



Annual Performance Report 2023

Permit EPR/LP3030XA

Cardiff Energy Recovery Facility

Trident Park ERF

VIRIDOR TRIDENT PARK LTD

Year: 2023

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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

"Cardiff Energy Recovery Facility is located immediately north of Cardiff Docks. The facility will process approximately 22.96 tonnes of residual municipal and C&I waste per line, per hour and has the capability of exporting approximately 34MW of electrical power.

In accordance with the requirements of Condition 4.2.2, Schedule 4 and Table S4.1 of Permit EPR/LP3030XA issued by Natural Resources Wales to Viridor Waste Management Limited (Viridor) on 21 Decemeber 2022, Viridor is required to produce an annual performance report which is to be submitted to Natural Resources Wales by the 31 January (or as agreed in writing with Natural Resources Wales) each year.

Viridor took over the operation of the Plant on 31st January 2015.

This report summarises the environmental and performance data collected at the site 1st January – 31st December 2023 and fulfils the reporting requirement of Chapter IV, Article 55 (2) of the Industrial Emissions Directive.

Summary of Operational Processes and Procedures

Incoming waste is mainly received from local authorities that have joined together to form two contract hubs - Prosiect Gwyrdd and Tomorrows Valley, some waste is recieved from Pembrokeshire County Council and the rest of the waste is received from third party businesses. Waste is received into an enclosed waste bunker. The waste is loaded into one of two furnaces, which combust the waste at >850°C. The hot gases are put through a variety of heat exchangers used to heat demineralised water to create superheated steam which drives a turbine generator. The turbine generator produces around 37MWh and exports around 33MWh. Combusted waste (incinerator bottom ash) is sent to a third party for further processing. The gases are treated with Lime, Activated carbon and Urea to remove potential pollution leaving the stacks. The powder containing reacted gas particulates (APCr) is removed and sent via a third party for reprocessing. Emissions are monitored via Continuous Emissions Monitoring equipment (CEMs) that are serviced by a contractor.

Operational Data

Plant Size	425,000 tonnes pa	MWth	MWe
No. of combustion lines	2	No. of Turbines:	1

Waste types received	Unit	Q1	Q2	Q3	Q4	Year Total	%
Household / Local Authority	tonnes	66,396	58,793	60,776	62,536	248,500	61.5%
Commercial & Industrial		40,212	28,165	44,413	42,994	155,785	38.5%
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		106,608	86,958	105,189	105,530	404,285	
Rejected Waste						-	-
Unprocessed waste transferred out						-	-
Total waste combusted **		109,584	88,315	103,503	109,511	410,913	

Energy Usage / Export	Unit	Q1	Q2	Q3	Q4	Year Total	KWh/te
Power Generated	MWh	79,135	59,040	78,063	80,642	296,880	722
Power Exported		70,842	52,601	69,251	71,762	264,456	644
Power Used on site		8,213	5,219	8,719	8,834	30,985	75
Power Imported		80	1,220	93	46	1,439	4
Parasitic Load	%	10.6%	12.7%	11.4%	11.1%	11.4%	
Thermal Energy Produced ***	MWh					-	-
Thermal Energy Exported ***						-	-
R1 value (if applicable)	R1					0.8	

Waste Disposal & Recovery	Unit	Q1	Q2	Q3	Q4	Year Total	% inputs
APC Residues - produced	tonnes	1,148	981	1,149	1,202	4,481	1.1%
IBA - produced		18,795	15,505	17,973	19,193	71,466	17.4%
Metals recycling		234	224	207	206	872	0.2%
Other		-	-	-	-	-	-
Other		-	-	-	-	-	-
Other		-	-	-	-	-	-

Raw Material Usage	Unit	Q1	Q2	Q3	Q4	Year Total	kg or Ltr /te
Mains Water	ltrs	16,066,000	#####	#####	#####	67,394,000	164.01
Other Water	ltrs					-	-
Ammonia	kgs					-	-
Urea	kgs	113,000	69,000	111,000	143,460	436,460	1.06
Activated Carbon	kgs	40,000	34,000	44,000	50,600	168,600	0.41
Lime / hydrated lime	kgs	1,617,000	#####	#####	1,796,000	6,413,000	15.61
Fuel oil	ltrs	98,775	161,280	90,963	92,727	443,745	1.08
Gas	cuf	-	-	-	-	-	-
Other						-	-

Summary	Line/Unit	Q1	Q2	Q3	Q4	Year Total	
1		2,129	1,701	2,058	2,141	8,028	91.6%
2		2,007	1,722	2,140	2,137	8,005	91.4%
Availability of waste combustion by line, hrs ****	3					-	0.0%
	4					-	0.0%
	5					-	0.0%
Overall Availability, mean avg. of all lines, hrs		2,068	1,711	2,099	2,139	3,207	36.6%
Hours of turbine operations, hrs	1	2,128	1,645	2,179	2,189	8,141	92.9%
Hours of turbine operations, hrs	2	-	-	-	-	-	0.0%
Hours of heat / steam export		-	-	-	-	-	n/a
Net Calorific Value of waste	MJ/kg	9	10	10	9	10	
Abnormal Events	qty.	2	-	-	-	2	yes
Abnormal operation	hours	2	-	-	-	2	0.0%
Permit Breaches	qty.	2	-	1	-	3	yes

Summary of Plant Operations and Maintenance during the reporting year

The main purpose of the facility is to burn non-hazardous municipal, commercial and industrial waste and to recover energy by producing steam. The steam will be used to produce electricity for export to the local grid and has the potential for further heat export to local consumers. The installation includes waste receipt and storage, two waste combustion units with associated waste heat boilers and exhaust gas abatement systems, on-site storage of residues and all systems for controlling and monitoring incinerator operation. The plant is designed to process approximately 26.48 tonnes per hour in two parallel and identical combustion units. Taking into account the expected long term availability of the facility, the annual permitted throughput of the facility is 425,000 tonnes of waste per annum.

The incoming municipal waste is loaded into the furnace via a feed hopper from the reception hall, where the waste vehicles deposit their loads into the storage bunker. After entering the combustion chamber via the refuse feed ram the waste is allowed to fall onto the grate in a controlled manner. The moving grate mechanisms are used to agitate the waste as it progresses down to the ash discharger. As the waste moves along, primary air is introduced from beneath the grate causing the waste to go through a series of drying and burning areas. Secondary air is introduced from above the grate for combustion control. An auxiliary oil fired burner is located in each combustion chamber to both establish minimum temperature on start up and to maintain the combustion gas temperature at a minimum of 850°C for 2 seconds in the combustion chamber before passing to the boiler, economiser and abatement plant. The furnace is equipped with a water tube boiler raising steam at 60 bar and 400°C. Economisers are fitted down stream of the boiler unit to pre-heat the incoming feed water. Each furnace unit is fitted with an independent dry urea injection system in order to reduce the facility's emissions of Oxides of Nitrogen (NOx) to air through selective non-catalytic reduction. A dry hydrated lime flue gas treatment system is used to neutralise acid flue gases with the injection of lime reagent into the reaction chamber. Activated carbon is injected into the flue gas stream in order to reduce the concentrations of heavy metals and dioxins in the combustion gases emitted to air. Bag filters are used to separate out the resulting particulate matter from the cooled and treated gases. The facility has a 90m stack containing the separate flue gas streams from each combustion unit, via which the combustion gases are released to air. Each flue gas stream is equipped with a Continuous Emission Monitoring System (CEMS) which continuously monitor for particulates, carbon monoxide (CO), ammonia (NH3), sulphur dioxide (SO2), hydrogen chloride (HCl), oxygen (O2), nitrogen oxides (NOx) and volatile organic compounds (VOC's).

There is a discharge of process effluent to sewer in accordance with a Trade Effluent Consent issued by Dwr Cymru Welsh Water. Uncontaminated surface and roof waters are discharged to the surface water drainage system via a series of interceptors, attenuation lagoons and isolation valves.

Trident Park's annual plant maintenance outage was held from 5 June to 6 July 2023. During this period planned maintenance and repair of equipment was undertaken.

Summary of Residue Handling for the reporting year

Bottom ash from the incinerator grate is quenched with water and then conveyed via a metals extraction system to a concrete storage area prior to removal from site.

Air pollution control residues (APCr) from the bag filter systems are collected continuously and stored in two dedicated silos. APCr is collected by direct transfer from the on site silos into transport tanker and goes to either for reprocessing or disposal. When taken for reprocessing APCr is taken through accelerated carbonation technology. These carbonated wastes are blended with binders and fillers and pelletised to form an aggregate. If APCr is sent for disposal it is placed within a hazardous waste cell in the landfill.



2023 Annual Reporting Performance Form 1

Permit EPR/LP3030XA

Operator: VIRIDOR TRIDENT PARK LTD

Facility: Cardiff Energy 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	D05.03	1,491.7		0.4%
APC Residues	R05.04		2,988.9	0.7%
				-
				-
Total Hazardous Waste		1,491.7	2,988.9	1.1%
2) Non-Hazardous Wastes				
IBA	R05		71,465.8	17.4%
Ferrous Metal	R04		872.0	0.2%
Process Water			13,665.0	3.3%
Non-Processable	D05.02	24.7		0.0%
				-
Total Non-Hazardous Waste		24.7	86,002.7	20.9%
TOTAL WASTE		1,516.4	88,991.6	22.0%

Operator's comments :

2023 Annual Reporting of Water and Other Raw Material Usage

Raw Material	Usage	Unit	Specific Usage	Unit
Mains Water	67394	m ³	0.16	m ³ /te
Total Water	67394	m ³	0.16	m ³ /te
Urea / Ammonia	436460	kg	1.06	kg/te
Activated Carbon	168600	kg	0.41	kg/te
Lime / hydrated lime / Sodium Bicarb.	6413000	kg	15.61	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	8028	8005				8141	
Number of periods of abnormal operation, qty.	2	0					
Cumulative hours of abnormal operation for this year, hours	1.5	0					

Operator's comments :

Signed: _____

Date: 29/01/2024

2023 Annual Reporting of Energy Usage/Export

Permit EPR/LP3030XA

Operator: VIRIDOR TRIDENT PARK LTD

Facility: Cardiff Energy 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	296,880	MWh	722
Electricity Imported	1439	MWh	4
Electricity Exported	264,456	MWh	644
Gas Oil	443	tonnes	
Steam/hot water exported	0	GWh	-

Operator's comments :

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Signed: 

Date: 29/01/2024

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	100%	100.00%
Oxides of nitrogen	100%	100.00%
Sulphur dioxide	100%	100.00%
Carbon monoxide	xx.xx % or 100.00% 95% of 10-min averages	100.00%
Total organic carbon	99.99%	100.00%
Hydrogen chloride	99.99%	100.00%
Hydrogen fluoride	100.00%	100.00%
	xx.xx %	xx.xx %

Summary of any notifications or non-compliances under the permit

Date	Summary of notification or non-compliance [including Line/Reference] ^{Note 2}	Reason	Measures taken to prevent reoccurrence
11/01/2023	Line 1 . Half hour VOC schedule 5	Power supply lost to common MCC board	Replacement power supplies installed
19/02/2023	Line 1 HCl 60 mins abnormal operation		
21/02/2023	Emission testing schedule 5	Periodic emissions testing	Isolated event
06/03/2023	Line 1 HCl 30 mins abnormal operation		
18/09/2023	Line 2 Half hour HCl schedule 5	Waste composition	Targetted waste inspections

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

Date	Summary of complaint [including Line/Reference]	Reason *	Measures taken to prevent reoccurrence
05/10/2023	Photo of stack emission	Not substantiated by NRW	

* including whether substantiated by the
operator or the EA

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

Lighting within the Tipping Hall have changed from fluorescent bulbs to LED lighting.

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

Historical Improvement Conditions (ICs) associated with the ERFs Environmental Permit EPR/LP3030XA/v007 were completed prior to 21 December 2022. Additional ICs have been included within the variation v008 dated 21 December 2022. IC6 OTNOC Management Plan, IC7 Results of NOx trial, IC8 results of mercurising monitoring, IC9 and IC10 Report demonstrates viability of CHP have all been submitted during 2023.

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 during 2023.

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

No significant improvements have occurred. The operations and engineering elements have remained constant.

Details of Public & Stakeholder Liasion

Summary of events held during the reporting year.	
Date	Description
10_01_2023	Community Liasion Meeting held on site
18_04_2023	Community Liasion Meeting held on site
11_07_2023	Community Liasion Meeting held on site
10_10_2023	Community Liasion Meeting held on site

List of events planned for next year	
Date	Description
Jan-24	Meeting to be held on-site conditions permitting
Apr-24	Meeting to be held on-site conditions permitting
Jul-24	Meeting to be held on-site conditions permitting
Oct-24	Meeting to be held on-site conditions permitting
	2 open dates are scheduled to be held during 2024. Dates are "to be confirmed".

If you wish to be involved in the public liasion programme, please contact [REDACTED] or [REDACTED]

Carbon dioxide emissions and biogenic content of waste inputs

Carbon dioxide emissions (all types of plant)

Annual mass of carbon dioxide released	tonnes	357500
Annual mass of carbon dioxide released per tonne of waste burned	t CO ₂ / t waste	1
Annual mass of carbon dioxide released per MWh of energy exported	t CO ₂ / MWh export	1
Description of how annual carbon dioxide mass emission has been calculated. See Note 1	Calibrated CEMS equipment and CDAS Reporting software	

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

Annual mass emissions of nitrous oxide	tonnes N ₂ O	14
Description of how annual nitrous oxide mass emission has been calculated See Note 2	Calibrated CEMS equipment and CDAS Reporting software	
Annual carbon dioxide and nitrous oxide emissions. Note 3.	tonnes CO ₂ e	361,522

Biogenic CO₂ emissions (See Note 4)

Percentage of total carbon dioxide emissions arising from biogenic waste	%	51.4%%
No. of measurements undertaken	Number	1
Description of how percentage biogenic carbon dioxide emissions have been measured or calculated. See Note 5	Waste sample and laboratory analysis undertaken by Marchwood	

Biogenic fraction of waste feedstock (See Note 4)

Yearly average biogenic percentage of the waste by net calorific value (NCV)	%	51.4%
If sampling undertaken, no. of samples used to ascertain average biogenic % above		1

Description of how biogenic percentage (by NCV) has been calculated or estimated. See Note 6	Waste sample and laboratory analysis undertaken by Marchwood
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Comments:

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Residue Quality Monitoring Requirements

Summary of monitoring undertaken and compliance
IBA sampling undertaken in accordance with ESA protocol.

Commentary on any specific events	
Date & Event	Description

Residue Quality Monitoring Results			
Parameter (unit)	Limit	Normal Operation	
		Bottom ash	APC Residues
Loss on Ignition (average %)	<5%	2.03	
Total Organic Carbon (average %)	<3%	1.57	
No. of Assessments Undertaken	—	33	4
No. of Hazardous Results	—	0	

Comments :
Additional IBA samples were undertaken to achieve Improvement Condition (NOx trial) within Environment

Emissions to Water

Summary of monitoring undertaken and compliance
Sampling of Trade Effluent Discharge undertaken by DWR CYMRU WELSH WATER on a monthly frequency.

Commentary on any specific events

Date & Event	Description

Emissions to Water / Sewer

Parameter	Monitoring Frequency	Limit	Target	Max.	Average
Trade Effluent Discharge Consent	Monthly				

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	A4	A5
Hydrogen fluoride	1 hr	2 mg/m ³	0.027	0.049			
Cd and Th and their compounds	0.5-8hrs	0.05 mg/m ³	0.0004	0.0004			
Hg and its compounds	0.5-8hrs	0.05 mg/m ³	0.0131	0.0076			
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V and their compounds	0.5-8hrs	0.5 mg/m ³	0.0391	0.035			
Dioxins & Furans (I-TEQ)	6-8hrs	0.1 ng/m ³	0.0412	0.0418			
PCBs (WHO-TEQ Humans / Mammals)	6-8hrs	None set ng/m ³	0.0041	0.0027			
PCBs (WHO-TEQ Fish)	6-8hrs	None set ng/m ³	0.0002	0.0001			
PCBs (WHO-TEQ Birds)	6-8hrs	None set ng/m ³	0.0069	0.0023			
Dioxins & Furans (WHO-TEQ Humans / Mammals)	6-8hrs	None set ng/m ³	0.0382	0.0373			
Dioxins & Furans (WHO-TEQ Fish)	6-8hrs	None set ng/m ³	0.0433	0.0445			
Dioxins & Furans (WHO-TEQ Birds)	6-8hrs	None set ng/m ³	0.0886	0.079			
Anthanthrene	6-8hrs	None set µg/m ³	<0.001	<0.0011			
Benzo(a)anthracene	6-8hrs	None set µg/m ³	< 0.001	<0.0011			
Benzo(a)pyrene	6-8hrs	None set µg/m ³	<0.001	<0.0011			
Benzo(b)fluoranthene	6-8hrs	None set µg/m ³	< 0.001	<0.0011			
Benzo(b)naphtho(2,1-d)thiophene	6-8hrs	None set µg/m ³	<0.001	<0.0011			
Benzo(c)phenanthrene	6-8hrs	None set µg/m ³	<0.001	<0.0011			
Benzo(ghi)perylene	6-8hrs	None set µg/m ³	< 0.001	<0.0011			
Benzo(k)fluoranthene	6-8hrs	None set µg/m ³	<0.001	<0.0011			
Cholanthrene	6-8hrs	None set µg/m ³	<0.001	<0.0011			
Chrysene	6-8hrs	None set µg/m ³	< 0.001	<0.0011			
Cyclopenta(cd)pyrene	6-8hrs	None set µg/m ³	<0.001	<0.0011			
Dibenzo(ai)pyrene	6-8hrs	None set µg/m ³	<0.001	<0.0011			
Dibenzo(ah)anthracene	6-8hrs	None set µg/m ³	<0.001	<0.0011			
Fluoranthene	6-8hrs	None set µg/m ³	0.02	0.01			
Indeno(123-cd) pyrene	6-8hrs	None set µg/m ³	<0.001	<0.0011			
Naphthalene	6-8hrs	None set µg/m ³	0.15	0.11			
Comments :							

Emissions to Air (continuously monitored)

Summary of monitoring undertaken, standards used and compliance												

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	200 mg/m ³	191.08	177.639	199.04	173.912						
	½ hourly mean	400 mg/m ³	328.83	177.718	271.26	174.107						
Particulates	Daily mean	10 mg/m ³	1.97	0.5625	2.3	0.4825						
	½ hourly mean	30 mg/m ³	4.09	0.56167	8.82	0.48333						
Total Organic Carbon	Daily mean	10 mg/m ³	0.51	0.1025	1.48	0.3175						
	½ hourly mean	20 mg/m ³	85.81	0.099167	11.09	0.3075						
Hydrogen chloride	Daily mean	10 mg/m ³	9.44	8.60167	9.41	8.3						
	½ hourly mean	60 mg/m ³	143.59	8.5925	68.16	8.23667						
Sulphur dioxide	Daily mean	50 mg/m ³	31.89	19.5408	33.43	13.9183						
	½ hourly mean	200 mg/m ³	166.26	19.5675	92.45	13.9933						
Carbon monoxide	Daily mean	50 mg/m ³	21.36	2.0375	39.18	6.15333						
	½ hourly mean *	100 mg/m ³ *	NA	NA	NA	NA						
	95%ile 10-min avg *	150 mg/m ³ *	6252.21	13.7367	3874.27	48.07						
Ammonia	Daily mean	No limit set until 03/12/23	6.84	1.585	6.28	1.178						
** = delete as appropriate, depending on whether your plant has half-horly or 10-min CO ELVs												

Comments :

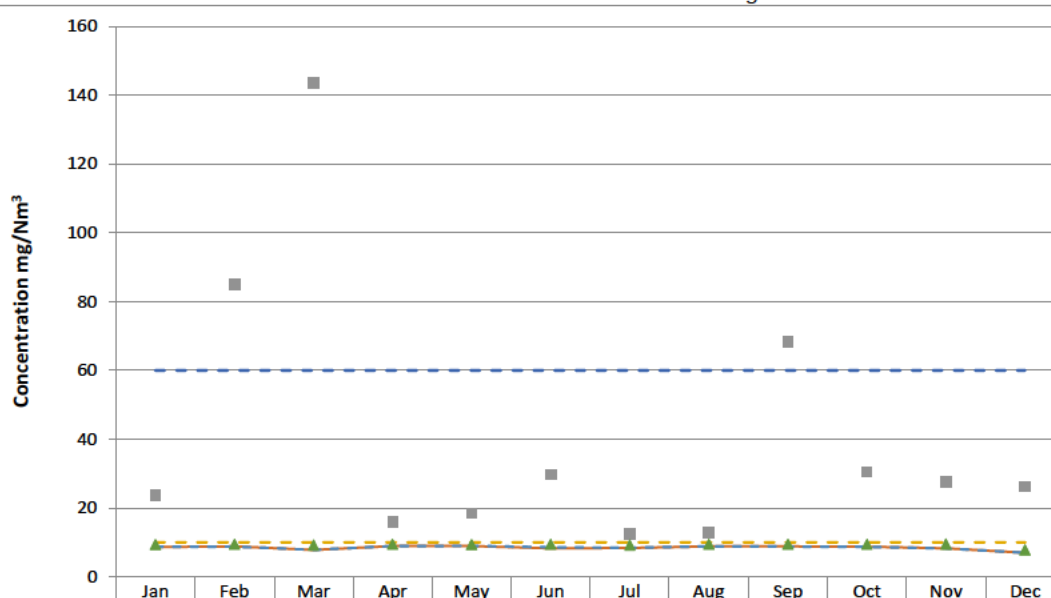
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Monitoring of Hydrogen Chloride emissions

Whole Installation

See Notes in Cell Q3

mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
2023	1/2 hourly HCl ELV	Monthly 1/2 hourly mean	Highest 1/2 hourly maximum	Daily HCl ELV*	Monthly daily mean	Highest daily maximum
Jan	60	8.61	23.77	10	8.68	9.3
Feb	60	8.83	84.93	10	8.76	9.41
Mar	60	7.76	143.59	10	7.76	9.16
Apr	60	8.9	15.96	10	8.94	9.36
May	60	8.92	18.45	10	8.96	9.34
Jun	60	8.23	29.64	10	8.53	9.39
Jul	60	8.36	12.38	10	8.39	9.16
Aug	60	8.81	12.73	10	8.81	9.39
Sep	60	8.8	68.16	10	8.77	9.38
Oct	60	8.72	30.33	10	8.73	9.39
Nov	60	8.18	27.48	10	8.2	9.44
Dec	60	6.93	26.13	10	6.96	7.79

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

--- 1/2 hourly HCl ELV	60	60	60	60	60	60	60	60	60	60	60	60
— Monthly 1/2 hourly mean	8.61	8.83	7.76	8.9	8.92	8.23	8.36	8.81	8.8	8.72	8.18	6.93
■ Highest 1/2 hourly maximum	23.77	84.93	143.59	15.96	18.45	29.64	12.38	12.73	68.16	30.33	27.48	26.13
--- Daily HCl ELV*	10	10	10	10	10	10	10	10	10	10	10	10
--- Monthly daily mean	8.68	8.76	7.76	8.94	8.96	8.53	8.39	8.81	8.77	8.73	8.2	6.96
▲ Highest daily maximum	9.3	9.41	9.16	9.36	9.34	9.39	9.16	9.39	9.38	9.39	9.44	7.79

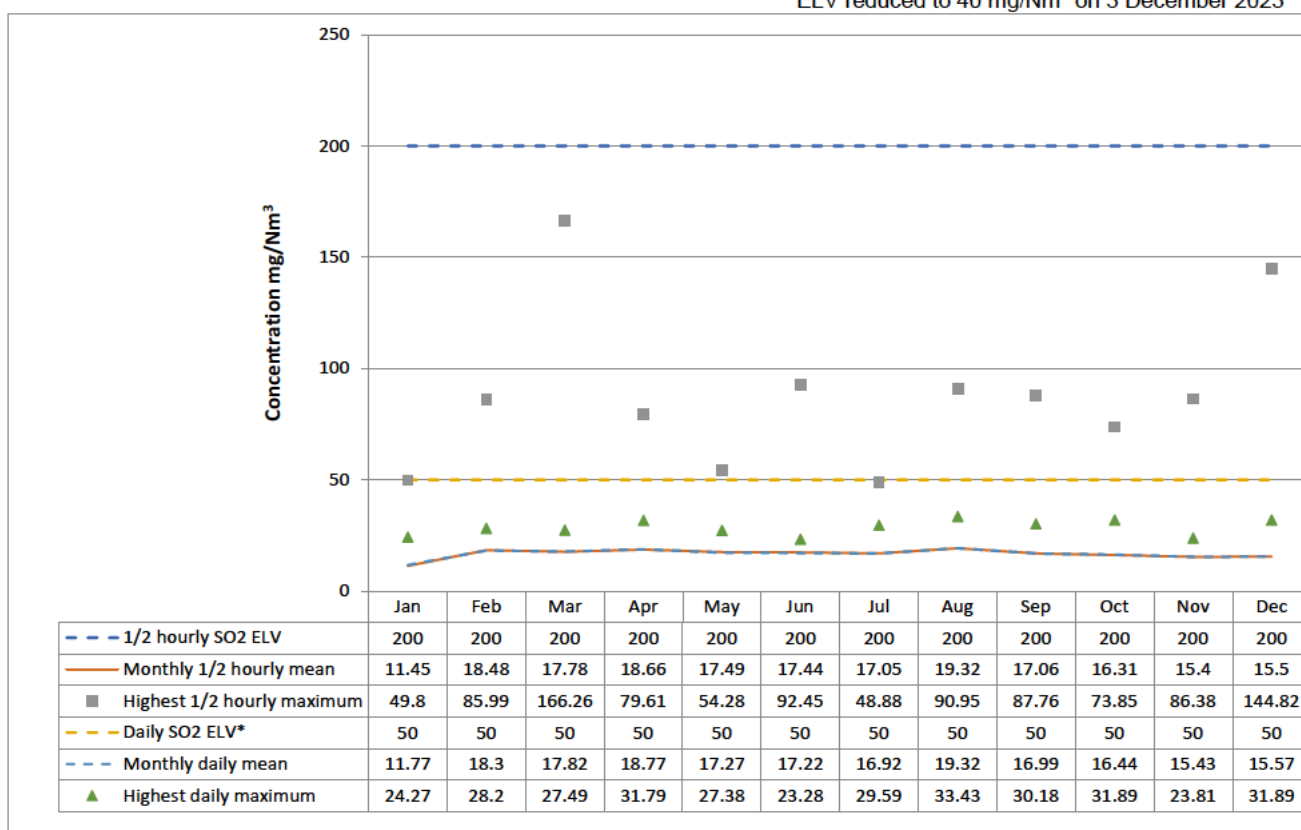
Comments :

Monitoring of Sulphur dioxide emissions

Whole Installation

See Notes in Cell Q3

mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
2023	1/2 hourly SO ₂ ELV	Monthly 1/2 hourly mean	Highest 1/2 hourly maximum	Daily SO ₂ ELV*	Monthly daily mean	Highest daily maximum
Jan	200	11.45	49.8	50	11.77	24.27
Feb	200	18.48	85.99	50	18.3	28.2
Mar	200	17.78	166.26	50	17.82	27.49
Apr	200	18.66	79.61	50	18.77	31.79
May	200	17.49	54.28	50	17.27	27.38
Jun	200	17.44	92.45	50	17.22	23.28
Jul	200	17.05	48.88	50	16.92	29.59
Aug	200	19.32	90.95	50	19.32	33.43
Sep	200	17.06	87.76	50	16.99	30.18
Oct	200	16.31	73.85	50	16.44	31.89
Nov	200	15.4	86.38	50	15.43	23.81
Dec	200	15.5	144.82	50	15.57	31.89

* ELV reduced to 40 mg/Nm³ on 3 December 2023

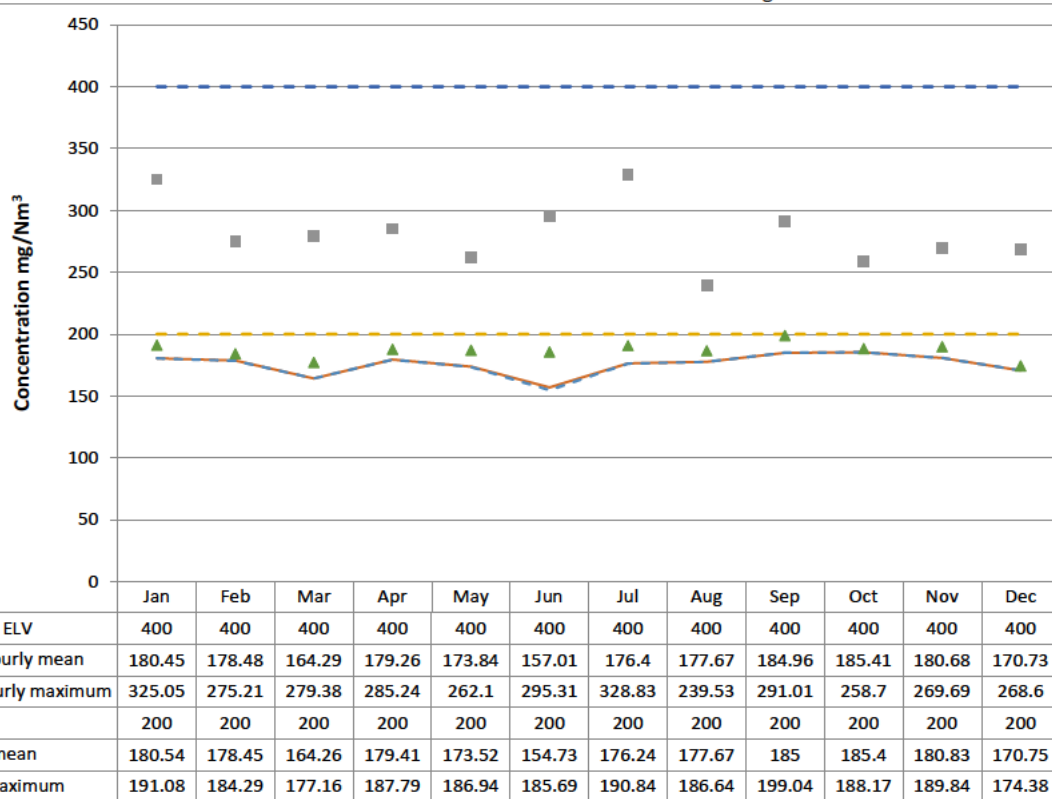
Comments :

Monitoring of Oxides of Nitrogen emissions

Whole Installation

See Notes in Cell Q3

mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
2023	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	180.45	325.05	200	180.54	191.08
Feb	400	178.48	275.21	200	178.45	184.29
Mar	400	164.29	279.38	200	164.26	177.16
Apr	400	179.26	285.24	200	179.41	187.79
May	400	173.84	262.1	200	173.52	186.94
Jun	400	157.01	295.31	200	154.73	185.69
Jul	400	176.4	328.83	200	176.24	190.84
Aug	400	177.67	239.53	200	177.67	186.64
Sep	400	184.96	291.01	200	185	199.04
Oct	400	185.41	258.7	200	185.4	188.17
Nov	400	180.68	269.69	200	180.83	189.84
Dec	400	170.73	268.6	200	170.75	174.38

* ELV reduced to 180 mg/Nm³ on 3 December 2023

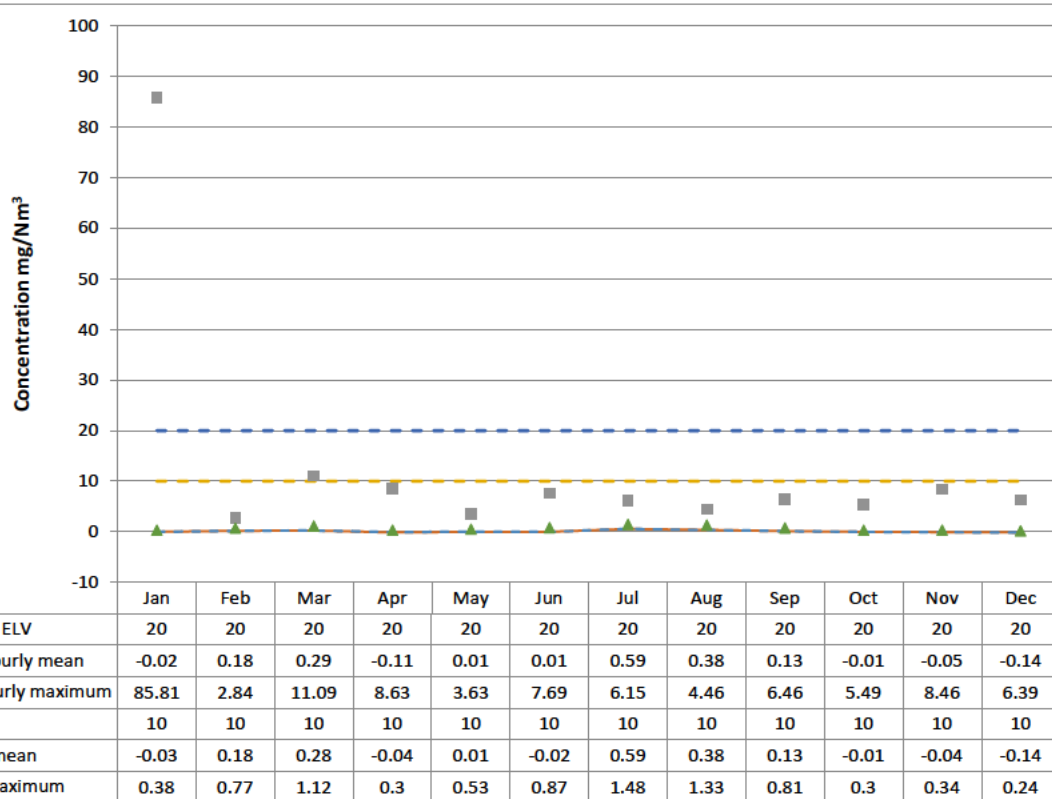
Comments :

Monitoring of Total organic carbon emissions

Whole Installation

See Notes in Cell Q3

mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
2023	1/2 hourly TOC ELV	Monthly 1/2 hourly mean	Highest 1/2 hourly maximum	Daily TOC ELV	Monthly daily mean	Highest daily maximum
Jan	20	-0.02	85.81	10	-0.03	0.38
Feb	20	0.18	2.84	10	0.18	0.77
Mar	20	0.29	11.09	10	0.28	1.12
Apr	20	-0.11	8.63	10	-0.04	0.3
May	20	0.01	3.63	10	0.01	0.53
Jun	20	0.01	7.69	10	-0.02	0.87
Jul	20	0.59	6.15	10	0.59	1.48
Aug	20	0.38	4.46	10	0.38	1.33
Sep	20	0.13	6.46	10	0.13	0.81
Oct	20	-0.01	5.49	10	-0.01	0.3
Nov	20	-0.05	8.46	10	-0.04	0.34
Dec	20	-0.14	6.39	10	-0.14	0.24



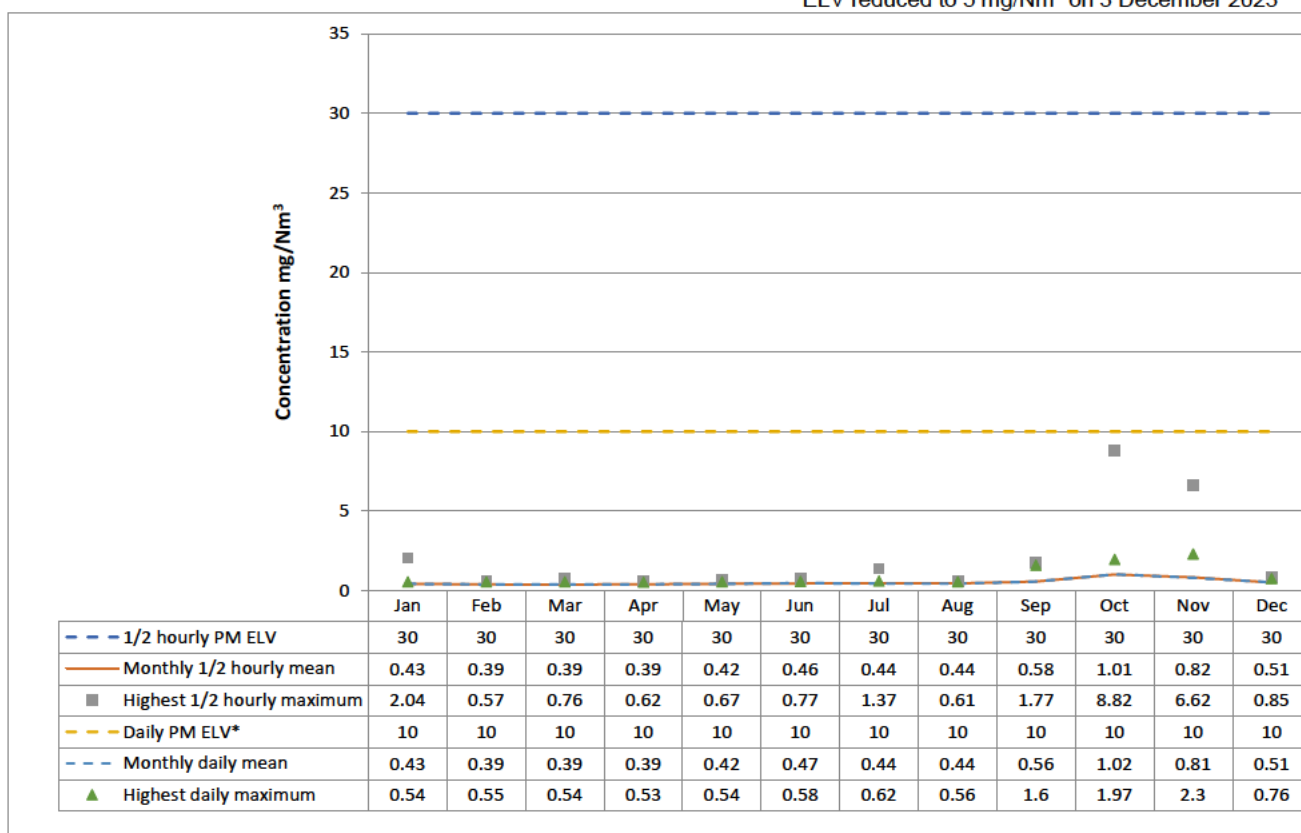
Comments :

Monitoring of Particulate matter emissions

Whole Installation

See Notes in Cell Q3

mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
	1/2 hourly PM ELV	Monthly 1/2 hourly mean	Highest 1/2 hourly maximum	Daily PM ELV*	Monthly daily mean	Highest daily maximum
2023						
Jan	30	0.43	2.04	10	0.43	0.54
Feb	30	0.39	0.57	10	0.39	0.55
Mar	30	0.39	0.76	10	0.39	0.54
Apr	30	0.39	0.62	10	0.39	0.53
May	30	0.42	0.67	10	0.42	0.54
Jun	30	0.46	0.77	10	0.47	0.58
Jul	30	0.44	1.37	10	0.44	0.62
Aug	30	0.44	0.61	10	0.44	0.56
Sep	30	0.58	1.77	10	0.56	1.6
Oct	30	1.01	8.82	10	1.02	1.97
Nov	30	0.82	6.62	10	0.81	2.3
Dec	30	0.51	0.85	10	0.51	0.76

* ELV reduced to 5 mg/Nm³ on 3 December 2023

Comments :

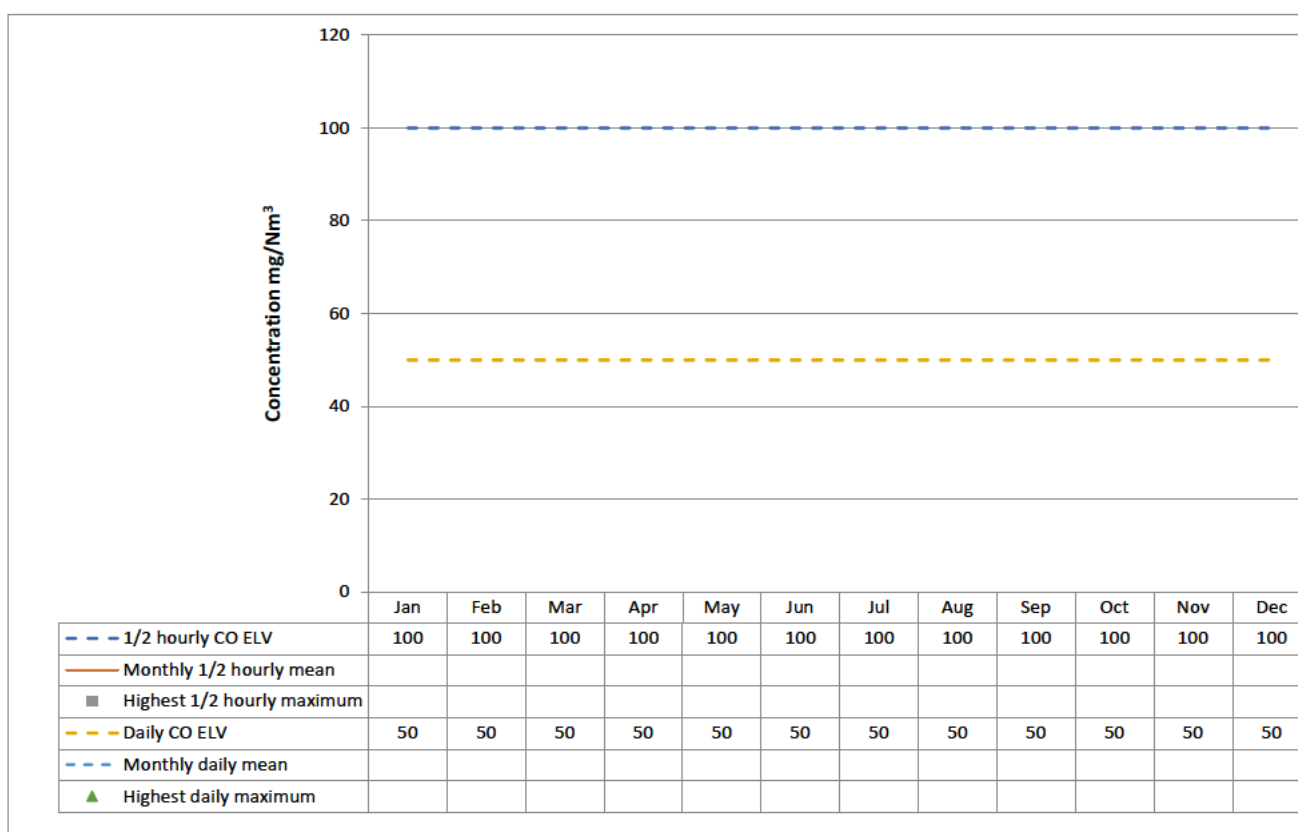
Monitoring of Carbon Monoxide (half hourly)

Whole Installation

See Notes in Cell Q3

Please complete this tab for your plant if you have 1/2 hourly CO ELVs; otherwise, leave it blank and complete the CO 95% 10 min tab

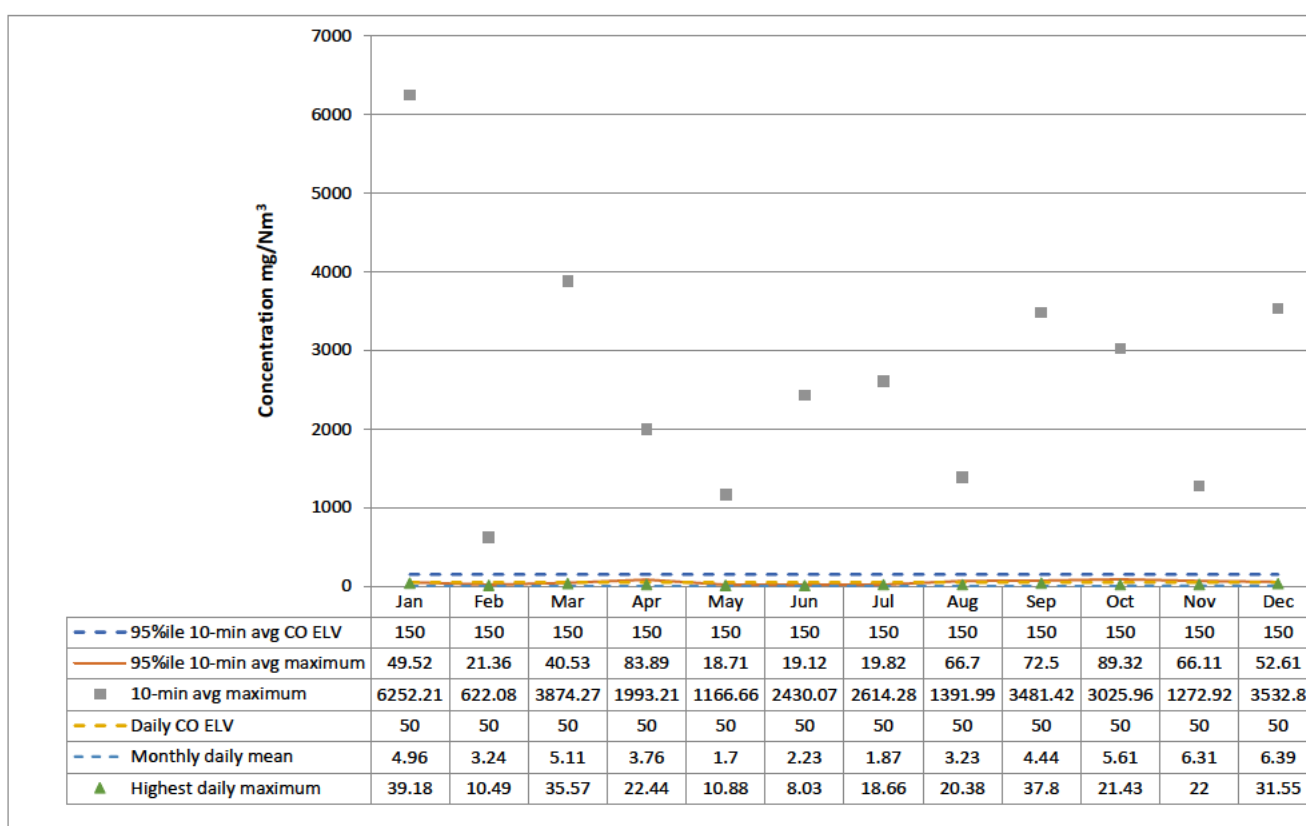
mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
2023	1/2 hourly CO ELV	Monthly 1/2 hourly mean	Highest 1/2 hourly maximum	Daily CO ELV	Monthly daily mean	Highest daily maximum
Jan	100			50		
Feb	100			50		
Mar	100			50		
Apr	100			50		
May	100			50		
Jun	100			50		
Jul	100			50		
Aug	100			50		
Sep	100			50		
Oct	100			50		
Nov	100			50		
Dec	100			50		



Comments :

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

mg/Nm ³	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
2023							
Jan	150	49.52	6.42	6252.21	50	4.96	39.18
Feb	150	21.36	3.23	622.08	50	3.24	10.49
Mar	150	40.53	5.64	3874.27	50	5.11	35.57
Apr	150	83.89	3.74	1993.21	50	3.76	22.44
May	150	18.71	1.78	1166.66	50	1.7	10.88
Jun	150	19.12	4.3	2430.07	50	2.23	8.03
Jul	150	19.82	1.87	2614.28	50	1.87	18.66
Aug	150	66.7	3.23	1391.99	50	3.23	20.38
Sep	150	72.5	5.05	3481.42	50	4.44	37.8
Oct	150	89.32	5.9	3025.96	50	5.61	21.43
Nov	150	66.11	6.33	1272.92	50	6.31	22
Dec	150	52.61	6.88	3532.8	50	6.39	31.55



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.

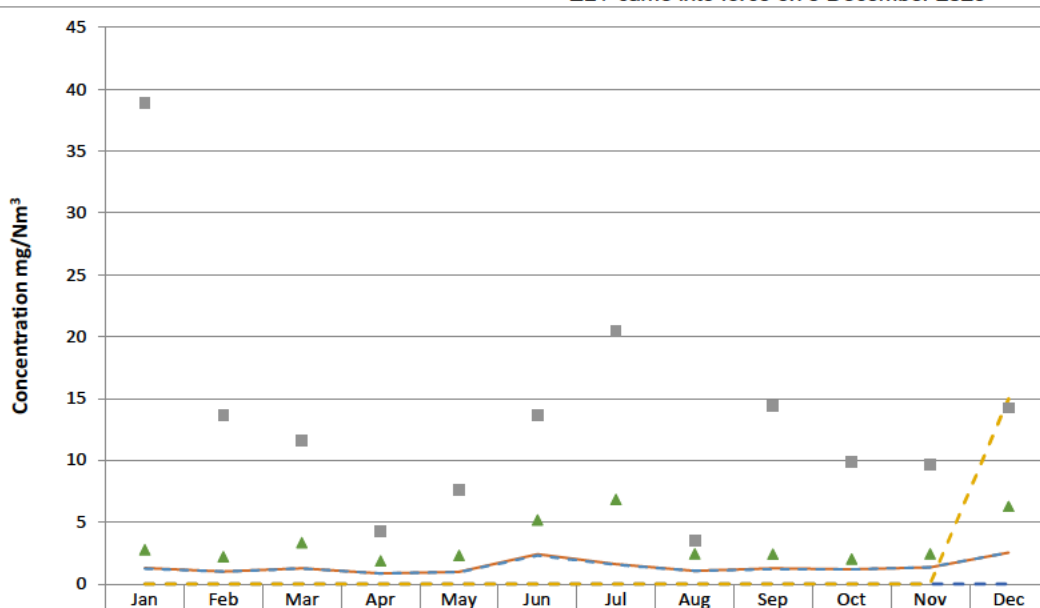
Monitoring of Ammonia emissions

Whole Installation

See Notes in Cell Q3

mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
2023	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	1.3	38.92	None	1.24	2.78
Feb	None	1.02	13.65	None	1.01	2.2
Mar	None	1.26	11.59	None	1.27	3.35
Apr	None	0.87	4.27	None	0.86	1.87
May	None	0.99	7.61	None	0.96	2.31
Jun	None	2.42	13.62	None	2.3	5.17
Jul	None	1.62	20.49	None	1.55	6.84
Aug	None	1.06	3.5	None	1.06	2.44
Sep	None	1.26	14.42	None	1.2	2.4
Oct	None	1.21	9.91	None	1.19	2.03
Nov	None	1.36	9.63	None	1.36	2.45
Dec	None	2.54	14.25	15	2.54	6.28

* ELV came into force on 3 December 2023



1/2 hourly NH3 ELV	0	0	0	0	0	0	0	0	0	0	0	0
Monthly 1/2 hourly mean	1.3	1.02	1.26	0.87	0.99	2.42	1.62	1.06	1.26	1.21	1.36	2.54
Highest 1/2 hourly maximum	38.92	13.65	11.59	4.27	7.61	13.62	20.49	3.5	14.42	9.91	9.63	14.25
Daily NH3 ELV*	0	0	0	0	0	0	0	0	0	0	0	15
Monthly daily mean	1.24	1.01	1.27	0.86	0.96	2.3	1.55	1.06	1.2	1.19	1.36	2.54
Highest daily maximum	2.78	2.2	3.35	1.87	2.31	5.17	6.84	2.44	2.4	2.03	2.45	6.28

Comments :

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