



recycling and recovery UK



Annual Performance Report 2019

Permit EPR/XP3436WB/V002

SUEZ R&R Wilton 11 EfW

other name of facility (if applicable)

SUEZ R&R

Year: 2019

Address: Wilton International, Middlesbrough TS10 4RG

Tel: 01642 442400

Email: alex.biggin@suez.com

Prepared by: Paula Bakes

Position: EIR Manager

Approved by: Alex Biggin

Position: Plant Manager

Version:

Issue Date:

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Distribution		
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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 Energy from Waste facility operates 24/7 and has a design capacity of 49.9 MW. This requires a fuel input with a maximum continuous rating of around 29.2 tonnes per hour of MSW (from Merseyside County Council and various commercial customers) with an average net calorific value of 9.8 MJ/kg. This equates to 467,200 tonnes per annum at 8000 hours operation per annum through two combustion lines.

The plant has two Lines capable of processing up to 500,000 tonnes of waste per year. Incoming waste is delivered to site by rail and bulk vehicle trucks. Rail waste is checked at SUEZ's Knowsley Transfer station, weighed and then loaded into ISO containers before being placed onto rail carriages and transported to the EFW facility.

Road waste is weighed via weighbridge at the Wilton site, and then tipped in the traditional way in the waste reception hall.

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Summary of Operational Processes and Procedures

WASTE RECEPTION

The plant is designed to accept contractual waste from Merseyside County Council via rail in bespoke ISO containers. Once at the EFW plant, the containers are lifted off the rail carriages by a gantry crane and placed onto mechanical 'tilters'. The tilters operate hydraulically and move to the edge of the waste pit waste before being tilted to a 60 degree angle, allowing the waste to fall into the waste pit.

Waste is also delivered by road via Bulk Transfer Vehicles in the standard operating way.

Air needed for combustion is drawn into the furnace from above the waste reception hall so that odour and dust do not escape from the building.

BUNKER

Mixing of waste occurs as the crane driver sorts the waste looking for unsuitable wastes to be removed, and to improve the homogeneity of the incinerator feedstock.

CONTROL ROOM

There is one control room which centralises the operation of all equipment, including the grab crane used to mix and load waste into hoppers that feeds the furnace. All on-site functions are monitored automatically and manually. Its systems verify in real time that equipment is functioning properly, continuously monitor the combustion gas, and maximise the efficiency of the entire EFW process.

GRATE AND BOILER

Waste is lifted into the feed hoppers by the crane, from here waste falls into the furnace-charging chute and then onto the grate system for incineration. The thermal energy released from the burning is used to convert water to super-heated steam. At high pressure, this steam drives a turbine to generate electricity.

ENERGY GENERATION

Electricity is generated at 11kv, with an electric capacity of 49.9 MWh. The plant also has the capability of exporting steam at 3 different pressures, 58 bar(g), 17 bar(g) and 1.4 bar(g). Steam is exported into the Wilton International site headers for use by a number of plants on site. Where possible the steam is taken from turbine extract to ensure maximum efficiency.

BOTTOM ASH

Ash left on the grate after incineration is carried by conveyor to a recycling facility opposite the EFW plant. Once operational (February 2017) the bottom ash recycling facility will use a magnet above the conveyor to extract ferrous material for recycling. The remaining bottom ash is processed for recycling following classification of its hazardous properties.

WATER COOLED CONDENSERS

WATER-COOLED CONDENSERS

After exiting the turbine, the steam is cooled and condensed back into water through water cooled condensers. This recovered water is treated and reused in the boilers to produce more steam. The water cooled condenser is capable of taking the full load from the boiler to ensure continuous operation of the EfW Plant.

EMISSION CONTROL

The gases from the furnace are subject to a rigorous cleaning process involving selective non-catalytic reduction (SNCR), spray absorbers, and active carbon injection. This removes oxides of nitrogen, acidic gases, dioxins, and heavy metals from the gas stream.

AIR POLLUTION CONTROL RESIDUE (APCR)

The cleaned gas is passed through fine-fabric bag filters to remove solid particles before it is emitted through the stack. The resultant APCR residue, or fly-ash, contains particles from the incineration process, we have a semi dry lime injection system. It is stored in a sealed silo until it removed from site for disposal.

EMISSIONS MONITORING

As they pass through the stack, the residual flue gases from the process are continuously monitored before release. Each incinerator line has an independent stack and emissions monitoring system. This data is relayed automatically to the control room.

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Operational Data

Plant Size	440,000 tonnes pa	170 MWth	49
No. of combustion lines	2	No. of Turbines:	1

Waste types received	Unit	Q1	Q2	Q3	Q4	Year Total
Household / Local Authority	tonnes	101,000	108,737	89,802	97,595	397,135.46
Commercial & Industrial		9,622	13,923	7,892	13,604	45,042
Hazardous		-	-	-	-	-
Clinical		-	-	-	-	-
Waste wood (biomass)		-	-	-	-	-
Refuse derived fuel		814	3,189	846	620	5,468
Solid recovered fuel		-	-	-	-	-
Other [Off Spec Compost 19.05.03]		-	-	-	241	241
Other [Please specify]						
Other [Please specify]						
Total waste received		111,436	125,850	98,541	112,061	447,887.51
Rejected Waste		-	-	-	-	-
Waste transferred out		-	-	-	-	-

Energy Usage / Export	Unit	Q1	Q2	Q3	Q4	Year Total
Power Generated	MWh	13,248	55,680	32,957	50,915	152,800
Power Exported		10,989	45,669	24,178	41,082	121,918
Power Used on site		2,259	10,010	8,780	9,833	30,882
Power Imported		7,426	1,026	526	222	9,199
Parasitic Load	%	46.8%	19.5%	27.8%	19.7%	24.7%
Thermal Energy Produced	MWh	27,816	83,407	92,525	99,148	302,897
Thermal Energy Exported		27,816	83,407	92,525	99,148	302,897
R1 value					0.68	Design / Ope

Waste Disposal & Recovery	Unit	Q1	Q2	Q3	Q4	Year Total
APC Residues - produced	tonnes	2,348	2,594	2,342	2,425	9,710
IBA - produced		25,396	30,441	22,037	27,073	104,948
Metals recycling		4,761	3,783	4,689	2,657	15,889.00
Other		-	-	-	-	-
Other		-	-	-	-	-
Other		-	-	-	-	-

Raw Material Usage	Unit	Q1	Q2	Q3	Q4	Year Total
Mains Water	m ³	19,620	14,960	17,320	15,090	66,990
Other Water (Demin & Raw)	m ³	283,380	224,260	177,900	178,530	864,070
Ammonia / Urea	kgs	357,200	424,200	318,400	513,500	1,613,300
Activated Carbon	kgs	21,160	25,660	19,140	19,480	85,440
Lime / hydrated lime	kgs	853,040	1,117,800	906,400	1,063,380	3,940,620
Fuel oil (Mobile Plant)	ltrs	1,901	1,449	1,044	2,124	6,517
Natural Gas	MWh	3,712	1,421	1,603	3,994	10,730
Other		-	-	-	-	-

Summary of Hours	Line/Unit	Q1	Q2	Q3	Q4	Year Total
Hours of waste combustion, total	1	1,850	2,019	1,221	2,033	7,124
Hours of waste combustion, total	2	1,694	2,050	1,710	1,807	7,260
Hours of waste combustion, total	3	-	-	-	-	-
Hours of waste combustion, total	4	-	-	-	-	-
Hours of waste combustion, total	5	-	-	-	-	-
Hours of turbine operations, total	1	417	1,870	1,705	2,079	6,071
Hours of turbine operations, total	2	-	-	-	-	-

Hours of heat / steam export		-	-	-	-	-
Abnormal Events	qty.	1	-	-	-	1
Abnormal operation	hours	1	-	-	-	1
Permit Breaches	qty.	-	-	-	-	-

MWe

%
88.7%
10.1%
-
-
-
1.2%
-
0.1%
100.0%
-
-

KWh/te
341
272
69
21
676
676
Operational / n/a

% inputs
2.2%
23.4%
3.5%
-
-
-

kg or Ltr /te
149.57
1,929.21
3.60
0.19
8.80
0.01
0.02
-

x %
x %
x %
x %
x %
x %
x %

n/a
yes
0.01%
no

Summary of Plant Operations and Maintenance during the reporting year

There were three periods of major maintenance activities during the year in March, April and September.

In March both boilers were brought offline for routine cleaning activities whilst the turbine was reinstalled following a failure in the previous year. This shutdown was 2nd - 15th March.

In April both boilers were brought offline due to a jacking oil leak on the turbine which required entry into the exhaust of the turbine. This shutdown was 7th - 13th April.

In September both boilers and the turbine were brought offline for the planned major shutdown of the year, in which there were major boiler repairs planned and carried out on both boilers along with a list of routine maintenance activities. This shutdown was 1st September - 5th October for Line 1, 10th September - 15th October for Line 2 and 10th September - 5th October for the turbine.

Summary of Residue Handling for the reporting year

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2019 Annual Reporting Performance Form 1

Permit EPR/XP3436WB/V002
Facility: SUEZ R&R Wilton 11 EfW

Operator: 0
Form: Performance 1

Reporting Period from: January to: December

2019 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	Landfill	9,709.7	0.0	2.2%
IBA				-
				-
				-
Total Hazardous Waste		9,709.7	0.0	2.2%
2) Non-Hazardous Wastes				
IBA	Recovery	104,947.6		23.4%
Total Metals	Recovery	15,889.0		3.5%
Process Water				-
				-
				-
Total Non-Hazardous Waste		120,836.6	0.0	27.0%
TOTAL WASTE		130,546.2	0.0	29.1%

Operator's comments :

2019 Annual Reporting of Water and Other Raw Material Usage

Raw Material	Usage	Unit	Specific Usage	Unit
Mains Water	66990	m ³	0.15	m ³ /te
Total Water	931060	m ³	2.08	m ³ /te
Urea / Ammonia	1613300	kg	3.60	kg/te
Activated Carbon	85440	kg	0.19	kg/te
Lime / hydrated lime / Sodium Bicarb.	3940620	kg	8.80	kg/te

Operator's comments :

2019 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	7123.6	7260.05					
Number of periods of abnormal operation, qty.	1	0					
Cumulative hours of abnormal operation for this year, hours	0.5	0					

Operator's comments :

Signed: _____

Date: _____

2019 Annual Reporting of Energy Usage/Export

Permit EPR/XP3436WB/V002

Operator: 0

Facility: SUEZ R&R Wilton 11 EfW

Form: Energy 1

Reporting Period from: January to: December

Energy Source	Energy Usage	Unit	Specific Usage (KWh/tonne incinerated)
Electricity Produced	152,800	MWh	341
Electricity Imported	9199.22	MWh	21
Electricity Exported	121,918	MWh	272
Natural Gas	10730.32	tonnes	0.02
Steam/hot water exported	302,897	GWh	676

Operator's comments :

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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	100% 95% of 10-min averages	100%
Total organic carbon	100%	100%
Hydrogen chloride	100%	100%
Hydrogen fluoride		
	xx %	xx %

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
11/01/2019	Failure of CEMS redundant analyser	The issue was a result of the analyser hardware malfunction whilst carrying out a QAL 3, the load was reduced and QAL 3 aborted and duty analyser returned to service. The root cause of the incident was down to a blocked exhaust from the analyser unit. This was identified by a CBISS engineer who attended site, The exhaust piping was found to contain a substance of up to 2metres in an 8mm tube. The pipe is not lagged and is cooled by air conditioning and further exposure to ambient atmosphere.	•Works order to the raised to capture the issue and engineer a solution to prevent reoccurrence •EC&I Technician to seek advice from CBISS and others plants within SUEZ •EC&I to review SWP to incorporate Pre-start checks on standby analyser with duty senior operator prior to any works being carried out. SWP to also include review of instantaneous half-hourly, and daily average. Hold point to be signed by both parties once amended. SWP to be trained out and signed off following SUEZ sign off/competence procedure •Analyser tubing/Pipework to be checked routinely by

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
23/09/2019	Noise	Noise complaint from Local MP on behalf of Local Resident	Wilton Site noise working Party
25/11/2019	Dust	Ash/ Dust Cloud complaint	Monitor facility & ensure that dust suppression system is being used appropriately

* 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.**

None.

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

None, completed in previous years.

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.

There was a plant trial started on both Lines in December to improve the efficiency of the ammonia dosing SNCR system in line with reducing NOx emissions and achieving improved control. This is ongoing but early results were successful and appear to show the plant can further optimise the system beyond the existing minimum performance guarantees to reduce both ammonia consumption and NOx emissions.

Details of Public & Stakeholder Liasion

Summary of events held during the reporting year.	
Date	Description
February/June/October/November	MWDA Client onsite inspection
2019	Local School Visits

List of events planned for next year	
Date	Description
February	Student Visit
January	Client Valuation Visit

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

Residue Quality Monitoring Requirements

Summary of monitoring undertaken and compliance
Quarterly IBA and APCR samples are taken on Lines 1&2
Fortnightly hazard assessments are carried out on Lines 1&2

Commentary on any specific events	
Date & Event	Description

Residue Quality Monitoring Results			
Parameter (unit)	Limit	Normal Operation	
		Bottom ash	APC Residues
Loss on Ignition (%)	<5%	-	
ToC (%)	<3%	1.28%	
No. of Assessments Undertaken	---	3 per quarter Lines 1&2	
No. of Hazardous Assessments	---	Fortnightly hazard assessments unless Plant is on outage	

Comments :

Emissions to Water

Summary of monitoring undertaken and compliance
None carried out.

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**

Periodic Testing carried out twice a year and either an AST or QAL 2. No breaches during 2019.

Results of emissions to air that are periodically monitored

Substance	Ref. Period	Emission Limit Value	Average				
			A1	A2	A3	A4	A5
Hydrogen fluoride	1 hr	2 mg/m ³	0.0695	0.055			
Cd and Th and their compounds	6-8hrs	0.05 mg/m ³	0.000745	0.00079			
Hg and its compounds	6-8hrs	0.05 mg/m ³	0.0014	0.00165			
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V and their compounds	6-8hrs	0.5 mg/m ³	0.014	0.0285			
Dioxins & Furans (I-TEQ)	6-8hrs	0.1 ng/m ³	0.00305	0.00845			
PCBs (WHO-TEQ Humans / Mammals)	6-8hrs	None set ng/m ³	0.000258	0.00063			
PCBs (WHO-TEQ Fish)	6-8hrs	None set ng/m ³	0.000013	0.00003			
PCBs (WHO-TEQ Birds)	6-8hrs	None set ng/m ³	0.000849	0.0034			
Dioxins & Furans (WHO-TEQ Humans / Mammals)	6-8hrs	None set ng/m ³	0.0029	0.00845			
Dioxins & Furans (WHO-TEQ Fish)	6-8hrs	None set ng/m ³	0.0032	0.009			
Dioxins & Furans (WHO-TEQ Birds)	6-8hrs	None set ng/m ³	0.0046	0.01305			
Anthanthrene	6-8hrs	None set µg/m ³	0.0105	0.0125			
Benzo(a)anthracene	6-8hrs	None set µg/m ³	0.0105	0.025			
Benzo(a)pyrene	6-8hrs	None set µg/m ³	0.022	0.0125			
Benzo(b)fluoranthene	6-8hrs	None set µg/m ³	0.0105	0.0125			
Benzo(b)naphtho(2,1-d)thiophene	6-8hrs	None set µg/m ³	0.0105	0.0125			
Benzo(c)phenanthrene	6-8hrs	None set µg/m ³	0.0105	0.0125			
Benzo(ghi)perylene	6-8hrs	None set µg/m ³	0.0105	0.0125			
Benzo(k)fluoranthene	6-8hrs	None set µg/m ³	0.0105	0.0125			
Cholanthrene	6-8hrs	None set µg/m ³	0.021	0.0185			
Chrysene	6-8hrs	None set µg/m ³	0.0105	0.0125			
Cyclopenta(cd)pyrene	6-8hrs	None set µg/m ³	0.0155	0.0185			
Dibenzo(ai)pyrene	6-8hrs	None set µg/m ³	0.0405	0.0865			
Dibenzo(ah)anthracene	6-8hrs	None set µg/m ³	0.0105	0.0125			
Fluoranthene	6-8hrs	None set µg/m ³	0.019	0.0825			
Indeno(123-cd) pyrene	6-8hrs	None set µg/m ³	0.0105	0.0125			
Naphthalene	6-8hrs	None set µg/m ³	2.46	2.795			

Comments :

Emissions to Air (continuously monitored)

Summary of monitoring undertaken, standards used and compliance												
Continuous monitoring via a CEMS system												

Results of emissions to air that are continuously monitored												
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	218	173.5	204	174.0833						
	½ hourly mean	400 mg/m ³	2329	173.5	335	174.0833						
Particulates	Daily mean	10 mg/m ³	0.5	0.258333	1.7	0.341667						
	½ hourly mean	30 mg/m ³	3	0.258333	5.4	0.341667						
Total Organic Carbon	Daily mean	10 mg/m ³	1	0.633333	1	0.466667						
	½ hourly mean	20 mg/m ³	4	0.633333	6.8	0.45						
Hydrogen chloride	Daily mean	10 mg/m ³	8	5.083333	8	4.9						
	½ hourly mean	60 mg/m ³	44	5.083333	26	4.9						
Sulphur dioxide	Daily mean	50 mg/m ³	37	13.08333	35	15.16667						
	½ hourly mean	200 mg/m ³	173	13.08333	144	15.16667						
Carbon monoxide	Daily mean	50 mg/m ³	20	5	23	5.666667						
	½ hourly mean *	100 mg/m ³ *										
	95%ile 10-min avg *	150 mg/m ³ *	5		5.666667							
Ammonia	Daily mean	No limit set	9	2.333333	4	1.666667						

* = delete or amend as appropriate

Comments :

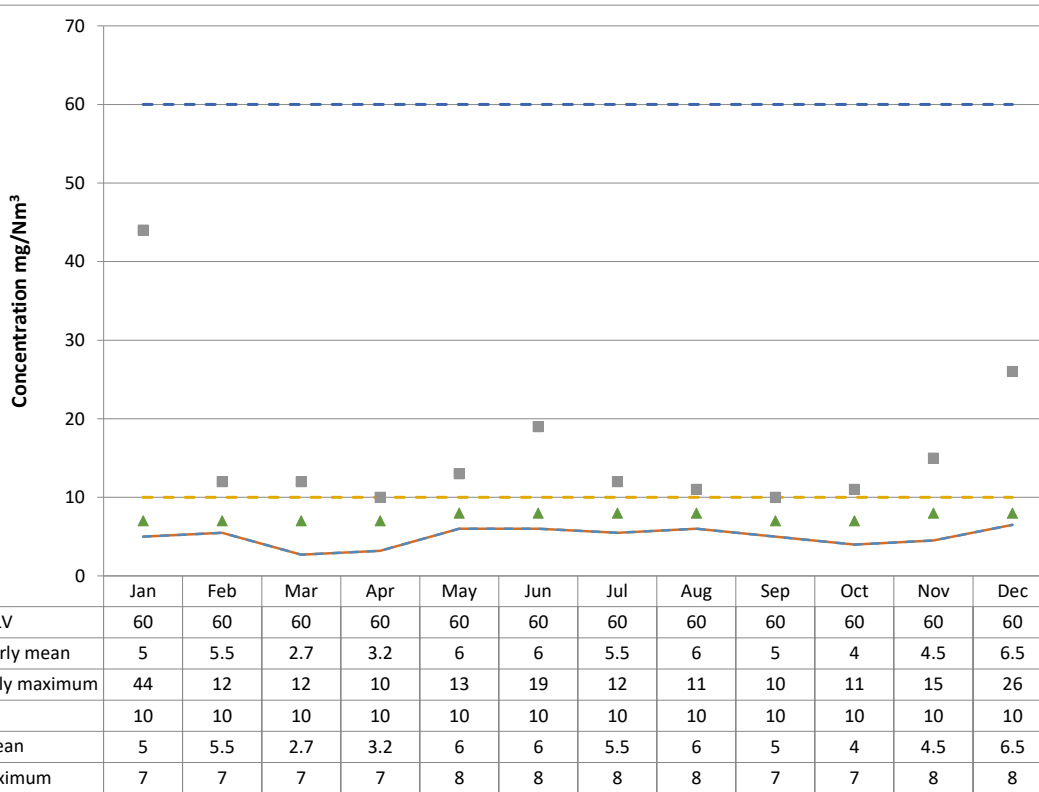


Monitoring of Hydrogen Chloride emissions

Whole Installation

See Notes in Cell Q3

mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
2019	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	5	44	10	5	7
Feb	60	5.5	12	10	5.5	7
Mar	60	2.7	12	10	2.7	7
Apr	60	3.2	10	10	3.2	7
May	60	6	13	10	6	8
Jun	60	6	19	10	6	8
Jul	60	5.5	12	10	5.5	8
Aug	60	6	11	10	6	8
Sep	60	5	10	10	5	7
Oct	60	4	11	10	4	7
Nov	60	4.5	15	10	4.5	8
Dec	60	6.5	26	10	6.5	8



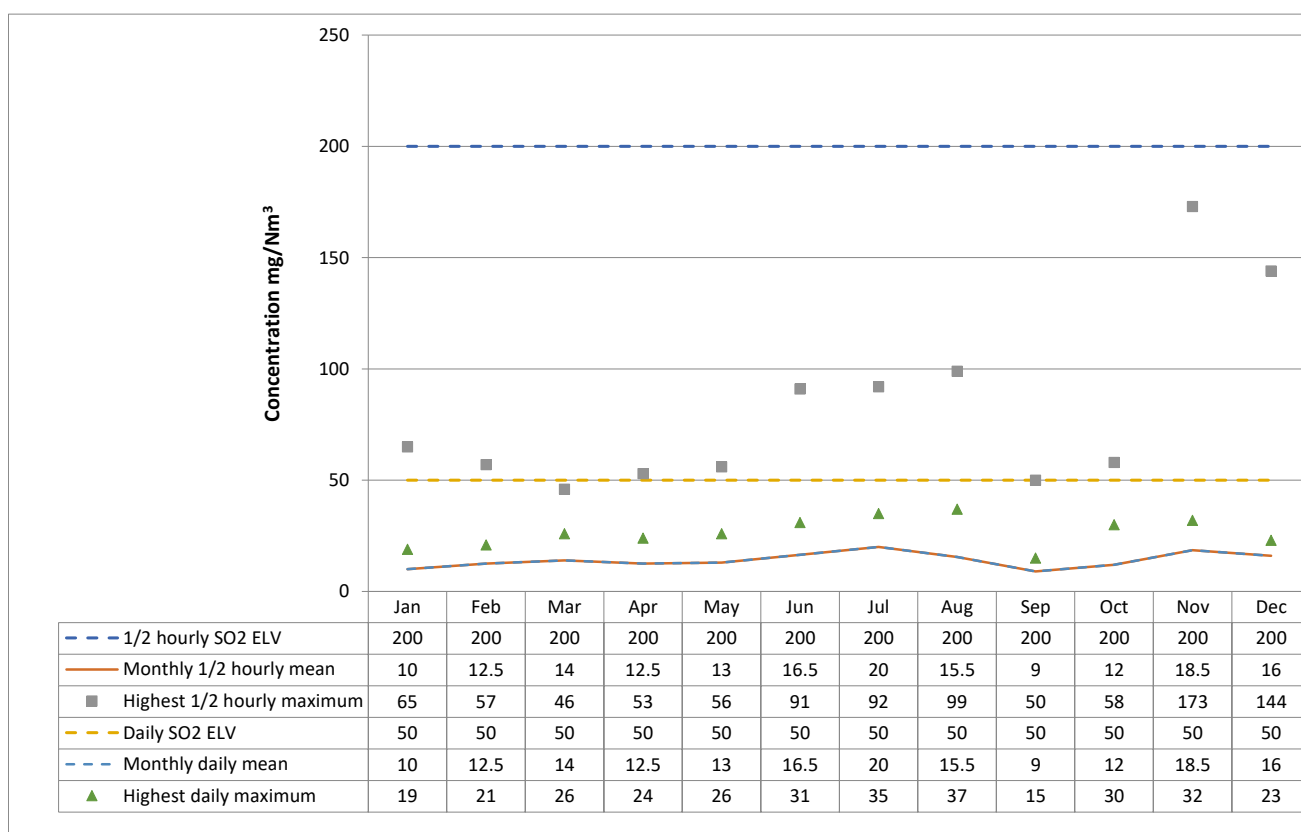
Comments :

Monitoring of Sulphur dioxide emissions

Whole Installation

See Notes in Cell Q3

mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
2019	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	10	65	50	10	19
Feb	200	12.5	57	50	12.5	21
Mar	200	14	46	50	14	26
Apr	200	12.5	53	50	12.5	24
May	200	13	56	50	13	26
Jun	200	16.5	91	50	16.5	31
Jul	200	20	92	50	20	35
Aug	200	15.5	99	50	15.5	37
Sep	200	9	50	50	9	15
Oct	200	12	58	50	12	30
Nov	200	18.5	173	50	18.5	32
Dec	200	16	144	50	16	23



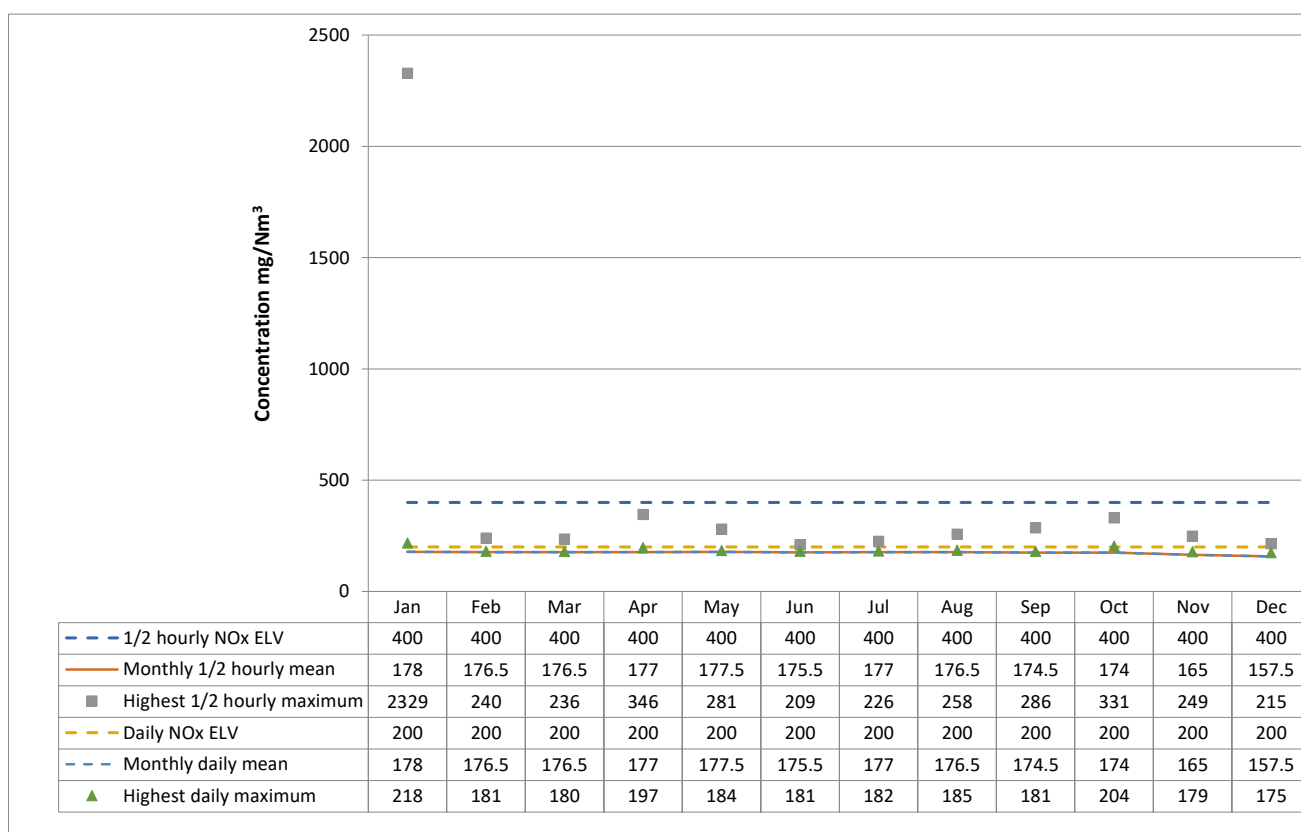
Comments :

Monitoring of Oxides of Nitrogen emissions

Whole Installation

See Notes in Cell Q3

mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
2019	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	178	2329	200	178	218
Feb	400	176.5	240	200	176.5	181
Mar	400	176.5	236	200	176.5	180
Apr	400	177	346	200	177	197
May	400	177.5	281	200	177.5	184
Jun	400	175.5	209	200	175.5	181
Jul	400	177	226	200	177	182
Aug	400	176.5	258	200	176.5	185
Sep	400	174.5	286	200	174.5	181
Oct	400	174	331	200	174	204
Nov	400	165	249	200	165	179
Dec	400	157.5	215	200	157.5	175

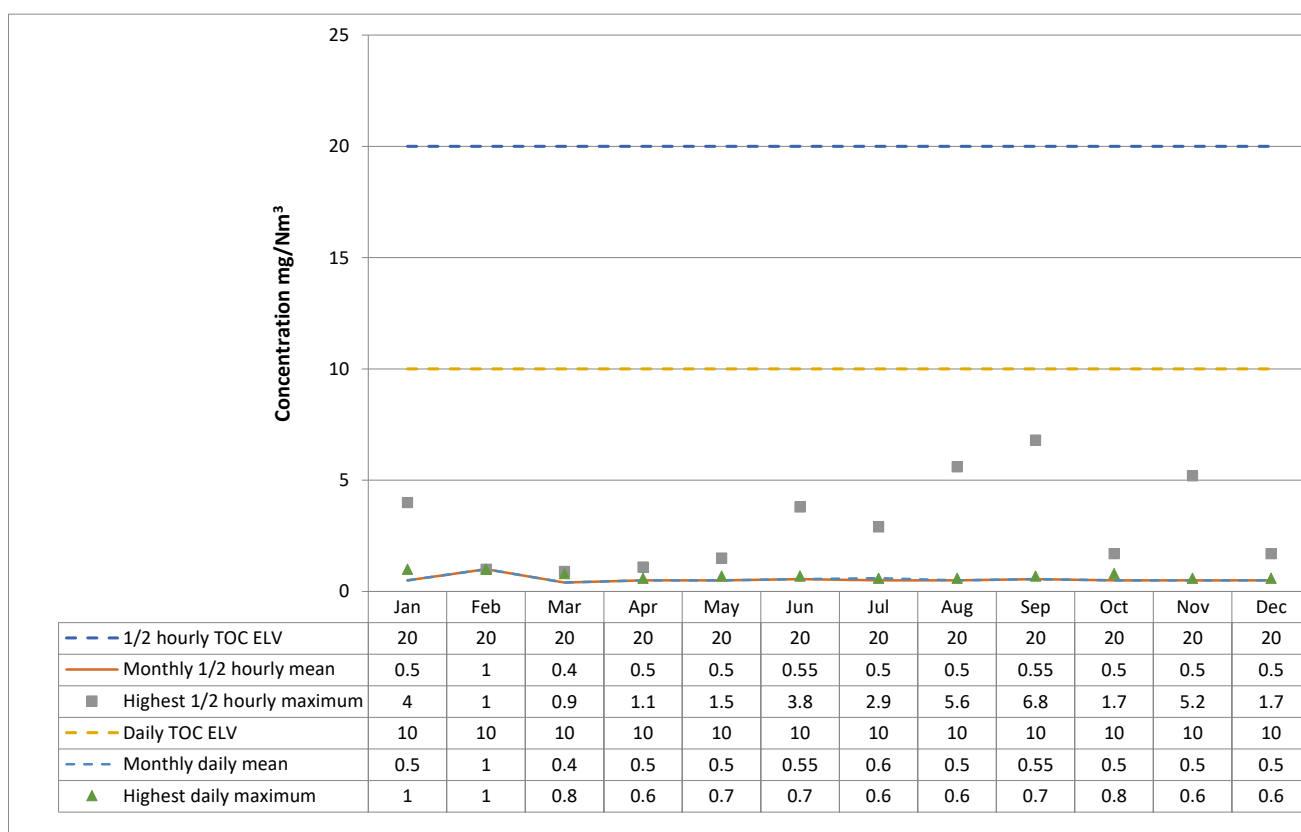


Comments :

Monitoring of Total organic carbon emissions Whole Installation

See Notes in Cell Q3

mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
2019	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	0.5	4	10	0.5	1
Feb	20	1	1	10	1	1
Mar	20	0.4	0.9	10	0.4	0.8
Apr	20	0.5	1.1	10	0.5	0.6
May	20	0.5	1.5	10	0.5	0.7
Jun	20	0.55	3.8	10	0.55	0.7
Jul	20	0.5	2.9	10	0.6	0.6
Aug	20	0.5	5.6	10	0.5	0.6
Sep	20	0.55	6.8	10	0.55	0.7
Oct	20	0.5	1.7	10	0.5	0.8
Nov	20	0.5	5.2	10	0.5	0.6
Dec	20	0.5	1.7	10	0.5	0.6



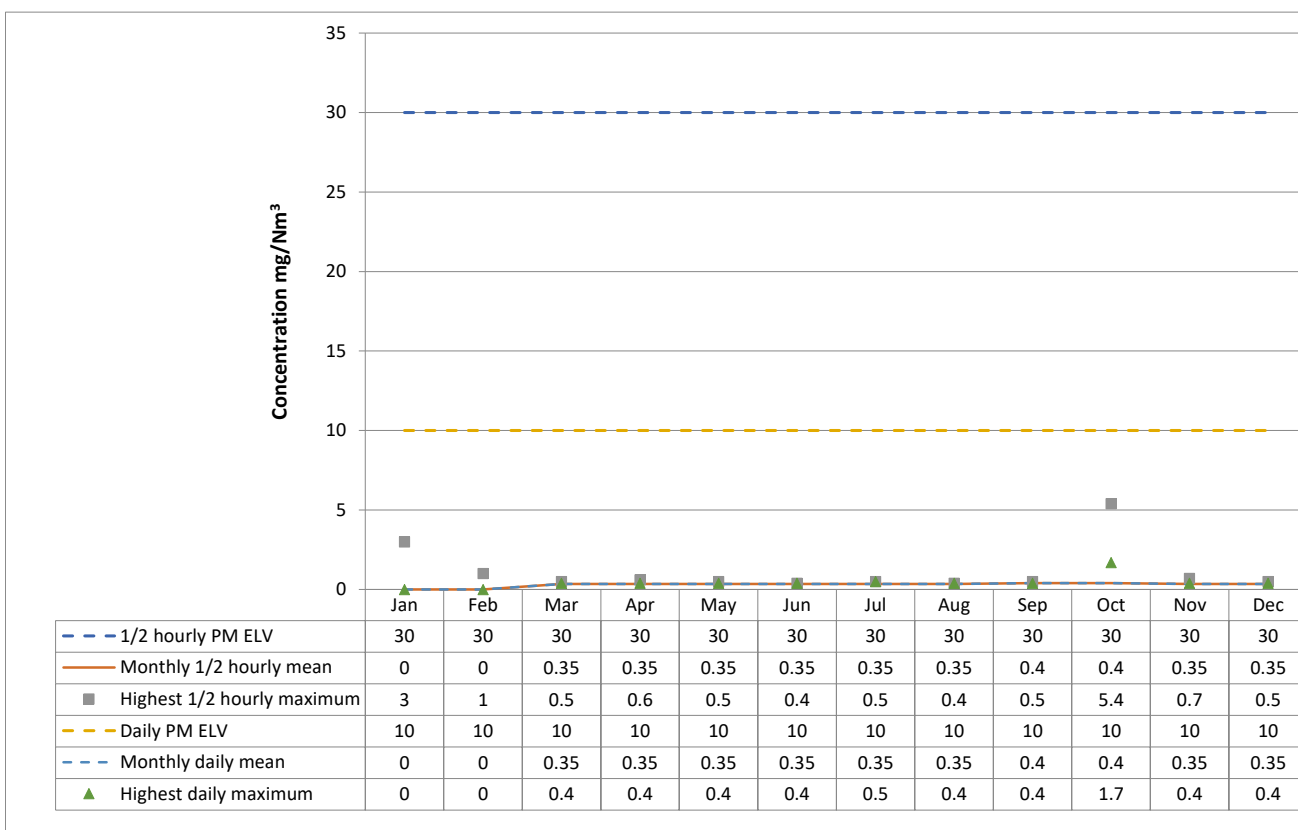
Comments :

Monitoring of Particulate matter emissions

Whole Installation

See Notes in Cell Q3

mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
2019	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	0	3	10	0	0
Feb	30	0	1	10	0	0
Mar	30	0.35	0.5	10	0.35	0.4
Apr	30	0.35	0.6	10	0.35	0.4
May	30	0.35	0.5	10	0.35	0.4
Jun	30	0.35	0.4	10	0.35	0.4
Jul	30	0.35	0.5	10	0.35	0.5
Aug	30	0.35	0.4	10	0.35	0.4
Sep	30	0.4	0.5	10	0.4	0.4
Oct	30	0.4	5.4	10	0.4	1.7
Nov	30	0.35	0.7	10	0.35	0.4
Dec	30	0.35	0.5	10	0.35	0.4



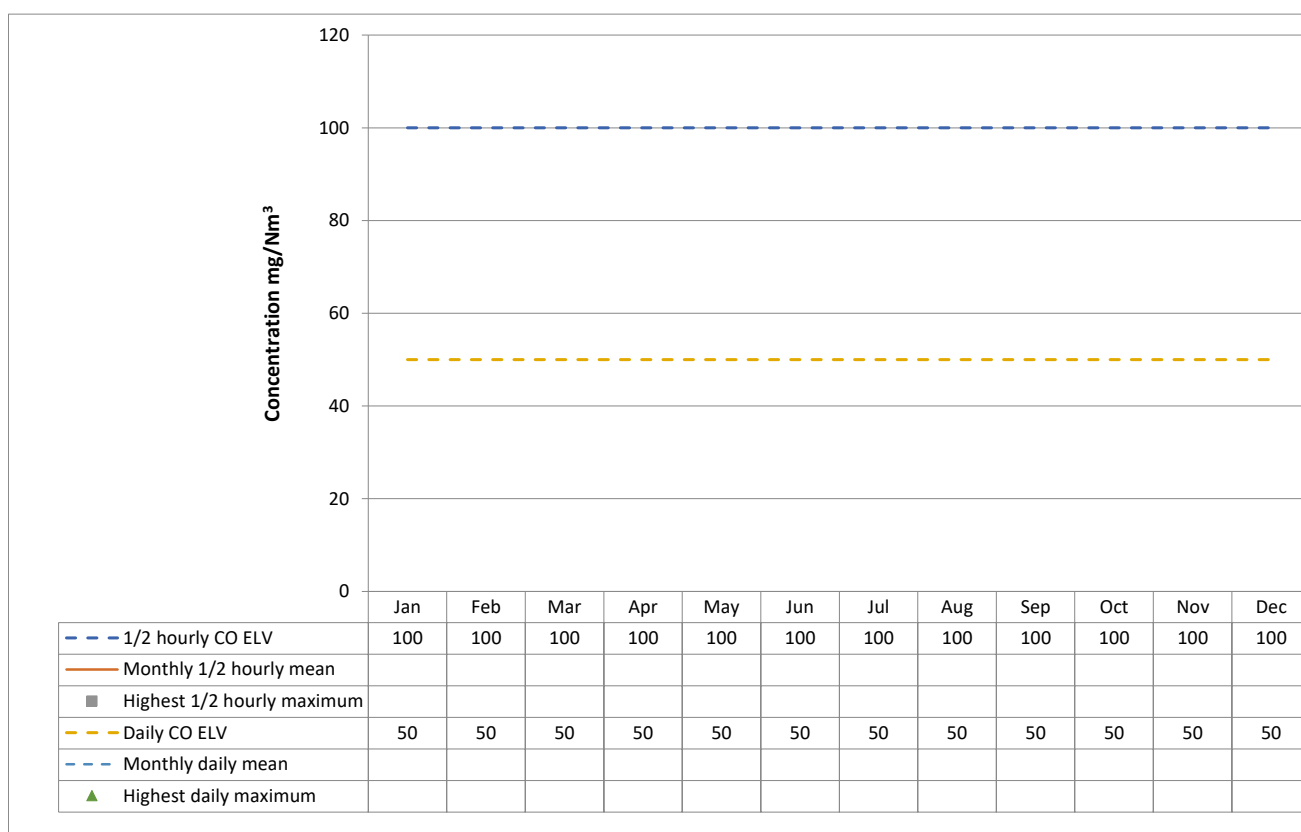
Comments :

Monitoring of Carbon Monoxide (half hourly)

Whole Installation

See Notes in Cell Q3

mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
2019	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		



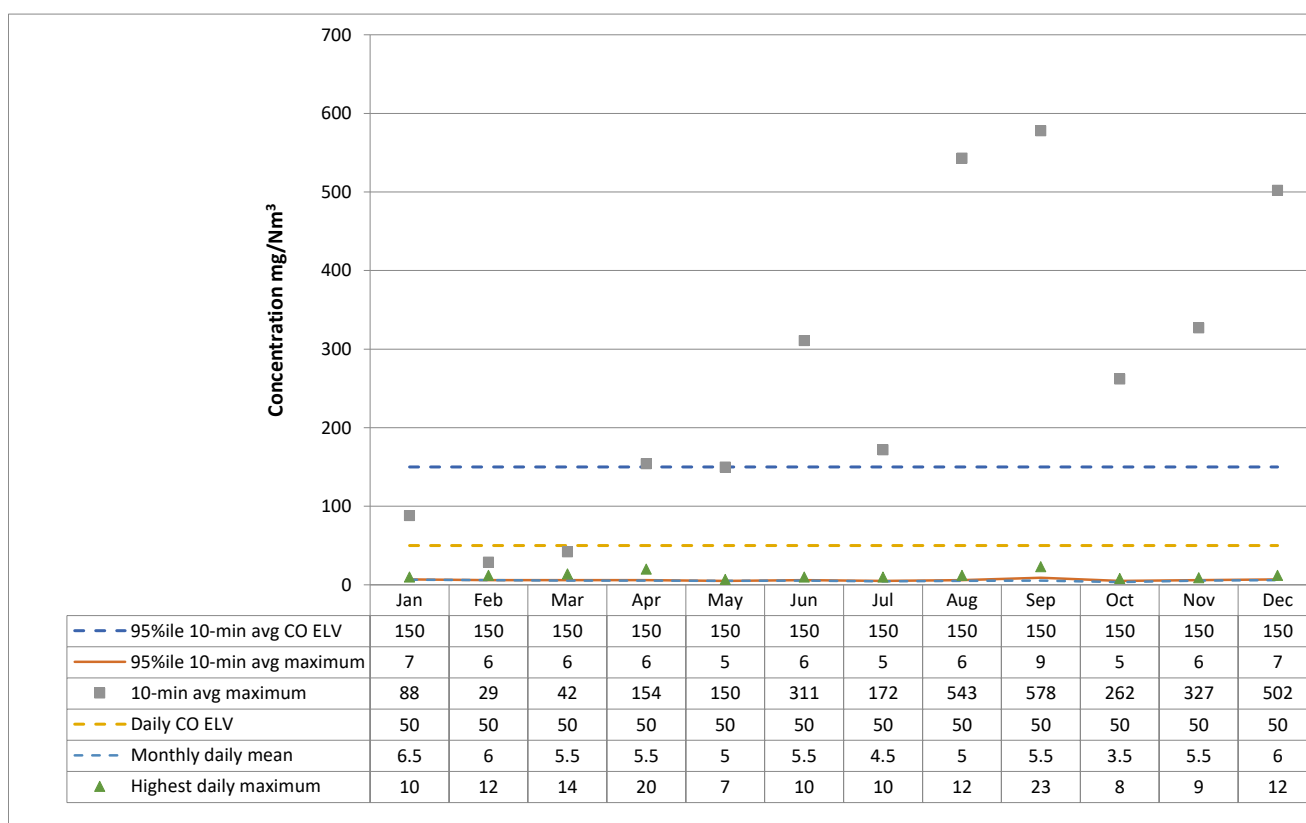
Comments :

Monitoring of Carbon Monoxide (10-minute avg)

Whole Installation

See Notes in Cell S3

mg/Nm ³	10-minute Reference Periods				Daily Reference Periods		
	95 th ile 10-min avg CO ELV	95 th ile 10-min avg maximum	Monthly CO 10-min avg mean	10-min avg maximum	Daily CO ELV	Monthly daily mean	Highest daily maximum
2019							
Jan	150	7	6.5	88	50	6.5	10
Feb	150	6	6	29	50	6	12
Mar	150	6	5.5	42	50	5.5	14
Apr	150	6	5.5	154	50	5.5	20
May	150	5	5	150	50	5	7
Jun	150	6	5.5	311	50	5.5	10
Jul	150	5	4.5	172	50	4.5	10
Aug	150	6	5	543	50	5	12
Sep	150	9	5.5	578	50	5.5	23
Oct	150	5	3.5	262	50	3.5	8
Nov	150	6	5.5	327	50	5.5	9
Dec	150	7	6	502	50	6	12

**Comments :**

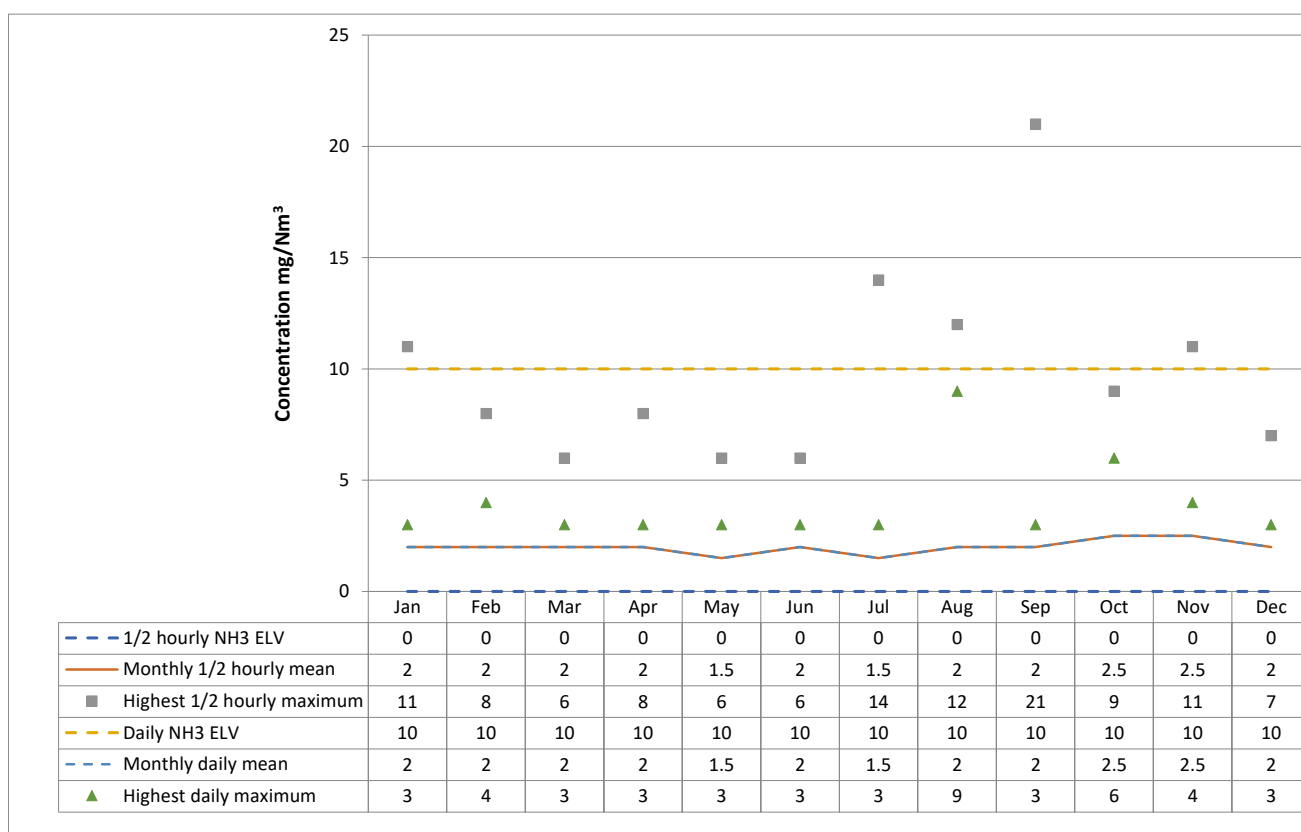
Environment Agency explanatory note: The 10-minute average ELV is based on the "95th percentile". In this case this means that 95% of the 10 minute averages in the relevant 24-hour period (i.e. 137) must be below 150 mg/Nm³, and 5% (i.e. 7) are allowed to be any value above 150 mg/Nm³. Whilst we expect 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		
2019	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	2	11	10	2	3
Feb	0	2	8	10	2	4
Mar	0	2	6	10	2	3
Apr	0	2	8	10	2	3
May	0	1.5	6	10	1.5	3
Jun	0	2	6	10	2	3
Jul	0	1.5	14	10	1.5	3
Aug	0	2	12	10	2	9
Sep	0	2	21	10	2	3
Oct	0	2.5	9	10	2.5	6
Nov	0	2.5	11	10	2.5	4
Dec	0	2	7	10	2	3

**Comments :**

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