



Annual Performance Report 2023

Permit EPR/P0446/14A/V2

Full Circle Generation Ltd

N/A

Full Circle Generation Ltd

Year: 2023

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Position: QHSE Manager

Approved by:

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Version Control		
Section	Information	Date
All	First Issue	31/01/2023

Distribution		
Copy	Name, Role	No.
1	[REDACTED] Manager	1
2	[REDACTED] WIEA Case Officer	2

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 plant is located in the Belfast Harbour Estate, adjacent sites are Spirit Aerospace and Calor Gas.

Plant Overview / Configuration:

- Three process streams incorporating 3 gasifiers/boilers, each 20.8MW net thermal
- Two steam turbines: 4.87 and 9.98 MWe
- Two identical package boiler islands feed one 10mw for private wire to Bombardier
- A third identical package boiler island feeds second 5 mw machine direct to the grid connection
- RDF crane is fully automated
- RDF NCV range: 11.5-16.5 MJ/kg
- A flue gas scrubbing system consists of SNCR (urea) and dry abatement (lime & PAC) with bag filters
- Design throughput of each line is 5.4 t/h of RDF. A total of 16.2 t/h for the plant as a whole.

Summary of Operational Processes and Procedures

The plant has a comprehensive set of Standard Operating Procedures (SOPs) covering site activities including:

- Waste reception, waste handling, waste quarantine, waste sampling
- Residue handling, storage and transport
- All process-related systems including for fuel metering, operation of gasifier, boiler, filtration, RDF and ash systems, water-steam cycle
- Functional safety test procedures
- Start up and shutdown procedures
- Maintenance procedures
- Building management procedures
- Statutory inspections, tests and checking.
- CEMS monitoring and calibration
- EH&S related procedures

The plant also has critical Emergency Operating Procedures (EOPs) covering:

- Fire procedures
- Gas release procedure
- Grid blackout
- Neighbouring site emergency
- Boiler leak
- Liquid spillage
- Steam turbine emergency

SOPs are reviewed periodically.

Operational Data

Plant Size	144,000	tonnes pa	21	MWth	15	MWe
No. of combustion lines	3	No. of Turbines:		2		

Waste types received	Unit	Q1	Q2	Q3	Q4	Year Total	%
Household / Local Authority	tonnes	-	-	-	-	-	-
Commercial & Industrial		-	-	-	-	-	-
Hazardous		-	-	-	-	-	-
Clinical		-	-	-	-	-	-
Waste wood (biomass)		-	-	-	-	-	-
Refuse Derived Fuel * - H'hold/LA		29,981	18,907	31,023	33,175	113,086	100.0%
Refuse Derived Fuel * - C&I		-	-	-	-	-	-
Other [Please specify]		-	-	-	-	-	-
Other [Please specify]		-	-	-	-	-	-
Other [Please specify]		-	-	-	-	-	-
Total waste received		29,981	18,907	31,023	33,175	113,086	
Rejected Waste		-	-	-	-	-	-
Unprocessed waste transferred out		-	823	-	-	823	0.7%
Total waste combusted **		29,981	18,084	31,023	33,175	112,263	

Energy Usage / Export	Unit	Q1	Q2	Q3	Q4	Year Total	KWh/te
Power Generated	MWh	16,960	12,475	21,493	21,793	72,721	648
Power Exported		12,910	9,721	16,645	17,231	56,508	503
Power Used on site		-	-	-	-	-	-
Power Imported		9	332	44	100	485	4
Parasitic Load	%	23.9%	24.1%	22.7%	21.3%	22.8%	
Thermal Energy Produced ***	MWh	-	-	-	-	-	-
Thermal Energy Exported ***	MWh	-	-	-	-	-	-
R1 value (if applicable)	R1	Design					

Waste Disposal & Recovery	Unit	Q1	Q2	Q3	Q4	Year Total	% inputs
APC Residues - produced	tonnes	1,075	568	928	1,183	3,754	3.3%
IBA - produced		3,137	2,268	3,360	3,450	12,214	10.9%
Metals recycling		-	-	-	-	-	-
Boiler Ash		149	157	93	112	512	0.5%
UGC Ash		321	187	264	262	1,035	0.9%
Other		-	-	-	-	-	-

Raw Material Usage	Unit	Q1	Q2	Q3	Q4	Year Total	kg or Ltr /te
Mains Water	ltrs	108,305	78,283	104,436	116,097	407,121	3.63
Other Water	ltrs	-	-	-	-	-	-
Ammonia	kgs	-	-	-	-	-	-
Urea	kgs	15,000	14,000	30,000	63,000	122,000	1.09
Activated Carbon	kgs	53,500	80,500	40,000	34,200	208,200	1.85
Lime / hydrated lime	kgs	462,000	334,000	551,000	621,000	1,968,000	17.53
Fuel oil	ltrs	1,178	4,412	1,550	1,604	8,744	0.08
Gas	cuf	66,759	114,160	33,029	67,632	281,580	
Other		-	-	-	-	-	-

Summary		Line/Unit	Q1	Q2	Q3	Q4	Year Total	
Availability of waste combustion by line, hrs ****	1		1,946	1,286	2,126	1,753	7,110	81.2%
	2		2,097	1,118	1,754	2,156	7,124	81.3%
	3		2,087	1,420	1,953	1,688	7,149	81.6%
	4		-	-	-	-	-	0.0%
	5		-	-	-	-	-	0.0%
Overall Availability, mean avg. of all lines, hrs							4,277	48.8%
Hours of turbine operations, hrs	1		2,146	1,588	2,187	2,151	8,072	92.1%
Hours of turbine operations, hrs	2		2,133	1,232	1,972	1,662	6,999	79.9%
Hours of heat / steam export							-	n/a
Net Calorific Value of waste	MJ/kg		11	12	16	10		
Abnormal Events	qty.		-	-	-	-	-	no
Abnormal operation	hours		-	-	-	-	-	0.0%
Permit Breaches	qty.		3	3	12	2	20	yes

Summary of Plant Operations and Maintenance during the reporting year

There were two planned outages in the period (April and Oct 2023) for maintenance, statutory inspection and rectification works.

The plant has been running extensive trials on dioxins and furans to establish trends and identify a programmes of rectifications to mitigate against exceedances. Subsequently, schedule 1 notifications have been issued where results have been above the permitted limit.

Summary of Residue Handling for the reporting year

There are 4 residue sources at the plant:

- A non-hazardous Incineration Bottom Ash (IBA) from the grate. Non-Haz
- A hazardous Undergrate and Combustor ash (UGC)
- Hazardous Boiler Ash
- Hazardous APCr filter ash

Tonnages are indicated on previous page.

IBA is collected in a common silo (from all three boilers), and discharged on trailers (covered) and taken to Riverridge site at Craigmore where it is disposed of to landfill or washed and recovered for use as an aggregate.

UGC is collected in bags (separately from each stream), transported off-site and disposed of to landfill at Augean.

Boiler ash is collected in bags (separately from each stream), transported off-site and disposed of to landfill at OCO's Wingmoor Farm site near Avonmouth.

APCr filter ash is collected in two silos (from all three boilers), discharged in tankers, and transported to OCO's Leeds facility and recovered for use in construction products.

2023 Annual Reporting Performance Form 1

Permit EPR/P0446/14A/V2

Operator: 0

Facility: Full Circle Generation Ltd

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	OCO		3,754.0	3.3%
IBA				-
UGC	Augean	1,034.9		0.9%
Boiler	OCO	511.6		0.5%
Total Hazardous Waste		1,546.5	3,754.0	4.7%
2) Non-Hazardous Wastes				
IBA	RR	12,214.2		10.9%
Ferrous Metal				-
Process Water	Trade Effluent	271,414.0		241.8%
				-
				-
Total Non-Hazardous Waste		283,628.2	0.0	252.6%
TOTAL WASTE		285,174.7	3,754.0	257.4%

Operator's comments :

2023 Annual Reporting of Water and Other Raw Material Usage

Raw Material	Usage	Unit	Specific Usage	Unit
Mains Water	407121	m ³	3.63	m ³ /te
Total Water	407121	m ³	3.63	m ³ /te
Urea / Ammonia	122000	kg	1.09	kg/te
Activated Carbon	208200	kg	1.85	kg/te
Lime / hydrated lime / Sodium Bicarb.	1968000	kg	17.53	kg/te

Operator's comments :

2023 Annual Reporting of other performance indicators

Parameter	Results by Line						10MW	5MW
	A1	A2	A3	A4	A5			
Operating hours for the year, hours	7110	7124	7149				8072	6999
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 :

No periods of abnormal operation are claimed for the period.

[REDACTED]

31/01/2024

2023 Annual Reporting of Energy Usage/Export

Permit EPR/P0446/14A/V2

Operator: 0

Facility: Full Circle Generation Ltd

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	72,721	MWh	648
Electricity Imported	485	MWh	4
Electricity Exported	56,508	MWh	503
Gas Oil		tonnes	8.7
Steam/hot water exported	0	GWh	-

Operator's comments :

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Signed: _____

Date: 13/01/2024

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%
Oxides of nitrogen	100%	100%
Sulphur dioxide	94.44%	100%
Carbon monoxide	100%	100%
Total organic carbon	100%	100%
Hydrogen chloride	83.33%	97.22%
Hydrogen fluoride	100%	100%
	96.82%	99.60%

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
02/02/2023	16-23 Sch 1 Stream 3 lime Injection Screw	Lime Injection blocked	Maintenance
25/05/2023	17-23 Sch 1 Stream 3 lime injection blockage	Lime Injection blocked	Maintenance
25/06/2023	18-23 Sch 1 Stream 2 CEMs Fault HCL	CEMs Fault	SQL upgrade
04/07/2023	19-23 Sch 1 Stream 2 SO2	Trip due to bang and clean	Training
21/03/2023	20-23 Sch 1 LEK13740 D&F ST1 21 Mar	Suspected de-novo synthesis	Ongoing improvement:
28/03/2023	21-23 Sch 1 LEK13740 D&F ST2 28 Mar	Suspected de-novo synthesis	Ongoing improvement:
28/06/2023	23-23 Sch 1 EMT06283 D&F ST3 28 Jun	Suspected de-novo synthesis	Ongoing improvement:
26/09/2023	24-23 Sch 1 Stream 1 SO2	Trip due to bang and clean	Training
01/08/2023	25-23 Sch 1 LEK13974 D&F ST3 01 Aug	Suspected de-novo synthesis	Ongoing improvement:
03/08/2023	26-23 Sch 1 LEK13974 D&F ST3 03 Aug	Suspected de-novo synthesis	Ongoing improvement:
08/08/2023	27-23 Sch 1 LEK13980 D&F ST3 08 Aug	Suspected de-novo synthesis	Ongoing improvement:
10/08/2023	28-23 Sch 1 LEK13980 D&F ST3 10 Aug	Suspected de-novo synthesis	Ongoing improvement:
23/08/2023	29-23 Sch 1 LEK13401 D&F ST3 23 Aug	Suspected de-novo synthesis	Ongoing improvement:
24/08/2023	30-23 Sch 1 LEK13401 D&F ST3 24 Aug	Suspected de-novo synthesis	Ongoing improvement:
19/09/2023	31-23 Sch 1 LEK 14030 D&F ST2 19 Sep	Suspected de-novo synthesis	Ongoing improvement:
21/09/2023	32-23 Sch 1 LEK 14030 D&F ST2 21 Sep	Suspected de-novo synthesis	Ongoing improvement:
31/09/2023	33-23 Sch1 LEK 14092 D&F ST2 31 Oct	Suspected de-novo synthesis	Ongoing improvement:
02/09/2023	34-23 Sch1 LEK 14092 D&F ST2 02 Nov	Suspected de-novo synthesis	Ongoing improvement:
31/10/2023	35-23 Sch1 LEK 14092 D&F ST3 31 Oct	Suspected de-novo synthesis	Ongoing improvement:
01/11/2023	36-23 Sch1 LEK 14092 D&F ST3 01 Nov	Suspected de-novo synthesis	Ongoing improvement:

* 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.**

Tramp air reduction works on each of 3 streams

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

Installation of 4th CEMS (analyser)
N₂O CEMS installed Dec 2023/Jan 2024

Summary of any changes to the plant or operating techniques which required a variation to the permit and a summary of the resulting environmental impact.

None

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

Fuel store bunker integrity inspection/repair - leak prevention
Fuel Hall crane software upgrades - fire prevention

Details of Public & Stakeholder Liasion

Summary of events held during the reporting year.	
Date	Description

List of events planned for next year	
Date	Description

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	0.942
Annual mass of carbon dioxide released per tonne of waste burned	t CO ₂ / t waste	0.942 tCO ₂ / 112263 = 8.39
Annual mass of carbon dioxide released per MWh of energy exported	t CO ₂ / MWh export	0.942 tCO ₂ / 56508 = 1.67
Description of how annual carbon dioxide mass emission has been calculated. See Note 1	E OTH	

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

Annual mass emissions of nitrous oxide	tonnes N ₂ O	0.0981 kgN ₂ O/t waste 112263 = 8
Description of how annual nitrous oxide mass emission has been calculated See Note 2	E OTH	
Total annual carbon dioxide and nitrous oxide emissions. Note 3.	tonnes CO ₂ e	8 x 298 = 2,384

Biogenic CO₂ emissions (See Note 4)

Percentage of total carbon dioxide emissions arising from biogenic waste	%	0.942 x 11.2% = 0.11
No. of measurements undertaken	Number	Calc
Description of how percentage biogenic carbon dioxide emissions have been measured or calculated. See Note 5	M OTH	

Biogenic fraction of waste feedstock (See Note 4)

Yearly average biogenic percentage of the waste by net calorific value (NCV)	%	11.2%
If sampling undertaken, no. of samples used to ascertain average biogenic % above	Number	36

Description of how biogenic percentage (by NCV) has been calculated or estimated. See Note 6	Data from monthly waste sampling (1 monthly sample from each of our 3 streams) has been used to calculate the average biogenic percentage.
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Comments:

As monitoring equipment for N₂O and CO₂ was not installed until the beginning of 2024, calculations have been used to estimate the figures for 2023.

Residue Quality Monitoring Requirements

Summary of monitoring undertaken and compliance
IBA ash (non-Haz) Quality monitoring: monthly lab samples. No issues.
UGC and Boiler ash (Haz) Quality monitoring: monthly lab samples. No issues.
APCr ash (Haz). Quality monitoring: monthly lab samples. No issues.

Commentary on any specific events	
Date & Event	Description
	None

Residue Quality Monitoring Results			
Parameter (unit)	Limit	Normal Operation	
		Bottom ash	APC Residues
Loss on Ignition (average %)	<5%	2.17	
Total Organic Carbon (average %)	<3%	0.71	
No. of Assessments Undertaken	---	12	
No. of Hazardous Results	---	0	

Comments :
1 set of samples tested each month

Emissions to Water

Summary of monitoring undertaken and compliance
Quarterly water samples taken from both sewer and run-off water.

Commentary on any specific events	
Date & Event	Description
	None

Emissions to Sewer

Parameter	Monitoring Frequency	Limit	Target	Max.	Average
BOD (ATU)	Quarterly		4.68	5.88	5.36
COD (Total)	Quarterly	500	25	38.8	30.2
pH	Quarterly	5-10	7.3	8.49	7.8225
Suspended Solids	Quarterly	300	3	20	11.5
Temperature (Deg C)	Quarterly	<43	18.5	21.1	19.875
Visible Oil & Grease	Quarterly	None Visible	<1	<1	<1
Emissions to Water					
BOD (ATU)	Quarterly	10	1.41	3.25	2.6175
COD (Total)	Quarterly		25	28	25.75
pH	Quarterly	06-Sep	7.06	8.49	7.6425
Suspended Solids	Quarterly	50	3	13	7.25
Temperature (Deg C)	Quarterly	25	18.7	21.2	19.8
Visible Oil & Grease	Quarterly	None Visible	<1	<1	<1

Emissions to Air (periodically monitored)

Summary of monitoring undertaken, standards used and compliance

Results of emissions to air that are periodically monitored					
Substance	Average			Round 1 Mar 2023	
	A1	A2	A3	A1	A2
Hydrogen fluoride	0.103	0.060	0.257	0.160	0.050
Cd and Th and their compounds	0.003	0.002	0.003	0.002	0.001
Hg and its compounds	0.001	0.003	0.008	0.001	0.001
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V and their compounds	0.041	0.058	0.195	0.051	0.012
Dioxins & Furans (I-TEQ)	0.241	0.445	0.171	0.533	1.172
PCBs (WHO-TEQ Humans / Mammals)	0.018	0.022	0.011	0.040	0.061
PCBs (WHO-TEQ Fish)	0.001	0.001	0.001	0.002	0.003
PCBs (WHO-TEQ Birds)	0.031	0.032	0.018	0.066	0.089
Dioxins & Furans (WHO-TEQ Humans / Mammals)	0.223	0.398	0.161	0.485	1.078
Dioxins & Furans (WHO-TEQ Fish)	0.240	0.435	0.173	0.535	1.192
Dioxins & Furans (WHO-TEQ Birds)	0.326	0.567	0.234	0.736	1.560
Anthanthrene	0.010	0.009	0.012	0.007	0.006
Benzo(a)anthracene	0.010	0.010	0.013	0.007	0.006
Benzo(a)pyrene	0.010	0.009	0.012	0.007	0.006
Benzo(b)fluoranthene	0.010	0.020	0.079	0.007	0.006
Benzo(b)naphtho(2,1-d)thiophene	0.010	0.009	0.012	0.007	0.006
Benzo(c)phenanthrene	0.004	0.009	0.013	0.007	0.006
Benzo(ghi)perylene	0.010	0.011	0.012	0.007	0.010
Benzo(k)fluoranthene	0.010	0.009	0.012	0.007	0.006
Cholanthrene	0.010	0.009	0.012	0.007	0.006
Chrysene	0.014	0.017	0.041	0.007	0.006
Cyclopenta(cd)pyrene	0.010	0.009	0.012	0.007	0.006
Dibenzo(ai)pyrene	0.010	0.009	0.012	0.007	0.006
Dibenzo(ah)anthracene	0.010	0.009	0.012	0.007	0.006
Fluoranthene	0.041	0.253	0.288	0.040	0.380
Indeno(123-cd) pyrene	0.010	0.015	0.018	0.007	0.006
Naphthalene	1.040	0.843	0.685	0.520	0.480
Comments :					



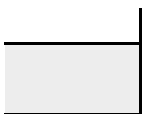
Emissions to Air (continuously monitored)

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.
Oxides of nitrogen	Daily mean	200 mg/m ³	112.20	80.26	154.70	86.48	124.60	79.52			
	½ hourly mean	400 mg/m ³	178.20	80.13	237.60	86.38	188.80	79.60			
Particulates	Daily mean	10 mg/m ³	3.60	0.66	0.30	-0.03	1.50	0.02			
	½ hourly mean	30 mg/m ³	3.80	0.73	1.30	0.04	2.00	0.08			
Total Organic Carbon	Daily mean	10 mg/m ³	1.10	0.15	0.80	0.07	0.90	0.27			
	½ hourly mean	20 mg/m ³	11.50	0.18	10.80	5.09	15.10	0.32			
Hydrogen chloride	Daily mean	10 mg/m ³	8.40	7.18	23.60	7.03	10.20	7.38			
	½ hourly mean	60 mg/m ³	53.30	7.22	182.60	7.11	69.20	7.43			
Sulphur dioxide	Daily mean	50 mg/m ³	11.90	4.03	8.60	3.77	12.40	4.33			
	½ hourly mean	200 mg/m ³	284.30	4.10	20.00	3.83	109.60	4.34			
Carbon monoxide	Daily mean	50 mg/m ³	28.30	1.63	4.70	1.40	4.30	1.78			
	95%ile 10-min avg *	150 mg/m ³ *	6.90	1.58	20.90	1.47	16.80	1.82			
Ammonia	Daily mean	No limit set until 03/12/23									

Comments :

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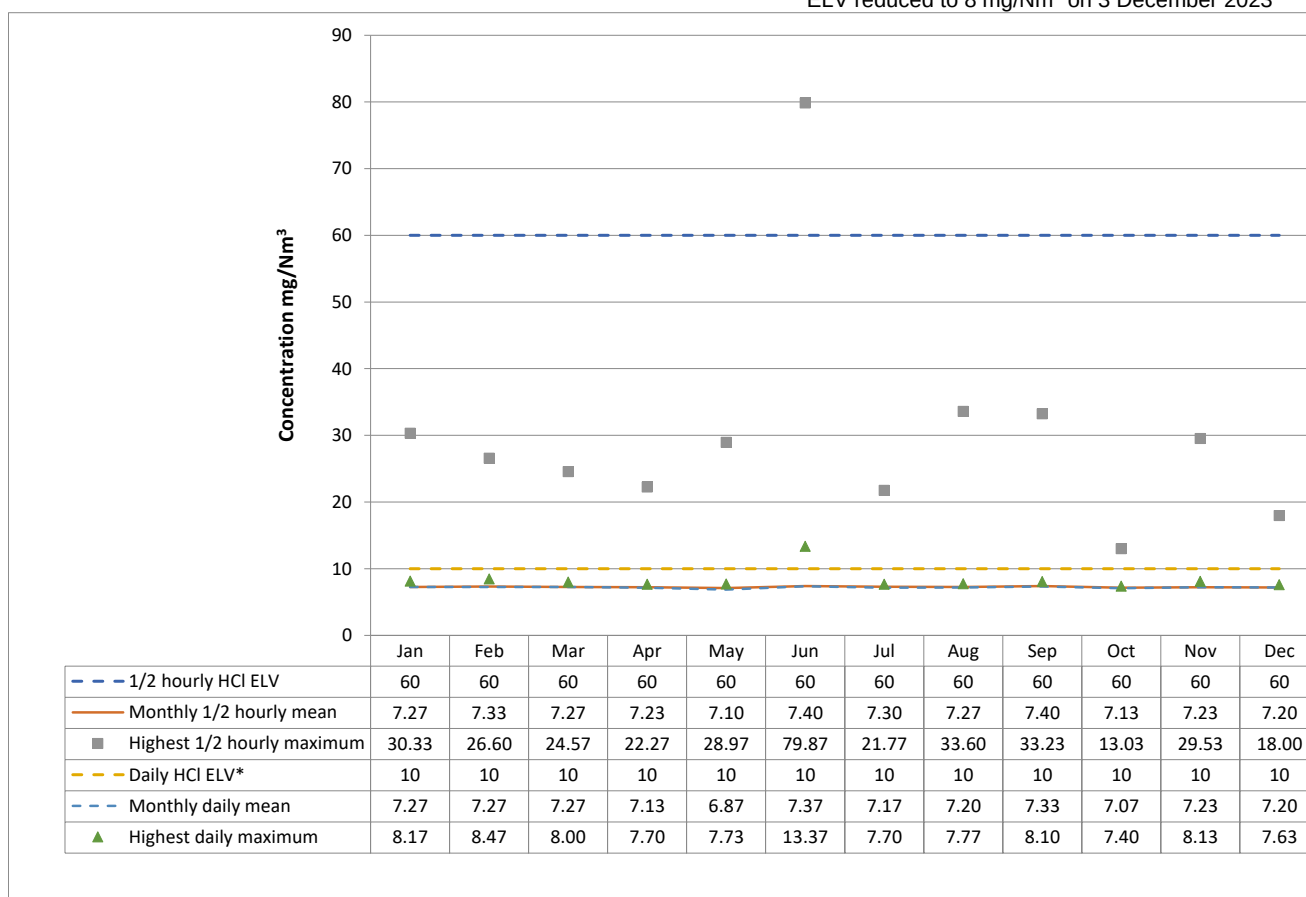


Monitoring of Hydrogen Chloride emissions

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	7.27	30.33	10	7.27	8.17
Feb	60	7.33	26.60	10	7.27	8.47
Mar	60	7.27	24.57	10	7.27	8.00
Apr	60	7.23	22.27	10	7.13	7.70
May	60	7.10	28.97	10	6.87	7.73
Jun	60	7.40	79.87	10	7.37	13.37
Jul	60	7.30	21.77	10	7.17	7.70
Aug	60	7.27	33.60	10	7.20	7.77
Sep	60	7.40	33.23	10	7.33	8.10
Oct	60	7.13	13.03	10	7.07	7.40
Nov	60	7.23	29.53	10	7.23	8.13
Dec	60	7.20	18.00	10	7.20	7.63

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

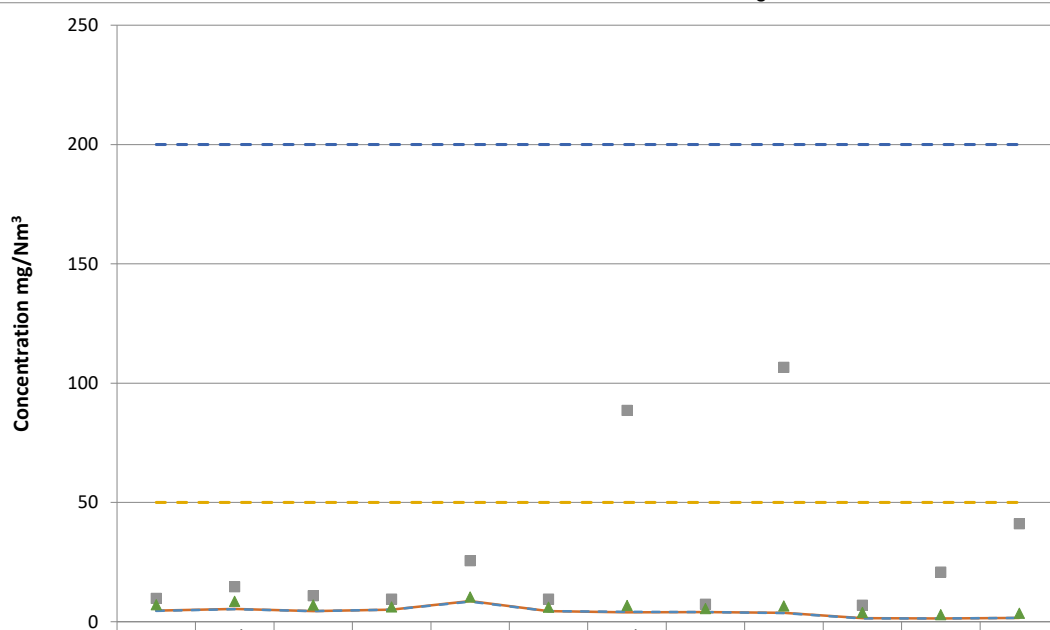
Comments :

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 SO2 ELV	Monthly 1/2 hourly mean	Highest 1/2 hourly maximum	Daily SO2 ELV*	Monthly daily mean	Highest daily maximum
Jan	200	4.63	9.73	50	4.60	7.13
Feb	200	5.33	14.60	50	5.30	8.50
Mar	200	4.50	10.83	50	4.47	7.03
Apr	200	5.07	9.40	50	5.07	6.17
May	200	8.67	25.57	50	8.43	10.40
Jun	200	4.47	9.43	50	4.43	6.13
Jul	200	3.95	88.53	50	4.17	6.80
Aug	200	4.07	7.30	50	4.03	5.50
Sep	200	3.70	106.60	50	3.67	6.57
Oct	200	1.50	6.90	50	1.40	3.83
Nov	200	1.37	20.80	50	1.37	2.93
Dec	200	1.60	41.00	50	1.57	3.53

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

— 1/2 hourly SO2 ELV	200	200	200	200	200	200	200	200	200	200	200	200
— Monthly 1/2 hourly mean	4.63	5.33	4.50	5.07	8.67	4.47	3.95	4.07	3.70	1.50	1.37	1.60
■ Highest 1/2 hourly maximum	9.73	14.60	10.83	9.40	25.57	9.43	88.53	7.30	106.60	6.90	20.80	41.00
— Daily SO2 ELV*	50	50	50	50	50	50	50	50	50	50	50	50
— Monthly daily mean	4.60	5.30	4.47	5.07	8.43	4.43	4.17	4.03	3.67	1.40	1.37	1.57
▲ Highest daily maximum	7.13	8.50	7.03	6.17	10.40	6.13	6.80	5.50	6.57	3.83	2.93	3.53

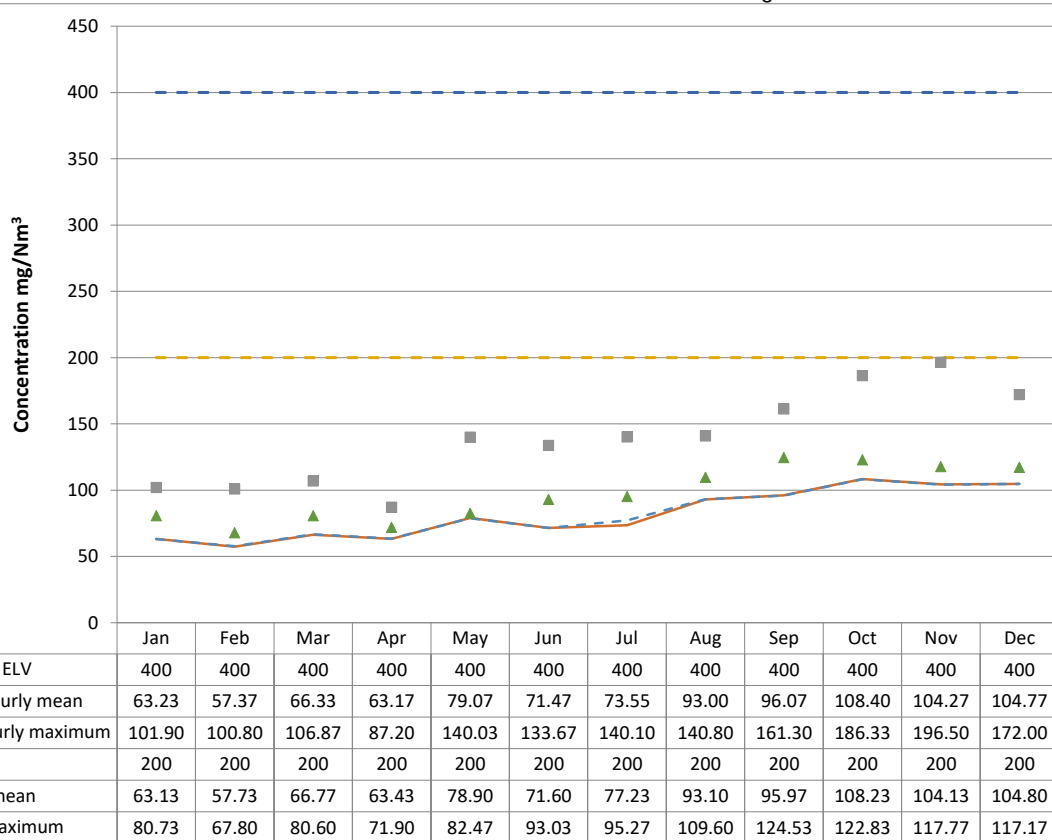
Comments :

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	63.23	101.90	200	63.13	80.73
Feb	400	57.37	100.80	200	57.73	67.80
Mar	400	66.33	106.87	200	66.77	80.60
Apr	400	63.17	87.20	200	63.43	71.90
May	400	79.07	140.03	200	78.90	82.47
Jun	400	71.47	133.67	200	71.60	93.03
Jul	400	73.55	140.10	200	77.23	95.27
Aug	400	93.00	140.80	200	93.10	109.60
Sep	400	96.07	161.30	200	95.97	124.53
Oct	400	108.40	186.33	200	108.23	122.83
Nov	400	104.27	196.50	200	104.13	117.77
Dec	400	104.77	172.00	200	104.80	117.17

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

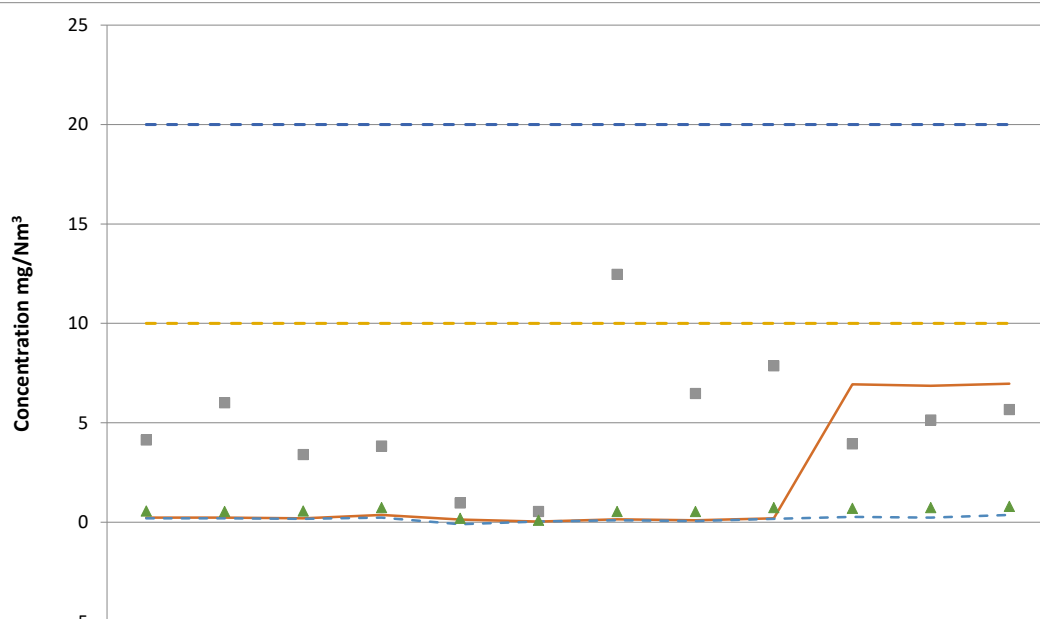
Comments :

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	0.23	4.13	10	0.20	0.57
Feb	20	0.23	6.00	10	0.20	0.53
Mar	20	0.20	3.40	10	0.17	0.57
Apr	20	0.37	3.83	10	0.23	0.73
May	20	0.13	0.97	10	-0.10	0.20
Jun	20	0.03	0.53	10	0.03	0.10
Jul	20	0.15	12.47	10	0.10	0.53
Aug	20	0.10	6.47	10	0.07	0.53
Sep	20	0.20	7.87	10	0.17	0.73
Oct	20	6.93	3.93	10	0.27	0.70
Nov	20	6.87	5.13	10	0.23	0.73
Dec	20	6.97	5.67	10	0.37	0.80



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly TOC ELV	20	20	20	20	20	20	20	20	20	20	20	20
Monthly 1/2 hourly mean	0.23	0.23	0.20	0.37	0.13	0.03	0.15	0.10	0.20	6.93	6.87	6.97
Highest 1/2 hourly maximum	4.13	6.00	3.40	3.83	0.97	0.53	12.47	6.47	7.87	3.93	5.13	5.67
Daily TOC ELV	10	10	10	10	10	10	10	10	10	10	10	10
Monthly daily mean	0.20	0.20	0.17	0.23	-0.10	0.03	0.10	0.07	0.17	0.27	0.23	0.37
Highest daily maximum	0.57	0.53	0.57	0.73	0.20	0.10	0.53	0.53	0.73	0.70	0.73	0.80

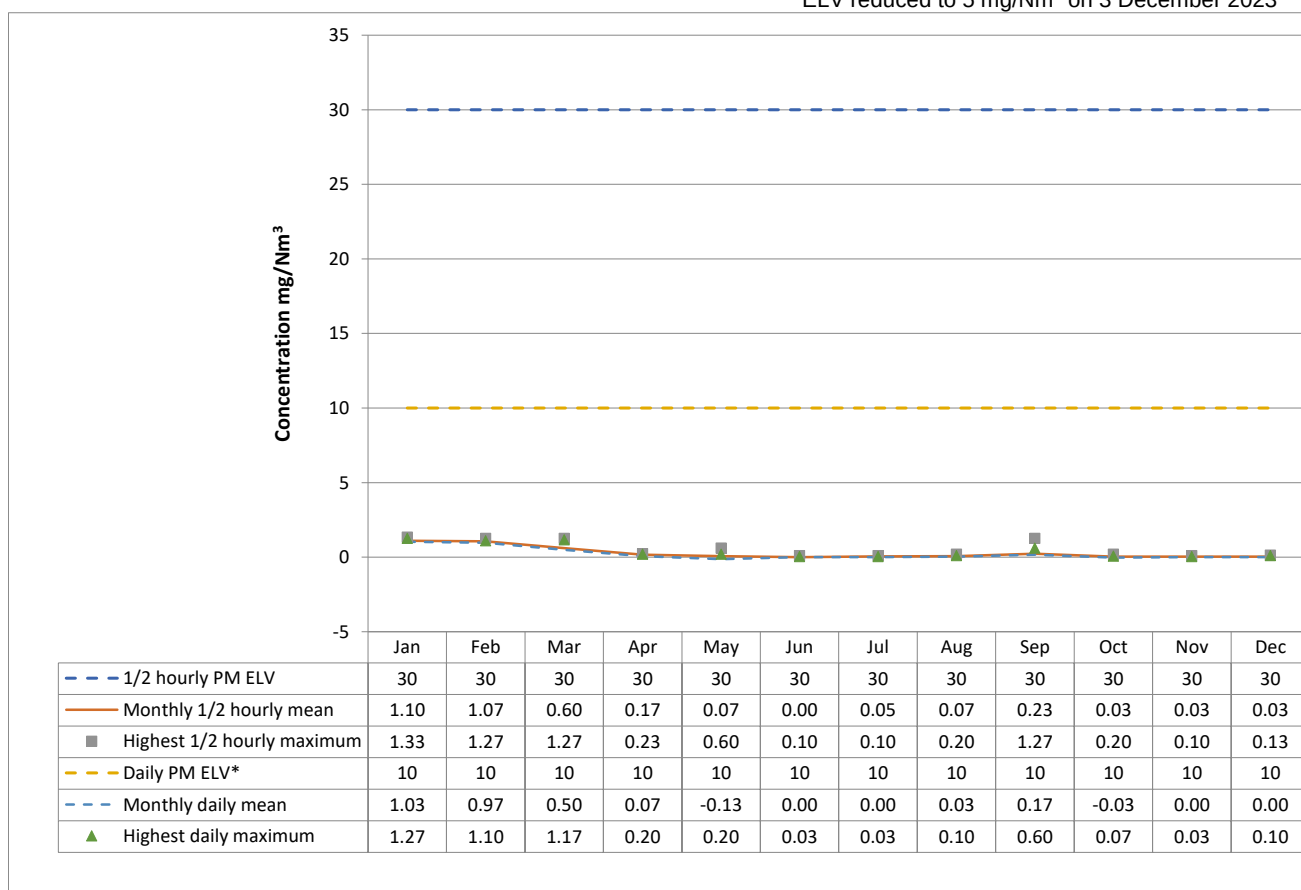
Comments :

Monitoring of Particulate matter emissions

Whole Installation

See Notes in Cell Q3

mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
2023	1/2 hourly PM ELV	Monthly 1/2 hourly mean	Highest 1/2 hourly maximum	Daily PM ELV*	Monthly daily mean	Highest daily maximum
Jan	30	1.10	1.33	10	1.03	1.27
Feb	30	1.07	1.27	10	0.97	1.10
Mar	30	0.60	1.27	10	0.50	1.17
Apr	30	0.17	0.23	10	0.07	0.20
May	30	0.07	0.60	10	-0.13	0.20
Jun	30	0.00	0.10	10	0.00	0.03
Jul	30	0.05	0.10	10	0.00	0.03
Aug	30	0.07	0.20	10	0.03	0.10
Sep	30	0.23	1.27	10	0.17	0.60
Oct	30	0.03	0.20	10	-0.03	0.07
Nov	30	0.03	0.10	10	0.00	0.03
Dec	30	0.03	0.13	10	0.00	0.10

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

Comments :

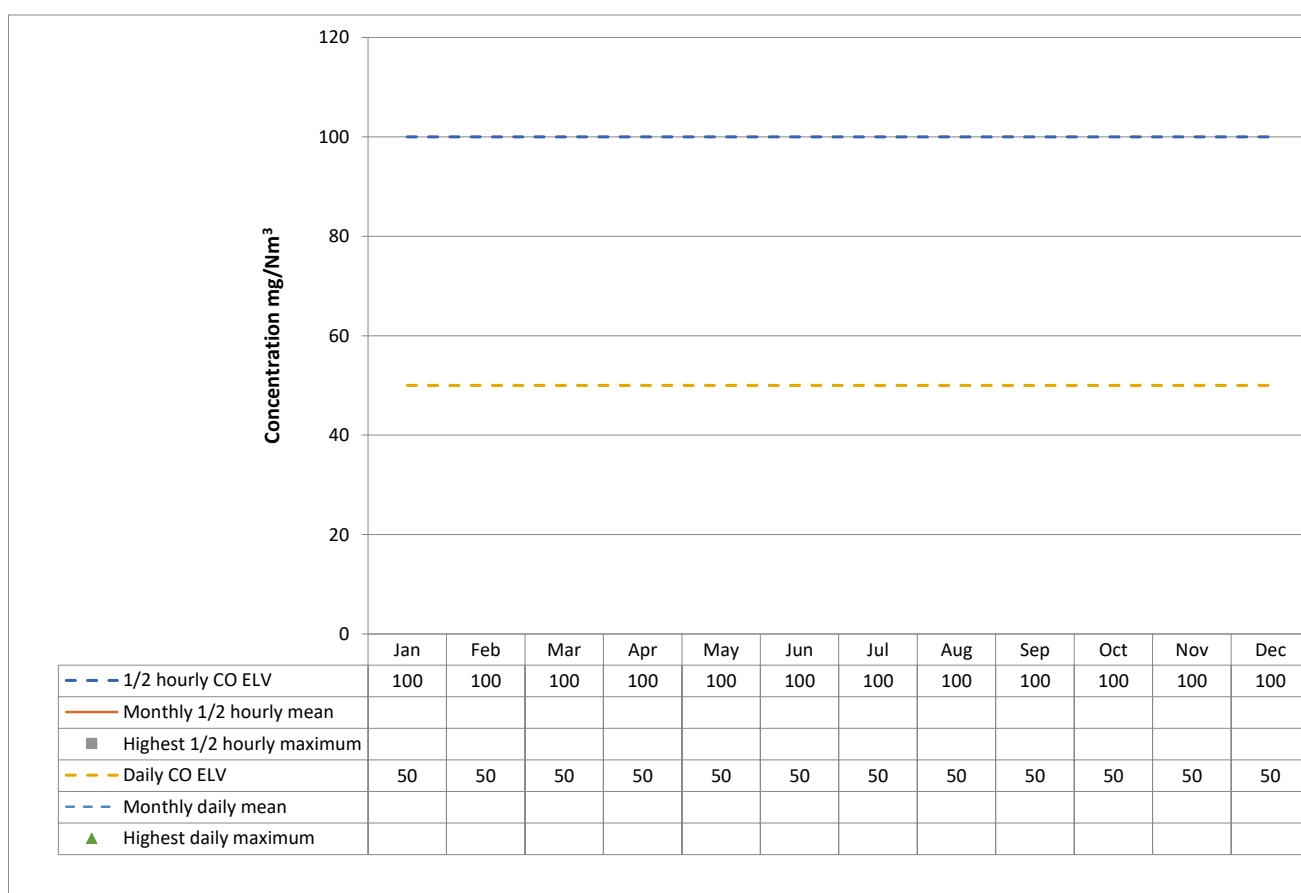
Monitoring of Carbon Monoxide (half hourly)

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 :

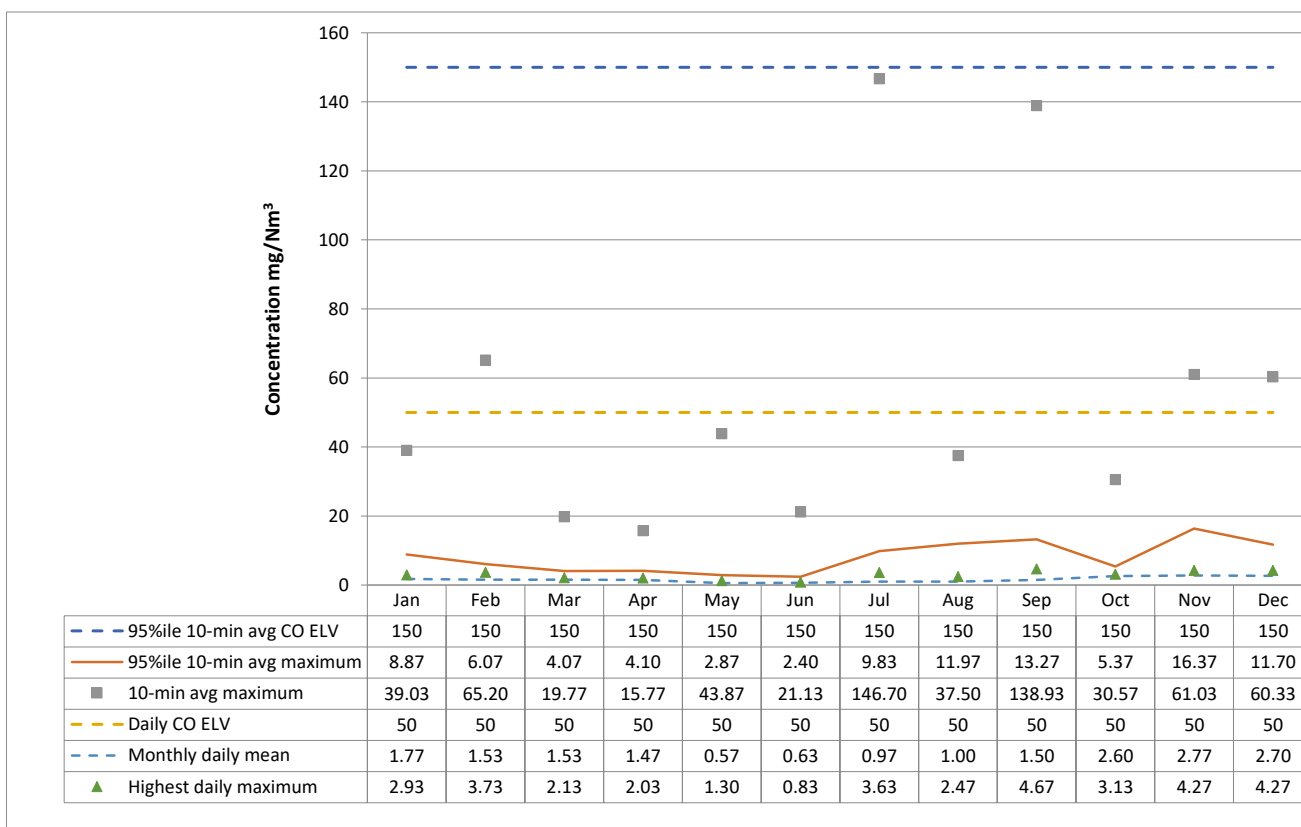
Monitoring of Carbon Monoxide (10-minute avg)

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

mg/Nm ³	10-minute Reference Periods				Daily Reference Periods		
2023	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	8.87	1.80	39.03	50	1.77	2.93
Feb	150	6.07	1.53	65.20	50	1.53	3.73
Mar	150	4.07	1.60	19.77	50	1.53	2.13
Apr	150	4.10	1.57	15.77	50	1.47	2.03
May	150	2.87	0.80	43.87	50	0.57	1.30
Jun	150	2.40	0.63	21.13	50	0.63	0.83
Jul	150	9.83	1.00	146.70	50	0.97	3.63
Aug	150	11.97	1.03	37.50	50	1.00	2.47
Sep	150	13.27	1.53	138.93	50	1.50	4.67
Oct	150	5.37	2.67	30.57	50	2.60	3.13
Nov	150	16.37	2.77	61.03	50	2.77	4.27
Dec	150	11.70	2.70	60.33	50	2.70	4.27

**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.

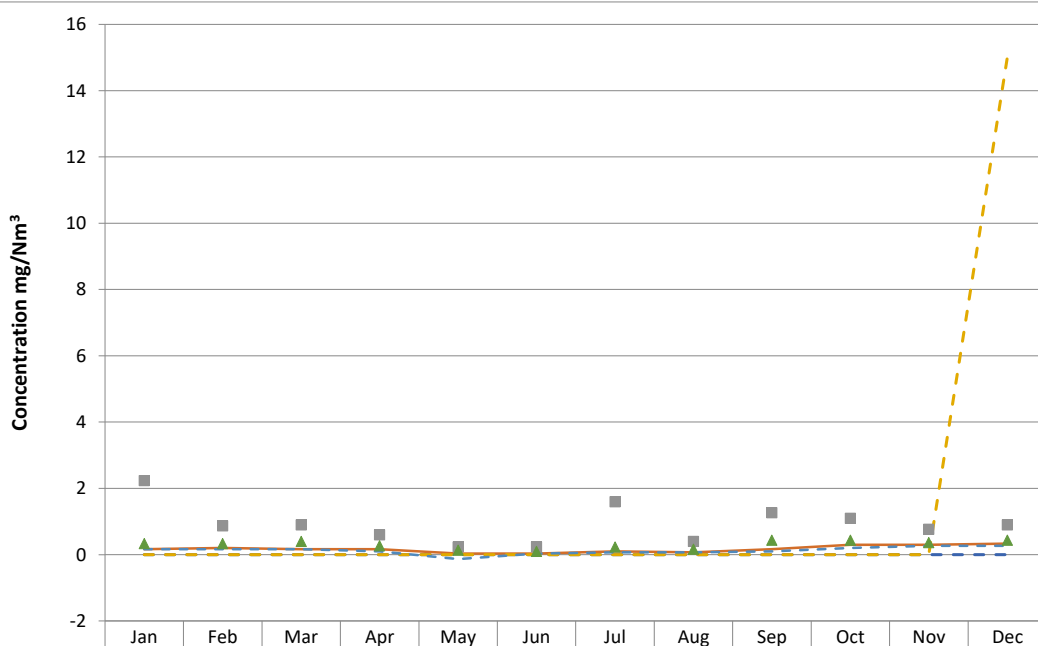
Monitoring of Ammonia emissions

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	0.17	2.23	None	0.17	0.33
Feb	None	0.20	0.87	None	0.17	0.33
Mar	None	0.17	0.90	None	0.17	0.40
Apr	None	0.17	0.60	None	0.10	0.27
May	None	0.03	0.23	None	-0.13	0.13
Jun	None	0.03	0.23	None	0.03	0.10
Jul	None	0.10	1.60	None	0.07	0.23
Aug	None	0.07	0.40	None	0.07	0.17
Sep	None	0.17	1.27	None	0.10	0.43
Oct	None	0.30	1.10	None	0.20	0.43
Nov	None	0.30	0.77	None	0.27	0.37
Dec	None	0.33	0.90	15	0.27	0.43

* 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	0.17	0.20	0.17	0.17	0.03	0.03	0.10	0.07	0.17	0.30	0.30	0.33
■ Highest 1/2 hourly maximum	2.23	0.87	0.90	0.60	0.23	0.23	1.60	0.40	1.27	1.10	0.77	0.90
- - - Daily NH3 ELV*	0	0	0	0	0	0	0	0	0	0	0	15
- - - Monthly daily mean	0.17	0.17	0.17	0.10	-0.13	0.03	0.07	0.07	0.10	0.20	0.27	0.27
▲ Highest daily maximum	0.33	0.33	0.40	0.27	0.13	0.10	0.23	0.17	0.43	0.43	0.37	0.43

Comments :

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