



Annual Performance Report 2019

Permit EPR/BK0825UI

Riverside Resource Recovery Facility

Cory Riverside Energy

Year: 2019

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Distribution		
Copy	Name, Role	No.
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1	Dougie Sutherland, CEO	
1	Mark Greenwood, Director Health, Safety, Environment & Quality Assurance	
1	David Crawford, Plant Manager	

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 Riverside Resource Recovery Energy from Waste facility at Belvedere in the London Borough of Bexley, uses the waste that would otherwise have gone to landfill as feedstock to generate electricity. As one of the largest operations of its kind in the UK, the facility generates c.580,000 MWh of electricity each year from processing circa 750,000 tonnes of waste through its three operating combustion lines. What's more, we use the River Thames as a green highway to move the waste from the city to the facility on our fleet of tugs and barges, removing around 100,000 truck movements a year off our capital's congested roads. By generating electricity from domestic and commercial residual waste, after recycling, we are improving resource efficiency, avoiding London's use on landfill, and achieving greater sustainability as part of London's circular economy. With the Riverside Resource Recovery facility continuing to be fully operational, the Environment Agency has renewed the facility R1 certification; this means that the facility is classified as a recovery operation. The facility is permitted to process 785,000 tonnes of waste from across London and exports 525,000 – 530,000 Mega Watt hours of electricity to the National Grid.

Summary of Operational Processes and Procedures

The Riverside Energy from Waste facility is a 24/7 operation which is operated from a continuously manned control room. The control room operator shall ensure that the site's operations are performed to the facility design and to the strict requirements of the environmental permit.

The river operations are a key aspect of the process for Riverside, with over 85% of the waste being brought to the plant on barges along the River Thames. From the jetty, the waste containers are removed from the barges and are transported using dock tractors into the site tipping hall.

In the tipping hall the waste is tipped into one of 12 tipping bays. Each bay has a hydraulically operated door designed to minimise noise and odour during tipping. Lights on each tipping bay indicate to the drivers of the vehicles which bay is available to receive waste. The tipping bays open into a waste bunker 30m deep, 61m long and 16m wide. It can hold up to circa. 10,000 tonnes of waste, enough to fuel the plant at full capacity for five days.

The plant runs three combustion lines. The waste cranes feed each combustion line ensuring that the boilers have the required feedstock for 24 hour operation. The waste travels down the feed chutes and onto a horizontal feeder table where hydraulically operated ram feeders push the waste onto the moving grate. The grate is made up of alternate rows of fixed and moving cast steel bars that are arranged on a slope. The forward movement of these bars tumbles the waste slowly down the burning waste bed.

Primary heated combustion air is drawn from above the waste bunker and fed into the waste bed through orifices in each grate bar. This process dries the waste and provides the correct amount of air to allow good combustion of the waste. Secondary swirling air is introduced above the grate. This ensures that the gases given off by the burning waste are thoroughly mixed, resulting in a fully optimised combustion process and lower levels of toxicity in the gases leaving the combustion chamber. Ammonia is injected into the flue gas to reduce the level of Oxides of Nitrogen.

The resulting sub-product, from processing the waste, is known as Incinerator Bottom Ash (IBA) and this falls from the end of the grate into a quench bath. The IBA is collected in an ash bunker and loaded into containers by cranes and hoppers. Any oversized metal is removed and recycled and the remainder is transported on the river (circa 200,000 tonnes per annum) to our partner plant at Tilbury Docks for processing and recycling into aggregate that is primarily used within the construction industry.

The energy from the flue gases is utilised to convert water into steam via the steam drum. The steam is then further super-heated and drives the turbine/generator, producing electricity which is used to power the facility and exported to the National Grid.

Flue gases leave the boiler and pass through a reactor tower where hydrated lime, powdered activated carbon and water are injected into the swirling gas flow. These neutralise acids and capture heavy metals.

Gases from the reactor tower are then drawn into the fabric filter baghouse. The clean gases pass through the filters and the Air Pollution Control residue (APCr) collects on the outer surface of the bags. The APCr is collected in silos.

Flue Gas is drawn through the entire process by Induced Draft Fans. The clean hot gas from the Fabric Filter is passed through a heat exchanger that heats feed water to provide an efficient process. Cooled gas is emitted via an 85 metre stack where it is discharged into atmosphere. Continuous Emissions Monitoring (CEMS) equipment continually records emissions to air.

The plant operates within a Health, Safety, Environmental and Quality Integrated Management System which is compliant with OHSAS 18001, ISO 14001 and ISO 9001 and is independently audited.

Operational Data

Plant Size	785,000 tonnes pa	MWth	MWe
No. of combustion lines	3	No. of Turbines:	1

Waste types received	Unit	Q1	Q2	Q3	Q4	Year Total	%
Household / Local Authority	tonnes	103,114	108,019	108,281	108,572	427,986	57.1%
Commercial & Industrial		77,040	79,472	83,191	81,745	321,448	42.9%
Hazardous		-	-	-	-	-	-
Clinical		-	-	-	-	-	-
Waste wood (biomass)		-	-	-	-	-	-
Refuse derived fuel		-	-	-	-	-	-
Solid recovered fuel		-	-	-	-	-	-
Other [Please specify]		-	-	-	-	-	-
Total waste received			180,154	187,491	191,472	190,317	749,434
Rejected Waste		-	6	-	4	9	0.0%
Waste transferred out		1,440	-	2,292	2,547	6,278	0.8%

Energy Usage / Export	Unit	Q1	Q2	Q3	Q4	Year Total	KWh/te
Power Generated	MWh	-	53,002	135,125	150,652	338,779	452
Power Exported		-	47,565	120,630	135,902	304,097	406
Power Used on site		12,330	13,694	14,502	15,049	55,576	74
Power Imported		12,330	8,257	8	300	20,894	28
Parasitic Load	%	-	22.4%	10.7%	10.0%	15.5%	
Thermal Energy Produced	GWh	-	-	-	-	-	-
Thermal Energy Exported		-	-	-	-	-	-
R1 value					0.76	Operational	

Waste Disposal & Recovery	Unit	Q1	Q2	Q3	Q4	Year Total	% inputs
APC Residues - produced	tonnes	4,547	4,543	4,505	4,861	18,456	2.5%
IBA - produced		40,573	45,166	40,002	44,211	169,953	22.7%
Metals recycling		168	188	168	136	660	0.1%
Other		-	-	-	-	-	-
Other		-	-	-	-	-	-
Other		-	-	-	-	-	-

Raw Material Usage	Unit	Q1	Q2	Q3	Q4	Year Total	kg or Ltr /te
Mains Water	m ³	38,090	30,179	33,029	24,478	125,776	167.83
Other Water	m ³	-	-	-	-	-	-
Ammonia	m ³	229	170	143	193	735	0.98
Activated Carbon	kgs	53,420	63,020	53,120	63,540	233,100	311.03
Hydrated Lime	kgs	2,093,580	2,117,520	2,100,040	2,365,720	8,676,860	11,577.88
Fuel oil	ltrs	314,455	366,944	439,090	339,635	1,460,123	1,948.30
Gas	cf	-	-	-	-	-	-
Other		-	-	-	-	-	-

Summary of Hours	Line/Unit	Q1	Q2	Q3	Q4	Year Total	
Hours of waste combustion, total	1	2,074	1,884	1,566	2,081	7,605	86.8%
Hours of waste combustion, total	2	2,061	1,926	1,788	1,942	7,717	88.1%
Hours of waste combustion, total	3	1,707	2,051	1,956	2,051	7,765	88.6%
Hours of turbine operations, total	1	-	782	2,208	2,136	5,126	58.5%
Hours of heat / steam export		-	-	-	-	-	n/a
Abnormal Events	qty.	-	-	-	-	-	no
Abnormal operation	hours	-	-	-	-	-	0.00%
Permit Breaches	qty.	-	-	-	-	-	no

Summary of Plant Operations and Maintenance during the reporting year**Steam Turbine Refurbishment & Re-build.**

Following a forced outage which occurred on the 10th October 2018 the steam turbine was dis-assembled and the damaged components returned to the OEM facility for refurbishment.

The refurbishment program, rebuild and commissioning of the steam turbine was successfully completed earlier than program in May 2019.

Planned Plant Shutdowns:

During 2019 each of the three boilers have under gone major inspections together with a common plant outage which was under taken in June of 2019. The major inspection scope of works included Grate Maintenance and any rectification, Refractory refurbishment , Boiler cleaning and Fabric filter maintenance. The driver for the common outage is to perform the required inspections under the Pressure Systems Safety Regulations 2000 (PSSR) all items registered on the written scheme were inspected, tested and witnessed by our competent body.

Summary of Residue Handling for the reporting year

100% of the Incinerator Bottom Ash and Recovered Metals were transported via the River Thames to Blue Phoenix Ltd (previously Ballast Phoenix) at their premises at Tilbury Docks.

The Air Pollution Control residue (APCr) was sent to two main destinations throughout 2019:

- 1) OCO Ltd (previously Carbon8) at Brandon, Suffolk where it was treated by Accelerated Carbonation Technology (ACT) to produce a stabilised product that is used as a component of breeze blocks.
- 2) Veolia Minosis in Cheshire where the APCr is stored in an underground storage facility within the Winsford salt mine. The unique geology in this area of Cheshire creates an impermeable cavity which is ideal for the storage of APCr.

2019 Annual Reporting Performance Form 1

Permit EPR/BK0825UI

Operator: Cory Riverside Energy

Facility: Riverside Resource Recovery Facility

Form: Performance 1

Reporting Period from:

01/01/20219

to:

31 December 2019

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	R05, D05	9,383.3	9,072.6	2.5%
IBA				-
				-
				-
Total Hazardous Waste		9,383.3	9,072.6	2.5%
2) Non-Hazardous Wastes				
IBA	R04		170,152.7	22.7%
Ferrous Metal	R04		659.9	0.1%
Process Water				-
				-
				-
Total Non-Hazardous Waste		0.0	170,812.6	22.8%
TOTAL WASTE		9,383.3	179,885.2	25.3%

Operator's comments :

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2019 Annual Reporting of Water and Other Raw Material Usage

Raw Material	Usage	Unit	Specific Usage	Unit
Mains Water	117710	m ³	0.16	m ³ /te
Total Water	117710	m ³	0.16	m ³ /te
Ammonia	670284	kg	0.89	kg/te
Activated Carbon	233200	kg	0.31	kg/te
Hydrated Lime	8676860	kg	11.58	kg/te

Operator's comments :

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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	7504	7603	7656				
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 :

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Signed: _____

Date: _____

2019 Annual Reporting of Energy Usage/Export

Permit EPR/BK0825UI

Operator: Cory Riverside Energy

Facility: Riverside Resource Recovery Facility

Form: Energy 1

Reporting Period from: 01/01/20219

to: 31 December 2019

Energy Source	Energy Usage	Unit	Specific Useage (KWh/tonne incinerated)
Electricity Produced	338,779	MWh	452
Electricity Imported	20894.23	MWh	28
Electricity Exported	304,097	MWh	406
Gas Oil	6	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	100% 95% of 10-min averages	100%	
Total organic carbon	100%	100%	
Hydrogen chloride	100%	100%	
Hydrogen fluoride			
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.

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

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.

Summary of any other improvements made to the plant or planned to be made and a summary of the resulting environmental benefits.
To improve overall efficiency, installation of LED lighting throughout the facility has proceeded through 2019.

Details of Public & Stakeholder Liasion

Summary of events held during the reporting year.	
Date	Description
16th -17th April	Facility Open Days for local residents
30th October	Kingston University Site Tour & Presentation
1st April	London South East College Media Students produced an educational video aid, of site operations, for use at local schools.
Monthly event	Local school site tour & presentation

List of events planned for next year	
Date	Description
29th January & 5th February	London South East Colleges event
Friday 3rd February	Reading University Environmental Management Students - Presentation & Site Tour
Friday 21st February	Tower Hamlets Work Experience event.
Saturday 28th March	Open day for potential apprentice applicants
Monday 27th July	Bexley Work Experience week

If you wish to be involved in the public liasion programme, please contact info@coryenergy.com

Residue Quality Monitoring Requirements

Summary of monitoring undertaken and compliance
In 2019, the Incinerator Bottom of Ash, of each line, was tested monthly for Total Organic Carbon (TOC) & Quarterly for Heavy Metals suite, Dioxins/Furans and Dioxin-like PCBs in line with the site permit requirements.
In 2019, The Air Pollution Control residue (APCr) was tested for Heavy Metals suite, Dioxins/Furans and Dioxin-like PCBs in line with the site permit requirements.
In 2019, the facility continued to adopt the the ESA Sampling & Testing Protocol to Assess the Status of Incinerator Bottom Ash, for the hazard assessment of IBA. The IBA remained classified as non-hazardous throughout 2019.

Commentary on any specific events

Date & Event	Description

Residue Quality Monitoring Results			
Parameter (unit)	Limit	Normal Operation	
		Bottom ash	APC Residues
ToC (%)	<3%	0.81%	
No. of Assessments Undertaken	---	36	12
No. of Hazardous Assessments	---	0	

Comments :

Emissions to Water

Summary of monitoring undertaken and compliance
Monthly visual assessment for visible oil or grease at three emission points for uncontaminated roof and surface water. No visible signs of oil or grease seen throughout 2019.

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					
All substances had 100% compliance with Emission Limit Values stated in Environmental Permit. Heavy metals suite (BS EN 14385), Mercury (BS EN 13211), Dioxins/Furans (BS EN 1948-1) and Polychlorinated Biphenyls (BS EN 1948-1) monitoring performed on a quarterly basis. Polycyclic Aromatic Hydrocarbons (BS ISO 11338-1) and Hydrogen Fluoride (BS ISO 15713) monitoring performed on a bi-annual basis.					
Results of emissions to air that are periodically monitored					
Substance	Ref. Period	Emission Limit Value	Average		
			A1	A2	A3
Hydrogen fluoride	1 hr	2 mg/m ³	0.025	0.05	0.035
Cd and Th and their compounds	6-8hrs	0.05 mg/m ³	0.000623	0.00095	0.00103
Hg and its compounds	6-8hrs	0.05 mg/m ³	0.0008	0.000643	0.0008075
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V and their compounds	6-8hrs	0.5 mg/m ³	0.019225	0.0192	0.020875
Dioxins & Furans (I-TEQ)	6-8hrs	0.1 ng/m ³	0.011275	0.014625	0.009225
PCBs (WHO-TEQ Humans / Mammals)	6-8hrs	None set ng/m ³	0.001025	0.000918	0.0011
PCBs (WHO-TEQ Fish)	6-8hrs	None set ng/m ³	4.75E-05	3.35E-05	0.00005
PCBs (WHO-TEQ Birds)	6-8hrs	None set ng/m ³	0.002325	0.001653	0.00265
Dioxins & Furans (WHO-TEQ Humans / Mammals)	6-8hrs	None set ng/m ³	0.011175	0.0143	0.0098
Dioxins & Furans (WHO-TEQ Fish)	6-8hrs	None set ng/m ³	0.0125	0.01575	0.010025
Dioxins & Furans (WHO-TEQ Birds)	6-8hrs	None set ng/m ³	0.01765	0.020975	0.013775
Anthanthrene	6-8hrs	None set µg/m ³	0.0033	0.00365	0.0034
Benzo(a)anthracene	6-8hrs	None set µg/m ³	0.0033	0.00365	0.0034
Benzo(a)pyrene	6-8hrs	None set µg/m ³	0.0033	0.00365	0.0034
Benzo(b)fluoranthene	6-8hrs	None set µg/m ³	0.0033	0.00365	0.0034
Benzo(b)naphtho(2,1-d)thiophene	6-8hrs	None set µg/m ³	0.0039	0.00485	0.00455
Benzo(c)phenanthrene	6-8hrs	None set µg/m ³	0.0039	0.00485	0.00455
Benzo(ghi)perylene	6-8hrs	None set µg/m ³	0.0033	0.00365	0.0034
Benzo(k)fluoranthene	6-8hrs	None set µg/m ³	0.0033	0.00365	0.0034
Cholanthrene	6-8hrs	None set µg/m ³	0.0039	0.00485	0.00455
Chrysene	6-8hrs	None set µg/m ³	0.0033	0.0067	0.0075
Cyclopenta(cd)pyrene	6-8hrs	None set µg/m ³	0.0039	0.00485	0.0076
Dibenzo(ai)pyrene	6-8hrs	None set µg/m ³	0.0055	0.00605	0.0057
Dibenzo(ah)anthracene	6-8hrs	None set µg/m ³	0.0068	0.00445	0.0034
Fluoranthene	6-8hrs	None set µg/m ³	0.025	0.115	0.19
Indeno(123-cd) pyrene	6-8hrs	None set µg/m ³	0.0033	0.00365	0.0034
Naphthalene	6-8hrs	None set µg/m ³	0.03195	0.03785	0.05295
Comments :					

Emissions to Air (continuously monitored)

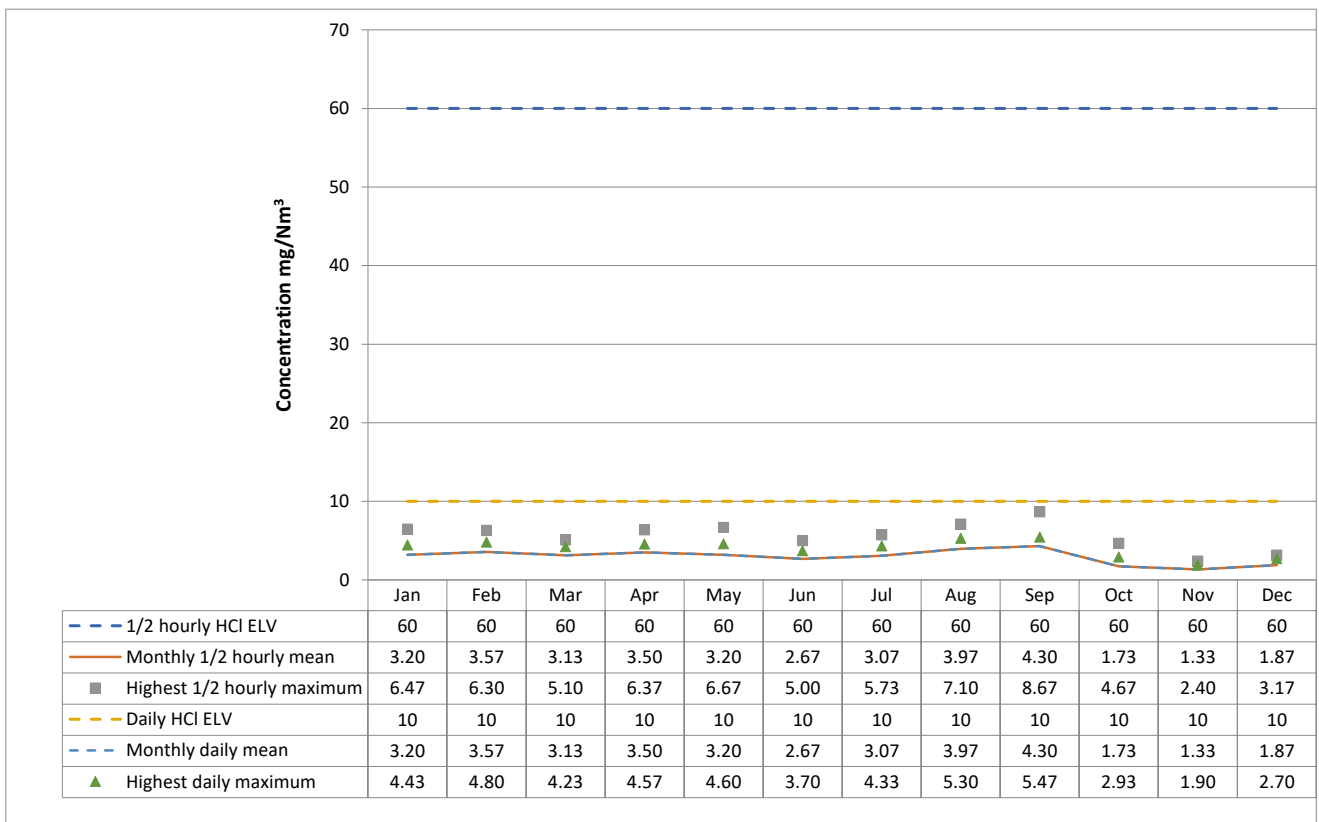
Summary of monitoring undertaken, standards used and compliance								
All substances listed below are continuously monitored in line with the requirements of the Environmental permit. There was 100% compliance throughout 2019. Oxides of Nitrogen (ISO 10849), Particulate Matter (BS EN 13284-2), Total Organic Carbon (BS EN 12619), Hydrogen Chloride, Sulphur Dioxide (BS 6069-4.4)								
Results of emissions to air that are continuously monitored								
Substance	Reference Period	Emission Limit Value	A1		A2		A3	
			Max.	Avg.	Max.	Avg.	Max.	Avg.
Oxides of nitrogen	Daily mean	200 mg/m ³	173.4	171	175.8	172.1	172.6	170.4
	½ hourly mean	400 mg/m ³	173.4	171	175.8	172.1	172.6	170.4
Particulates	Daily mean	10 mg/m ³	-	-	-	-	-	-
	½ hourly mean	30 mg/m ³	-	-	-	-	-	-
Total Organic Carbon	Daily mean	10 mg/m ³	0.4	0.18	0.6	0.44	0.3	0.2
	½ hourly mean	20 mg/m ³	0.4	0.18	0.6	0.44	0.3	0.2
Hydrogen chloride	Daily mean	10 mg/m ³	3.2	2.05	3.3	2.5	5.9	4.3
	½ hourly mean	60 mg/m ³	3.2	2.05	3.3	2.5	5.9	4.3
Sulphur dioxide	Daily mean	50 mg/m ³	3.2	2.2	4.9	3.5	5.2	4.16
	½ hourly mean	200 mg/m ³	3.2	2.2	4.9	3.5	5.2	4.16
Carbon monoxide	Daily mean	50 mg/m ³	10.8	2.78	6	2.75	16.6	3.71
	95%ile 10-min avg *	150 mg/m ³ *	25.1	2.78	12.3	2.75	40.6	3.71
Ammonia	Daily mean	No limit set	0.9	0.425	0.4	0.33	0.4	0.35
Comments :								
Following EA guidance and approval in July 2015, RRRL now monitor particulate emissions qualitatively as opposed to quantitatively. The particulate data is now reported in mA (milliamperes) and the reporting range of the instrument is 4mA to 20mA.								

Monitoring of Hydrogen Chloride emissions

Whole Installation

See Notes in Cell Q3

2019	1/2 Hourly Reference Periods			Daily Reference Periods		
	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	3.20	6.47	10	3.20	4.43
Feb	60	3.57	6.30	10	3.57	4.80
Mar	60	3.13	5.10	10	3.13	4.23
Apr	60	3.50	6.37	10	3.50	4.57
May	60	3.20	6.67	10	3.20	4.60
Jun	60	2.67	5.00	10	2.67	3.70
Jul	60	3.07	5.73	10	3.07	4.33
Aug	60	3.97	7.10	10	3.97	5.30
Sep	60	4.30	8.67	10	4.30	5.47
Oct	60	1.73	4.67	10	1.73	2.93
Nov	60	1.33	2.40	10	1.33	1.90
Dec	60	1.87	3.17	10	1.87	2.70



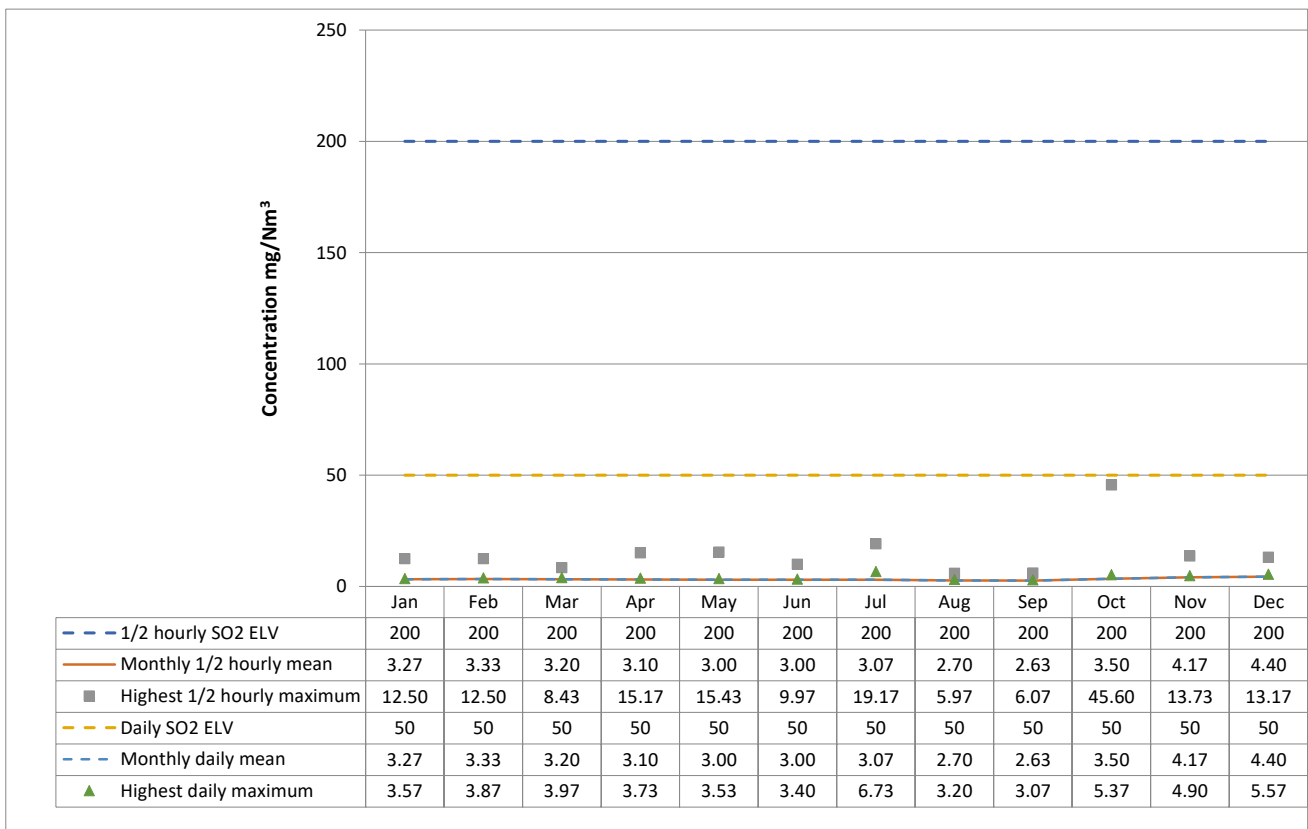
Comments :

Monitoring of Sulphur dioxide emissions

Whole Installation

See Notes in Cell Q3

mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
	1/2 hourly SO2 ELV	Monthly 1/2 hourly mean	Highest 1/2 hourly maximum	Daily SO2 ELV	Monthly daily mean	Highest daily maximum
2019						
Jan	200	3.27	12.50	50	3.27	3.57
Feb	200	3.33	12.50	50	3.33	3.87
Mar	200	3.20	8.43	50	3.20	3.97
Apr	200	3.10	15.17	50	3.10	3.73
May	200	3.00	15.43	50	3.00	3.53
Jun	200	3.00	9.97	50	3.00	3.40
Jul	200	3.07	19.17	50	3.07	6.73
Aug	200	2.70	5.97	50	2.70	3.20
Sep	200	2.63	6.07	50	2.63	3.07
Oct	200	3.50	45.60	50	3.50	5.37
Nov	200	4.17	13.73	50	4.17	4.90
Dec	200	4.40	13.17	50	4.40	5.57



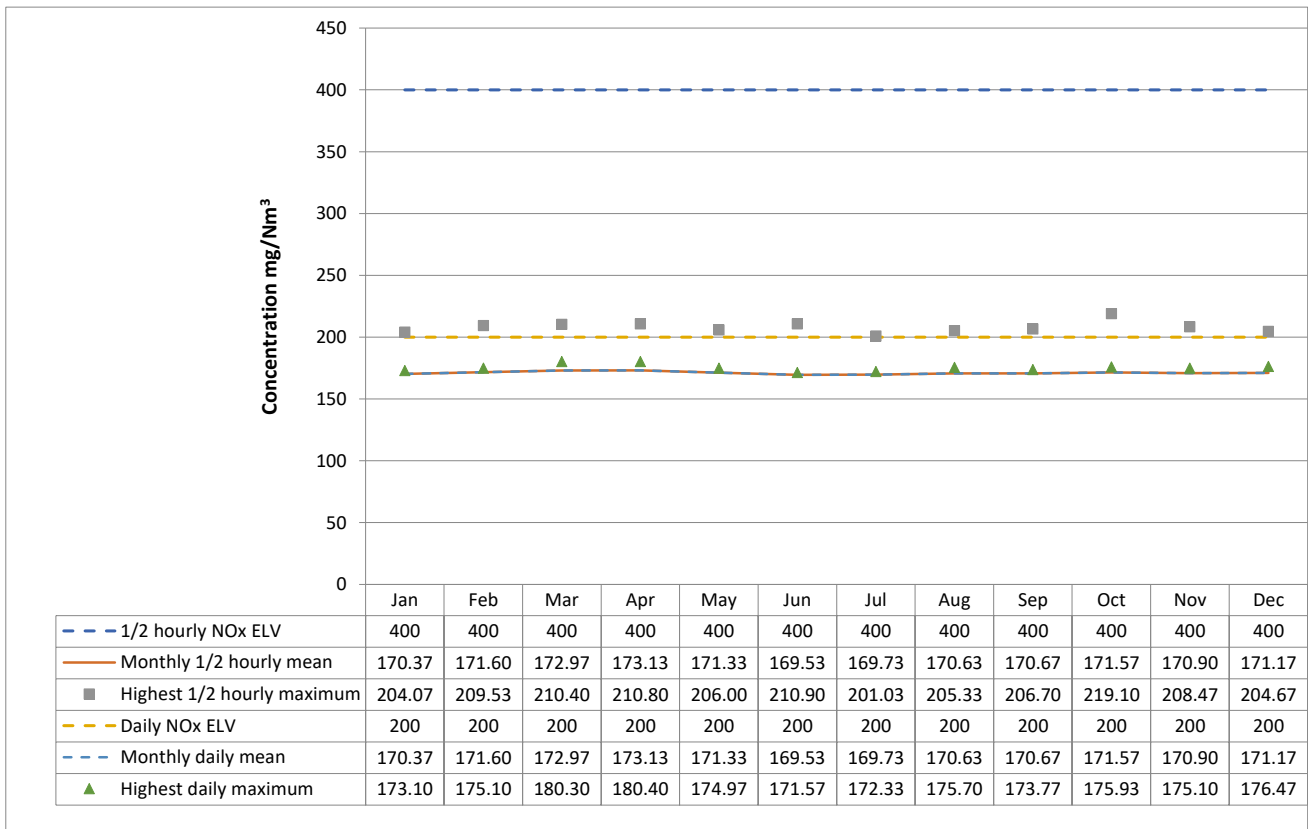
Comments :

Monitoring of Oxides of Nitrogen emissions

Whole Installation

See Notes in Cell Q3

mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
	1/2 hourly NOx ELV	Monthly 1/2 hourly mean	Highest 1/2 hourly maximum	Daily NOx ELV	Monthly daily mean	Highest daily maximum
2019						
Jan	400	170.37	204.07	200	170.37	173.10
Feb	400	171.60	209.53	200	171.60	175.10
Mar	400	172.97	210.40	200	172.97	180.30
Apr	400	173.13	210.80	200	173.13	180.40
May	400	171.33	206.00	200	171.33	174.97
Jun	400	169.53	210.90	200	169.53	171.57
Jul	400	169.73	201.03	200	169.73	172.33
Aug	400	170.63	205.33	200	170.63	175.70
Sep	400	170.67	206.70	200	170.67	173.77
Oct	400	171.57	219.10	200	171.57	175.93
Nov	400	170.90	208.47	200	170.90	175.10
Dec	400	171.17	204.67	200	171.17	176.47

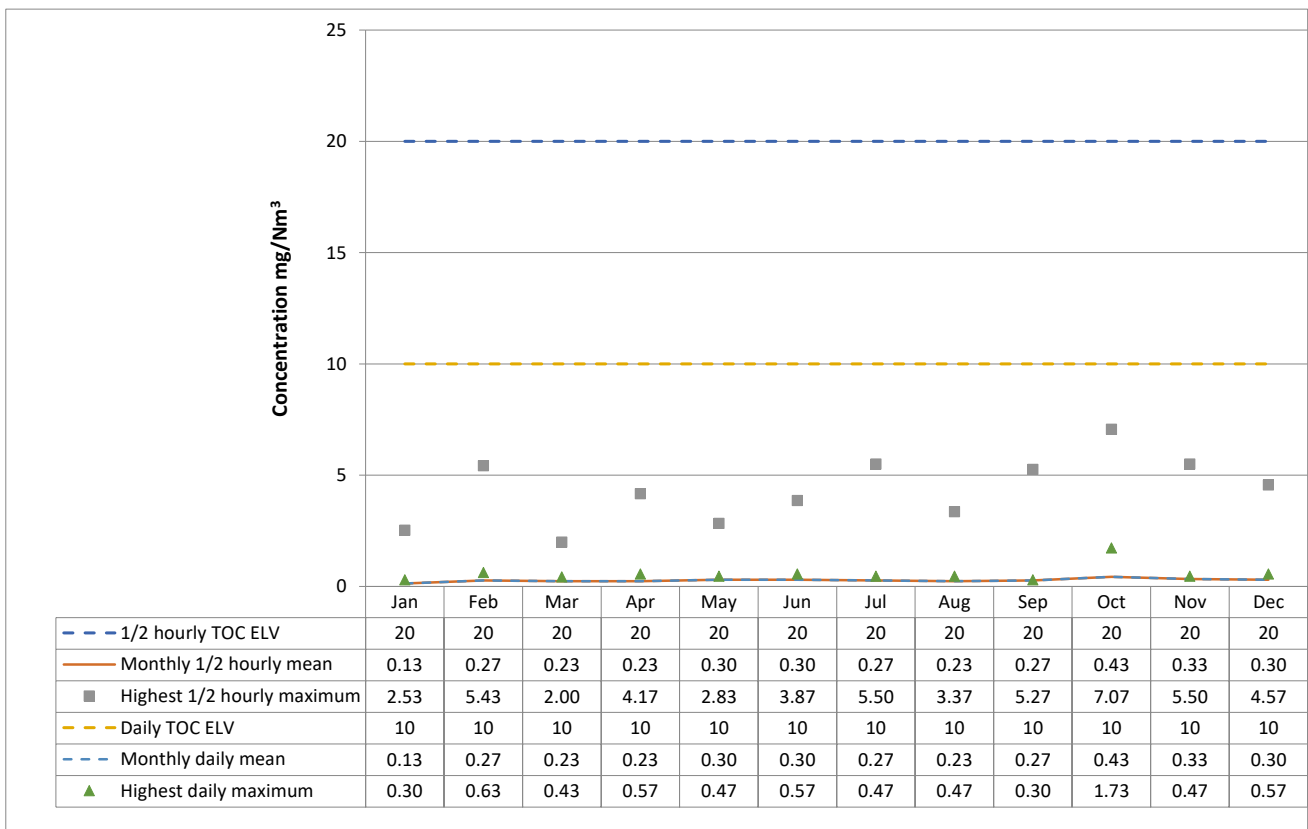


Comments :

Monitoring of Total organic carbon emissions Whole Installation

See Notes in Cell Q3

mg/Nm ³	1/2 Hourly Reference Periods			Daily Reference Periods		
	1/2 hourly TOC ELV	Monthly 1/2 hourly mean	Highest 1/2 hourly maximum	Daily TOC ELV	Monthly daily mean	Highest daily maximum
2019						
Jan	20	0.13	2.53	10	0.13	0.30
Feb	20	0.27	5.43	10	0.27	0.63
Mar	20	0.23	2.00	10	0.23	0.43
Apr	20	0.23	4.17	10	0.23	0.57
May	20	0.30	2.83	10	0.30	0.47
Jun	20	0.30	3.87	10	0.30	0.57
Jul	20	0.27	5.50	10	0.27	0.47
Aug	20	0.23	3.37	10	0.23	0.47
Sep	20	0.27	5.27	10	0.27	0.30
Oct	20	0.43	7.07	10	0.43	1.73
Nov	20	0.33	5.50	10	0.33	0.47
Dec	20	0.30	4.57	10	0.30	0.57



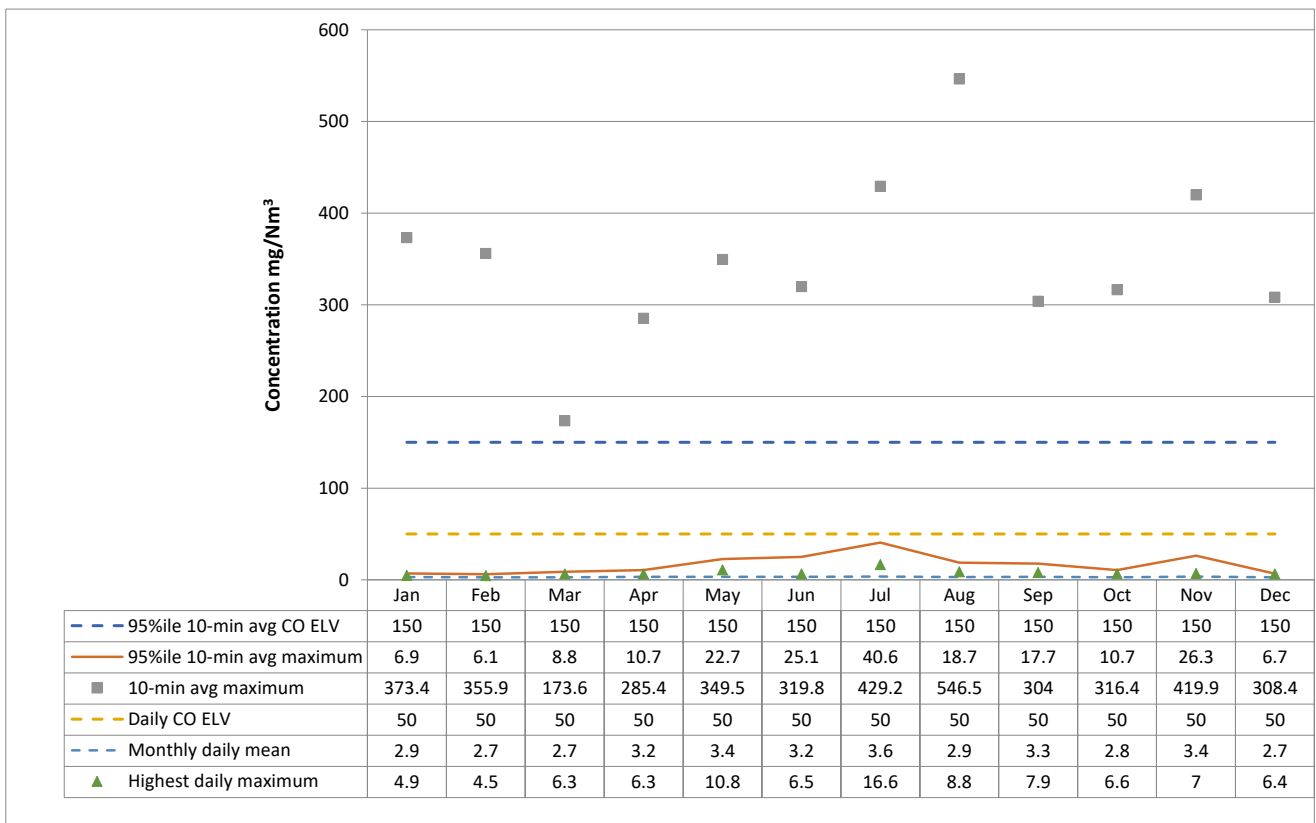
Comments :

Monitoring of Carbon Monoxide (10-minute avg)

Whole Installation

See Notes in Cell S3

2019	10-minute Reference Periods				Daily Reference Periods		
	95%ile 10-min avg CO ELV	95%ile 10-min avg maximum	Monthly CO 10-min avg mean	10-min avg maximum	Daily CO ELV	Monthly daily mean	Highest daily maximum
Jan	150	6.9	2.9	373.4	50	2.9	4.9
Feb	150	6.1	2.7	355.9	50	2.7	4.5
Mar	150	8.8	2.7	173.6	50	2.7	6.3
Apr	150	10.7	3.2	285.4	50	3.2	6.3
May	150	22.7	3.4	349.5	50	3.4	10.8
Jun	150	25.1	3.2	319.8	50	3.2	6.5
Jul	150	40.6	3.6	429.2	50	3.6	16.6
Aug	150	18.7	2.9	546.5	50	2.9	8.8
Sep	150	17.7	3.3	304	50	3.3	7.9
Oct	150	10.7	2.8	316.4	50	2.8	6.6
Nov	150	26.3	3.4	419.9	50	3.4	7
Dec	150	6.7	2.7	308.4	50	2.7	6.4



Comments :

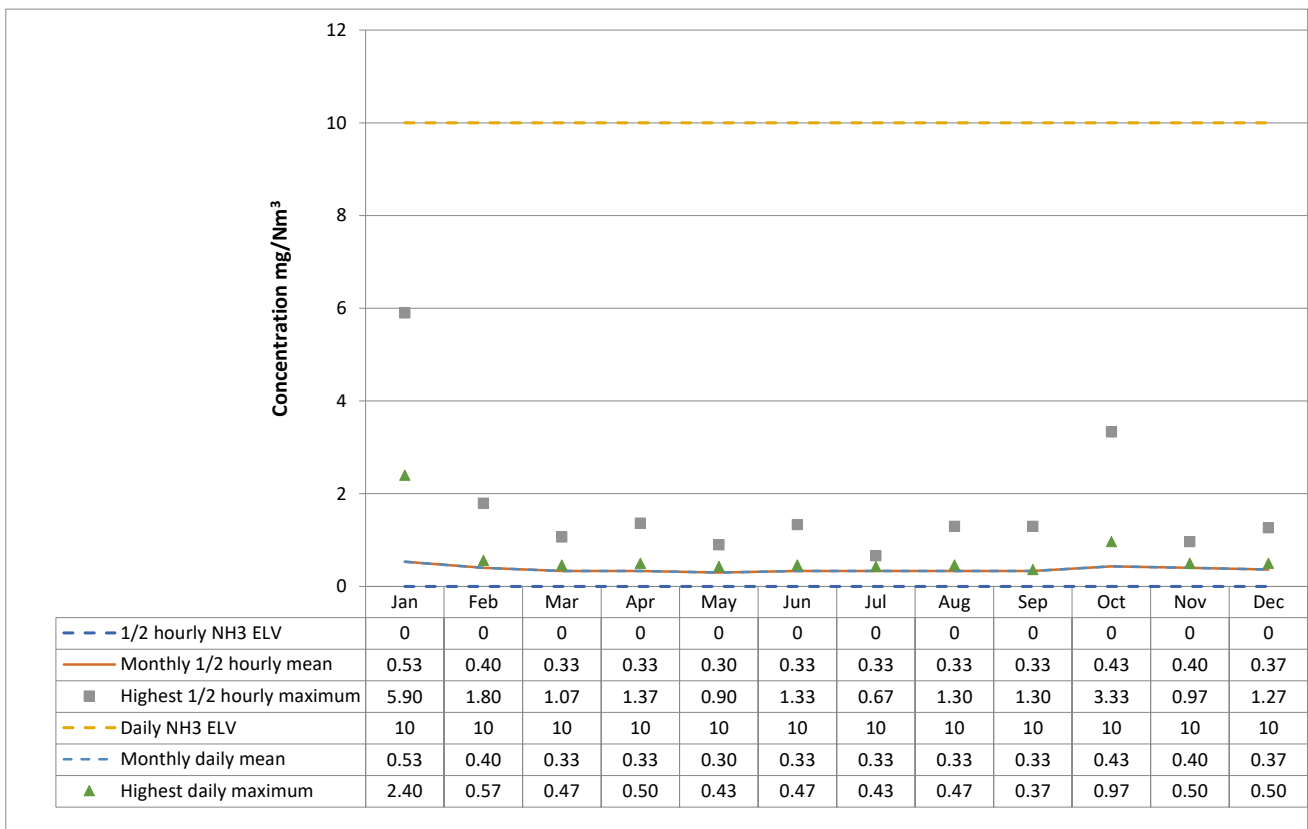
Environment Agency explanatory note: The 10-minute average ELV is based on the "95th percentile". In this case this means that 95% of the 10 minute averages in the relevant 24-hour period (i.e. 137) must be below 150 mg/Nm3, and 5% (i.e. 7) are allowed to be any value above 150 mg/Nm3. Whilst we expect 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

2019	1/2 Hourly Reference Periods			Daily Reference Periods		
	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	0.53	5.90	10	0.53	2.40
Feb	0	0.40	1.80	10	0.40	0.57
Mar	0	0.33	1.07	10	0.33	0.47
Apr	0	0.33	1.37	10	0.33	0.50
May	0	0.30	0.90	10	0.30	0.43
Jun	0	0.33	1.33	10	0.33	0.47
Jul	0	0.33	0.67	10	0.33	0.43
Aug	0	0.33	1.30	10	0.33	0.47
Sep	0	0.33	1.30	10	0.33	0.37
Oct	0	0.43	3.33	10	0.43	0.97
Nov	0	0.40	0.97	10	0.40	0.50
Dec	0	0.37	1.27	10	0.37	0.50



Comments :

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