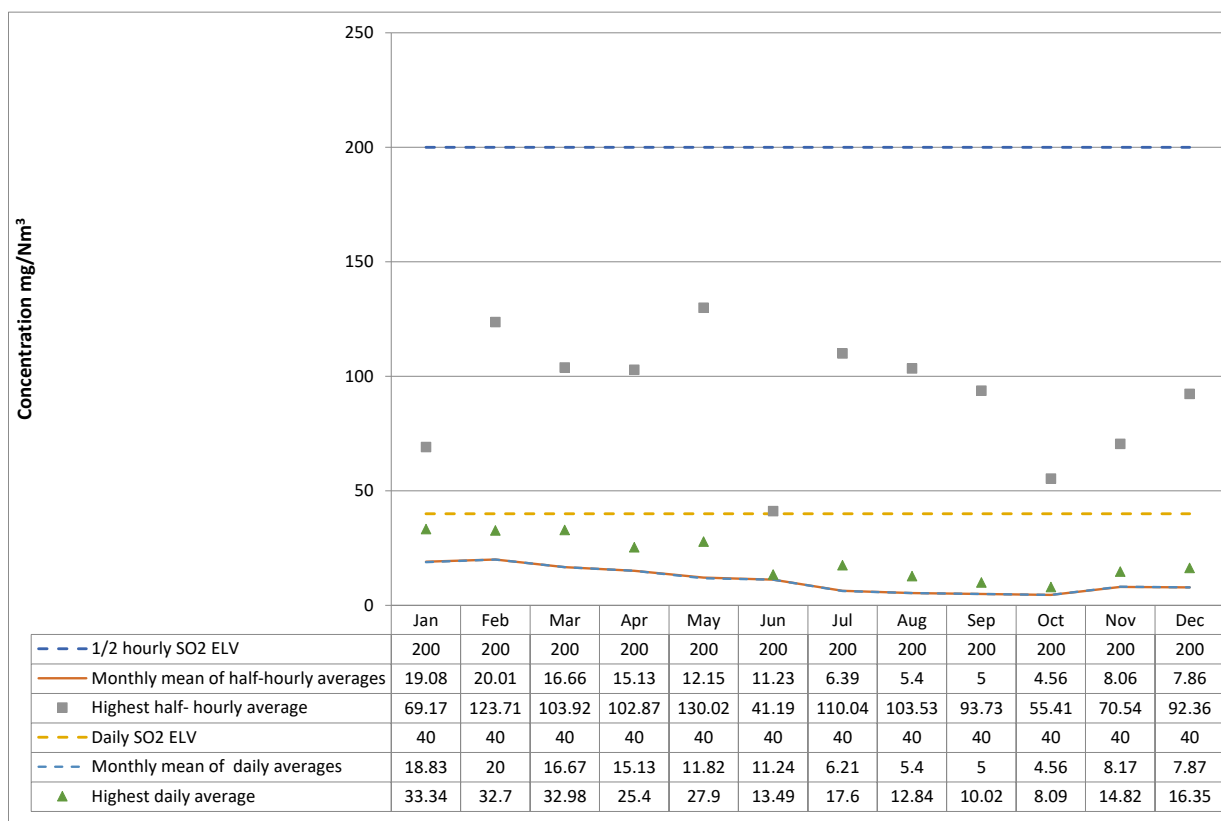


Comments :

Monitoring of Sulphur dioxide emissions

Whole Installation

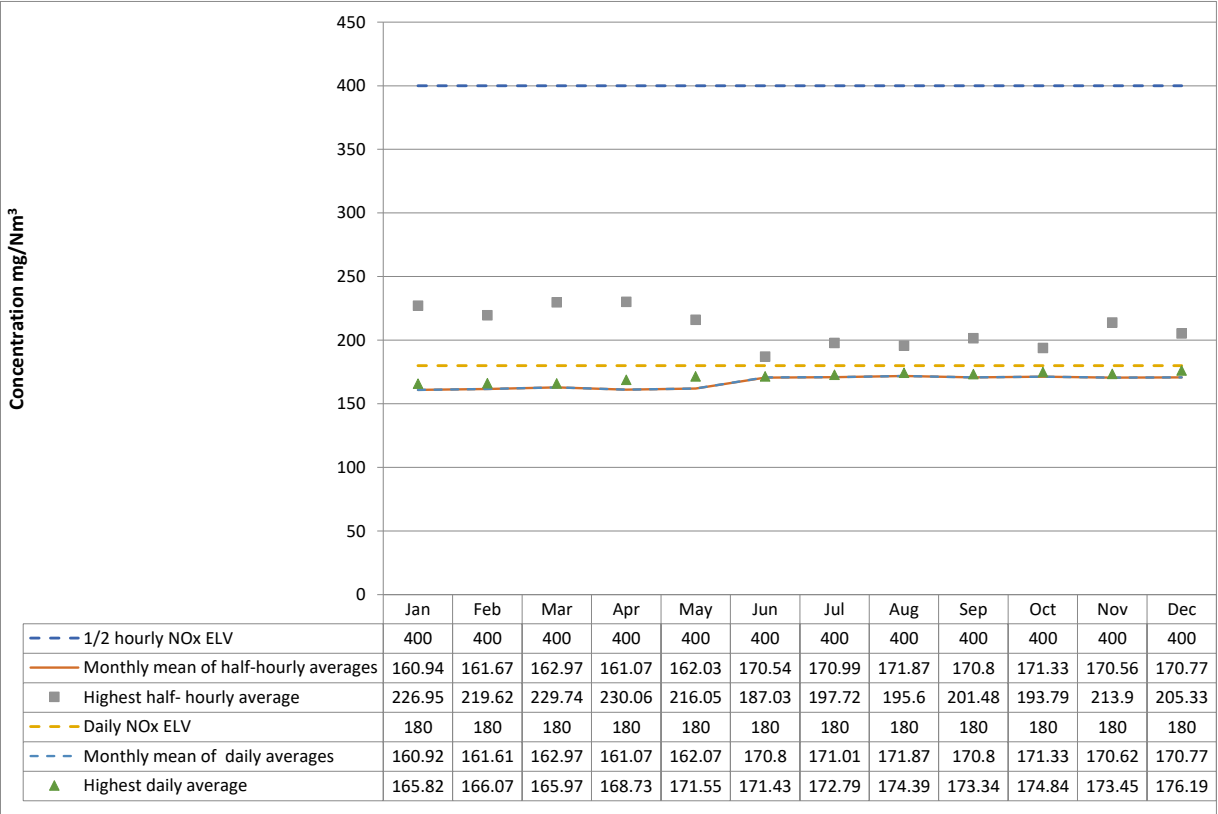
2024	1/2 Hourly Reference Periods			Daily Reference Periods		
mg/Nm ³	1/2 hourly SO2 ELV	Monthly mean of half-hourly averages	Highest half-hourly average	Daily SO2 ELV	Monthly mean of daily averages	Highest daily average
Jan	200	19.08	69.17	40	18.83	33.34
Feb	200	20.01	123.71	40	20	32.7
Mar	200	16.66	103.92	40	16.67	32.98
Apr	200	15.13	102.87	40	15.13	25.4
May	200	12.15	130.02	40	11.82	27.9
Jun	200	11.23	41.19	40	11.24	13.49
Jul	200	6.39	110.04	40	6.21	17.6
Aug	200	5.4	103.53	40	5.4	12.84
Sep	200	5	93.73	40	5	10.02
Oct	200	4.56	55.41	40	4.56	8.09
Nov	200	8.06	70.54	40	8.17	14.82
Dec	200	7.86	92.36	40	7.87	16.35



Comments :

Monitoring of Oxides of Nitrogen emissions Whole Installation

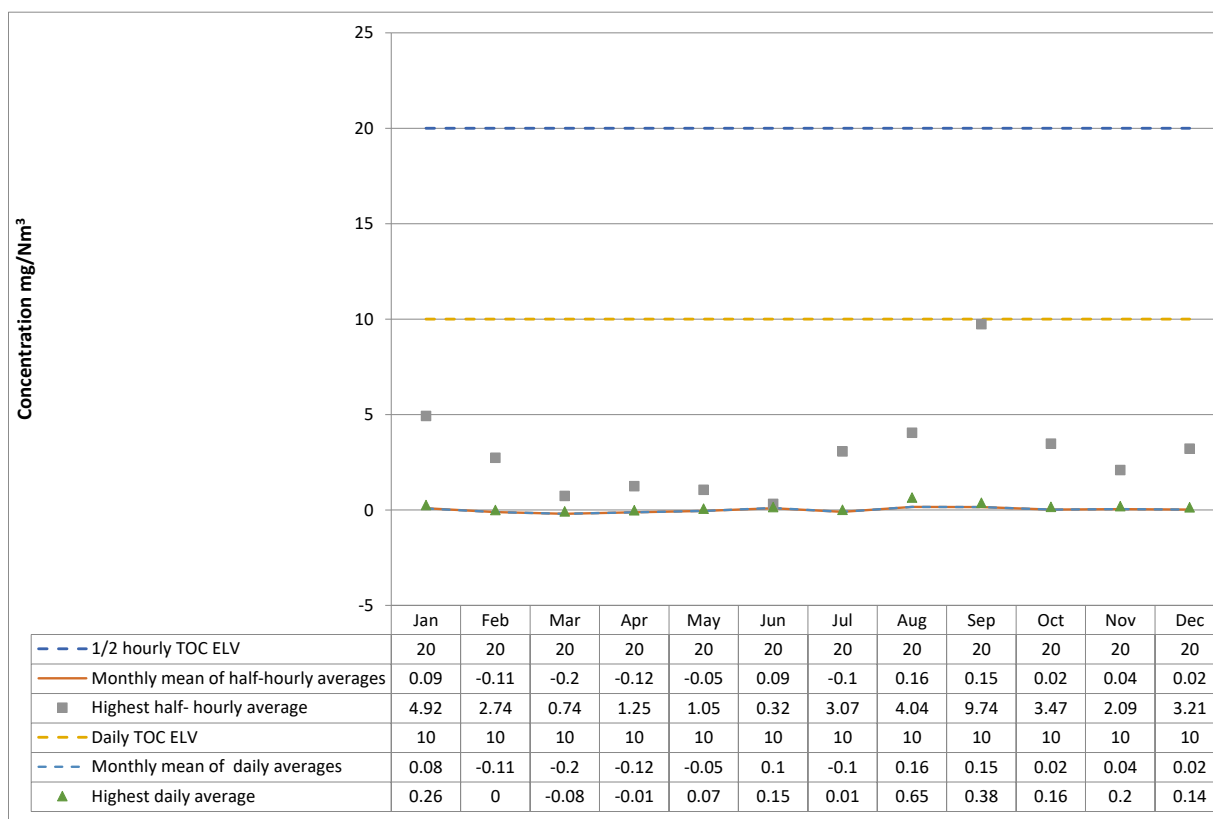
2024	1/2 Hourly Reference Periods			Daily Reference Periods		
mg/Nm ³	1/2 hourly NOx ELV	Monthly mean of half-hourly averages	Highest half-hourly average	Daily NOx ELV	Monthly mean of daily averages	Highest daily average
Jan	400	160.94	226.95	180	160.92	165.82
Feb	400	161.67	219.62	180	161.61	166.07
Mar	400	162.97	229.74	180	162.97	165.97
Apr	400	161.07	230.06	180	161.07	168.73
May	400	162.03	216.05	180	162.07	171.55
Jun	400	170.54	187.03	180	170.8	171.43
Jul	400	170.99	197.72	180	171.01	172.79
Aug	400	171.87	195.6	180	171.87	174.39
Sep	400	170.8	201.48	180	170.8	173.34
Oct	400	171.33	193.79	180	171.33	174.84
Nov	400	170.56	213.9	180	170.62	173.45
Dec	400	170.77	205.33	180	170.77	176.19



Comments :

Monitoring of Total organic carbon emissions Whole Installation

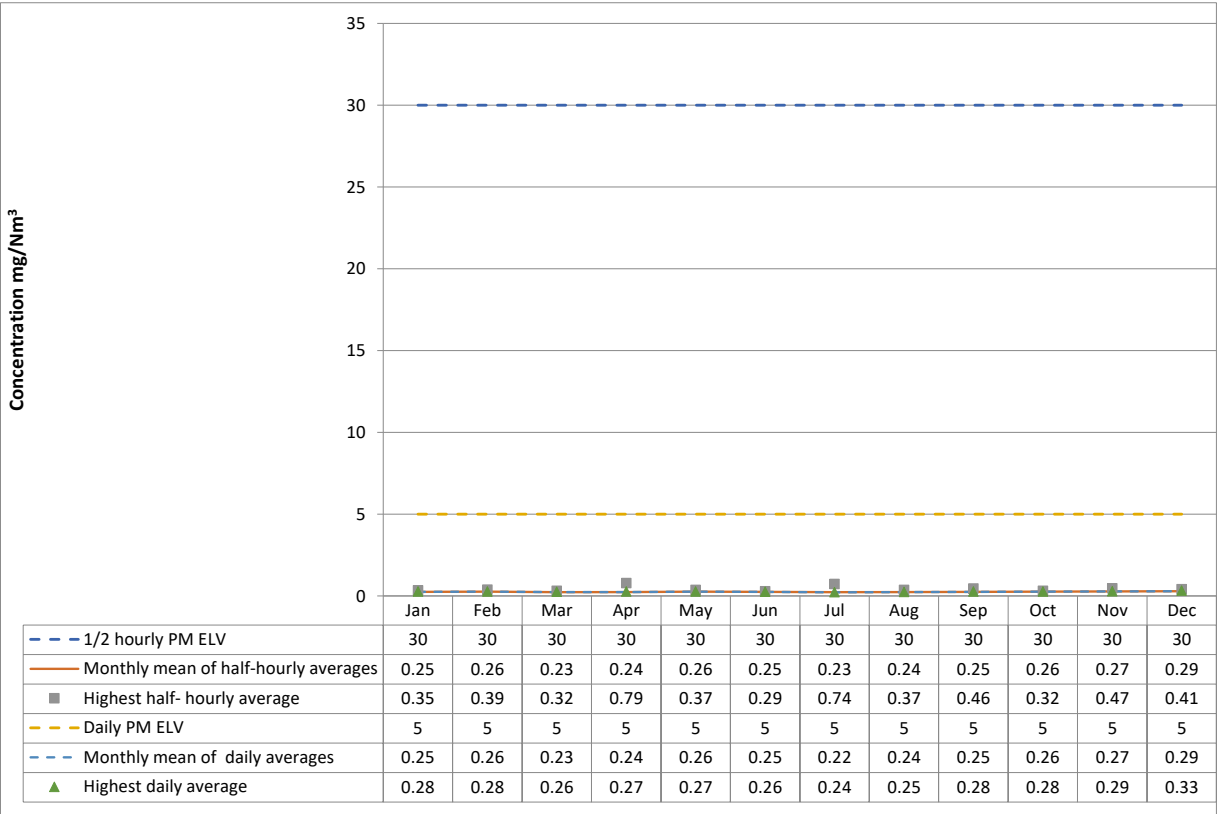
2024	1/2 Hourly Reference Periods			Daily Reference Periods		
mg/Nm ³	1/2 hourly TOC ELV	Monthly mean of half-hourly averages	Highest half-hourly average	Daily TOC ELV	Monthly mean of daily averages	Highest daily average
Jan	20	0.09	4.92	10	0.08	0.26
Feb	20	-0.11	2.74	10	-0.11	0
Mar	20	-0.2	0.74	10	-0.2	-0.08
Apr	20	-0.12	1.25	10	-0.12	-0.01
May	20	-0.05	1.05	10	-0.05	0.07
Jun	20	0.09	0.32	10	0.1	0.15
Jul	20	-0.1	3.07	10	-0.1	0.01
Aug	20	0.16	4.04	10	0.16	0.65
Sep	20	0.15	9.74	10	0.15	0.38
Oct	20	0.02	3.47	10	0.02	0.16
Nov	20	0.04	2.09	10	0.04	0.2
Dec	20	0.02	3.21	10	0.02	0.14



Comments :

Monitoring of Particulate matter emissions Whole Installation

2024	1/2 Hourly Reference Periods			Daily Reference Periods		
mg/Nm ³	1/2 hourly PM ELV	Monthly mean of half-hourly averages	Highest half-hourly average	Daily PM ELV	Monthly mean of daily averages	Highest daily average
Jan	30	0.25	0.35	5	0.25	0.28
Feb	30	0.26	0.39	5	0.26	0.28
Mar	30	0.23	0.32	5	0.23	0.26
Apr	30	0.24	0.79	5	0.24	0.27
May	30	0.26	0.37	5	0.26	0.27
Jun	30	0.25	0.29	5	0.25	0.26
Jul	30	0.23	0.74	5	0.22	0.24
Aug	30	0.24	0.37	5	0.24	0.25
Sep	30	0.25	0.46	5	0.25	0.28
Oct	30	0.26	0.32	5	0.26	0.28
Nov	30	0.27	0.47	5	0.27	0.29
Dec	30	0.29	0.41	5	0.29	0.33

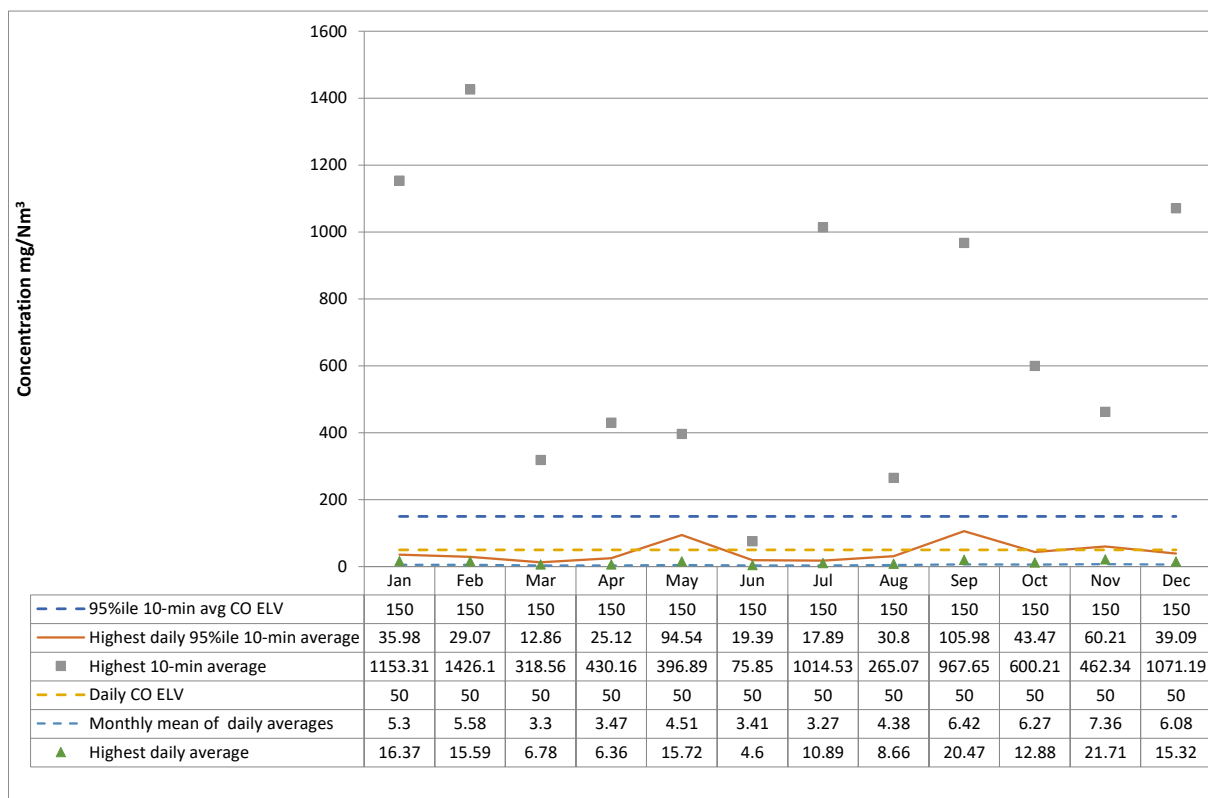


Comments :

Monitoring of Carbon Monoxide (10-minute avg)

Whole Installation

2024	10-minute Reference Periods				Daily Reference Periods		
	95%ile 10-min avg CO ELV	Highest daily 95%ile 10-min average	Monthly mean of 10-min averages	Highest 10-min average	Daily CO ELV	Monthly mean of daily averages	Highest daily average
Jan	150	35.98	5.26	1153.31	50	5.3	16.37
Feb	150	29.07	5.7	1426.1	50	5.58	15.59
Mar	150	12.86	3.3	318.56	50	3.3	6.78
Apr	150	25.12	3.47	430.16	50	3.47	6.36
May	150	94.54	4.51	396.89	50	4.51	15.72
Jun	150	19.39	3.66	75.85	50	3.41	4.6
Jul	150	17.89	3.28	1014.53	50	3.27	10.89
Aug	150	30.8	4.38	265.07	50	4.38	8.66
Sep	150	105.98	6.42	967.65	50	6.42	20.47
Oct	150	43.47	6.27	600.21	50	6.27	12.88
Nov	150	60.21	7.36	462.34	50	7.36	21.71
Dec	150	39.09	6.08	1071.19	50	6.08	15.32

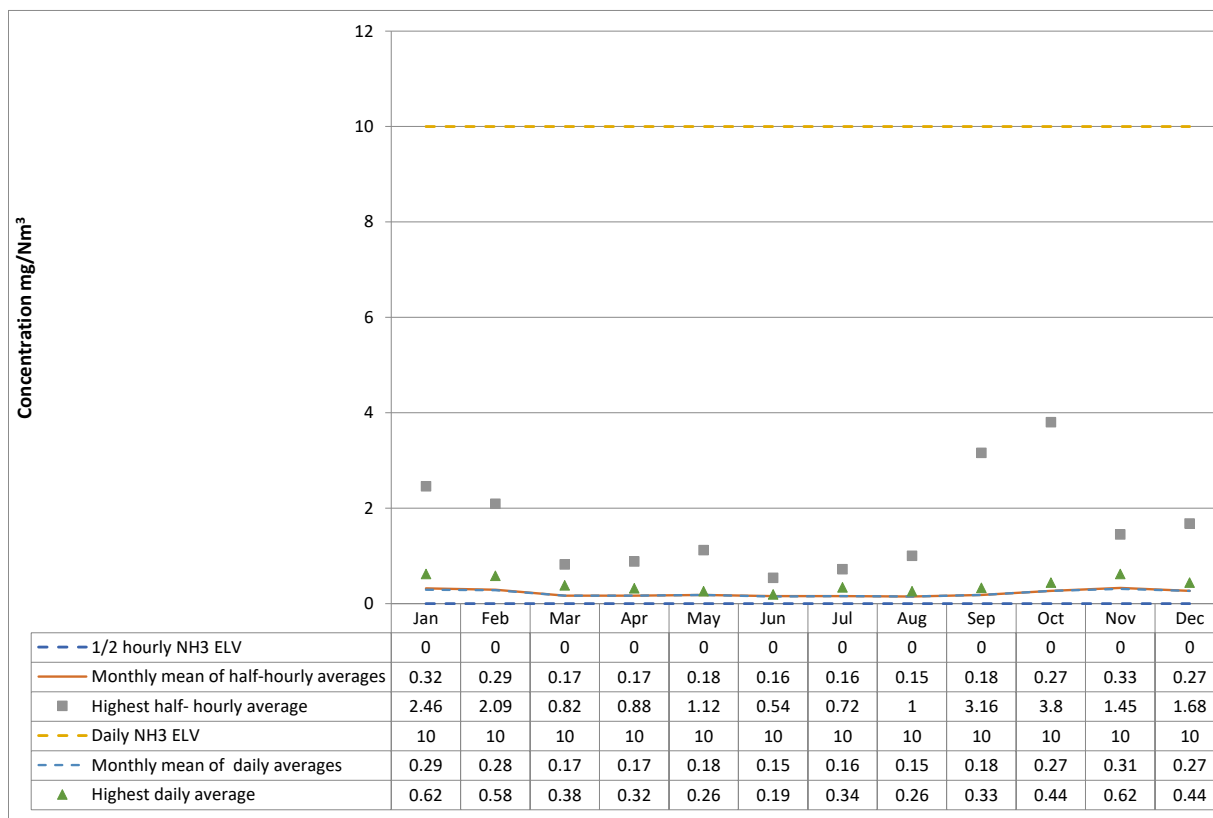
**Comments :**

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

2024	1/2 Hourly Reference Periods			Daily Reference Periods		
mg/Nm ³	1/2 hourly NH3 ELV	Monthly mean of half-hourly averages	Highest half-hourly average	Daily NH3 ELV	Monthly mean of daily averages	Highest daily average
Jan	None	0.32	2.46	10	0.29	0.62
Feb	None	0.29	2.09	10	0.28	0.58
Mar	None	0.17	0.82	10	0.17	0.38
Apr	None	0.17	0.88	10	0.17	0.32
May	None	0.18	1.12	10	0.18	0.26
Jun	None	0.16	0.54	10	0.15	0.19
Jul	None	0.16	0.72	10	0.16	0.34
Aug	None	0.15	1	10	0.15	0.26
Sep	None	0.18	3.16	10	0.18	0.33
Oct	None	0.27	3.8	10	0.27	0.44
Nov	None	0.33	1.45	10	0.31	0.62
Dec	None	0.27	1.68	10	0.27	0.44

**Comments :**

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