2020 Annual Reporting Performance Form 1

Permit EPR/XP3436WB/V002 Operator: 0
Facility: SUEZ R&R Wilton 11 EfW Form: Performance 1

Reporting Period from: January to: December

2020 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	9,287.0	0.0	2.0%
IBA				-
				-
				-
Total Hazardous Waste		9,287.0	0.0	2.0%
2) Non-Hazardous Wastes				
IBA	Recovery	114,173.0		24.3%
Total Metals	Recovery	17,855.0		3.8%
Process Water				-
				-
				-
Total Non-Hazardous Waste		132,028.0	0.0	28.1%
TOTAL WASTE		**141,315.0**	**0.0**	30.1%

Operator's comments :

2020 Annual Reporting of Water and Other Raw Material Usage

Raw Material	Usage	Unit	Specific Useage	Unit
Mains Water	60281	m^3	0.13	m^3/te
Total Water	805741	m^3	1.71	m^3/te
Urea / Ammonia	1452200	kg	3.09	kg/te
Activated Carbon	82040	kg	0.17	kg/te
Lime / hydrated lime / Sodium Bicarb.	4437960	kg	9.44	kg/te

Operator's comments :

2020 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	7192	7856.28						
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: _____

recycling and recovery UK

Annual Performance Report 2020

Permit EPR/XP3436WB/V002

SUEZ R&R Wilton 11 EfW

other name of facility (if applicable)

SUEZ R&R

Year:	2020		
Address:	Wilton International, Middlesbrough TS10 4RG		
Tel:	01642 442400		
Email:	paula.bakes@suez.com		
Prepared by:	Paula Bakes	Position:	EIR Manager
Approved by:	Alex Biggins	Position:	Plant Manager
Version:			
Issue Date:			

Contents

Version Control

Section	Information	Date

Distribution

Copy	Name, Role	No.

This report is required under the Industrial Emissions Directive's Article 55(2) requirements on reporting and public information on waste incineration plants and co-incineration plants, which require the operator to produce an annual report on the functioning and monitoring of the plant and make it available to the public.

Plant Description and Design

The 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.
(alt enter to make new para)

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 and independent stack and emissions monitoring system. This data is relayed automatically to the control room.
(alt enter to make new para)

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	123,766	130,096	93,870	119,184	**466,916.00**
Commercial & Industrial		1,609	452	-	1,248	**3,309**
Hazardous		-	-	-	-	**-**
Clinical		-	-	-	-	**-**
Waste wood (biomass)		-	-	-	-	**-**
Refuse derived fuel						**-**
Solid recovered fuel		-	-	-	-	**-**
Other [Off Spec Compost 19.05.03]		-	-	-		**-**
Other [Please specify]						
Other [Please specify]						
Total waste received		**125,375**	**130,548**	**93,870**	**120,432**	**470,225.00**
Rejected Waste		-	-	-	-	**-**
Waste transferred out		-	-	-	-	**-**

Energy Useage / Export	Unit	Q1	Q2	Q3	Q4	**Year Total**
Power Generated	MWh	48,438	65,714	36,087	55,761	**206,000**
Power Exported		38,450	54,387	27,739	46,751	**167,327**
Power Used on site		9,988	11,327	8,348	9,011	**38,674**
Power Imported		277	11	585	740	**1,613**
Parasitic Load	%	21.1%	17.3%	24.4%	17.3%	19.4%
Thermal Energy Produced	MWh	124,916	82,856	82,226	82,549	**372,546**
Thermal Energy Exported		124,916	82,856	82,226	82,549	**372,546**
R1 value					0.68	Design / Ope

Waste Disposal & Recovery	Unit	Q1	Q2	Q3	Q4	**Year Total**
APC Residues - produced	tonnes	2,484	2,465	2,075	2,263	**9,287**
IBA - produced		28,661	34,821	22,597	28,094	**114,173**
Metals recycling		4,871	4,982	4,136	3,866	**17,855.00**
Ferrous		3,196	3,191	2,579	2,587	**11,553**
Non Ferrous		1,675	1,791	1,557	1,279	**6,302**
Mixed Metal Skips (Scrap Metal Ski		4	1	120	6	**131**

Raw Material Usage	Unit	Q1	Q2	Q3	Q4	**Year Total**
Mains Water	m^3	14,021	17,547	15,293	13,420	**60,281**
Other Water (Demin & Raw)	m^3	166,674	203,434	171,372	203,980	**745,460**
Ammonia / Urea	kgs	468,400	523,100	355,500	105,200	**1,452,200**
Activated Carbon	kgs	22,940	22,160	16,560	20,380	**82,040**
Lime / hydrated lime	kgs	1,196,580	1,268,680	997,000	975,700	**4,437,960**
Fuel oil (Mobile Plant)	ltrs	778	640	677	670	**2,765**
Natural Gas	MWh	2,772	2,237	2,279	2,876	**10,164**
Other		-	-	-	-	**-**

Summary of Hours	Line/Unit	Q1	Q2	Q3	Q4	**Year Total**
Hours of waste combustion, total	1	1,947	2,080	1,151	2,014	**7,192**
Hours of waste combustion, total	2	2,052	2,050	1,749	2,005	**7,856**
Hours of waste combustion, total	3	-	-	-	-	**-**
Hours of waste combustion, total	4	-	-	-	-	**-**
Hours of waste combustion, total	5	-	-	-	-	**-**
Overall Avaliability, mean average of all lines		3,999	4,130	2,900	4,019	**15,048**
Hours of turbine operations, total	1	2,064	2,183	1,740	1,858	**7,845**

Hours of turbine operations, total	2					**-**
Hours of heat / steam export		-	-	-	-	**-**
Net Calorific Value of waste	MJ/kg	9.59	9.38	9.58	9.34	**38**
Abnormal Events	qty.	-	-	-	-	**-**
Abnormal operation	hours	-	-	-	-	**-**
Permit Breaches	qty.	-	-	-	-	**-**

MWe

%
99.3%
0.7%
-
-
-
-
-
-
100.0%
-
-

KWh/te
438
356
82
3
792
792
erational / n/a

% inputs
2.0%
24.3%
3.8%
2.5%
1.3%
0.0%

kg or Ltr /te
128.20
1,585.33
3.09
0.17
9.44
0.01
0.02
-

82.10%
89.68%
x %
x %
x %
171.78%
x %

x %
n/a
no
0.00%
no

Summary of Plant Operations and Maintenance during the reporting year

Overall this has been a good year for Wilton 11, plant was offline from the 20th March due to SembCorp natural gas pipeline works being carried out and were fully operational by the 25th March following SembCorp's completion of the gas line.

Line 1 suffered a tube leak in the final economiser, this leaking pipe was plugged due to the construction of the economiser banks and the plant was back on production on the 5th May

A tube failure was identified in the second pass on the 24th July, we also took the opportunity to replace the ID fan motor whilst tube repairs were carried out to save time during the planned maintenance shutdown scheduled for Sept.

Line 2 suffered a 2nd pass tube leak on the 23rd May, the area was quickly identified and 3 x sections were replaced after tube thickness checks carried out, repairs were complete and we were back on production on the 28th May.

Periodic Online cleaning has been carried out up to September due to the boiler fouling issues

There was 1 period of major maintenance activities during the year in September - October.

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 activites. This shutdown was 1st September - 23rd September for Line 1, 12th September - 6th October for Line 2 and 12th September - 23rd September for the turbine.

During this period we also had SPG's installed by CNIM to combat the boiler fouling that the plant has experianced since commissioning.

Summary of Residue Handling for the reporting year

Residue handling system has performed well in 2020, previously we observed some corrosion in the actilab double screws, this was relined and coated with a resistant material in 2019 and on inspection this year there was minimal wear on the system.

There was an EA audit carried out on the 7th December 2020 of the ash sampling that is periodically carried out. The main purpose of the visit was to witness the routine sampling of incinerator bottom ash as part of an audit to check compliance with the Environmental Service Association (ESA) "Sampling and Testing protocol to assess the status of IBA".

There were no actions or recomendations following that audit

2020 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 Useage (KWh/tonne incinerated
Electricity Produced	206,000	MWh	438
Electricity Imported	1613	MWh	3
Electricity Exported	167,327	MWh	356
Natural Gas	10164	tonnes	0.02
Steam/hot water exported	372,546	GWh	792

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

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

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

*** 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.

SPG's fitted in the September shutdown at the top of the 2nd pass to aid with boiler fouling issues, we have to date not observed the need to carry out additional online cleaning therefore this has reduced the need to reduce rates to carry out this task.

We have also replaced the final economisers on both lines in September due to corrosion and fouling, we are now seeing lower back end temperatures and the lime dosing is therefore more efficient.

Lime optimisation has been positive and we are hoping for a strong, sustainable saving there and that's really as a result of the final economiser replacements. Another benefit of that was reduced ID fan power requirements due to a clear gas path through the final economisers, which has seen us reduce our parasitic load by around 200 kW.

IBA Belt improvements – Drop-off Chutes – The Drop-Off chutes have undergone several modifications since originally being install, all proved improvement on the functionality. The most recent (pre-outage) was incorporated to reduce the number of torn belts from scaffolding tubes and other long metal objects getting wedged in the chutes and cutting into the belt. However, we continued to have other issues such as:
a. Objects bouncing around after leaving the drop off area and falling off the conveyor belt, this was both an operational and H&S Issue.
b. The low front opening of the chute was acting as a bottle neck contributing to blockages in the chute itself. Fig-SJ13 shows the previous chute where you can see the height of the opening and where the skirt rubbers ended. Fig-SJ14 shows the larger aperture opening and the extended skirt rubbers.
c. The narrow impact area was causing concentrated areas of wear and these wear plates had required replacement twice within the previous 12 months.
The chute has been modified to address these issues. The side skirts have been extended away from the impact zone to reduce the likelihood of any items escaping from the belt. The front opening of the chute has been increased to help prevent blockages, the impact area and wear plate material has also been upgraded to help prolong wear plate life expectancy.

2) Primary Scrapers - Wire and other small metallic items were getting stuck between the primary scraper and the conveyor belt. This dramatically reduced efficiency of the Primary Scrapers, which then required regular maintenance, which could only be achieved by leaning into the drop-off chute

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.

BREF trials carried out to optimise ammonia useage and Lime useage, positive results seen with the plant demonstrating that it can control NOX at the proposed lower limits.

Lime dosing also improved as described above following optimisation and finall economiser replacements.

Details of Public & Stakeholder Liasion

Summary of events held during the reporting year.	
Date	**Description**
30/01/2020	Operational review meeting – Josef Stauss/G Mayson
11/02/2020	Insurance survey – Kiel Tullis/Chubb
13/02/2020	Northumbria University – Carbon Capture project
03/12/2020	DB Cargo – Site visit
07/12/2020	EA – IBA audit/Site visit

List of events planned for next year	
Date	**Description**

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 & APCR samples taken on Lines 1&2
Fortnightly hazard assessment 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 samples per quarter	
No. of Hazardous Assessments	---	Fortnightly hazard assessment, unless plant 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
Monitoring completed biannually.

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	0.036	0.0355			
Cd and Th and their compounds	6-8hrs	0.05 mg/m^3	0.00071	0.00236			
Hg and its compounds	6-8hrs	0.05 mg/m^3	0.006	0.0069			
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V and their compounds	6-8hrs	0.5 mg/m^3	0.027	0.0755			
Dioxins & Furans (I-TEQ)	6-8hrs	0.1 ng/m^3	0.00232	0.001285			
PCBs (WHO-TEQ Humans / Mammals)	6-8hrs	None set ng/m^3	0.000226	0.0002			
PCBs (WHO-TEQ Fish)	6-8hrs	None set ng/m^3	1.16E-05	0.000012			
PCBs (WHO-TEQ Birds)	6-8hrs	None set ng/m^3	0.00073	0.000845			
Dioxins & Furans (WHO-TEQ Humans / Mammals)	6-8hrs	None set ng/m^3	0.002595	0.00465			
Dioxins & Furans (WHO-TEQ Fish)	6-8hrs	None set ng/m^3	0.002485	0.001315			
Dioxins & Furans (WHO-TEQ Birds)	6-8hrs	None set ng/m^3	0.003175	0.00185			
Anthanthrene	6-8hrs	None set µg/m^3	0.00082	0.000825			
Benzo(a)anthracene	6-8hrs	None set µg/m^3	0.00127	0.001325			
Benzo(a)pyrene	6-8hrs	None set µg/m^3	0.00082	0.000825			
Benzo(b)fluoranthene	6-8hrs	None set µg/m^3	0.00082	0.000825			
Benzo(b)naptho(2,1-d) thiophene	6-8hrs	None set µg/m^3	0.001035	0.001025			
Benzo(c)phenanthrene	6-8hrs	None set µg/m^3	0.000975	0.001525			
Benzo(ghi)perylene	6-8hrs	None set µg/m^3	0.00082	0.000825			
Benzo(k)fluoranthene	6-8hrs	None set µg/m^3	0.00082	0.000825			
Cholanthrene	6-8hrs	None set µg/m^3	0.00082	0.001025			
Chrysene	6-8hrs	None set µg/m^3	0.00185	0.00185			
Cyclopenta(cd)pyrene	6-8hrs	None set µg/m^3	0.00082	0.001025			
Dibenzo(ai)pyrene	6-8hrs	None set µg/m^3	0.00082	0.000825			
Dibenzo(ah)anthracene	6-8hrs	None set µg/m^3	0.00082	0.000825			
Fluoranthene	6-8hrs	None set µg/m^3	0.003695	0.0047			
Indeno(123-cd) pyrene	6-8hrs	None set µg/m^3	0.00082	0.001275			
Naphthalene	6-8hrs	None set µg/m^3	0.076	0.1055			
Comments :							

Emissions to Air (continously monitored)

Summary of monitoring undertaken, standards used and compliance

Results of emissions to air that are continuously monitored

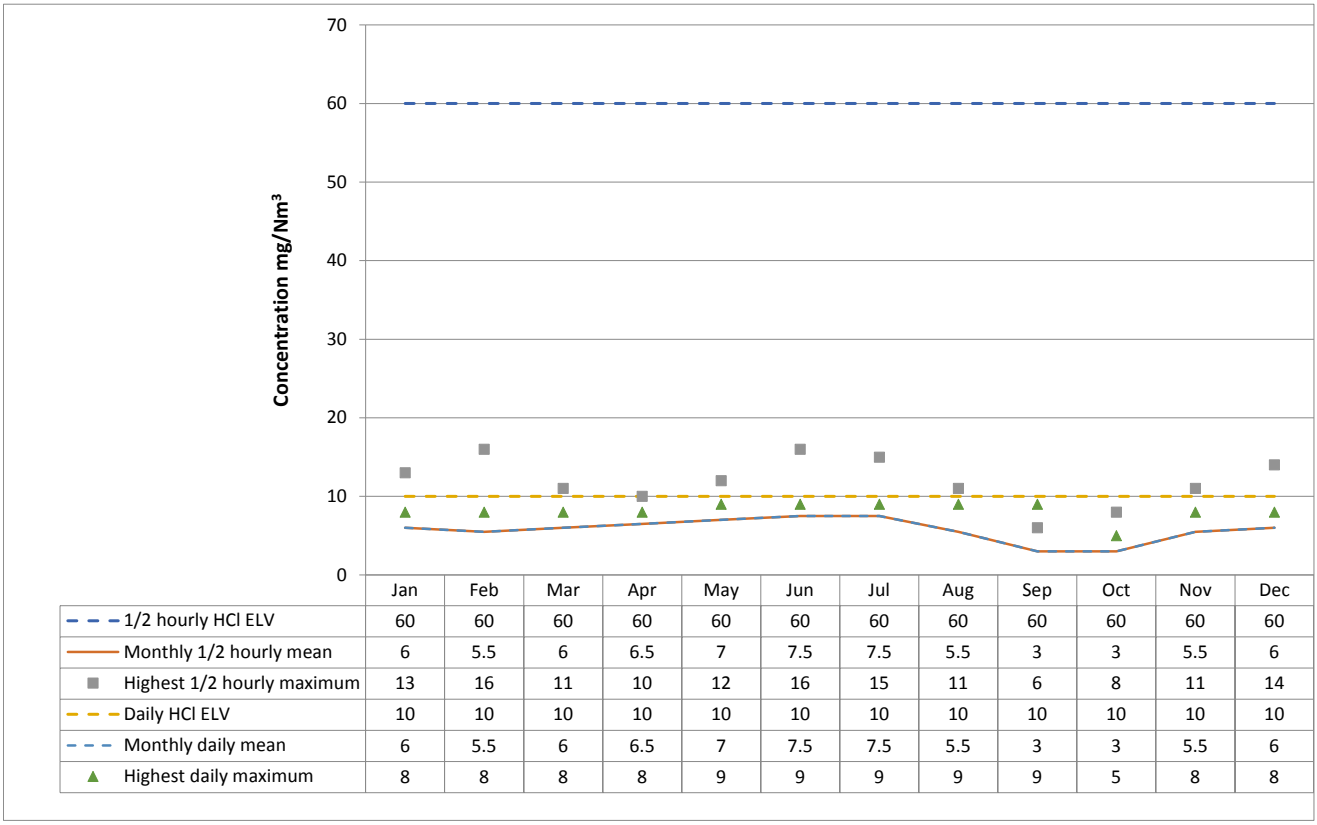
Substance	**Reference Period**	**Emission Limit Value**	**A1**		**A2**		**A3**		**A4**		**A5**	
			Max.	**Avg.**	**Max.**	**Avg.**	**Max.**	**Avg.**	**Max.**	**Avg.**	**Max.**	**Avg.**
Oxides of nitrogen	Daily mean	200 mg/m^3	189	170.4167	193	173						
	½ hourly mean	400 mg/m^3	339	170.4167	360	173						
Particulates	Daily mean	10 mg/m^3	1	0.366667	0.5	0.4						
	½ hourly mean	30 mg/m^3	2.9	0.366667	3.7	0.4						
Total Organic Carbon	Daily mean	10 mg/m^3	1	0.541667	0.8	0.4						
	½ hourly mean	20 mg/m^3	5.2	0.541667	5.6	0.4						
Hydrogen chloride	Daily mean	10 mg/m^3	9	5.416667	9	6.083333						
	½ hourly mean	60 mg/m^3	16	5.416667	16	6.083333						
Sulphur dioxide	Daily mean	50 mg/m^3	46	20	32	18						
	½ hourly mean	200 mg/m^3	87	20	81	18						
Carbon monoxide	Daily mean	50 mg/m^3	30	5.5	8	4.666667						
	½ hourly mean *	100 mg/m^3 *										
	95%ile 10-min avg *	150 mg/m^3 *	16.41667		9							
Ammonia	Daily mean	No limit set	4	1.416667	3	0.666667						

* = 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		
2020	**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	6	13	10	6	8
Feb	60	5.5	16	10	5.5	8
Mar	60	6	11	10	6	8
Apr	60	6.5	10	10	6.5	8
May	60	7	12	10	7	9
Jun	60	7.5	16	10	7.5	9
Jul	60	7.5	15	10	7.5	9
Aug	60	5.5	11	10	5.5	9
Sep	60	3	6	10	3	9
Oct	60	3	8	10	3	5
Nov	60	5.5	11	10	5.5	8
Dec	60	6	14	10	6	8

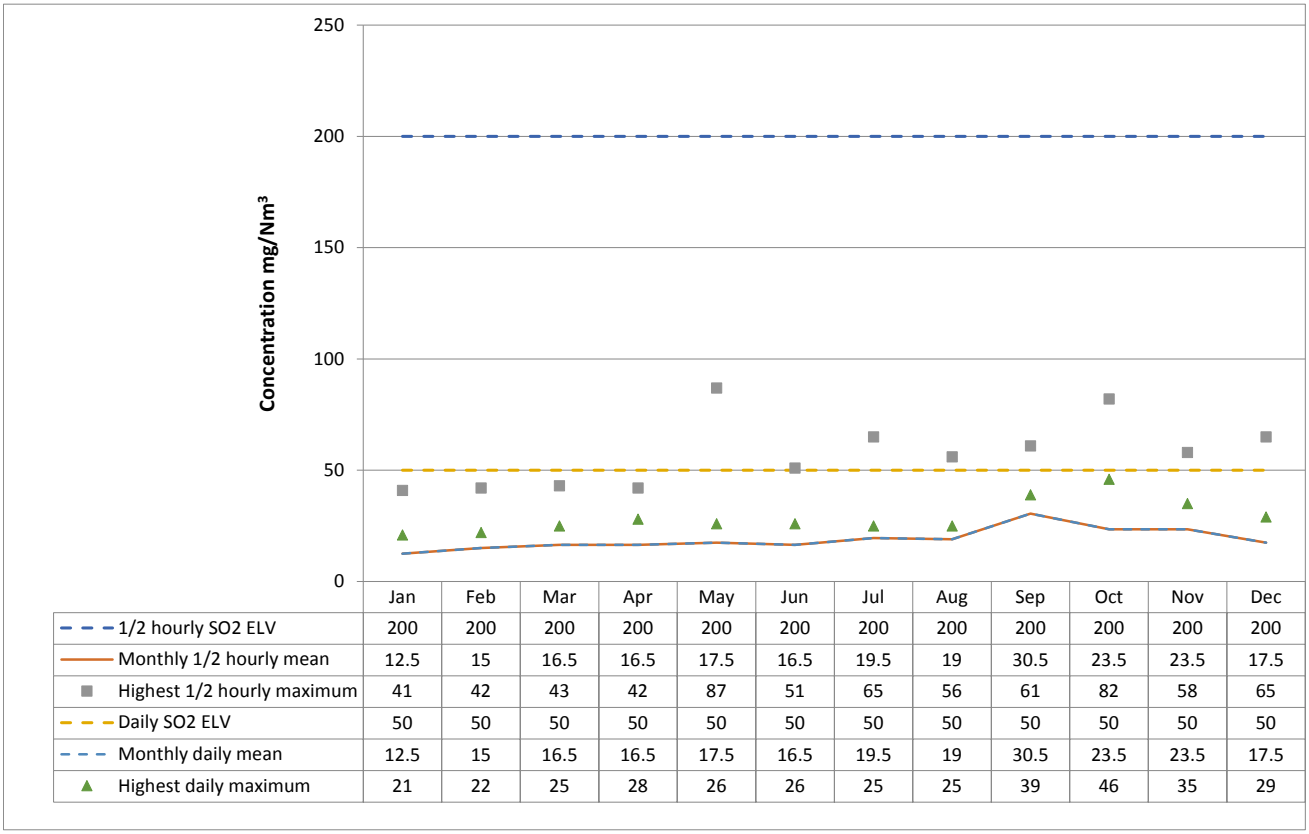


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly HCl ELV	60	60	60	60	60	60	60	60	60	60	60	60
Monthly 1/2 hourly mean	6	5.5	6	6.5	7	7.5	7.5	5.5	3	3	5.5	6
Highest 1/2 hourly maximum	13	16	11	10	12	16	15	11	6	8	11	14
Daily HCl ELV	10	10	10	10	10	10	10	10	10	10	10	10
Monthly daily mean	6	5.5	6	6.5	7	7.5	7.5	5.5	3	3	5.5	6
Highest daily maximum	8	8	8	8	9	9	9	9	9	5	8	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		
2020	**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	12.5	41	50	12.5	21
Feb	200	15	42	50	15	22
Mar	200	16.5	43	50	16.5	25
Apr	200	16.5	42	50	16.5	28
May	200	17.5	87	50	17.5	26
Jun	200	16.5	51	50	16.5	26
Jul	200	19.5	65	50	19.5	25
Aug	200	19	56	50	19	25
Sep	200	30.5	61	50	30.5	39
Oct	200	23.5	82	50	23.5	46
Nov	200	23.5	58	50	23.5	35
Dec	200	17.5	65	50	17.5	29

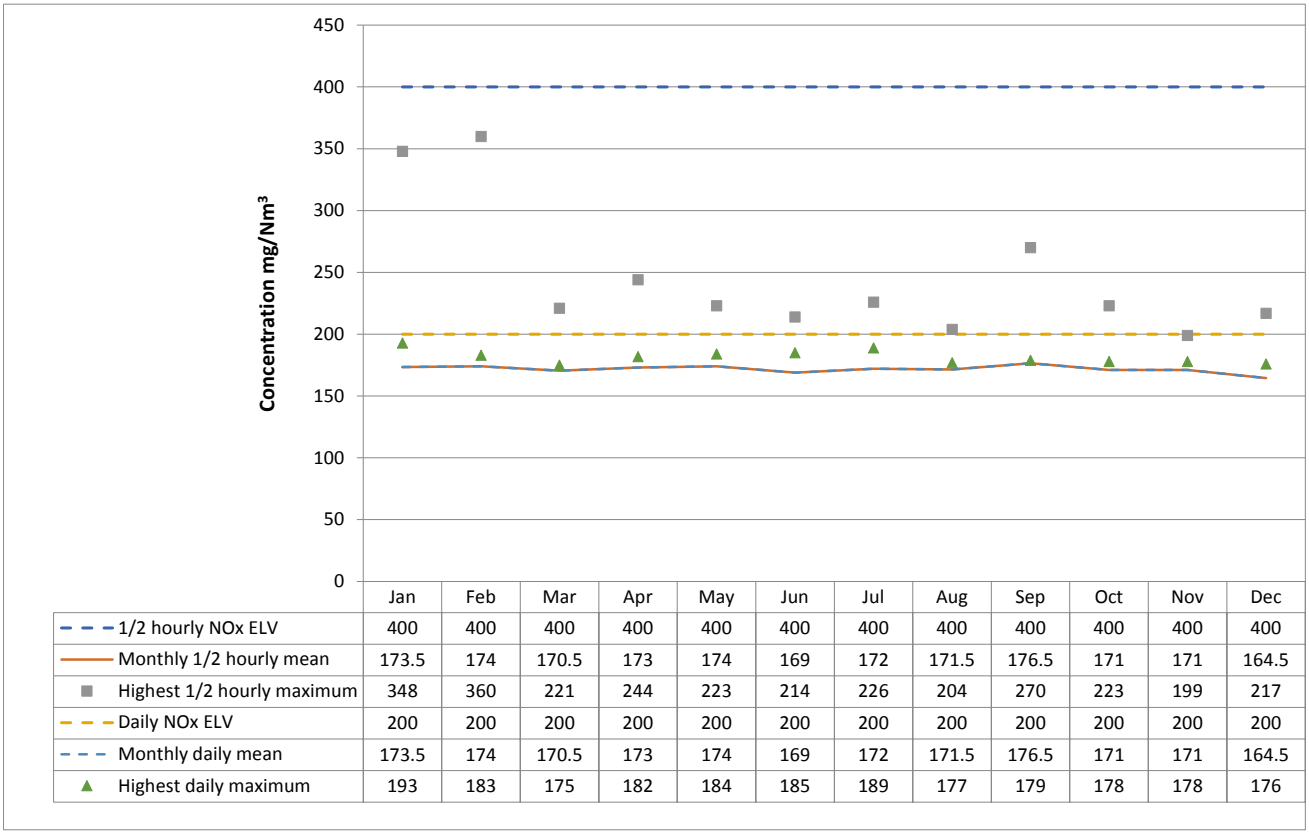


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly SO2 ELV	200	200	200	200	200	200	200	200	200	200	200	200
Monthly 1/2 hourly mean	12.5	15	16.5	16.5	17.5	16.5	19.5	19	30.5	23.5	23.5	17.5
Highest 1/2 hourly maximum	41	42	43	42	87	51	65	56	61	82	58	65
Daily SO2 ELV	50	50	50	50	50	50	50	50	50	50	50	50
Monthly daily mean	12.5	15	16.5	16.5	17.5	16.5	19.5	19	30.5	23.5	23.5	17.5
Highest daily maximum	21	22	25	28	26	26	25	25	39	46	35	29

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		
2020	**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	173.5	348	200	173.5	193
Feb	400	174	360	200	174	183
Mar	400	170.5	221	200	170.5	175
Apr	400	173	244	200	173	182
May	400	174	223	200	174	184
Jun	400	169	214	200	169	185
Jul	400	172	226	200	172	189
Aug	400	171.5	204	200	171.5	177
Sep	400	176.5	270	200	176.5	179
Oct	400	171	223	200	171	178
Nov	400	171	199	200	171	178
Dec	400	164.5	217	200	164.5	176

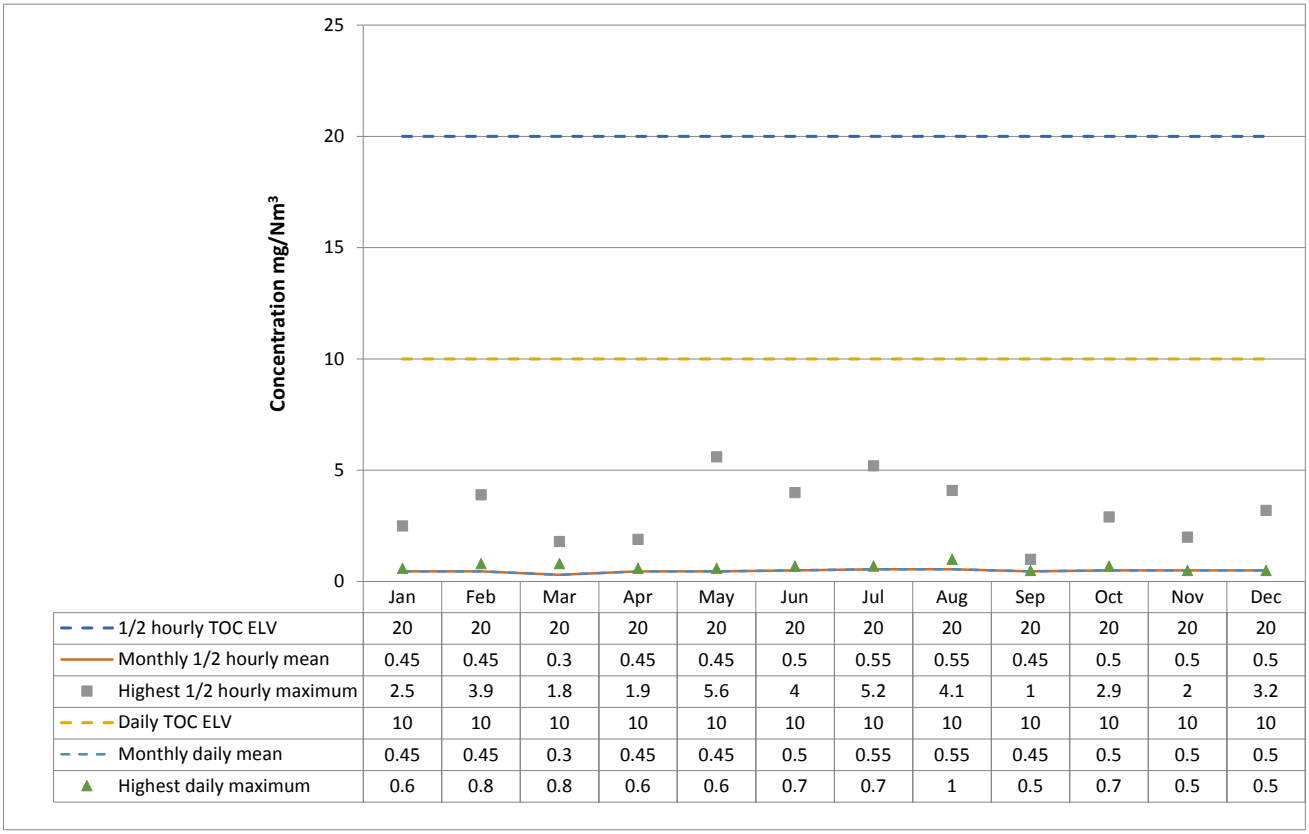


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly NOx ELV	400	400	400	400	400	400	400	400	400	400	400	400
Monthly 1/2 hourly mean	173.5	174	170.5	173	174	169	172	171.5	176.5	171	171	164.5
Highest 1/2 hourly maximum	348	360	221	244	223	214	226	204	270	223	199	217
Daily NOx ELV	200	200	200	200	200	200	200	200	200	200	200	200
Monthly daily mean	173.5	174	170.5	173	174	169	172	171.5	176.5	171	171	164.5
Highest daily maximum	193	183	175	182	184	185	189	177	179	178	178	176

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		
2020	**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	0.45	2.5	10	0.45	0.6
Feb	20	0.45	3.9	10	0.45	0.8
Mar	20	0.3	1.8	10	0.3	0.8
Apr	20	0.45	1.9	10	0.45	0.6
May	20	0.45	5.6	10	0.45	0.6
Jun	20	0.5	4	10	0.5	0.7
Jul	20	0.55	5.2	10	0.55	0.7
Aug	20	0.55	4.1	10	0.55	1
Sep	20	0.45	1	10	0.45	0.5
Oct	20	0.5	2.9	10	0.5	0.7
Nov	20	0.5	2	10	0.5	0.5
Dec	20	0.5	3.2	10	0.5	0.5

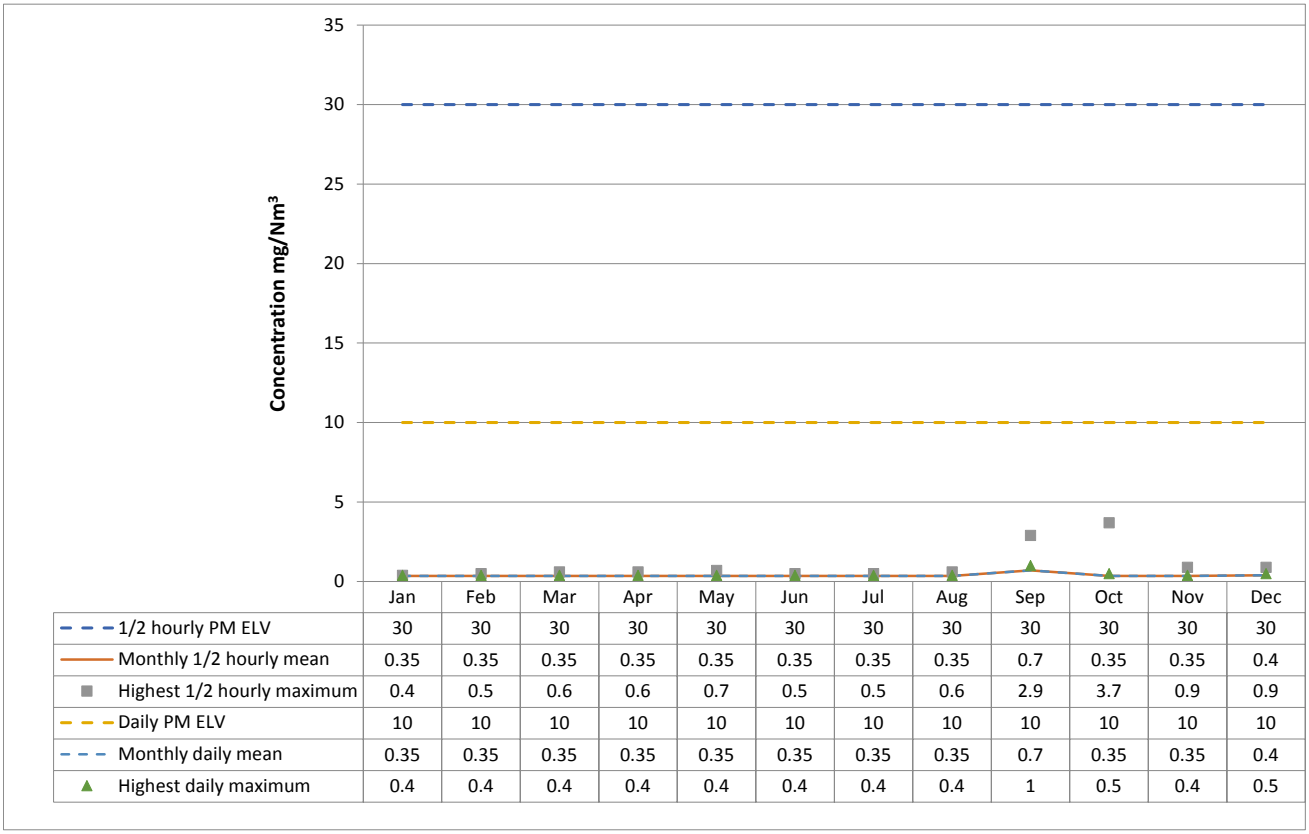


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly TOC ELV	20	20	20	20	20	20	20	20	20	20	20	20
Monthly 1/2 hourly mean	0.45	0.45	0.3	0.45	0.45	0.5	0.55	0.55	0.45	0.5	0.5	0.5
Highest 1/2 hourly maximum	2.5	3.9	1.8	1.9	5.6	4	5.2	4.1	1	2.9	2	3.2
Daily TOC ELV	10	10	10	10	10	10	10	10	10	10	10	10
Monthly daily mean	0.45	0.45	0.3	0.45	0.45	0.5	0.55	0.55	0.45	0.5	0.5	0.5
Highest daily maximum	0.6	0.8	0.8	0.6	0.6	0.7	0.7	1	0.5	0.7	0.5	0.5

Comments :

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

mg/Nm^3	1/2 Hourly Reference Periods			Daily Reference Periods		
2020	**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	0.35	0.4	10	0.35	0.4
Feb	30	0.35	0.5	10	0.35	0.4
Mar	30	0.35	0.6	10	0.35	0.4
Apr	30	0.35	0.6	10	0.35	0.4
May	30	0.35	0.7	10	0.35	0.4
Jun	30	0.35	0.5	10	0.35	0.4
Jul	30	0.35	0.5	10	0.35	0.4
Aug	30	0.35	0.6	10	0.35	0.4
Sep	30	0.7	2.9	10	0.7	1
Oct	30	0.35	3.7	10	0.35	0.5
Nov	30	0.35	0.9	10	0.35	0.4
Dec	30	0.4	0.9	10	0.4	0.5

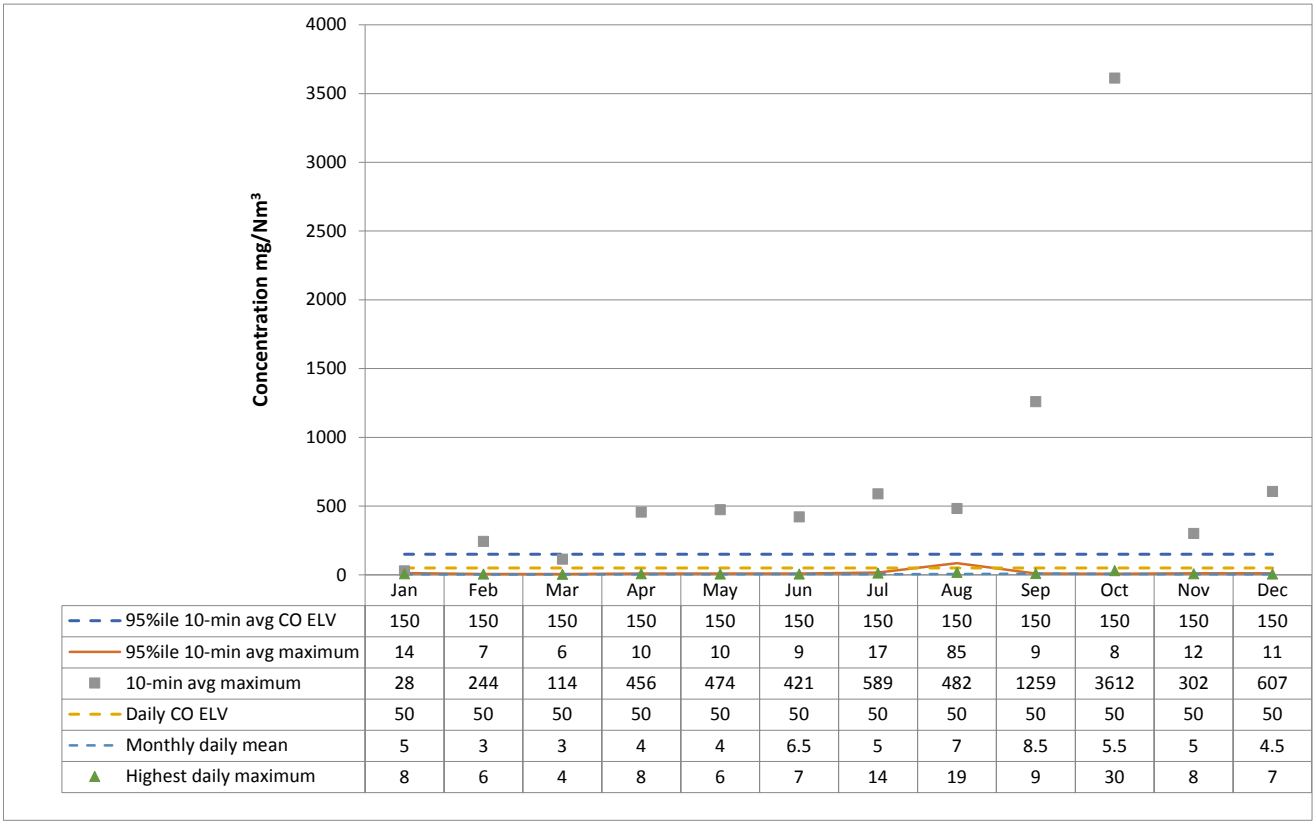


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly PM ELV	30	30	30	30	30	30	30	30	30	30	30	30
Monthly 1/2 hourly mean	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.7	0.35	0.35	0.4
Highest 1/2 hourly maximum	0.4	0.5	0.6	0.6	0.7	0.5	0.5	0.6	2.9	3.7	0.9	0.9
Daily PM ELV	10	10	10	10	10	10	10	10	10	10	10	10
Monthly daily mean	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.7	0.35	0.35	0.4
Highest daily maximum	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1	0.5	0.4	0.5

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		
2020	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	14	5	28	50	5	8
Feb	150	7	3	244	50	3	6
Mar	150	6	3	114	50	3	4
Apr	150	10	4	456	50	4	8
May	150	10	4	474	50	4	6
Jun	150	9	5	421	50	6.5	7
Jul	150	17	5	589	50	5	14
Aug	150	85	7	482	50	7	19
Sep	150	9	8.5	1259	50	8.5	9
Oct	150	8	5.5	3612	50	5.5	30
Nov	150	12	5	302	50	5	8
Dec	150	11	4.5	607	50	4.5	7



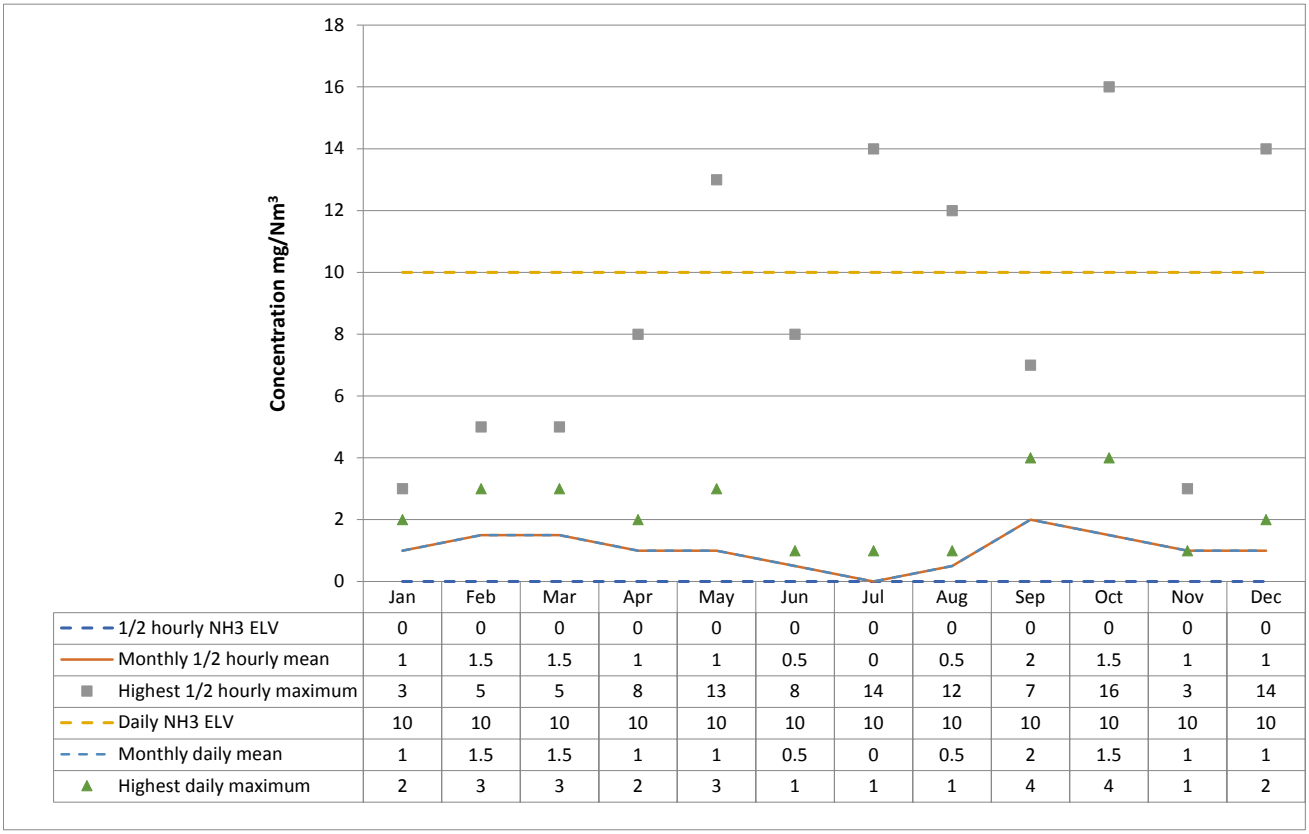
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
95%ile 10-min avg CO ELV	150	150	150	150	150	150	150	150	150	150	150	150
95%ile 10-min avg maximum	14	7	6	10	10	9	17	85	9	8	12	11
10-min avg maximum	28	244	114	456	474	421	589	482	1259	3612	302	607
Daily CO ELV	50	50	50	50	50	50	50	50	50	50	50	50
Monthly daily mean	5	3	3	4	4	6.5	5	7	8.5	5.5	5	4.5
Highest daily maximum	8	6	4	8	6	7	14	19	9	30	8	7

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

mg/Nm^3	1/2 Hourly Reference Periods			Daily Reference Periods		
2020	**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	1	3	10	1	2
Feb	0	1.5	5	10	1.5	3
Mar	0	1.5	5	10	1.5	3
Apr	0	1	8	10	1	2
May	0	1	13	10	1	3
Jun	0	0.5	8	10	0.5	1
Jul	0	0	14	10	0	1
Aug	0	0.5	12	10	0.5	1
Sep	0	2	7	10	2	4
Oct	0	1.5	16	10	1.5	4
Nov	0	1	3	10	1	1
Dec	0	1	14	10	1	2



	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	1	1.5	1.5	1	1	0.5	0	0.5	2	1.5	1	1
Highest 1/2 hourly maximum	3	5	5	8	13	8	14	12	7	16	3	14
Daily NH3 ELV	10	10	10	10	10	10	10	10	10	10	10	10
Monthly daily mean	1	1.5	1.5	1	1	0.5	0	0.5	2	1.5	1	1
Highest daily maximum	2	3	3	2	3	1	1	1	4	4	1	2

Comments :

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