



## Annual Performance Report 2020

Permit EPR/LP3030XA

Cardiff Energy Recovery Facility

Trident Park ERF

**VIRIDOR TRIDENT PARK LIMITED**

Year: 2020

Address:

Trident Park  
Glass Avenue  
Ocean Way  
Cardiff  
CF24 5EN

Tel: 02920501149

Email: [DCGJones@viridor.co.uk](mailto:DCGJones@viridor.co.uk)

Prepared by: Gwyn Jones

Position: EHS Manager

Approved by: Philip Eyre

Position: Head of Operations S

Version: D1

Issue Date: 10-May-21

<b>Contents</b>		
<b>Section</b>	<b>Subject</b>	<b>Page</b>
	Facility Information	
	Operational Summary	
	Operational Data	
	Performance Form 1	
	Energy Form 1	
	Permit Compliance	
	Improvements	
	Public Liasion	
	Residue Quality - Optional	
	Emissions to Water	
	Emissions to Air (periodically monitored)	
	Emissions to Air (continuously monitored)	
	Hydrogen Chloride emissions	
	Sulphur Dioxide emissions	
	Oxides of Nitrogen emissions	
	Total Organic Carbon emissions	
	Particulate Matter emissions	
	Carbon Monoxide emissions	
	Ammonia emissions	

<b>Version Control</b>		
<b>Section</b>	<b>Information</b>	<b>Date</b>

<b>Distribution</b>		
<b>Copy</b>	<b>Name, Role</b>	<b>No.</b>

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**

Cardiff Energy Recovery Facility is located immediately north of Cardiff Docks. The facility will process approximately 22.96 tonnes of residual municipal and C&I waste per line, per hour and has the capability of exporting approximately 30MW of electrical power.

In accordance with the requirements of Condition 4.2.2, Schedule 4 and Table S4.1 of Permit EPR/LP3030XA issued by Natural Resources Wales to Viridor Waste Management Limited (Viridor) on 4th November 2010, Viridor is required to produce an annual performance report which is to be submitted to Natural Resources Wales by the 31 January (or as agreed in writing with Natural Resources Wales) each year.

Viridor took over the operation of the Plant on 31st January 2015; therefore the 2020 Report is the sixth document.

This report summarises the environmental and performance data collected at the site 1st January 2020 – 31st December 2020 and fulfils the reporting requirement of Chapter IV, Article 55 (2) of the Industrial Emissions Directive.

**Summary of Operational Processes and Procedures**

Incoming waste is mainly received from local authorities that have joined together to form two contract hubs - Prosiect Gwyrdd and Tomorrows Valley, the rest of the waste is received from third party businesses. Waste is received into an enclosed waste bunker. The waste is loaded into one of two furnaces, which combust the waste at >850°C. The hot gases are put through a variety of heat exchangers used to heat demineralised water to create superheated steam which drives a turbine generator. The turbine generator produces around 37MWh and exports around 33MWh. Combusted waste (incinerator bottom ash) is sent to a third party for further processing. The gases are treated with Lime, Activated carbon and Urea to remove potential pollution leaving the stacks. The powder containing reacted gas particulates (APCr) is removed and sent via a third party for reprocessing. Emissions are monitored via Continuous Emissions Monitoring equipment (CEMs) that are serviced by a contractor.

**Operational Data**

Plant Size	425,000 tonnes pa	MWth	MWe
No. of combustion lines	2	No. of Turbines:	1

Waste types received	Unit	Q1	Q2	Q3	Q4	Year Total	%
Household / Local Authority	tonnes	71,883	75,159	62,628	66,476	276,146	72.8%
Commercial & Industrial		28,250	25,948	10,390	32,202	96,789	25.5%
Clinical		1,969	1,151	970	1,508	5,597	1.5%
Refuse Derived Fuel * - H'hold/LA		-	-	-	-	-	-
Refuse Derived Fuel * - C&I		329	61	-	482	872	0.2%
<b>Total waste received</b>		<b>102,430</b>	<b>102,319</b>	<b>73,987</b>	<b>100,667</b>	<b>379,404</b>	<b>100.0%</b>
Rejected Waste		-	-	-	-	-	-
Unprocessed waste transferred out		2.9	5.8	5.3	-	14	0.0%
<b>Total waste combusted</b>		<b>102,428</b>	<b>102,313</b>	<b>73,982</b>	<b>100,667</b>	<b>379,390</b>	<b>100.0%</b>

Energy Usage / Export	Unit	Q1	Q2	Q3	Q4	Year Total	KWh/te
Power Generated	MWh	71,310	67,416	49,609	71,954	260,289	686
Power Exported		63,221	62,337	43,664	63,801	233,023	614
Power Used on site		7,780	7,511	6,395	7,989	29,676	78
Power Imported		22	49	657	172	899	2
Parasitic Load	%	11.4%	7.6%	13.1%	11.5%	10.8%	
Thermal Energy Produced **	MWh					-	-
Thermal Energy Exported **						-	-
R1 value		Operational				86.8% ±1.3%	

Waste Disposal & Recovery	Unit	Q1	Q2	Q3	Q4	Year Total	% inputs
APC Residues - produced 190107	tonnes	2,384	1,090	879	1,220	5,573	1.5%
IBA - produced 190112		18,681	18,940	12,881	16,045	66,547	17.5%
Metals recycling 190102		2,801	2,419	1,965	2,783	9,968	2.6%
other wastes (including mixtures of r		3	8	5	-	17	0.0%

Raw Material Usage	Unit	Q1	Q2	Q3	Q4	Year Total	kg or Ltr /te
Mains Water	ltrs	2,849,000	12,298,000	14,541,000	9,525,000	39,213,000	103.36
Urea	kgs	138840.00	109,500	71,760	123,540	443,640	1.17
Activated Carbon	kgs	32,220	33,960	27,740	37,120	131,040	0.35
Lime / hydrated lime	kgs	1,095,680	982,860	772,380	1,140,360	3,991,280	10.52
Fuel oil	ltrs	84,236	77,990	219,708	88,659	470,593	1.24
Other		-	-	-	-	-	

Summary	Line/Unit	Q1	Q2	Q3	Q4	Year Total	
Availability of waste combustion by line, hrs	1	44,326	2,170	1,733	1,849	50,077	570.1%
	2	2,184	2,005	1,401	2,204	7,793	88.7%
Overall Availability, mean avg. of all lines, hrs		46,510	4,175	3,133	4,053	28,935	329.4%
Hours of turbine operations, hrs	1	2,184	2,181	1,853	2,172	8,390	95.5%
Hours of heat / steam export						-	n/a
Net Calorific Value of waste	MJ/kg	9.88	9.67	10.29	9.81		-
Abnormal Events	qty.	1	-	1	-	2	yes
Abnormal operation	hours	1	-	1	-	1	0.01%
Permit Breaches	qty.	1	-	2	-	3	yes

<b>Summary of Plant Operations and Maintenance during the reporting year</b>
--

The main purpose of the facility is to burn non-hazardous municipal, commercial and industrial waste and to recover energy by producing steam. The steam will be used to produce electricity for export to the local grid and has the potential for further heat export to local consumers. The installation includes waste receipt and storage, two waste combustion units with associated waste heat boilers and exhaust gas abatement systems, on-site storage of residues and all systems for controlling and monitoring incinerator operation. The plant is designed to process approximately 26.48 tonnes per hour in two parallel and identical combustion units. Taking into account the expected long term availability of the facility, the annual permitted throughput of the facility is 425,000 tonnes of waste per annum.

The incoming municipal waste is loaded into the furnace via a feed hopper from the reception hall, where the waste vehicles deposit their loads into the storage bunker. After entering the combustion chamber via the refuse feed ram the waste is allowed to fall onto the grate in a controlled manner. The moving grate mechanisms are used to agitate the waste as it progresses down to the ash discharger. As the waste moves along, primary air is introduced from beneath the grate causing the waste to go through a series of drying and burning areas. Secondary air is introduced from above the grate for combustion control. An auxiliary oil fired burner is located in each combustion chamber to both establish minimum temperature on start up and to maintain the combustion gas temperature at a minimum of 850°C for 2 seconds in the combustion chamber before passing to the boiler, economiser and abatement plant. The furnace is equipped with a water tube boiler raising steam at 60 bar and 400°C. Economisers are fitted down stream of the boiler unit to pre-heat the incoming feed water. Each furnace unit is fitted with an independent dry urea injection system in order to reduce the facility's emissions of Oxides of Nitrogen (NOx) to air through selective non-catalytic reduction. A dry hydrated lime flue gas treatment system is used to neutralise acid flue gases with the injection of lime reagent into the reaction chamber. Activated carbon is injected into the flue gas stream in order to reduce the concentrations of heavy metals and dioxins in the combustion gases emitted to air. Bag filters are used to separate out the resulting particulate matter from the cooled and treated gases. The facility has a 90m stack containing the separate flue gas streams from each combustion unit, via which the combustion gases are released to air. Each flue gas stream is equipped with a Continuous Emission Monitoring System (CEMS) which continuously monitor for particulates, carbon monoxide (CO), ammonia (NH3), sulphur dioxide (SO2), hydrogen chloride (HCl), oxygen (O2), nitrogen oxides (NOx) and volatile organic compounds (VOC's).

There is a discharge of process effluent to sewer in accordance with a Trade Effluent Consent issued by Dwr Cymru Welsh Water. Uncontaminated surface and roof waters are discharged to the surface water drainage system via a series of interceptors, attenuation lagoons and isolation valves. Trident Park's annual plant maintenance outage was held 1st September - 12 October 2020. During this period planned maintenance and repair of equipment was undertaken.

The R1 value given in this annual report is provisional pending a final value report by the third party service provider.

<b>Summary of Residue Handling for the reporting year</b>
---

Bottom ash from the incinerator grate is quenched with water and then conveyed via a metals extraction system to a concrete storage area prior to removal from site. There have been no hazardous results from IBA testing in 2020.

Air pollution control residues (APCr) from the bag filter systems are collected continuously and stored in two dedicated silos. APCr is collected by direct transfer from the on site silos into transport tanker and goes to either for reprocessing or disposal. When taken for reprocessing APCr is taken through accelerated carbonation technology. These carbonated wastes are blended with binders and fillers and pelletised to form an aggregate. APCr sent for disposal is mixed with water before it is transferred to a hazardous waste cell in the landfill.

## 2020 Annual Reporting Performance Form 1

Permit EPR/LP3030XA

Facility: Cardiff Energy Recovery Facility

Operator: Viridor Trident Park Limited

Form: Performance 1

Reporting Period from:

01 January 2020

to:

31 December 2020

### 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	D05.03	2,427.8	3,144.7	1.5%
IBA	0.0	0.0	0.0	-
Total Hazardous Waste		2,427.8	3,144.7	1.5%
2) Non-Hazardous Wastes				
IBA	R05	0.0	66,547.6	17.5%
Ferrous Metal	R04	0.0	9,967.8	2.6%
Process Water (other wastes (including mixtures of materials))	D05.02	16.7	0.0	0.0%
Total Non-Hazardous Waste		16.7	76,515.4	20.2%
<b>TOTAL WASTE</b>		<b>2,444.5</b>	<b>79,660.1</b>	<b>21.6%</b>

Operator's comments :

### 2020 Annual Reporting of Water and Other Raw Material Usage

Mains Water	39213000	litres	103.36	l/te
Urea / Ammonia	443640	kg	1.17	kg/te
Activated Carbon	131040	kg	0.35	kg/te
Lime	3991280	kg	10.52	kg/te

Operator's comments :

### 2020 Annual Reporting of other performance indicators

	A1	A2			Turbine
Operating hours for the year, hours	50077	7793			8390
Number of periods of abnormal operation, qty.	1	1			N/A
Cumulative hours of abnormal operation for this year, hours	30 minutes	30 minutes			N/A

Operator's comments :

Signed: G Jones

Date: 10 05 2021

## 2020 Annual Reporting of Energy Usage/Export

Permit EPR/LP3030XA

Operator: Viridor Trident Park Limited

Facility: Cardiff Energy Recovery Facility

Form: Energy 1

Reporting Period from:

01 January 2020

to:

31 December 2020

Energy Source	Energy Usage	Unit	Specific Usage (KWh/tonne incinerated)
Electricity Produced	260,289	MWh	686
Electricity Imported	899.4	MWh	2
Electricity Exported	233,023	MWh	614
Diesel Oil	470593	litres	
Steam/hot water exported	0	GWh	-

**Operator's comments :**

--

Signed: G Jones

Date: 10 05 2021

## 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	100.00%	100.00%
Oxides of nitrogen	99.46%	100.00%
Sulphur dioxide	100.00%	100.00%
Carbon monoxide	100% (of all 95% 10 min. averages)	98.91%
Total organic carbon	99.46%	100.00%
Hydrogen chloride	100.00%	100.00%
Hydrogen fluoride	100.00%	100.00%
	<b>99.82%</b>	<b>99.84%</b>

### 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
08/02/2020	Schedule Notification Part C submitted due to ½ hour NOx ELV exceedance from 13:30H to 13:59H on L1. Value recorded as 407.32mg/m3, 1/2 hour ELV= 400mg/m3.	Blockage in a urea nozzle. All possible preventative measures were undertaken as this exceedance occurred after the decision to "come off waste" was made at 13:10H in order to instigate investigation and undertake necessary works. NOx value exceeded the ½ hour limit whilst waiting for waste to clear the line. .	All pipework/udders/filters taken apart and cleaned thoroughly and refitted whilst off waste.  15:55H > Urea system back in service and injection pressure stable around 47mbar.  All other emissions remained under ELV.
14/07/2020	Schedule Notification Part C submitted due to 1/2 hour TOC ELV exceedance from 10:30H to 10:59H on L2 during plant shutdown. Value recorded as 30.5mg/m3. 1/2 hour ELV for TOC= 20mg/m3	Whilst investigating a tube leak on Line 2 it was decided to close the dampers so an evaluation of tubes with the Line 2 boiler could be undertaken. Whilst the dampers were closed, and Line 2 was going through the shutdown process an elevated VOC reading was obtained.	The shutdown process continued and a repair of a tube leak began.
30/08/2020	Schedule Notification Part A and B submitted due to daily CO ELV exceedance. Value recorded as 109.5mg/m3. Daily ELV for CO = 50mg/m3.	It is believed that the slight exceedance was due to the grabbing of "old" waste from the near the base of the bunker and placement of the waste into the waste hopper. Due to the low volume of waste in the bunker there was limited opportunity for this "old" was to be mixed with fresh waste.  Site managers took the decision to reach down to the base of the bunker in as part of the preparation for the 2020 Outage.	This was considered a one-off event based on the works being undertaken (outage preparation), with lessons learnt for the 2021 site outage.



**Summary of any complaints received and actions to taken to resolve them.**

<b>Date</b>	<b>Summary of complaint [including Line/Reference]</b>	<b>Reason *</b>	<b>Measures taken to prevent reoccurrence</b>
20_02_2020	E-mail received from NRW regarding reports of black smoke from Trident Park's stacks from a local housing development. A resident notified NRW directly at approx. 07:10H. NRW notified Viridor at 18:09H.	No issues surrounding the plants' operational performance were identified around the time of the complaint and both lines were operating in stable conditions.	This complaint was unable to be substantiated so further measures to prevent reoccurrence could not be concluded.
08_06_2020	E-mail received from NRW regarding reports of flies present in the Splott area on the 8th June 2020. NRW notified Viridor 01 June 2020	A video of the tipping hall and a service report from the Pest Control contractor was submitted to the Regulator. Both of these documents supported the fly issue did not arise from Trident Park ERF.	This complaint was unable to be substantiated so further measures to prevent reoccurrence could not be concluded.
30_07_2020	Odour complaint received from NRW from CF3 3AD Pwll-Mawr (circa 4 miles from site): 'Caller reporting a strong smell of gone off meat/glue smell in the area. This has been at its worse today. Caller is unsure if this is coming from Cardiff Bay Incinerator, the near pete bog/landfill tip. Caller states this has been ongoing for years, and caller states NRW have investigated this before, but did not get to the source of it. Caller has contacted the council but has not heard anything.'	This complaint was unable to be substantiated so further measures to prevent reoccurrence could not be concluded.	Investigation carried out. Weather data for the area reviewed and at the time of the complaint the wind direction was ESE. Comparing this with the location of the complaint this suggests that Trident Park ERF was not the
13_08_2020	NRW complaint report received by Viridor for 13 August 2020. "Caller complaining of black dust fallout everyday resulting in a layer of black dust on exterior surfaces. Says this has been happening for a while but that it has been getting worse recently. Reporter is not 100% sure but thinks is it coming from the Viridor incinerator plant opposite as he can't think where else it could be coming from".	No issues surrounding the plants' operational performance were identified around the time of the complaint and both lines were operating in stable conditions.	This complaint was unable to be substantiated so further measures to prevent reoccurrence could not be concluded.
30_08_2020	Complaint form recieved from NRW on 1 September 2020 regarding excessive noise from Trident Park ERF on Saturday approx 1:10am. Caller states several blasts of steam/smoke and loud mechanical grating type noise.	In readiness for our 2020 Outage the Control Room were emptying the waste bunker to less than 1,000 tonnes. At around 01:00H, the Control Room noticed that Line 2 had high steam flows and the drum pressure had reached 78.1 bar, to balance this data the Control Room switched the roof vents to manual and increased to 100% open for a short while until the boiler was stable.	Information was feed into the 2020 Outage Lesson Learnt programme for future Outages.

\* 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.**

Western Power Distribution built and completed a sub station (with upgraded power connection) that allowed Trident Park ERF to export more electricity onto the National Grid.

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

All Improvement Conditions associated with Cardiff Energy Recovery Facility's Environmental Permit EPR/LP3030XA were completed prior to the calendar year of 2020.

**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.**

On the 2/9/2020 a variation (V005) was issued by NRW relating to the change the companies registered address. This variation had no impact on the environment.

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

During 2020 Western Power Distribution built a sub station within the site boundary to facilitate the export of more electricity derived from the turbine. It is believed this export of energy onto the National Grid is positive for the environment as the feedstock is sourced from waste that may have otherwise gone to landfill. A feasibility study is ongoing that considers heat export from Trident Park ERF.

**Details of Public & Stakeholder Liasion**

<b>Summary of events held during the reporting year.</b>	
<b>Date</b>	<b>Description</b>
07/01/2020	Community Liasion Meeting.
01/05/2020	During May 2020 a Briefing Note was sent to members of the Community Liasion Group. Due to the Coronavirus pandemic and the need to maintain good bio-security no vistors were allowed on site.
23/07/2020	Community Liasion Meeting held over video conference call.
03/11/2020	Community Liasion Meeting held over video conference call.

<b>List of events planned for next year</b>	
<b>Date</b>	<b>Description</b>
Jan-21	12 Jan 2021 Community Liasion Meeting was held via TEAMS conference call.
Apr-21	Due to the ongoing Coronavirus Pandemic it is likely that Community Liasion Meetings shall be continue to be undertaken over video conference call.
Feb-21	Planned Virtual Open Day
Mar-21	Planned Virtual open Day
Jul-21	Community Liasion Meeting. Method of engagement shall be confirmed -depending upon infection rate of Coronavirus in the population.
Oct-21	Community Liasion Meeting. Method of engagement shall be confirmed - depending upon infection rate of Coronavirus in the population.

**If you wish to be involved in the public liasion programme, please contact Gwyn Jones**

**Residue Quality Monitoring Requirements**

<b>Summary of monitoring undertaken and compliance A5:G1A5:G39</b>
During the calendar year of 2020, 23 combined Metals, 10 TOC analysis (5 per line) and 6 combined Dioxin, Furan and Metal tests were undertaken on the IBA produced at Cardiff Energy Recovery Facility. All IBA samples completed undergo hazard analysis in line with the ESA protocol.
APCr is sampled quarterly as required by the permit.

<b>Commentary on any specific events</b>	
<b>Date &amp; Event</b>	<b>Description</b>

<b>Residue Quality Monitoring Results</b>			
Parameter (unit)	Limit	Normal Operation	
		Bottom ash	APC Residues
Loss on Ignition (average %)	<5%	3.0	
Total Organic Carbon (average %)	<3%	L1 0.95% L2 .1.05%	
No. of Assessments Undertaken	---	39	8
No. of Hazardous Results	---	0	

<b>Comments :</b>

## Annual Performance Report 2 Cardiff Energy Recovery Facility

### Emissions to Water

Summary of monitoring undertaken and compliance
The monitoring of emissions to water form W1 is not required under Cardiff Energy Recovery Facility Environmental Permit EPR/LP3030XA/V004. The discharge must remain visibly free of any solids, oil or grease. Inspections are carried out periodically by site staff and also on a monthly basis by a contractor.

Commentary on any specific events	
Date & Event	Description
	No adverse events during year.

Emissions to Water / Sewer					
Parameter	Monitoring Frequency	Limit	Target	Max.	Average
No parameters set	Access Weekly, not required.	No limits set. Discharge to be free of any visible solids, oil or grease	-	-	-

**Emissions to Air (periodically monitored)****Summary of monitoring undertaken, standards used and compliance****Results of emissions to air that are periodically monitored**

Substance	Ref. Period	Emission Limit Value	Average H1		Average H2	
			A1	A2	A1	A2
Nitrous Oxide	Periodic over 30 minutes. Maximum 8 hours	None set	11.1	10.8	7.9	13.6
Hydrogen fluoride		2 mg/m <sup>3</sup>	0.02	0.02	0.01	0.01
Hg and its compounds		0.05 mg/m <sup>3</sup>	0.0055	0.0031	0.0033	0.0027
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V and their compounds	6-8hrs	0.5 mg/m <sup>3</sup>	0.135	0.182	0.0285	0.0247
Dioxins & Furans (I-TEQ)	6-8hrs	0.1 ng/m <sup>3</sup>	0.0278	0.0138	0.0088	0.0083
PCBs (WHO-TEQ Humans / Mammals)	6-8hrs	None set ng/m <sup>3</sup>	0.00146	0.00083	0.0005	0.0005
PCBs (WHO-TEQ Fish)	6-8hrs	None set ng/m <sup>3</sup>	0.00007	0.00004	0.000002	0
PCBs (WHO-TEQ Birds)	6-8hrs	None set ng/m <sup>3</sup>	0.0033	0.00241	0.0012	0.0014
Dioxins & Furans (WHO-TEQ Humans / Mammals)	6-8hrs	None set ng/m <sup>3</sup>	0.0259	0.0129	0.0084	0.0079
Dioxins & Furans (WHO-TEQ Fish)	6-8hrs	None set ng/m <sup>3</sup>	0.0283	0.0139	0.0091	0.0085
Dioxins & Furans (WHO-TEQ Birds)	6-8hrs	None set ng/m <sup>3</sup>	0.0514	0.0282	0.0127	0.0125
Anthanthrene	6-8hrs	None set µg/m <sup>3</sup>	0	0	<0.0011	<0.001
Benzo(a)anthracene	6-8hrs	None set µg/m <sup>3</sup>	<0.0006	0	<0.0011	<0.001
Benzo(a)pyrene	6-8hrs	None set µg/m <sup>3</sup>	<0.0006	<0.0007	<0.0011	<0.001
Benzo(b)fluoranthene	6-8hrs	None set µg/m <sup>3</sup>	<0.0006	<0.0007	<0.0011	<0.001
Benzo(b)naptho(2,1-d) thiophene	6-8hrs	None set µg/m <sup>3</sup>	<0.0006	<0.0007	0	<0.001
Benzo(c)phenanthrene	6-8hrs	None set µg/m <sup>3</sup>	<0.0006	<0.0007	<0.0011	<0.001
Benzo(ghi)perylene	6-8hrs	None set µg/m <sup>3</sup>	<0.0006	<0.0007	<0.0011	<0.001
Benzo(k)fluoranthene	6-8hrs	None set µg/m <sup>3</sup>	<0.0006	<0.0007	<0.0011	<0.001
Cholanthrene	6-8hrs	None set µg/m <sup>3</sup>	<0.0006	<0.0007	<0.0011	<0.001
Chrysene	6-8hrs	None set µg/m <sup>3</sup>	0	0	0	<0.001
Cyclopenta(cd)pyrene	6-8hrs	None set µg/m <sup>3</sup>	<0.0006	<0.0007	<0.0011	<0.001
Dibenzo(ai)pyrene	6-8hrs	None set µg/m <sup>3</sup>	<0.0006	<0.0007	<0.0011	<0.001
Dibenzo(ah)anthracene	6-8hrs	None set µg/m <sup>3</sup>	<0.0006	<0.0007	<0.0011	<0.001
Fluoranthene	6-8hrs	None set µg/m <sup>3</sup>	0	0.01	0.01	0
Indeno(123-cd) pyrene	6-8hrs	None set µg/m <sup>3</sup>	<0.0006	<0.0007	<0.0011	<0.001
Naphthalene	6-8hrs	None set µg/m <sup>3</sup>	0.17	0.21	0.15	0.36

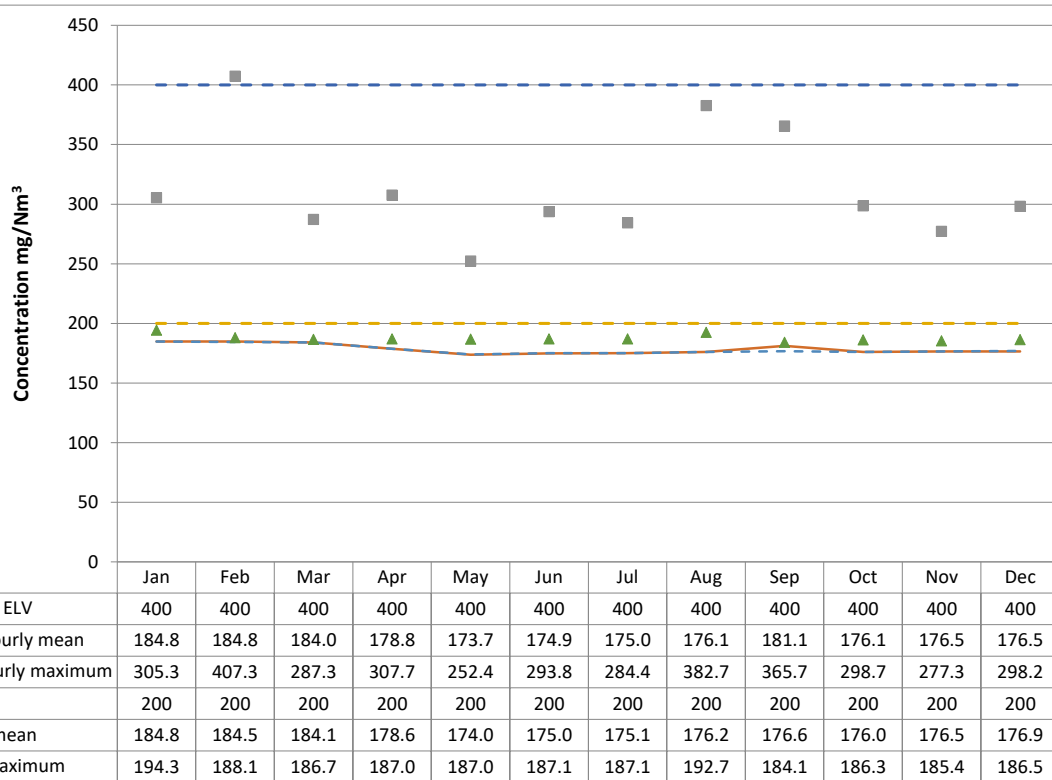
**Comments :**

## Monitoring of Oxides of Nitrogen emissions

## Whole Installation

See Notes in Cell Q3

mg/Nm <sup>3</sup>	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	184.8	305.3	200	184.8	194.3
Feb	400	184.8	407.3	200	184.5	188.1
Mar	400	184.0	287.3	200	184.1	186.7
Apr	400	178.8	307.7	200	178.6	187.0
May	400	173.7	252.4	200	174.0	187.0
Jun	400	174.9	293.8	200	175.0	187.1
Jul	400	175.0	284.4	200	175.1	187.1
Aug	400	176.1	382.7	200	176.2	192.7
Sep	400	181.1	365.7	200	176.6	184.1
Oct	400	176.1	298.7	200	176.0	186.3
Nov	400	176.5	277.3	200	176.5	185.4
Dec	400	176.5	298.2	200	176.9	186.5



## Comments :

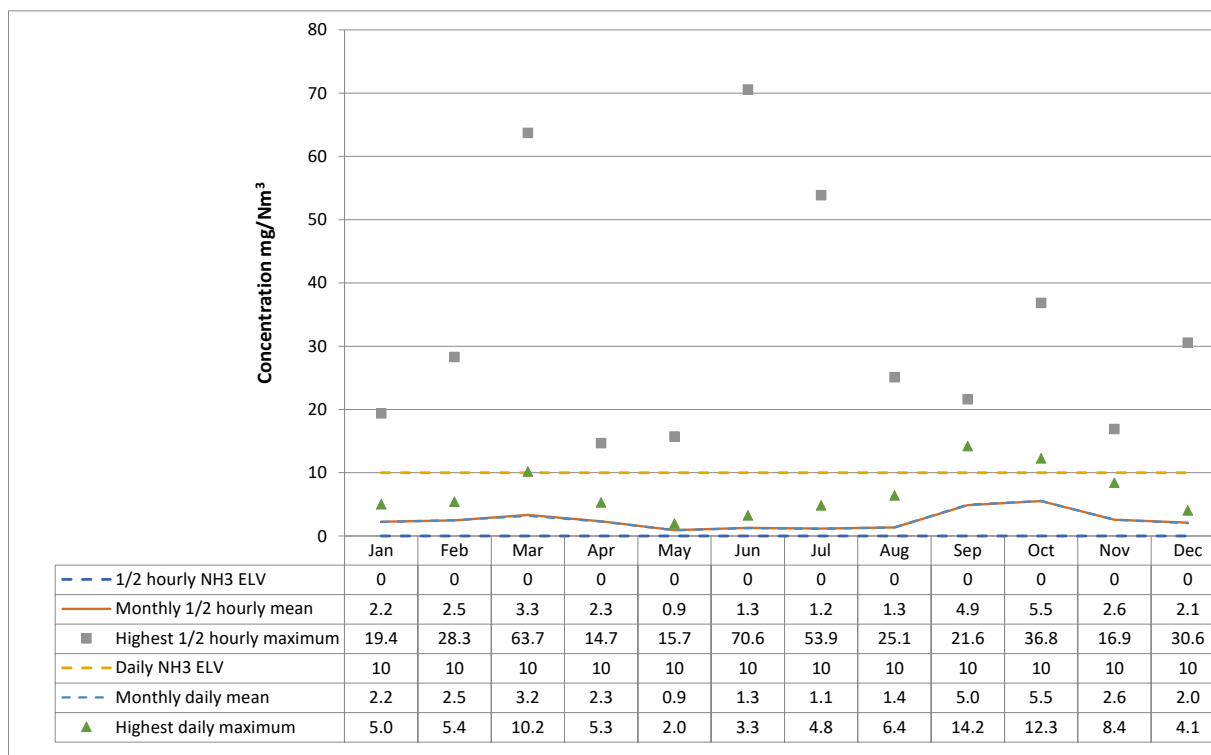
Please refer to the Permit Compliance page for further detail on the permitted exceedance of the ELV (407.3mg/Nm<sup>3</sup>) on the 8th of February 2020.

## Monitoring of Ammonia emissions

## Whole Installation

See Notes in Cell Q3

mg/Nm <sup>3</sup>	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	2.2	19.4	10	2.2	5.0
Feb	0	2.5	28.3	10	2.5	5.4
Mar	0	3.3	63.7	10	3.2	10.2
Apr	0	2.3	14.7	10	2.3	5.3
May	0	0.9	15.7	10	0.9	2.0
Jun	0	1.3	70.6	10	1.3	3.3
Jul	0	1.2	53.9	10	1.1	4.8
Aug	0	1.3	25.1	10	1.4	6.4
Sep	0	4.9	21.6	10	5.0	14.2
Oct	0	5.5	36.8	10	5.5	12.3
Nov	0	2.6	16.9	10	2.6	8.4
Dec	0	2.1	30.6	10	2.0	4.1

**Comments :**

An indicated ELV value of zero in the table above means that no ammonia limit is set in the permit. The BREF ELV has not yet been implemented in Trident Park's Environmental Permit and does not apply during the 2020 reporting year.

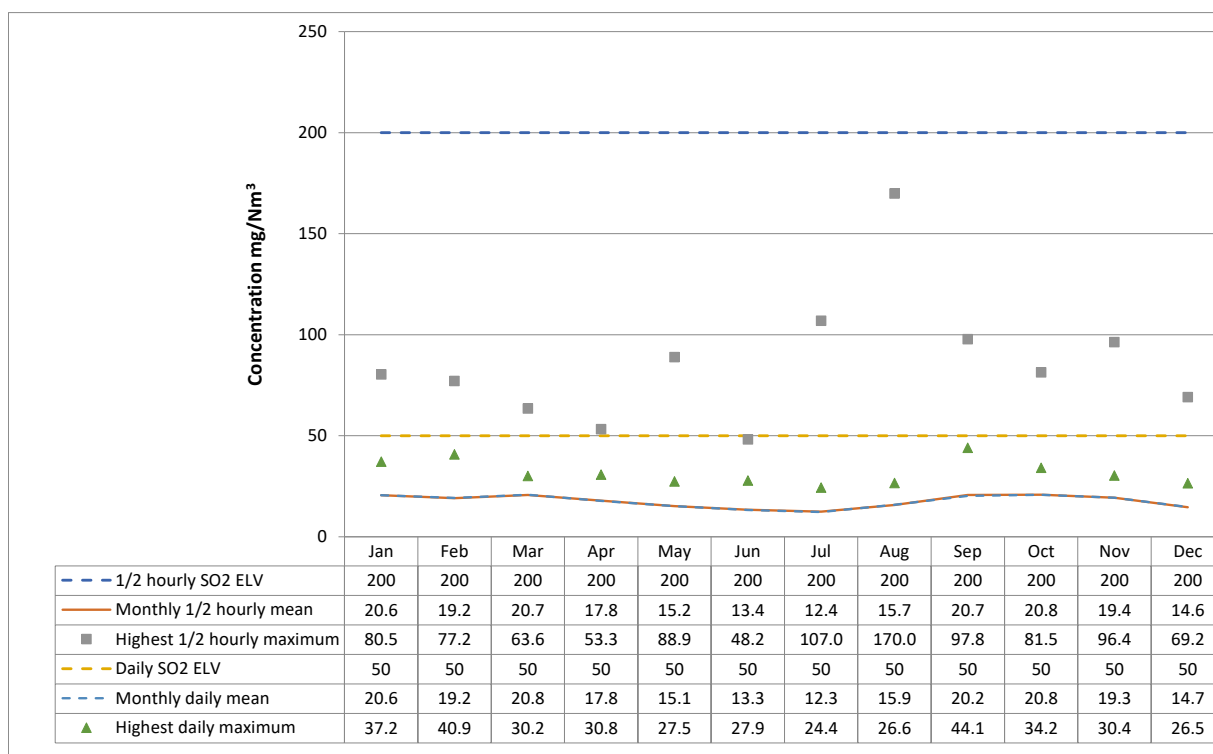


## Monitoring of Sulphur dioxide emissions

## Whole Installation

See Notes in Cell Q3

mg/Nm <sup>3</sup>	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	20.6	80.5	50	20.6	37.2
Feb	200	19.2	77.2	50	19.2	40.9
Mar	200	20.7	63.6	50	20.8	30.2
Apr	200	17.8	53.3	50	17.8	30.8
May	200	15.2	88.9	50	15.1	27.5
Jun	200	13.4	48.2	50	13.3	27.9
Jul	200	12.4	107.0	50	12.3	24.4
Aug	200	15.7	170.0	50	15.9	26.6
Sep	200	20.7	97.8	50	20.2	44.1
Oct	200	20.8	81.5	50	20.8	34.2
Nov	200	19.4	96.4	50	19.3	30.4
Dec	200	14.6	69.2	50	14.7	26.5



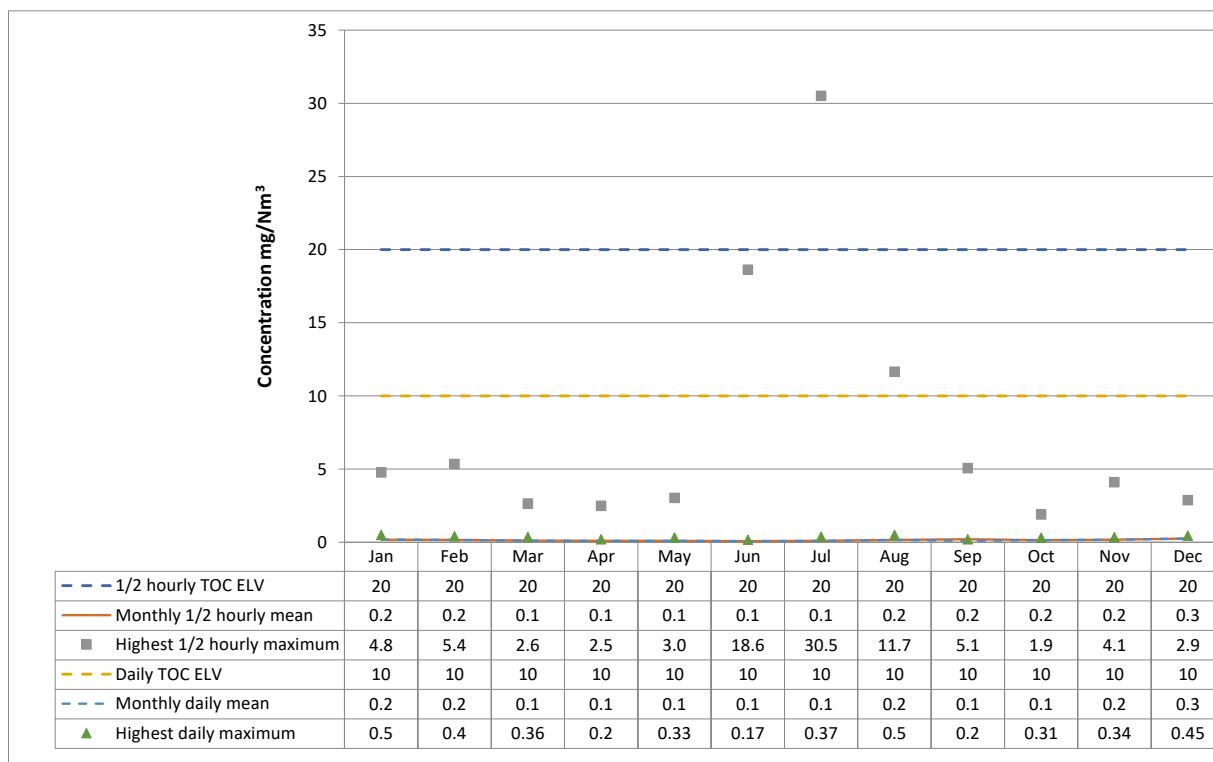
Comments :

## Monitoring of Total organic carbon emissions

## Whole Installation

See Notes in Cell Q3

mg/Nm <sup>3</sup>	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	0.2	4.8	10	0.2	0.5
Feb	20	0.2	5.4	10	0.2	0.4
Mar	20	0.1	2.6	10	0.1	0.36
Apr	20	0.1	2.5	10	0.1	0.2
May	20	0.1	3.0	10	0.1	0.33
Jun	20	0.1	18.6	10	0.1	0.17
Jul	20	0.1	30.5	10	0.1	0.37
Aug	20	0.2	11.7	10	0.2	0.5
Sep	20	0.2	5.1	10	0.1	0.2
Oct	20	0.2	1.9	10	0.1	0.31
Nov	20	0.2	4.1	10	0.2	0.34
Dec	20	0.3	2.9	10	0.3	0.45



## Comments :

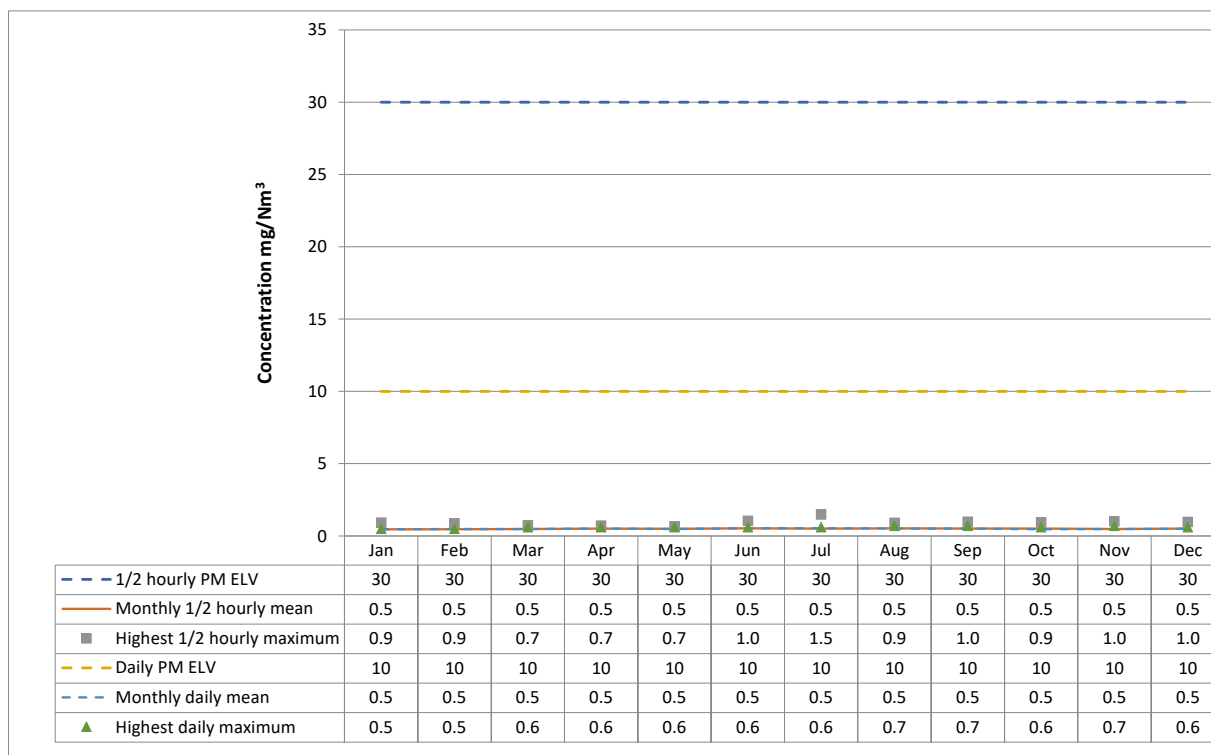
Please refer to the Permit Compliance page for further detail on the permitted exceedance of the ELV (30.5mg/Nm<sup>3</sup>) on the 14th of July 2020.

## Monitoring of Particulate matter emissions

## Whole Installation

See Notes in Cell Q3

mg/Nm <sup>3</sup>	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	0.5	0.9	10	0.5	0.5
Feb	30	0.5	0.9	10	0.5	0.5
Mar	30	0.5	0.7	10	0.5	0.6
Apr	30	0.5	0.7	10	0.5	0.6
May	30	0.5	0.7	10	0.5	0.6
Jun	30	0.5	1.0	10	0.5	0.6
Jul	30	0.5	1.5	10	0.5	0.6
Aug	30	0.5	0.9	10	0.5	0.7
Sep	30	0.5	1.0	10	0.5	0.7
Oct	30	0.5	0.9	10	0.5	0.6
Nov	30	0.5	1.0	10	0.5	0.7
Dec	30	0.5	1.0	10	0.5	0.6



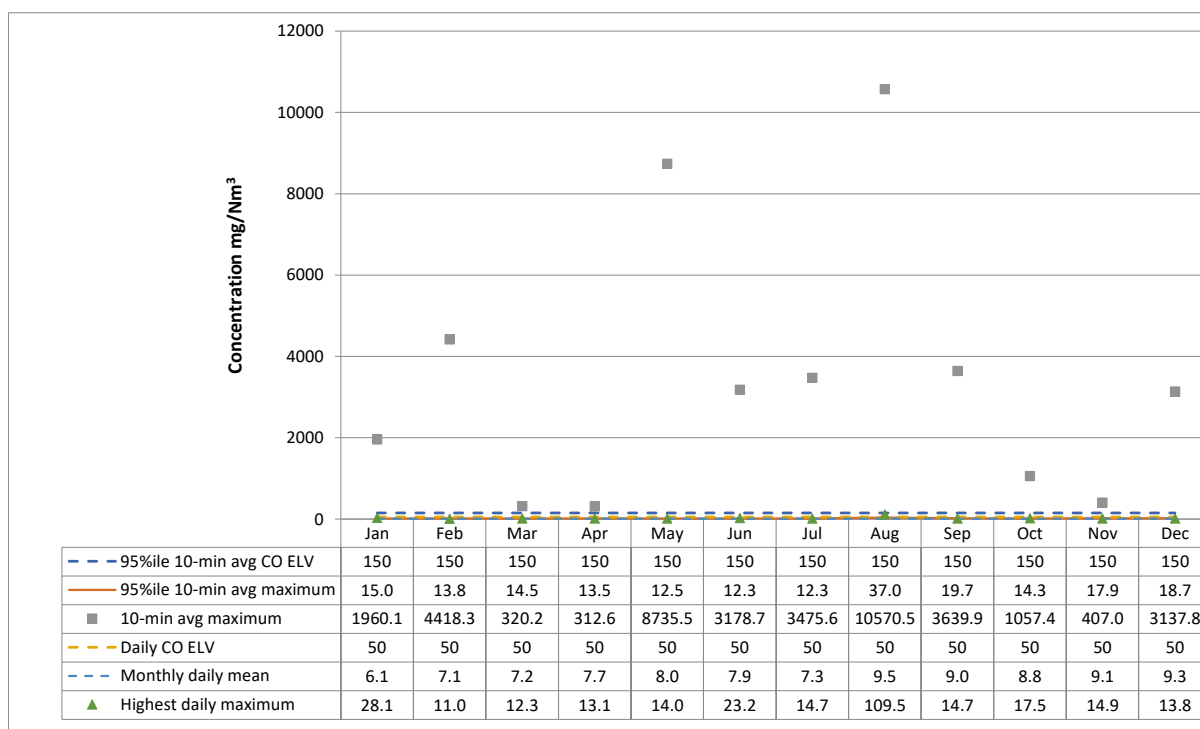
Comments :

## Monitoring of Carbon Monoxide (10-minute avg)

## Whole Installation

See Notes in Cell S3

mg/Nm <sup>3</sup>	10-minute Reference Periods				Daily Reference Periods		
2020	95 <sup>th</sup> ile 10-min avg CO ELV	95 <sup>th</sup> 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	15.0	6.1	1960.1	50	6.1	28.1
Feb	150	13.8	7.6	4418.3	50	7.1	11.0
Mar	150	14.5	7.2	320.2	50	7.2	12.3
Apr	150	13.5	7.8	312.6	50	7.7	13.1
May	150	12.5	9.2	8735.5	50	8.0	14.0
Jun	150	12.3	10.1	3178.7	50	7.9	23.2
Jul	150	12.3	8.1	3475.6	50	7.3	14.7
Aug	150	37.0	12.0	10570.5	50	9.5	109.5
Sep	150	19.7	16.6	3639.9	50	9.0	14.7
Oct	150	14.3	9.1	1057.4	50	8.8	17.5
Nov	150	17.9	9.1	407.0	50	9.1	14.9
Dec	150	18.7	9.6	3137.8	50	9.3	13.8

**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/Nm<sup>3</sup>, and 5% (i.e. 7) are allowed to be any value above 150 mg/Nm<sup>3</sup>. 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/Nm<sup>3</sup>, provided the 95th percentile ELV has been met for that period.

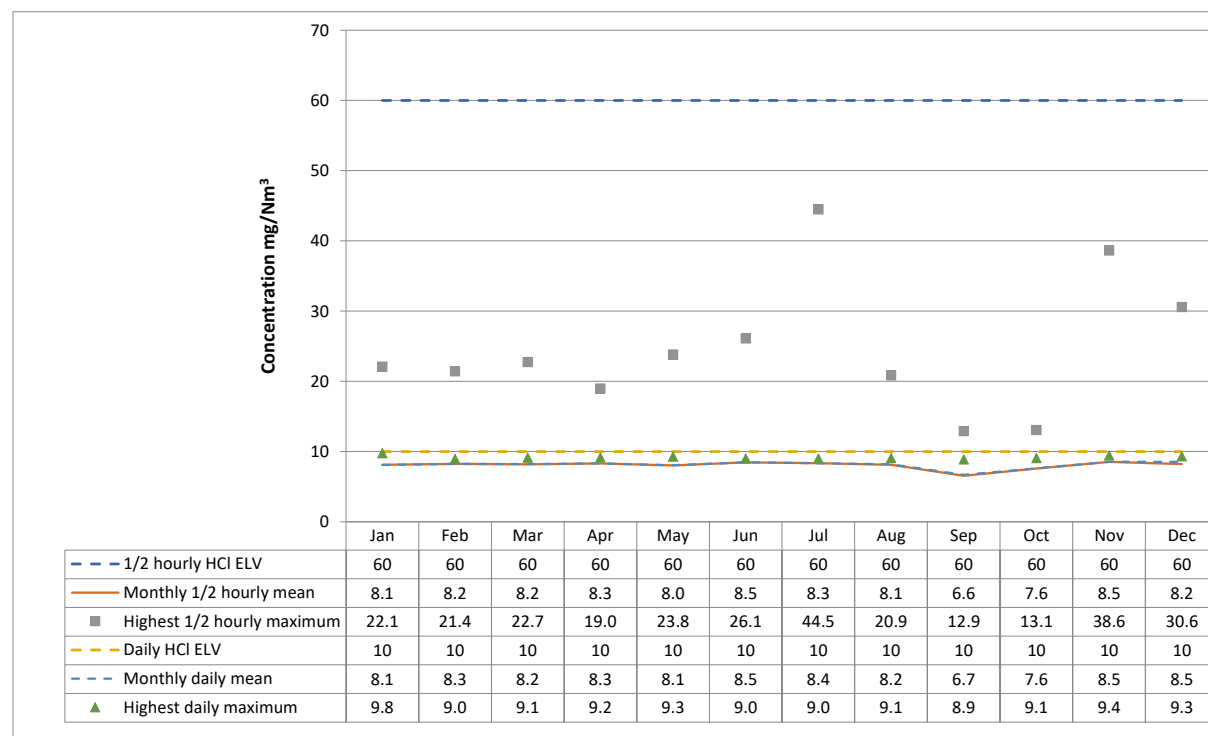
Please refer to the Permit Compliance page for further detail on the permitted exceedance of the ELV (109.5 mg/Nm<sup>3</sup>) on the 30th of August 2020.

## Monitoring of Hydrogen Chloride emissions

## Whole Installation

See Notes in Cell Q3

mg/Nm <sup>3</sup>	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	8.1	22.1	10	8.1	9.8
Feb	60	8.2	21.4	10	8.3	9.0
Mar	60	8.2	22.7	10	8.2	9.1
Apr	60	8.3	19.0	10	8.3	9.2
May	60	8.0	23.8	10	8.1	9.3
Jun	60	8.5	26.1	10	8.5	9.0
Jul	60	8.3	44.5	10	8.4	9.0
Aug	60	8.1	20.9	10	8.2	9.1
Sep	60	6.6	12.9	10	6.7	8.9
Oct	60	7.6	13.1	10	7.6	9.1
Nov	60	8.5	38.6	10	8.5	9.4
Dec	60	8.2	30.6	10	8.5	9.3



Comments :

**Emissions to Air (continuously monitored)**

Summary of monitoring undertaken, standards used and compliance										

Results of emissions to air that are continuously monitored (maximum and average values for each line)										
Substance	Reference Period	Emission Limit Value	Q1 A1		Q2 A1		Q3 A1		Q4 A1	
			Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.
Oxides of nitrogen	Daily mean	200 mg/m <sup>3</sup>	188.73	184.27	183.45	169.65	182.75	170.23	178.83	169.84
	½ hourly mean	400 mg/m <sup>3</sup>	407.32		248.66		275.60		287.79	
Particulates	Daily mean	10 mg/m <sup>3</sup>	0.60	0.51	0.60	0.55	0.70	0.61	0.70	0.51
	½ hourly mean	30 mg/m <sup>3</sup>	0.92		0.95		0.90		0.93	
Total Organic Carbon	Daily mean	10 mg/m <sup>3</sup>	0.50	0.15	0.20	0.04	0.50	0.12	0.45	0.15
	½ hourly mean	20 mg/m <sup>3</sup>	5.35		18.62		11.65		4.10	
Hydrogen chloride	Daily mean	10 mg/m <sup>3</sup>	9.60	8.02	8.96	8.20	8.97	8.10	9.17	7.86
	½ hourly mean	60 mg/m <sup>3</sup>	22.09		23.83		44.48		30.58	
Sulphur dioxide	Daily mean	50 mg/m <sup>3</sup>	40.86	26.85	30.77	17.53	26.61	17.41	34.24	17.58
	½ hourly mean	200 mg/m <sup>3</sup>	80.45		53.26		169.98		81.47	
Carbon monoxide	Daily mean	50 mg/m <sup>3</sup>	12.25	6.55	13.98	8.62	14.72	6.40	13.83	7.07
	95%ile 10-min avg	150 mg/m <sup>3</sup>	14.50		13.50		11.61		11.64	
Ammonia	Daily mean	No limit set	10.18	3.81	5.29	1.34	4.83	1.17	6.79	2.60

**Comments :**

CEMS data figures are adjusted for the method uncertainty .

Please see the Permit Compliance page for further detail on any exceedances of the ELV as identified in the table above.

Results of emissions to air that are continuously monitored (maximum and average values for each quarter for Line 2)										
Substance	Reference Period	Emission Limit Value	Q1 A2		Q2 A2		Q3 A2		Q4 A2	
			Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.
Oxides of nitrogen	Daily mean	200 mg/m <sup>3</sup>	194.33	184.62	187.05	182.08	192.65	181.69	186.52	183.11
	½ hourly mean	400 mg/m <sup>3</sup>	313.64		307.71		382.74		298.69	
Particulates	Daily mean	10 mg/m <sup>3</sup>	0.50	0.44	0.60	0.47	0.50	0.43	0.60	0.45
	½ hourly mean	30 mg/m <sup>3</sup>	0.86		1.04		1.49		1.01	
Total Organic Carbon	Daily mean	10 mg/m <sup>3</sup>	0.47	0.16	0.33	0.14	0.50	0.11	0.42	0.23
	½ hourly mean	20 mg/m <sup>3</sup>	4.77		3.03		30.50		1.90	
Hydrogen chloride	Daily mean	10 mg/m <sup>3</sup>	9.76	8.35	9.29	8.35	9.05	7.38	9.43	8.58
	½ hourly mean	60 mg/m <sup>3</sup>	22.74		26.12		16.57		38.62	
Sulphur dioxide	Daily mean	50 mg/m <sup>3</sup>	30.16	13.52	24.56	13.29	44.13	14.82	30.36	18.99
	½ hourly mean	200 mg/m <sup>3</sup>	56.66		88.93		42.51		96.37	
Carbon monoxide	Daily mean	50 mg/m <sup>3</sup>	28.10	6.97	23.16	7.13	109.53	10.82	17.52	10.73
	95%ile 10-min avg	150 mg/m <sup>3</sup>	15.02		12.53		36.97		18.68	
Ammonia	Daily mean	No limit set	2.66	1.45	3.76	1.63	14.22	3.79	12.27	4.16

**Comments :**

CEMS data figures are adjusted for the method uncertainty .

Please see the Permit Compliance page for further detail on any exceedances of the ELV as identified in the table above.