BIOMASS UK NO.1 LLP

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Annual Performance Report 2022

Permit EPR/DP3932RS

Hull Energy Production Facility

Biomass UK No 1 LLP

Year:	2022		
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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 Hull Energy Production Facility is a renewable energy generation facility which has been designed to recover energy from pre-prepared mixed waste wood feedstocks using gasification. The gasification facility is an Advanced Thermal Treatment (ATT) process that will produce a combustible synthesis gas, which is then used to raise steam and generate electricity, through steam cycle turbine generation.

The Advanced Thermal Treatment (ATT) plant is designed to process shredded mixed waste wood feedstocks to produce heat to raise steam in a conventional tube boiler for utilisation in a steam turbine for the production of renewable electricity with an export capacity up to 10MWe.

The Installation has been designed to process approximately 86,400 tonnes of pre-processed non-hazardous mixed waste wood per annum.

Summary of Operational Processes and Procedures

The principle components of the process comprise the following:

Waste Acceptance and Reception: All waste wood is delivered directly into the fuel storage building via electrically operated roller shutter doors. When required, the waste is discharged onto the feedstock feed system, which delivers the waste into the gasification building. All waste is accepted in accordance to the sites waste acceptance procedures.

Gasification: The feedstock feed system delivers the waste into the fluidised bed gasification system where the waste is combusted to produce a synthetic gas (syngas). The syngas is then combusted to produce a high temperature flue-gas. A steam boiler then recovers the heat from the combustion gases through the conversion into superheated steam.

Electricity Generation : The superheated steam then passes to a Steam Turbine and Generator, which will export 10MWe (net) of renewable electricity onto the Local Distribution Network.

Flue-Gas Cleaning : Flue gas cleaning and pollution control consists of urea injection for De-NOx, lime injection for acid gas neutralisation and activated carbon powder injection for absorption and removal of heavy metals, dioxins, VOCs and other harmful substances. The stream has a baghouse system, which is designed to have the capacity to remove submicron dust particles within anticipated emission limit values (ELV's) stipulated by Chapter IV of the Industrial Emissions Directive (IED).

The plant is operated in accordance with its Environmental Management System which is designed to meet the requirements of ISO14001:2004.

Operational Data

Plant Size		86,400	tonnes pa		MWth	10	MWe
No. of combustion lines	1		No. of Turbines:		1		

Waste types received	Unit	Q1	Q2	Q3	Q4	**Year Total**	%
Household / Local Authority	tonnes	-	-	-	-	**-**	-
Commercial & Industrial		-	-	-	-	**-**	-
Hazardous		-	-	-	-	**-**	-
Clinical		-	-	-	-	**-**	-
Waste wood (biomass)		4,699	4,324	527	-	**9,550**	59.0%
Refuse Derived Fuel * - H'hold/LA		-	-	1,501	5,128	**6,629**	41.0%
Refuse Derived Fuel * - C&I		-	-	-		**-**	-
Total waste received		**4,699**	**4,324**	**2,028**	**5,128**	**16,179**	100.0%
Rejected Waste		-	-	-	-	**-**	-
Unprocessed waste transferred out		-	520	503	-	**1,023**	6.3%
Total waste combusted		**4,699**	**3,804**	**1,525**	**5,128**	**15,156**	93.7%

Energy Useage / Export	Unit	Q1	Q2	Q3	Q4	**Year Total**	KWh/te
Power Generated	MWh	4,411	4,575	1,440	5,536	**15,962**	1,053
Power Exported		3,653	3,735	1,229	4,506	**13,123**	866
Power Used on site		-	-	-	-	**-**	-
Power Imported		486	520	523	617	**2,146**	142
Parasitic Load	%	25.4%	26.7%	37.4%	26.8%	27.5%	
Thermal Energy Produced **	MWh					**-**	-
Thermal Energy Exported **						**-**	-
R1 value						Design / Operational / n/a	

Waste Disposal & Recovery	Unit	Q1	Q2	Q3	Q4	**Year Total**	% inputs
APC Residues - produced	tonnes	93	182	-	640	**915**	5.7%
IBA - produced		44	111	50	87	**292**	1.8%
Metals recycling		-	-	-	-	**-**	-

Raw Material Usage	Unit	Q1	Q2	Q3	Q4	**Year Total**	kg or Ltr /te
Mains Water	M3	4,150	6,592	6,500	9,000	**26,242**	1.62
Other Water	ltrs	-	-	-	-	**-**	-
Ammonia	kgs	-	-	-	-	**-**	-
Urea	kgs	19,260	9,360	20,460	19,800	**68,880**	4.26
Activated Carbon	kgs	-	-	-	890	**890**	0.06
Lime / hydrated lime	kgs	39,740	48,900	17,420	180,640	**286,700**	17.72
Fuel oil	ltrs	265,748	265,574	262,448	593,792	**1,387,562**	85.76
Gas	cf	-	-	-	-	**-**	-

Summary	Line/Unit	Q1	Q2	Q3	Q4	**Year Total**	
Availability of waste combustion by line, hrs	1	422	441	140	562	**1,565**	17.9%
Overall Availability, mean avg. of all lines, hrs		422	441	140	562	**1,565**	**17.9%**
Hours of turbine operations, hrs	1	422	441	140	562	**1,565**	17.9%
Hours of heat / steam export						**-**	n/a
Net Calorific Value of waste	MJ/kg	14	14	15	17		-
Abnormal Events	qty.	-	-	-	-	**-**	no
Abnormal operation	hours	-	-	-	-	**-**	0.00%
Permit Breaches	qty.	-	-	3	29	**32**	yes

Summary of Plant Operations and Maintenance during the reporting year

The plant began the year running on wood fuel until a planned shut down in June. During the shut down the fuel feeding screws were upgraded and the metering bins which required some structural modifications to accommodate the new larger equipment.

After the upgrade on the fuel feed system the plant started on wood operation in September, however the wood operation was not successful with the new modifications.

The plant switched to utilising RDF as a fuel in the latter stage of Q3. After trialling the RDF the fuel was then switched to SRF and remained on this fuel for the rest of the year. During Q4 the plant has run intermittently with regular shut downs required for cleaning and de-slagging.

Engineers are continuing to make adjustments to the software and hardware changes to improve the availability of the plant. There will be further adjustments and modifications ongoing into 2023 to improve plant reliability and availability.

Summary of Residue Handling for the reporting year

Fuel sampling was carried out daily during the initial month of the change from wood to RDF feedstock.

Monthly sampling of IBA and APCR commenced in September in line with Schedule 4 of the Environmental Permit. IBA and APCR is handled by a broker N+P and taken to the Augean site in Middlesbrough.

2022 Annual Reporting Performance Form 1

Permit EPR/DP3932RS
Facility: Hull Energy Production Facility

Operator: Biomass UK No 1 LLP
Form: Performance 1

Reporting Period from: 01 January 2022 to: 31 December 2022

2022 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		915.0	0.0	6.0%
IBA		291.7	0.0	1.9%
				-
				-
Total Hazardous Waste		1,206.7	0.0	8.0%
2) Non-Hazardous Wastes				
IBA		0.0	0.0	-
Ferrous Metal		0.0	0.0	-
Process Water		0.0	0.0	-
				-
				-
Total Non-Hazardous Waste		0.0	0.0	-
TOTAL WASTE		**1,206.7**	**0.0**	8.0%

Operator's comments :

2022 Annual Reporting of Water and Other Raw Material Usage

Raw Material	Usage	Unit	Specific Useage	Unit
Mains Water	26242	m^3	1.73	m^3/te
Total Water	26242	m^3	1.73	m^3/te
Urea / Ammonia	68880	kg	4.54	kg/te
Activated Carbon	890	kg	0.06	kg/te
Lime / hydrated lime / Sodium Bicarb.	286700	kg	18.92	kg/te

Operator's comments :

2022 Annual Reporting of other performance indicators

Parameter	Results by Line							
	A1	A2	A3	A4	A5		Turbine 1	Turbine 2
Operating hours for the year, hours	1565						1565	
Number of periods of abnormal operation, qty.	0						0	
Cumulative hours of abnormal operation for this year, hours	0						0	

Operator's comments :

Signed: _____ Date: _____

2022 Annual Reporting of Energy Usage/Export

Permit EPR/DP3932RS Operator: 0

Facility: Hull Energy Production Facility Form: Energy 1

Reporting Period from: 01 January 2022 to: 31 December 2022

Energy Source	Energy Usage	Unit	Specific Useage (KWh/tonne incinerated
Electricity Produced	15,962	MWh	1053
Electricity Imported	2145.9	MWh	142
Electricity Exported	13,123	MWh	866
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	
	Half-hourly limit	Daily limit
Particulates	100%	100%
Oxides of nitrogen	100%	100%
Sulphur dioxide	100%	100%
Carbon monoxide	98%	99%
Total organic carbon	100%	100%
Hydrogen chloride	99%	99%
Hydrogen fluoride	100%	100%

Summary of any notifications or non-compliances under the permit

Date	Summary of notification or non-compliance [including Line/Reference]	Reason	Measures taken to prevent reoccurrence
29/10/2022	CO 1/2 hrly av ELV breached (167.34 mg/m3)	Air ingress due to insufficient plug of material at gasifier knife gate valves due to fuel feed system trip	Manual plug created to prevent air ingress, review of SOPs
31/10/2022	CO 1/2 hrly av ELV breached (302.94 mg/m3)	Poor fuel quality	Increase in mixing
31/10/2022	CO daily av ELV breached (302.94 mg/m3)		
01/11/2022	CO 1/2 hrly av ELV breached (200.53 mg/m3)	Inconsistency in fuel blending leading to higher rates and higher oxygen set point	Increase in mixing and toolbox talk
04/11/2022	CO 1/2 hrly av ELV breached (158.42 mg/m3)		
04/11/2022	HCL 1/2 hrly av ELV breached (70.97 mg/m3)	Blockage of the recycle lime silo outlet	Monitoring of baghouse and dosing levels, toolbox talk
04/11/2022	HCL 1/2 hrly av ELV breached (226.5 mg/m3)		
04/11/2022	HCL 1/2 hrly av ELV breached (72.02 mg/m3)		
07/11/2022	CO 1/2 hrly av ELV breached (107.99 mg/m3)	Inconsistency in fuel and process tweaks on O2 combustion dampeners during commissioning	Increase in blending of fuel and adjustment on O2 control dampeners
07/11/2022	CO 1/2 hrly av ELV breached (253.49 mg/m3)		
07/11/2022	CO 1/2 hrly av ELV breached (116.7 mg/m3)		
07/11/2022	CO 1/2 hrly av ELV breached (174.62 mg/m3)		
07/11/2022	CO daily av ELV breached (50.26 mg/m3)		
07/11/2022	CO 1/2 hrly av ELV breached (317.95 mg/m3)		
07/11/2022	CO daily av ELV breached (97.67 mg/m3)		
07/11/2022	CO 1/2 hrly av ELV breached (102.49 mg/m3)		
07/11/2022	HCL daily av ELV breached (10.97 mg/m3)	Blockage of the recycle lime silo outlet	Blockage removal and setpoint changes to lime dosing, baghouse and APCr conveying systems during commissioning
08/11/2022	HCL daily av ELV breached (11.9 mg/m3)		

09/11/2022	CO 1/2 hrly av ELV breached (109.93 mg/m3)	Inconsistency in fuel and process tweaks on O2 combustion dampeners during commissioning	Increase in blending of fuel and adjustment on O2 control dampeners
09/11/2022	CO 1/2 hrly av ELV breached (120 mg/m3)		
10/11/2022	CO 1/2 hrly av ELV breached (201.93 mg/m3)		
10/11/2022	CO 1/2 hrly av ELV breached (102.76 mg/m3)		
11/11/2022	HCL daily av ELV breached (10.35 mg/m3)	Blockage of the recycle lime silo outlet	Blockage removal and setpoint changes to lime dosing, baghouse and APCr conveying systems during commissioning
12/11/2022	CO 1/2 hrly av ELV breached (341.85 mg/m3)	Erratic level control causing fuel feed interruption and furnace instability	Fuel feed reduction oil burner support to stabilise furnace during commissioning
16/11/2022	CO 1/2 hrly av ELV breached (156.33 mg/m3)	Inconsistency in fuel and process tweaks on O2 combustion dampeners during commissioning	Increase in blending of fuel and adjustment on O2 control dampeners
16/11/2022	CO 1/2 hrly av ELV breached (160.88 mg/m3)		
16/11/2022	CO 1/2 hrly av ELV breached (108.86 mg/m3)		
16/11/2022	CO 1/2 hrly av ELV breached (115.75 mg/m3)		
16/11/2022	CO 1/2 hrly av ELV breached (180.08 mg/m3)		
16/11/2022	CO 1/2 hrly av ELV breached (276.51 mg/m3)		
16/11/2022	CO 1/2 hrly av ELV breached (170.82 mg/m3)		
16/11/2022	CO 1/2 hrly av ELV breached (123.42 mg/m3)		
16/11/2022	CO 1/2 hrly av ELV breached (129.33mg/m3)		
02/12/2022	CO 1/2 hrly av ELV breached (103.71 mg/m3)	Suspected wet batch of fuel not blending correctly causing higher oxygen and rates	Setpoints changes to bed temperature and process made to aid combustion. Fuel not to be used and toolbox talks given
04/12/2022	CO 1/2 hrly av ELV breached (105.53mg/m3)	Fuel admission and feeding being restored causing spike	Fine tweaking of the dampers and blending techniques improved during commissioning
07/12/2022	CO 1/2 hrly av ELV breached (154.86mg/m3)		
07/12/2022	CO 1/2 hrly av ELV breached (146.37 mg/m3)		
09/12/2022	CO 1/2 hrly av ELV breached (173.87 mg/m3)	Inconsistency in fuel blending	Systems altered for new fuel type. Samples taken from suppliers to locate suspect poor fuel and increased visual inspection and rejection
09/12/2022	CO 1/2 hrly av ELV breached (116.22 mg/m3)		
10/12/2022	CO 1/2 hrly av ELV breached (140.09 mg/m3)		
10/12/2022	CO 1/2 hrly av ELV breached (183.36 mg/m3)		
10/12/2022	CO 1/2 hrly av ELV breached (219.86 mg/m3)		
10/12/2022	CO 1/2 hrly av ELV breached (337.96 mg/m3)		
11/12/2022	CO 1/2 hrly av ELV breached (149.74 mg/m3)		
12/12/2022	CO 1/2 hrly av ELV breached (140.80 mg/m3)		
14/12/2022	CO 1/2 hrly av ELV breached (117 mg/m3)	Variable fuel quality	Fine tweaking of the dampers and blending techniques improved during commissioning
20/12/2022	CO 1/2 hrly av ELV breached (125.08 mg/m3)		
21/12/2022	CO 1/2 hrly av ELV breached (113.92 mg/m3)		
21/12/2022	CO 1/2 hrly av ELV breached (103.45 mg/m3)		
21/12/2022	CO 1/2 hrly av ELV breached (117.91 mg/m3)		

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
	None received in 2022		

*** 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.
During 2022 an OFGR fan has been installed at Hull. This improves cooling and reduces high temperatures in the hot gas path leading to improved thermal efficiency.

Summary of any permit improvement conditions that have been completed within the year and the resulting environmental benefits.
N/A - permit improvement conditions relate to post commissioning and will be undertaken in 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.
The plant switched fuel during 2022 from wood to RDF which required a permit variation which was completed in 2020.

Summary of any other improvements made to the plant or planned to be made and a summary of the resulting environmental benefits.
The addition of a new Scrubber spray water lance will reduce emmisions mainly HCL. The addition of new SNCR nozzle injectors will improve and reduce NOX emmissions.

Details of Public & Stakeholder Liasion

Summary of events held during the reporting year.	
Date	**Description**
2022	None

List of events planned for next year	
Date	**Description**
2023	Not yet planned

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

Residue Quality Monitoring Requirements

Summary of monitoring undertaken and compliance
Since the plant has been operational utilising RDF as a feedstock, there have been insufficent quantities of IBA to undertake regular testing. Going forward this will be done on a monthly basis to inform hazard assessment of the IBA, and both IBA and APC will be tested quarterly in line with the permit.

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%		
Total Organic Carbon (average %)	<3%		
No. of Assessments Undertaken	---		
No. of Hazardous Results	---		

Comments :

Emissions to Water

Summary of monitoring undertaken and compliance

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
QAL 2 Testing has not yet been completed. This will be done as soon as possible following the end of commissioning the plant on RDF feedstocks

Results of emissions to air that are periodically monitored							
Substance	**Ref. Period**	**Emission Limit Value**	**Average**				
			A1				
Hydrogen fluoride	1 hr	2 mg/m^3					
Cd and Th and their compounds	6-8hrs	0.05 mg/m^3					
Hg and its compounds	6-8hrs	0.05 mg/m^3					
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V and their compounds	6-8hrs	0.5 mg/m^3					
Dioxins & Furans (I-TEQ)	6-8hrs	0.1 ng/m^3					
PCBs (WHO-TEQ Humans / Mammals)	6-8hrs	None set ng/m^3					
PCBs (WHO-TEQ Fish)	6-8hrs	None set ng/m^3					
PCBs (WHO-TEQ Birds)	6-8hrs	None set ng/m^3					
Dioxins & Furans (WHO-TEQ Humans / Mammals)	6-8hrs	None set ng/m^3					
Dioxins & Furans (WHO-TEQ Fish)	6-8hrs	None set ng/m^3					
Dioxins & Furans (WHO-TEQ Birds)	6-8hrs	None set ng/m^3					
Anthanthrene	6-8hrs	None set µg/m^3					
Benzo(a)anthracene	6-8hrs	None set µg/m^3					
Benzo(a)pyrene	6-8hrs	None set µg/m^3					
Benzo(b)fluoranthene	6-8hrs	None set µg/m^3					
Benzo(b)naptho(2,1-d) thiophene	6-8hrs	None set µg/m^3					
Benzo(c)phenanthrene	6-8hrs	None set µg/m^3					
Benzo(ghi)perylene	6-8hrs	None set µg/m^3					
Benzo(k)fluoranthene	6-8hrs	None set µg/m^3					
Cholanthrene	6-8hrs	None set µg/m^3					
Chrysene	6-8hrs	None set µg/m^3					
Cyclopenta(cd)pyrene	6-8hrs	None set µg/m^3					
Dibenzo(ai)pyrene	6-8hrs	None set µg/m^3					
Dibenzo(ah)anthracene	6-8hrs	None set µg/m^3					
Fluoranthene	6-8hrs	None set µg/m^3					
Indeno(123-cd) pyrene	6-8hrs	None set µg/m^3					
Naphthalene	6-8hrs	None set µg/m^3					
Comments :							

Emissions to Air (continously 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)

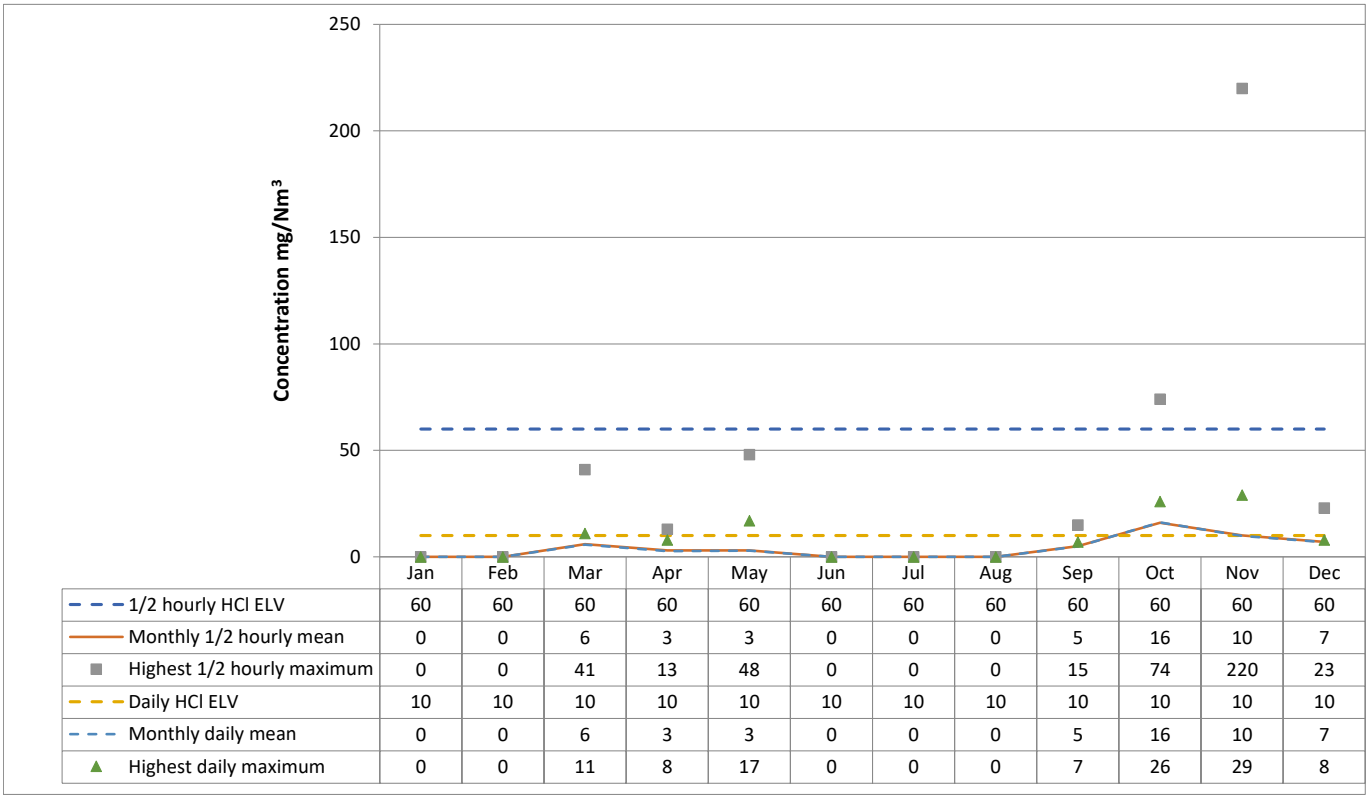
Substance	**Reference Period**	**Emission Limit Value**	**A1**									
			Max.	**Avg.**								
Oxides of nitrogen	Daily mean	200 mg/m^3	257.00	117.63								
	½ hourly mean	400 mg/m^3	438.00	117.56								
Particulates	Daily mean	10 mg/m^3	608.00	9.08								
	½ hourly mean	30 mg/m^3	6216.00	9.00								
Total Organic Carbon	Daily mean	10 mg/m^3	381.00	12.54								
	½ hourly mean	20 mg/m^3	1202.00	16.50								
Hydrogen chloride	Daily mean	10 mg/m^3	29.00	5.46								
	½ hourly mean	60 mg/m^3	220.00	5.56								
Sulphur dioxide	Daily mean	50 mg/m^3	49.00	8.94								
	½ hourly mean	200 mg/m^3	147.00	9.00								
Carbon monoxide	Daily mean	50 mg/m^3	3241.00	91.01								
	½ hourly mean *	100 mg/m^3 *	17958.00	90.89								
Ammonia	Daily mean	7.5 mg/m^3	32.00	1.05								

* = delete or amend as appropriate

Comments :

Monitoring of Hydrogen Chloride emissions **Whole Installation** *See Notes in Cell Q3*

mg/Nm^3	1/2 Hourly Reference Periods			Daily Reference Periods		
2022	**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	0	0	10	0	0
Feb	60	-	-	10	-	-
Mar	60	6	41	10	6	11
Apr	60	3	13	10	3	8
May	60	3	48	10	3	17
Jun	60	-	-	10	-	-
Jul	60	-	-	10	-	-
Aug	60	0	0	10	0	0
Sep	60	5	15	10	5	7
Oct	60	16	74	10	16	26
Nov	60	10	220	10	10	29
Dec	60	7	23	10	7	8

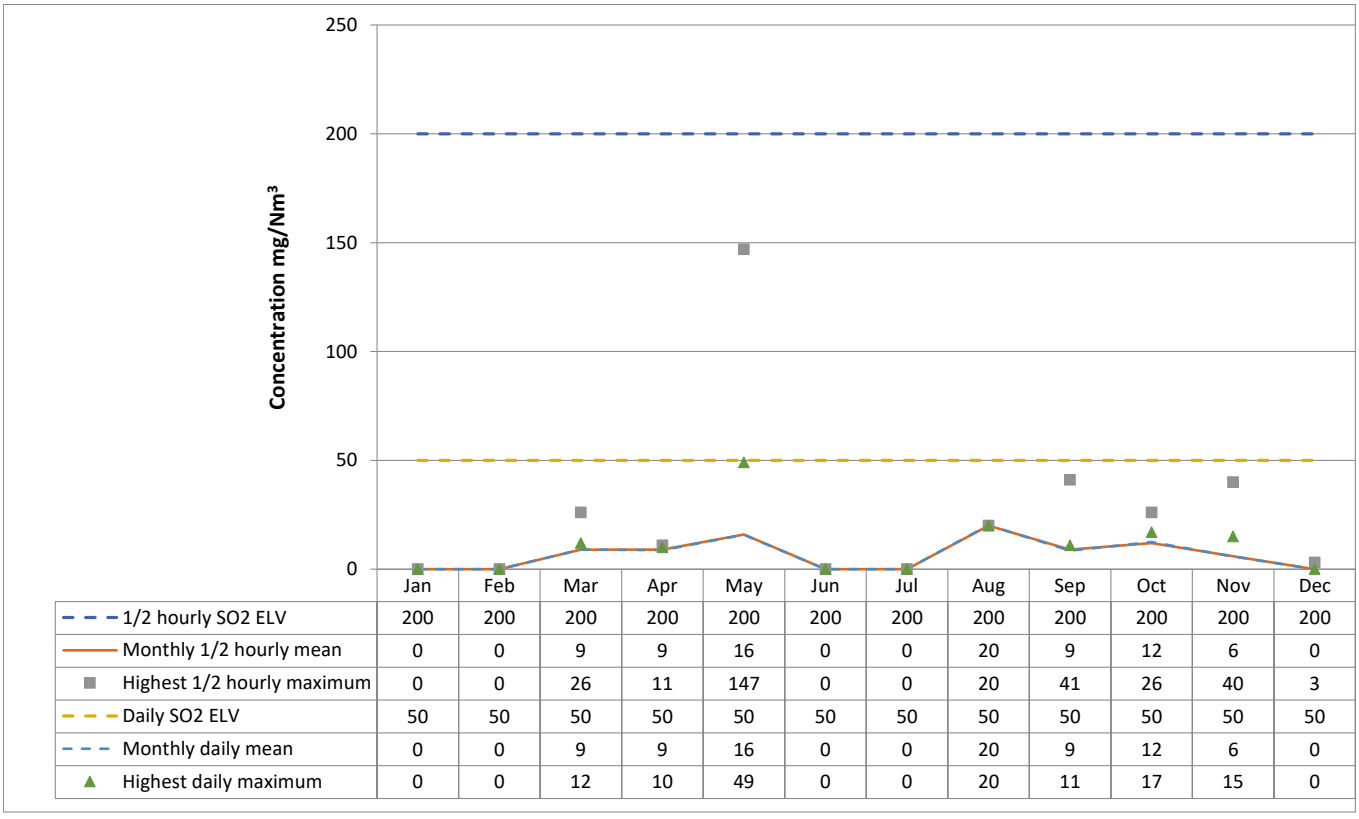


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly HCl ELV	60	60	60	60	60	60	60	60	60	60	60	60
Monthly 1/2 hourly mean	0	0	6	3	3	0	0	0	5	16	10	7
Highest 1/2 hourly maximum	0	0	41	13	48	0	0	0	15	74	220	23
Daily HCl ELV	10	10	10	10	10	10	10	10	10	10	10	10
Monthly daily mean	0	0	6	3	3	0	0	0	5	16	10	7
Highest daily maximum	0	0	11	8	17	0	0	0	7	26	29	8

Comments :

Monitoring of Sulphur dioxide emissions **Whole Installation** *See Notes in Cell Q3*

mg/Nm^3	1/2 Hourly Reference Periods			Daily Reference Periods		
2022	**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	0	0	50	0	0
Feb	200	-	-	50	-	-
Mar	200	9	26	50	9	12
Apr	200	9	11	50	9	10
May	200	16	147	50	16	49
Jun	200	-	-	50	-	-
Jul	200	-	-	50	-	-
Aug	200	20	20	50	20	20
Sep	200	9	41	50	9	11
Oct	200	12	26	50	12	17
Nov	200	6	40	50	6	15
Dec	200	0	3	50	0	0

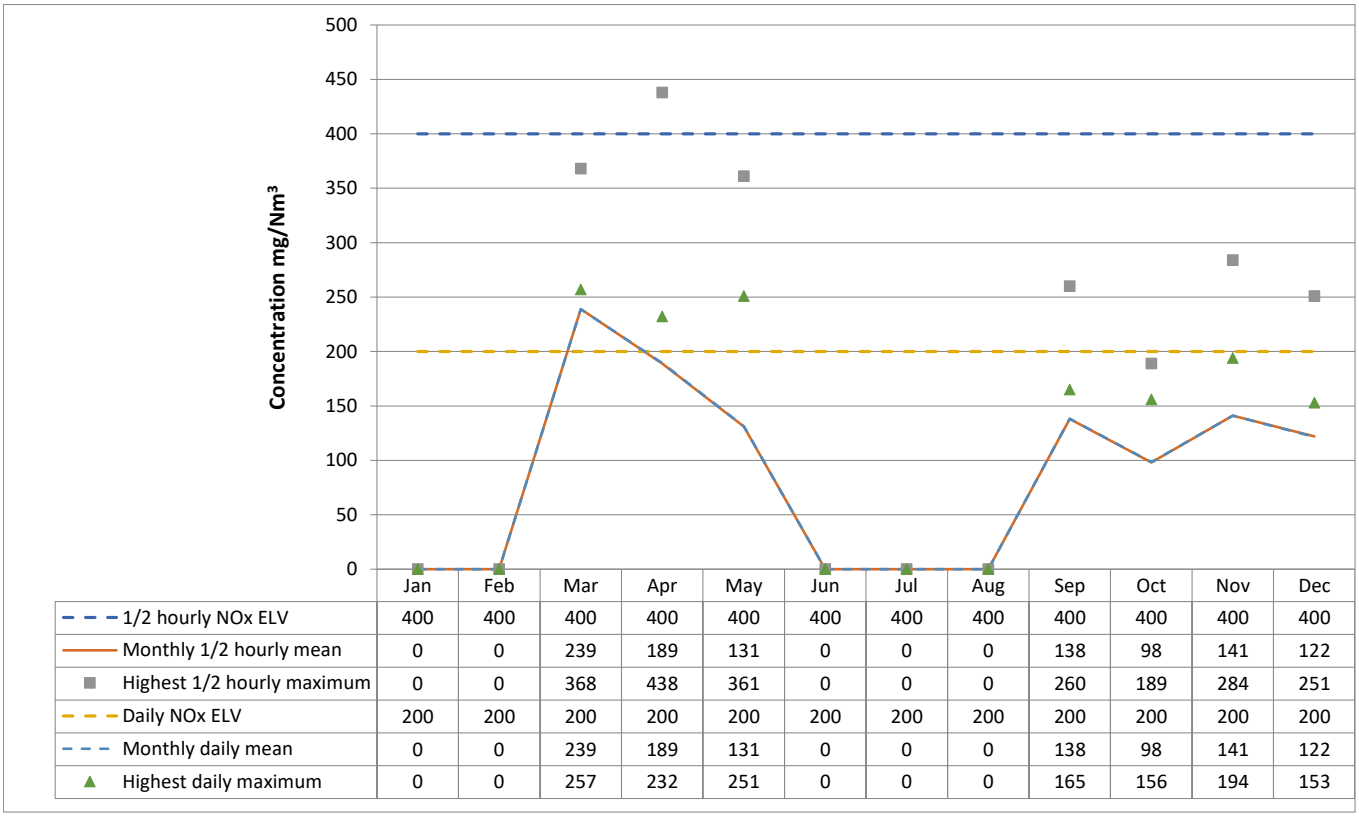


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly SO2 ELV	200	200	200	200	200	200	200	200	200	200	200	200
Monthly 1/2 hourly mean	0	0	9	9	16	0	0	20	9	12	6	0
Highest 1/2 hourly maximum	0	0	26	11	147	0	0	20	41	26	40	3
Daily SO2 ELV	50	50	50	50	50	50	50	50	50	50	50	50
Monthly daily mean	0	0	9	9	16	0	0	20	9	12	6	0
Highest daily maximum	0	0	12	10	49	0	0	20	11	17	15	0

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		
2022	**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	0	0	200	0	0
Feb	400	-	-	200	-	-
Mar	400	239	368	200	239	257
Apr	400	189	438	200	189	232
May	400	131	361	200	131	251
Jun	400	-	-	200	-	-
Jul	400	-	-	200	-	-
Aug	400	0	0	200	0	0
Sep	400	138	260	200	138	165
Oct	400	98	189	200	98	156
Nov	400	141	284	200	141	194
Dec	400	122	251	200	122	153

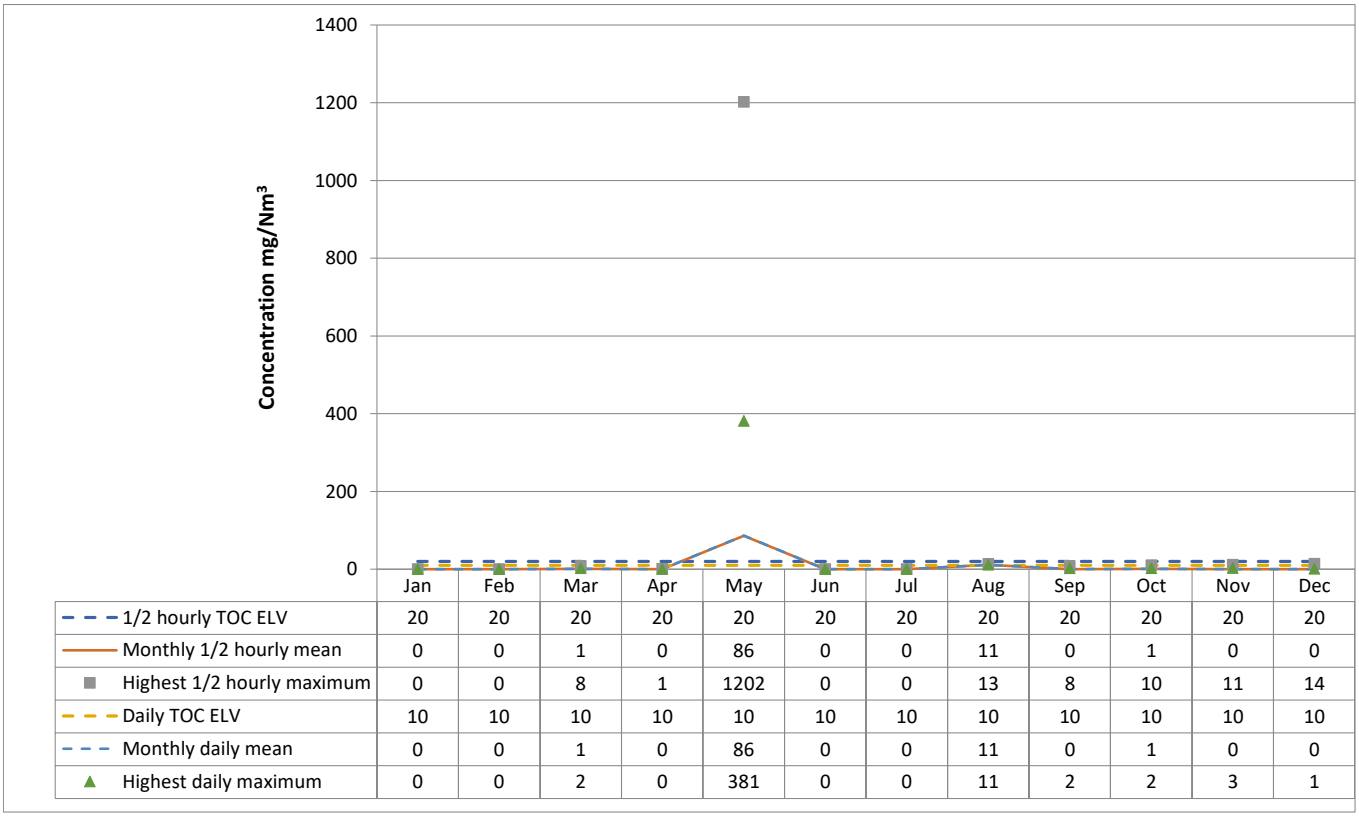


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly NOx ELV	400	400	400	400	400	400	400	400	400	400	400	400
Monthly 1/2 hourly mean	0	0	239	189	131	0	0	0	138	98	141	122
Highest 1/2 hourly maximum	0	0	368	438	361	0	0	0	260	189	284	251
Daily NOx ELV	200	200	200	200	200	200	200	200	200	200	200	200
Monthly daily mean	0	0	239	189	131	0	0	0	138	98	141	122
Highest daily maximum	0	0	257	232	251	0	0	0	165	156	194	153

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		
2022	**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	-	-	10	-	-
Feb	20	-	-	10	-	-
Mar	20	1	8	10	1	2
Apr	20	-	1	10	0	0
May	20	86	1202	10	86	381
Jun	20	-	-	10	-	-
Jul	20	-	-	10	-	-
Aug	20	11	13	10	11	11
Sep	20	0	8	10	0	2
Oct	20	1	10	10	1	2
Nov	20	0	11	10	0	3
Dec	20	-	14	10	0	1

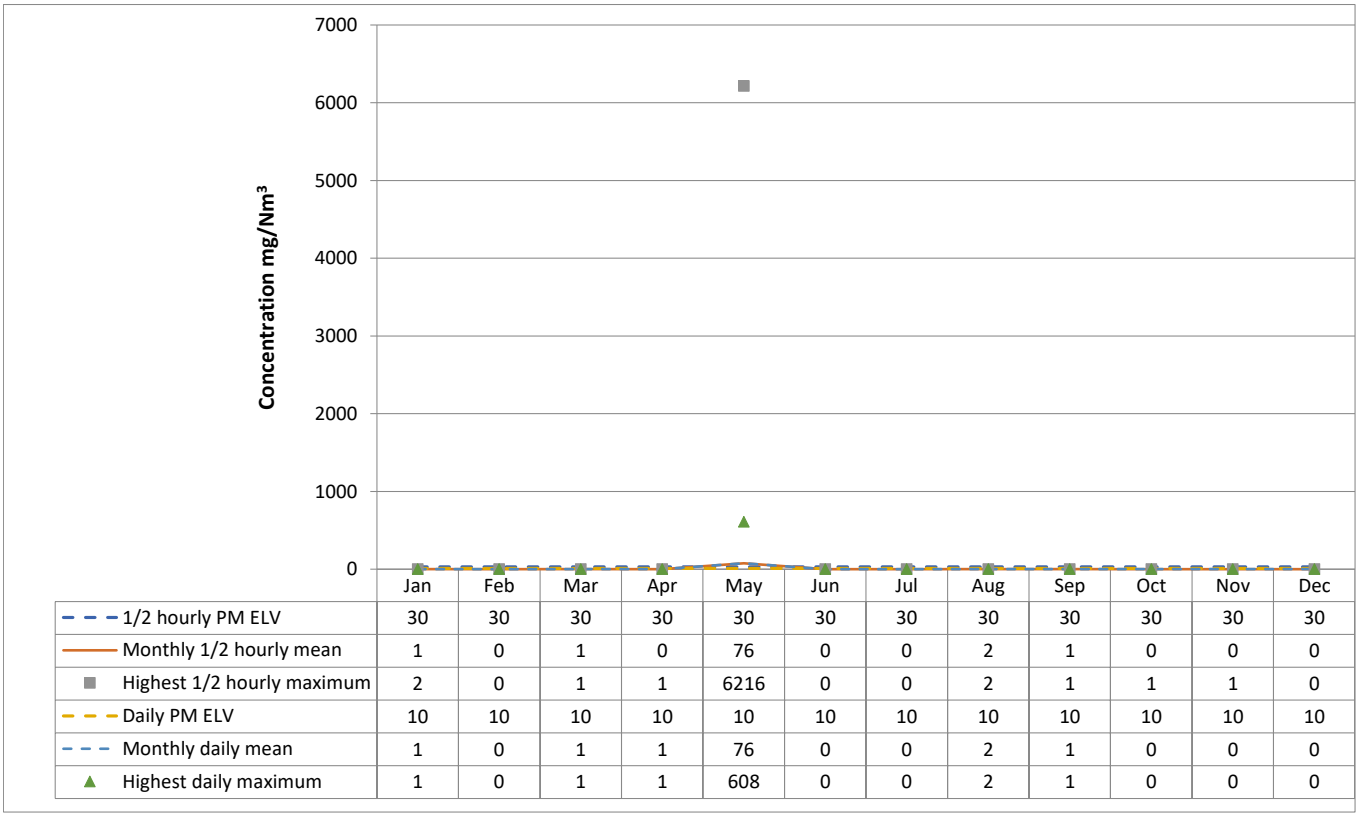


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly TOC ELV	20	20	20	20	20	20	20	20	20	20	20	20
Monthly 1/2 hourly mean	0	0	1	0	86	0	0	11	0	1	0	0
Highest 1/2 hourly maximum	0	0	8	1	1202	0	0	13	8	10	11	14
Daily TOC ELV	10	10	10	10	10	10	10	10	10	10	10	10
Monthly daily mean	0	0	1	0	86	0	0	11	0	1	0	0
Highest daily maximum	0	0	2	0	381	0	0	11	2	2	3	1

Comments :

Monitoring of Particulate matter emissions **Whole Installation** *See Notes in Cell Q3*

mg/Nm^3	1/2 Hourly Reference Periods			Daily Reference Periods		
2022	**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	2	10	1	1
Feb	30	-	-	10	-	-
Mar	30	1	1	10	1	1
Apr	30	0	1	10	1	1
May	30	76	6216	10	76	608
Jun	30	-	-	10	-	-
Jul	30	-	-	10	-	-
Aug	30	2	2	10	2	2
Sep	30	1	1	10	1	1
Oct	30	0	1	10	0	0
Nov	30	0	1	10	0	0
Dec	30	0	0	10	0	0

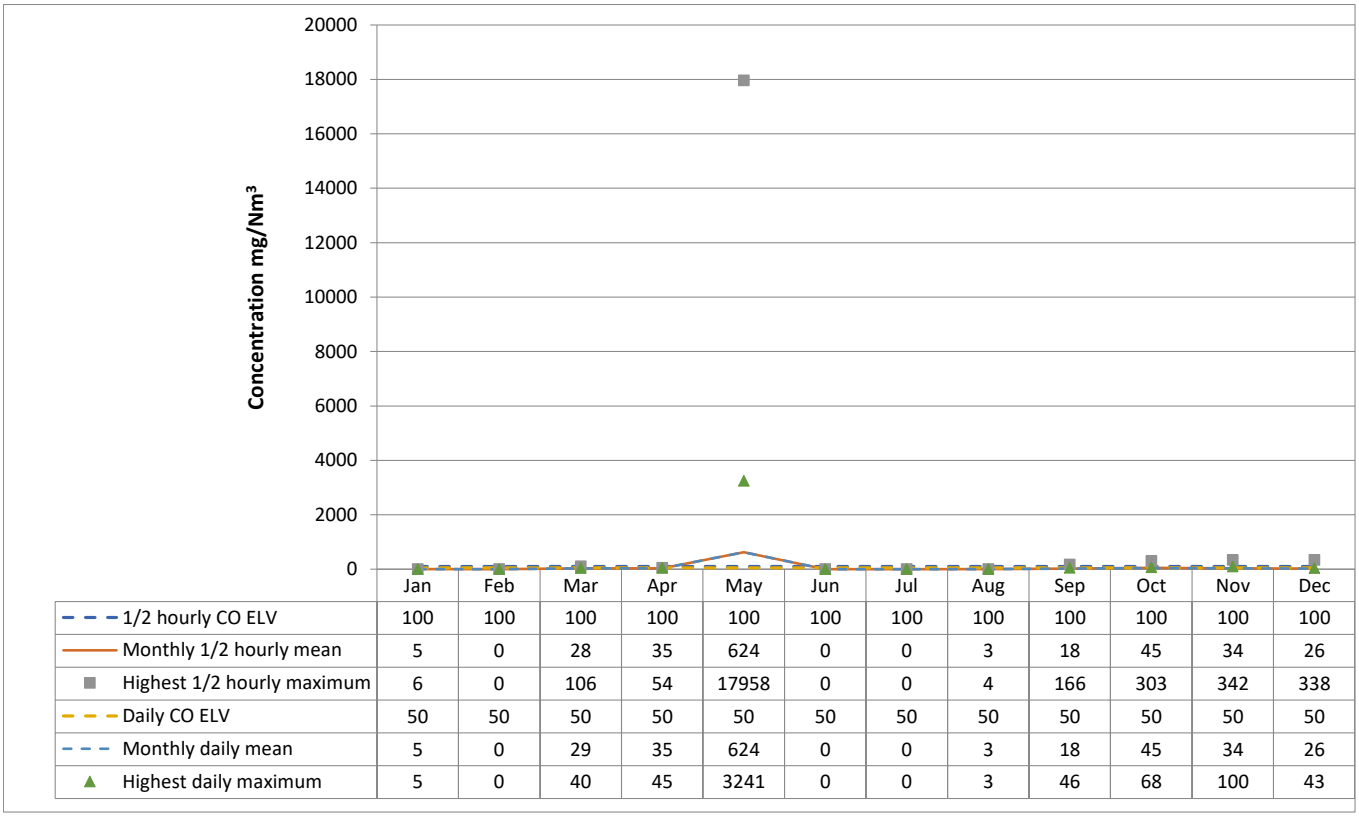


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly PM ELV	30	30	30	30	30	30	30	30	30	30	30	30
Monthly 1/2 hourly mean	1	0	1	0	76	0	0	2	1	0	0	0
Highest 1/2 hourly maximum	2	0	1	1	6216	0	0	2	1	1	1	0
Daily PM ELV	10	10	10	10	10	10	10	10	10	10	10	10
Monthly daily mean	1	0	1	1	76	0	0	2	1	0	0	0
Highest daily maximum	1	0	1	1	608	0	0	2	1	0	0	0

Comments :

Monitoring of Carbon Monoxide (half hourly) **Whole Installation** *See Notes in Cell Q3*

mg/Nm^3	1/2 Hourly Reference Periods			Daily Reference Periods		
2022	**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	5	6	50	5	5
Feb	100	-	-	50	-	-
Mar	100	28	106	50	29	40
Apr	100	35	54	50	35	45
May	100	624	17958	50	624	3241
Jun	100	-	-	50	-	-
Jul	100	-	-	50	-	-
Aug	100	3	4	50	3	3
Sep	100	18	166	50	18	46
Oct	100	45	303	50	45	68
Nov	100	34	342	50	34	100
Dec	100	26	338	50	26	43

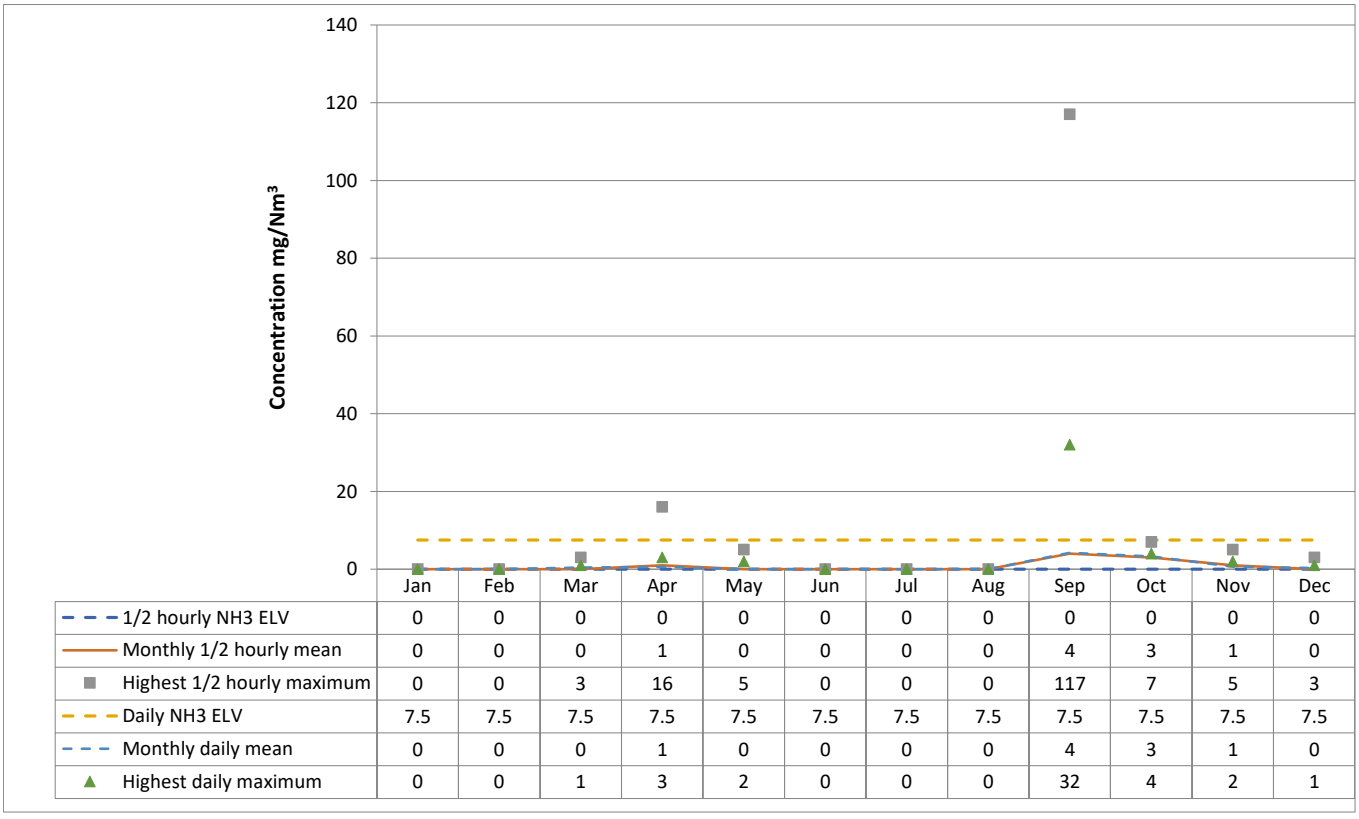


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly CO ELV	100	100	100	100	100	100	100	100	100	100	100	100
Monthly 1/2 hourly mean	5	0	28	35	624	0	0	3	18	45	34	26
Highest 1/2 hourly maximum	6	0	106	54	17958	0	0	4	166	303	342	338
Daily CO ELV	50	50	50	50	50	50	50	50	50	50	50	50
Monthly daily mean	5	0	29	35	624	0	0	3	18	45	34	26
Highest daily maximum	5	0	40	45	3241	0	0	3	46	68	100	43

Comments :

Monitoring of Ammnonia emissions **Whole Installation** *See Notes in Cell Q3*

mg/Nm^3	1/2 Hourly Reference Periods			Daily Reference Periods		
2022	**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	0	0	0	7.5	0	0
Feb	0	-	-	7.5	-	-
Mar	0	0	3	7.5	0	1
Apr	0	1	16	7.5	1	3
May	0	0	5	7.5	0	2
Jun	0	-	-	7.5	-	-
Jul	0	-	-	7.5	-	-
Aug	0	0	0	7.5	0	0
Sep	0	4	117	7.5	4	32
Oct	0	3	7	7.5	3	4
Nov	0	1	5	7.5	1	2
Dec	0	0	3	7.5	0	1



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly NH3 ELV	0	0	0	0	0	0	0	0	0	0	0	0
Monthly 1/2 hourly mean	0	0	0	1	0	0	0	0	4	3	1	0
Highest 1/2 hourly maximum	0	0	3	16	5	0	0	0	117	7	5	3
Daily NH3 ELV	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Monthly daily mean	0	0	0	1	0	0	0	0	4	3	1	0
Highest daily maximum	0	0	1	3	2	0	0	0	32	4	2	1

Comments :

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