

Annual performance report for: Equitix ESI CHP (Nottingham) Limited; Widmerpool Biomass Power Plant

Permit Number: EPR/QP3936AX

Year: 2018

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.

1. Introduction

Name and address of plant	Widmerpool Biomass Power Plant Fosse Way Widmerpool Nottingham NG12 5PS
Description of waste input	Waste wood
Operator contact details if members of the public have any questions	Mr Paul Ireland Equitix Limited Welken House 10 – 11 Charterhouse Square London EC1M 6EH Switchboard: 020 7250 7333

2. Plant description

The installation is located on the John Brook saw Mill site, adjacent to the A46 Fosse Way near Widmerpool, Nottinghamshire. The installation is surrounded on all sides by agricultural land. The nearest residential properties are a farm house situated approximately 200 m to the south and west of the development site. There are a number of local wildlife sites within 2 km of the installation.

The biomass plant incinerates waste wood, using moving grate technology. There is one release point to air (A1) via a 37 m stack. Emissions released from this point will undergo the following gas abatement prior to discharge:-

- SNCR (Selective Non-Catalytic Reduction) for reduction of NO_x (Oxides of Nitrogen) using urea,
- Acid Gas Abatement (injection of dry lime),
- Activated Carbon (injected upstream of the fabric filter) for metals and dioxins, and
- Advanced bag (fabric) filter for particulate matter (and air pollution control (APC) residues).

Effluent from the process (made up of boiler blowdown and effluent from the reverse osmosis system) will be treated on site then transferred to the surface water drainage system that drains to the Fairham Brook. There will also be a discharge of uncontaminated surface water from roofs, roadways and hardstanding areas.

The biomass plant is designed to generate 6.7 MW_e of electricity of which 5.7 MW_e will be available for export to the grid. In addition, the plant will provide 4.5 MW_{th} of process heat for use by a virgin timber drying plant to be developed separately on adjoining land. The installation will burn waste wood and is limited to 70,000 tonnes per year.

3. Summary of Plant Operation

Waste wood (biomass) received	25,107.42 tonnes
Total waste received	25,107.42 tonnes
Total plant operational hours	4187.5 hours
Total hours of "abnormal operation" (see permit for definition)	One abnormal occurrence, involving issues with the Lime dosing system. Plant output reduced between 06:00 until 23:00 on 17/12/18 to ensure no emissions breach. 10.2 hours equivalent loss.
Total quantity of incinerator bottom ash (IBA) produced	855.31 tonnes
Disposal or recovery route for IBA	Landfilled (D1)
Did any batches of IBA test as hazardous? If yes, state quantity	All (175 of 175)
Total quantity of air pollution control (APC) residues produced	269.32 tonnes
Disposal or recovery route for APC residues	Landfilled (D1)
Total electricity generated for export to the National Grid	23,338.6492 MWh

4. Summary of Plant Emissions

4.1 Summary of continuous emissions monitoring results for emissions to air

The following charts show the performance of the plant against its emission limit values (ELVs) for substances that are continuously monitored.



Monthly emissions summary



Monthly emissions summary incl half-hourly

Line 1 - Hydrogen Chloride

Pinnacle Power Ltd
Widmerpool

EPR/QP3936AX

Annual Reporting of Continuously Monitored Emissions to Air for HCl, Emission Point Report for 2018

30 mg/Nm³



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
--- 30 min ELV	90	90	90	90	90	90	90	90	90	90	90	90
— Monthly 1/2 hr Mean.	-	-	-	-	12.1	11.2	11.3	11.7	11.5	11.4	12.9	12.9
■ Monthly 1/2 hr Max	-	-	-	-	40.6	26.3	33.1	26.8	18.7	22.8	29.5	55.5
--- Daily ELV	15	15	15	15	15	15	15	15	15	15	15	15
— Daily Mean	-	-	-	-	11.8	11.2	11.3	11.7	13.0	11.4	12.9	12.9
▲ Daily Max	-	-	-	-	15.7	13.4	14.4	14.1	14.0	14.0	14.3	14.1

Signature _____
Authorized Representative

Date _____

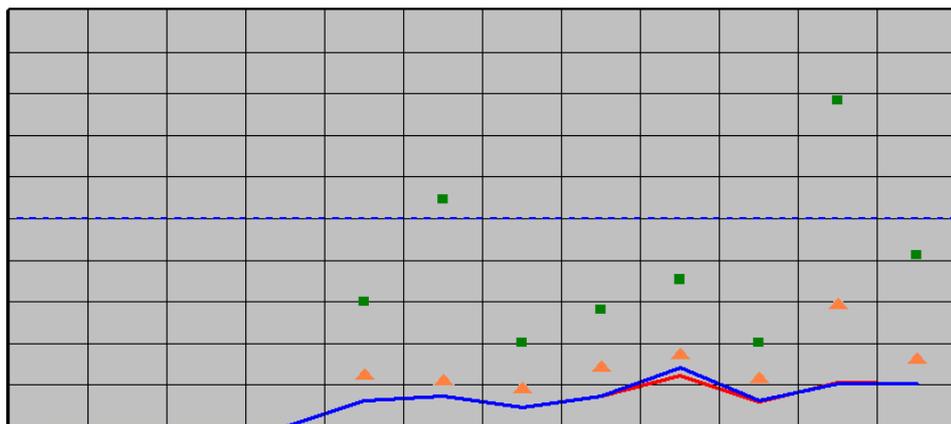
Line 1 – Sulphur Dioxide

Pinnacle Power Ltd
Widmerpool

EPR/QP3936AX

Annual Reporting of Continuously Monitored Emissions to Air for SO₂, Emission Point Report for 2018

150 mg/Nm³



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
--- 30 min ELV	300	300	300	300	300	300	300	300	300	300	300	300
— Monthly 1/2 hr Mean.	-	-	-	-	9.6	10.9	7.0	10.9	18.4	8.9	15.9	15.6
■ Monthly 1/2 hr Max	-	-	-	-	45.1	81.8	30.4	42.4	53.0	30.3	117.5	62.0
--- Daily ELV	75	75	75	75	75	75	75	75	75	75	75	75
— Daily Mean	-	-	-	-	9.5	11.0	7.0	11.0	21.4	9.4	15.7	15.6
▲ Daily Max	-	-	-	-	18.0	15.9	13.1	20.8	25.3	16.6	43.5	23.8

Signature _____
Authorized Representative

Date _____

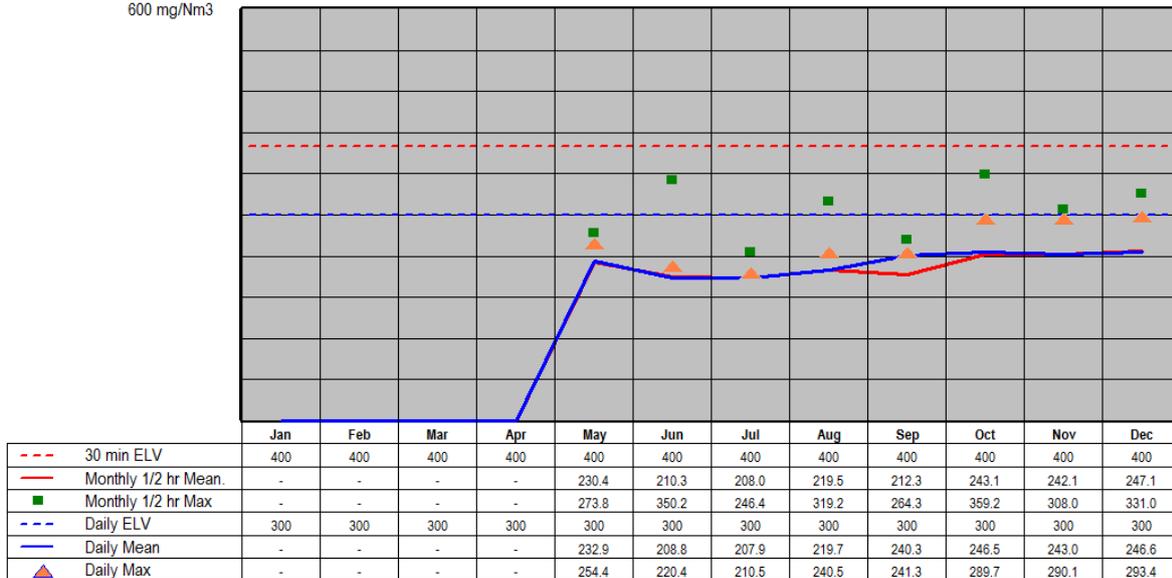
Line 1 – Oxides of Nitrogen

Pinnacle Power Ltd
Widmerpool

EPR/QP3936AX

Annual Reporting of Continuously Monitored Emissions to Air for NO_x, Emission Point Report for 2018

600 mg/Nm³



Signature _____
Authorised Representative

Date _____

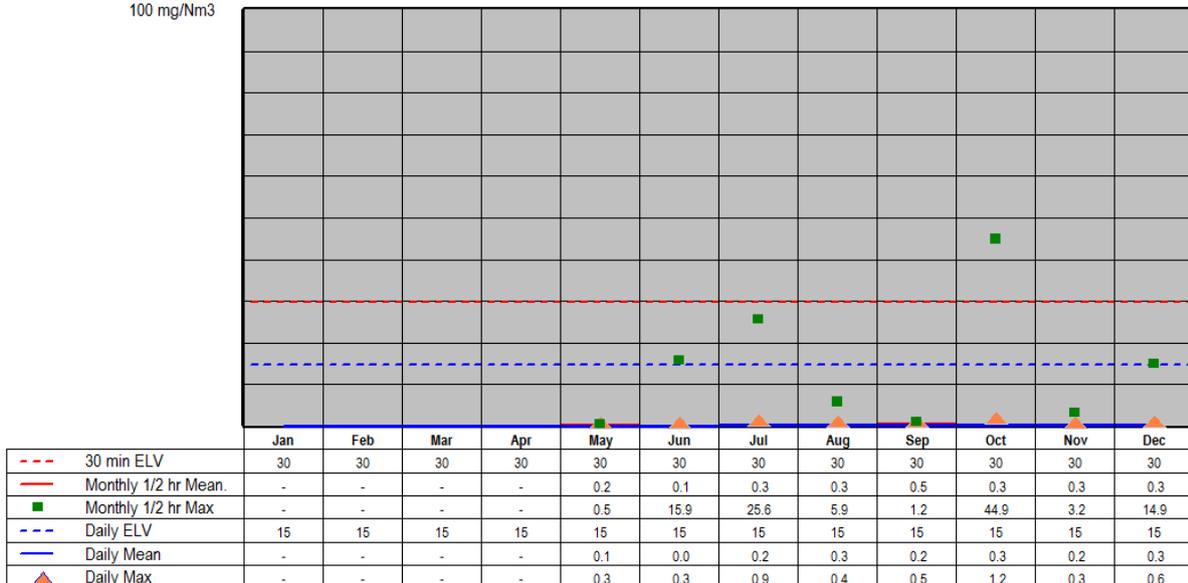
Line 1 – Total Organic Carbon

Pinnacle Power Ltd
Widmerpool

EPR/QP3936AX

Annual Reporting of Continuously Monitored Emissions to Air for TOC, Emission Point Report for 2018

100 mg/Nm³



Signature _____
Authorised Representative

Date _____

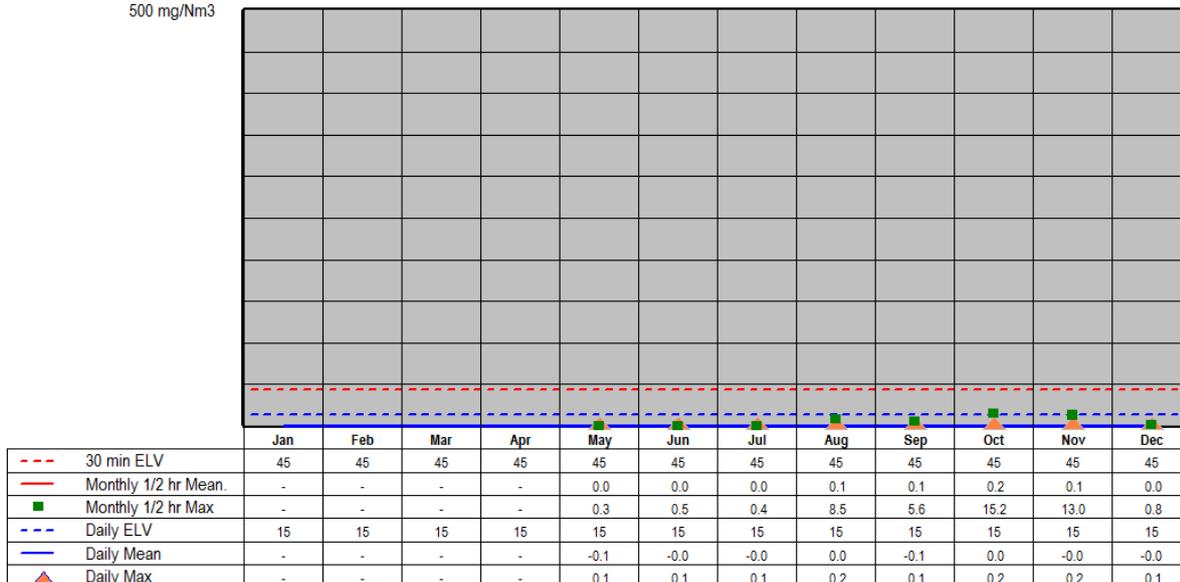
Line 1 – Particulates

Pinnacle Power Ltd
Widmerpool

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Annual Reporting of Continuously Monitored Emissions to Air for Dust, Emission Point Report for 2018

500 mg/Nm3



Signature _____
Authorized Representative

Date _____

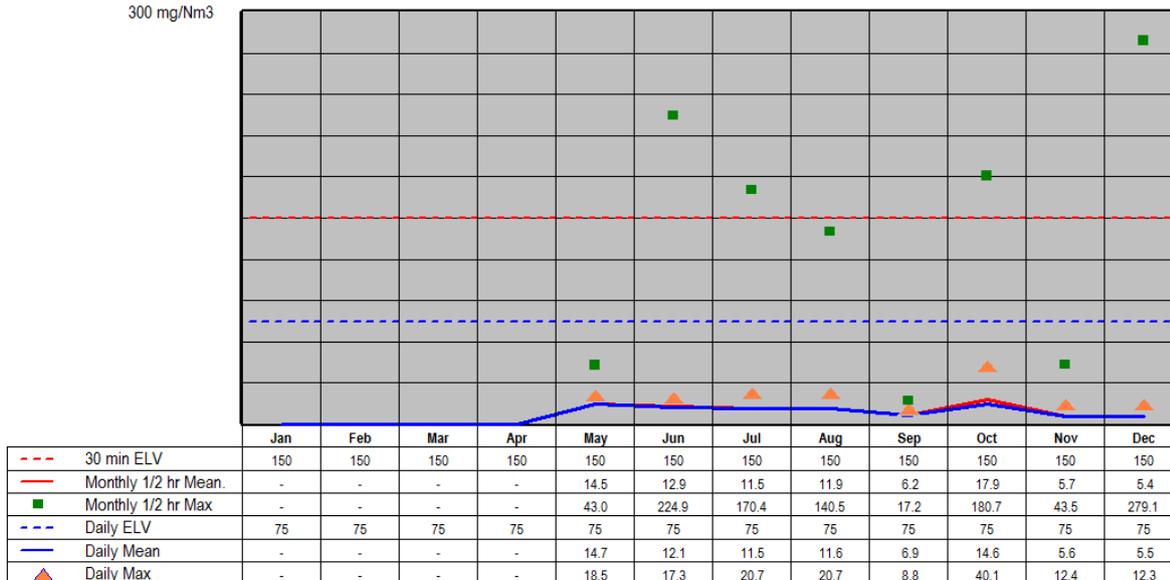
Line 1 – Carbon Monoxide

Pinnacle Power Ltd
Widmerpool

EPR/QP3936AX

Annual Reporting of Continuously Monitored Emissions to Air for CO, Emission Point Report for 2018

300 mg/Nm3



Signature _____
Authorized Representative

Date _____

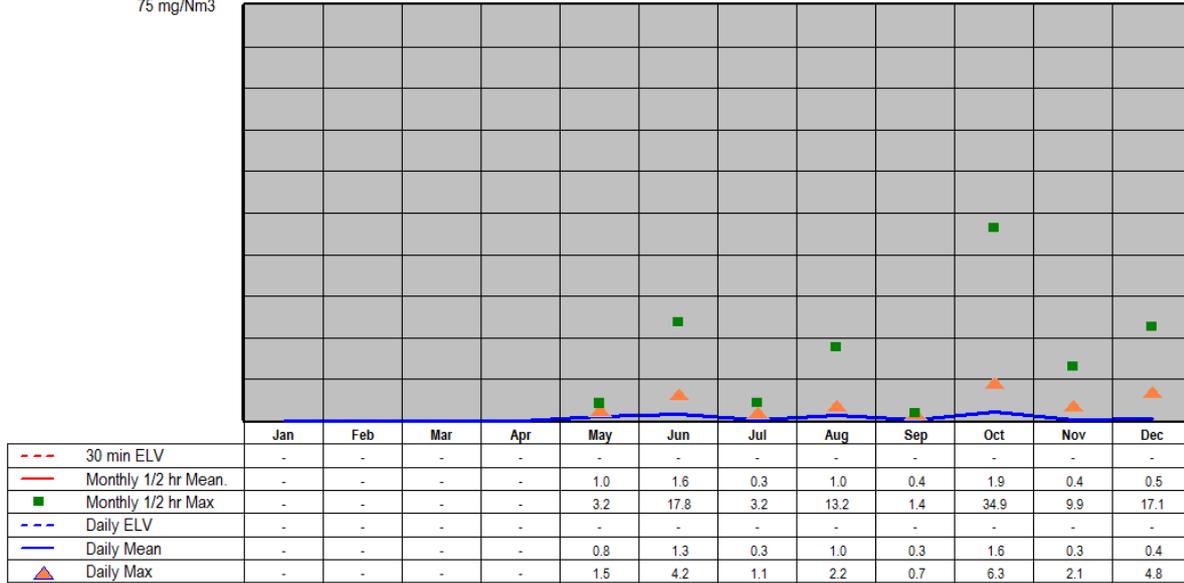
Line 1 – Ammonia

Pinnacle Power Ltd
Widmerpool

EPR/QP3936AX

Annual Reporting of Continuously Monitored Emissions to Air for NH₃, Emission Point Report for 2018

75 mg/Nm³



Signature _____

Authorised Representative

Date _____

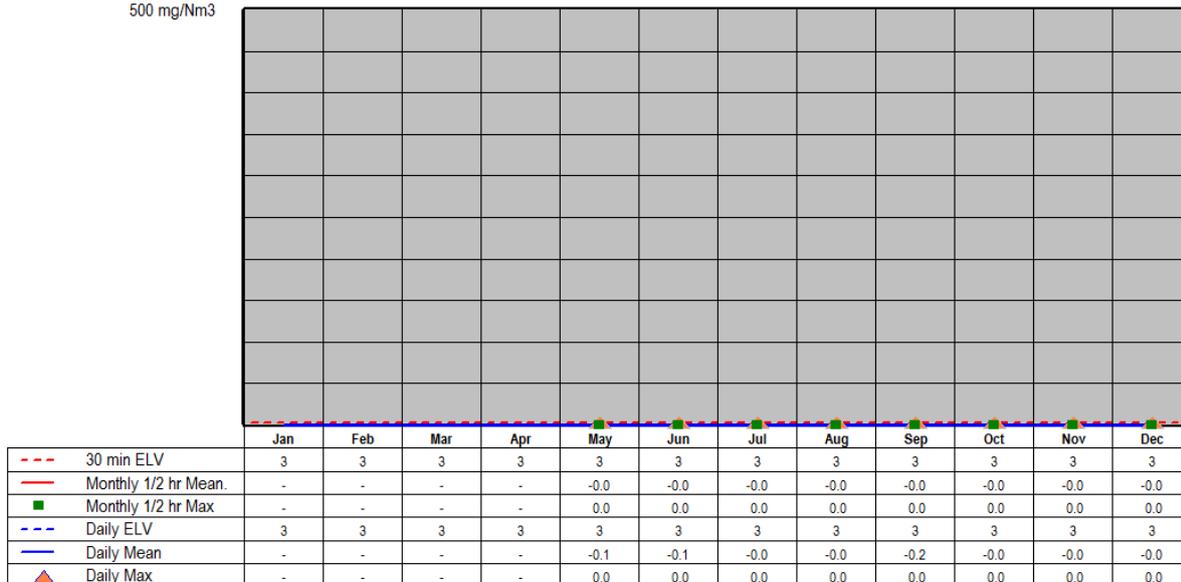
Line 1 – Hydrogen Fluoride

Pinnacle Power Ltd
Widmerpool

EPR/QP3936AX

Annual Reporting of Continuously Monitored Emissions to Air for HF, Emission Point Report for 2018

500 mg/Nm³



Signature _____

Authorised Representative

Date _____

4.2 Summary of periodic monitoring results for emissions to air

The table below shows the results of periodically monitored substances.

Substance	Emission limit value	Results	
		10-12/10/2018	17-18/12/2018
Mercury and its compounds	0.05 mg/m ³	0.0006 mg/m ³	0.0013 mg/m ³
Cadmium & Thallium and their compounds (total)	0.05 mg/m ³	0.0015 mg/m ³	0.0031 mg/m ³
Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.5 mg/m ³	0.15 mg/m ³	0.144 mg/m ³
Dioxins and Furans (I-TEQ)	0.1 ng/m ³	0.2569 ng/m ³	0.0347 ng/m ³
Hydrogen Fluoride	3 mg/m ³	1.3 mg/m ³	0.54 mg/m ³

4.3 Summary of monitoring results for emissions to water

The following table summarises the available spot sample results of monitoring of emissions to water for each month.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily/monthly ELV (mg/m ³)	30 mg/l Suspended Solids (monthly spot sample)											
Monthly maximum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10	< 5	5	7

5. Summary of Permit Compliance

5.1 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	99.88 %	100 %
Total Organic Carbon	99.98 %	100 %
Hydrogen Chloride	100 %	98.38 %
Hydrogen Fluoride	100 %	100 %

5.2 Summary of any notifications or non-compliances under the permit

Date	Summary of notification or non-compliance	Reason	Measures taken to prevent reoccurrence
25/05/2018	Breach of daily average ELV for HCl (15 mg m^{-3}). Daily average = 15.7 mg m^{-3} .	Extended cleaning period resulted in Lime injection being off for longer than intended and an elevated emission of HCl.	Consideration of appropriate spares to enable swift replacement where required.
07/06/2018; 20:29	Breach of 30-minute ELV for CO (90 mg m^{-3}). 30-minute discharge of 173.8 mg m^{-3} CO.	Biomass feed blockage.	Adjustments to feed system, and fuel mixing / de-compaction to ease flow.
08/06/2018; 21:29	Breach of 30-minute ELV for CO (90 mg m^{-3}). 30-minute discharge of 224.9 mg m^{-3} CO.	Biomass feed blockage.	Adjustments to feed system, and fuel mixing / de-compaction to ease flow.
20/06/2018; 00:59	Breach of 30-minute ELV for CO (90 mg m^{-3}). 30-minute discharge of 470.1 mg m^{-3} CO.	Operator error – inclusion of incorrect set-point resulting in momentary disruption to the combustion system.	Training improvements.
25/07/2018; 22:59	Breach of 30-minute ELV for CO (90 mg m^{-3}). 30-minute discharge of 170.4 mg m^{-3} CO.	A false alarm of a level sensor stopped the feed system, disturbing the combustion control.	Regular scheduling of planned cleaning operations to prevent false alarm.
02/10/2018	Breach of daily average ELV for HCl (15 mg m^{-3}). Daily average = 15.6 mg m^{-3} .	Valve on air supply line was partially closed during maintenance and reduced the transportation of reagent on start-up.	Increase pre-start checks after shut-downs.
25/10/2018; 09:59 and 10:59 respectively	Breach of 30-minute ELV for CO (90 mg m^{-3}) and TOC (30 mg m^{-3}). 30-minute discharges of 180.7 mg m^{-3} CO and 44.9 mg m^{-3} TOC.	A limit switch sensor on one side of the moving grate was faulty, resulting in false readings and triggering a stop of the fuel feed, which is highly disruptive for combustion control.	Replacement of the sensor.
10/10/2018; 12:42 - 18:42 (360 minutes)	Exceedance of Dioxin and Furan emissions during periodic monitoring. ELV = 0.1 ng m^{-3} . Measured discharge = 0.2569 ng m^{-3} .	Exceedance identified at reporting.	Increase Activated Carbon dosing and determine whether the set point requires permanent adjustment.
11/12/2018; 15:59	Breach of 30-minute ELV for CO (90 mg m^{-3}). 30-minute discharge of 266.3 mg m^{-3} CO.	A diesel hose leak on the post combustion burner resulted in a small fire.	Installation of new higher rated hoses with protective sleeves on both diesel burners.

Note that one additional notification was made but is considered to have been made in error as follows:

12/06/2018 Breach of 30-minute ELV for CO (90 mg m^{-3}) Invalid / non-reportable result from CEMS

This result was reported using the Schedule 5 Notification form, but is recorded as an invalid result on the CEMS system.

On 15/11/2018 the plant ran for a 7 – 8 hour period, with the CEMS recording valid data between 15:29 and 22:29. If these 15 logs were to be applied as a daily average, then the HCl emission would exceed the daily limit (discharging an average of 15.5 mg m^{-3} over the 7 – 8 hour period). However, as the period of valid monitoring is only one-third of the daily averaging period, it is not considered appropriate to assess against the longer-term average emission limit value.

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

Date of complaint	Summary of complaint	Reason for complaint including whether substantiated by the operator or the EA	If substantiated, measures to prevent reoccurrence
None			

6. Summary of plant improvements

Summary of any permit improvement conditions that have been completed within the year and the resulting environmental benefits.
None
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.
None

Annual assessment of production / treatment and performance parameters (Permit Tables S4.2 and S4.3)

Table S4.2: Annual production / treatment		
Parameter	Total (2018)	Units
Total wood waste co-incinerated	25,107.42	tonnes
Electrical energy produced	26,072,920.39	kWhrs
Thermal energy produced e.g. steam for export	0	kWhrs
Electrical energy exported	23,338,649.20	kWhrs
Electrical energy used on installation	837,938.10	kWhrs
Waste heat utilised by the installation	0	kWhrs
Table S4.3 Performance parameters		
Parameter	Specific consumption / production in 2018	Units
Electrical energy exported from the installation	929.55	kWhrs / tonne of waste incinerated
Electrical energy imported / used at the installation	33.37	kWhrs / tonne of waste incinerated
Fuel oil consumption	4.41	litres / tonne of waste incinerated
Mass of Bottom Ash produced	0.03407	kgs / tonne of waste incinerated
Mass of APCR produced	0.01073	kgs / tonne of waste incinerated
Mass of Other solid residues produced	0.00000	kgs / tonne of waste incinerated
Urea consumption	0.00893	kgs / tonne of waste incinerated
Activated Carbon consumption	0.00024	kgs / tonne of waste incinerated
Lime consumption	0.00321	kgs / tonne of waste incinerated
Water consumption	0.11829	m ³ / tonne of waste incinerated
Periods of abnormal operation	1 event (10.2 hours) resulting in no exceedance of emissions	Number and cumulative hours