

Annual performance report for: Birmingham Bio Power Ltd

Permit Number: EPR/HP3238ZC

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	Birmingham Bio Power Fordrough Yardly Birmingham B25 8DW
Description of waste input	Whilst the plant is permitted to receive a variety of wastes since the plant commenced generation it has processed a single feedstock; shredded pre-sorted waste wood otherwise destined for landfill.
Operator contact details if members of the public have any questions	Hannah Reynolds (Renewable Compliance Manager) M: 07717767435 E: hannahreynolds@cogenuk.com T: 01782 384898 A: Birmingham Bio Power Ltd C/O CoGen Ltd, Blythe House, Blythe Park Cresswell, Stoke on Trent, ST11 9RD

2. Plant description

Birmingham Bio Power Ltd (BBPL), operates an energy from waste (EfW) plant utilising Advanced Thermal Conversion (ATC) technology, located in Yardly, Birmingham.

The comprises of 4 gasification units which produce syngas that is fed into a single combustion chamber. The resultant combustion gases are subsequently ignited and used as a heat medium for a boiler. In the boilers the temperature is rapidly reduced through transfer of the heat energy in the gas to form steam, steam from the boiler then drives a steam turbine to generate renewable electricity which provided power for 8440 homes in 2018.

The plant has a single stack release point and uses established and proven abatement techniques to clean the combustion gases before being released to atmosphere. The plant and the abatement techniques utilised at the facility produce several residues totalling <5% (by tonnage) of the waste input, thus reducing landfill by 95%. The primary residue is bottom ash which is approximately 3%.

3. Summary of Plant Operation

Waste wood (biomass) received	53,053 tonnes
Total waste received	53,053 tonnes
Total waste processed	49,012 tonnes
Total boiler operational hours	5,681 hours
Total turbine operational hours	5,401 hours
Total hours of "abnormal operation" (see permit for definition)	4 hours
Total quantity of incinerator bottom ash (IBA) produced	1,689 tonnes
Disposal or recovery route for IBA	As most of the containments within the waste feedstock are concentrated into the IBA it is a hazardous waste. As such there is not currently a recycling route for the IBA. The current disposal route is hazardous landfill.
Did any batches of IBA test as hazardous? If yes, state quantity	Yes, all IBA produced by the facility is hazardous.
Total quantity of air pollution control (APC) residues produced	641 tonnes
Disposal or recovery route for APC residues	Air Pollution Control residue is a bi-product of Hydrogen Chloride and Sulphur emission abatement. As such the residue contains very high levels of chloride and sulphate making it hazardous. The residue is treated and is then disposed of in landfill.
Total electricity generated for own-use, export to a third-party neighbour and export to the National Grid	44,719.80 MWh
Total electricity generated for export to the National Grid only.	38,824.94 MWh

4. Summary of Plant Emissions

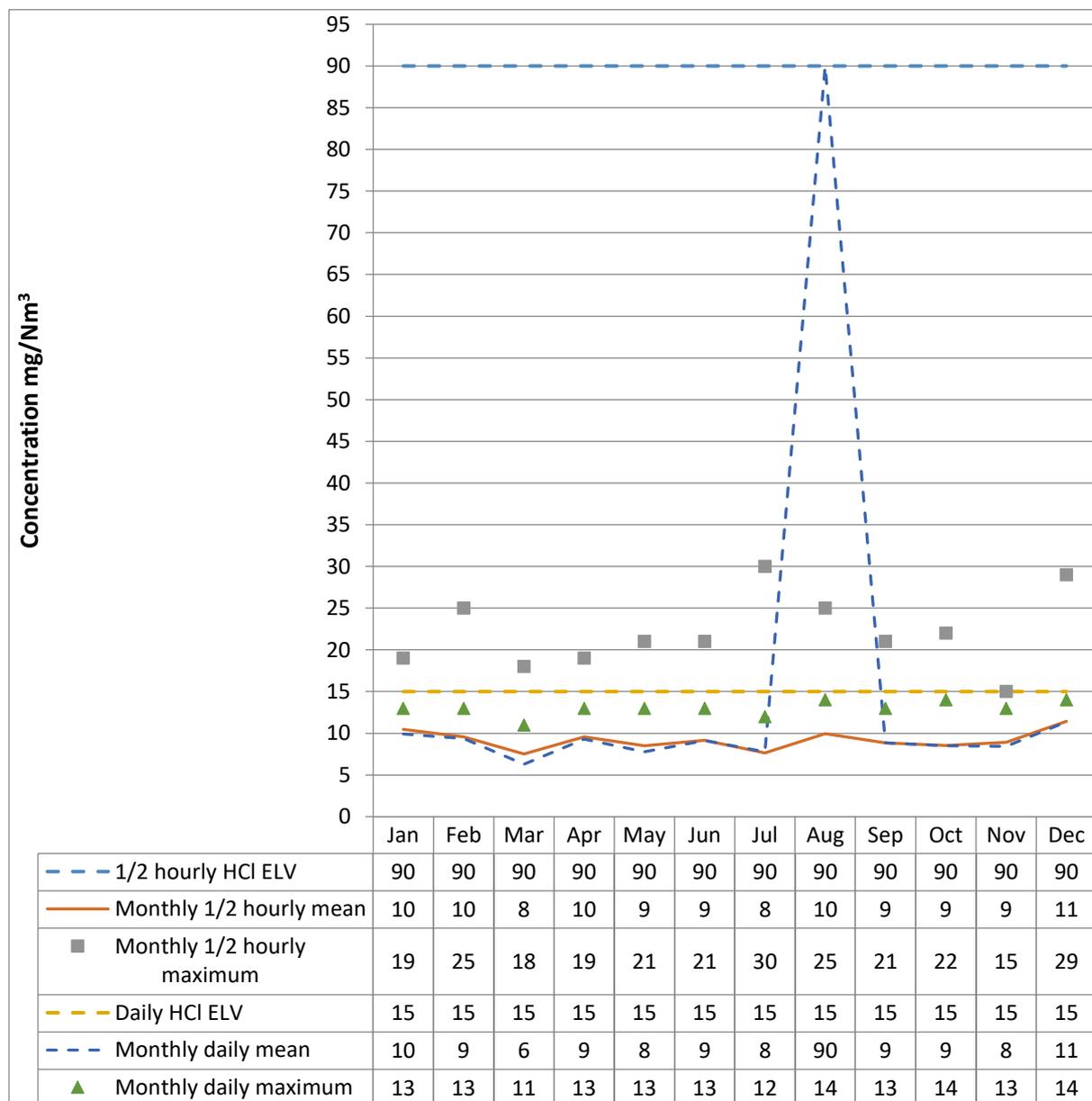
4.1 Summary of continuous emissions monitoring results for emissions to air

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



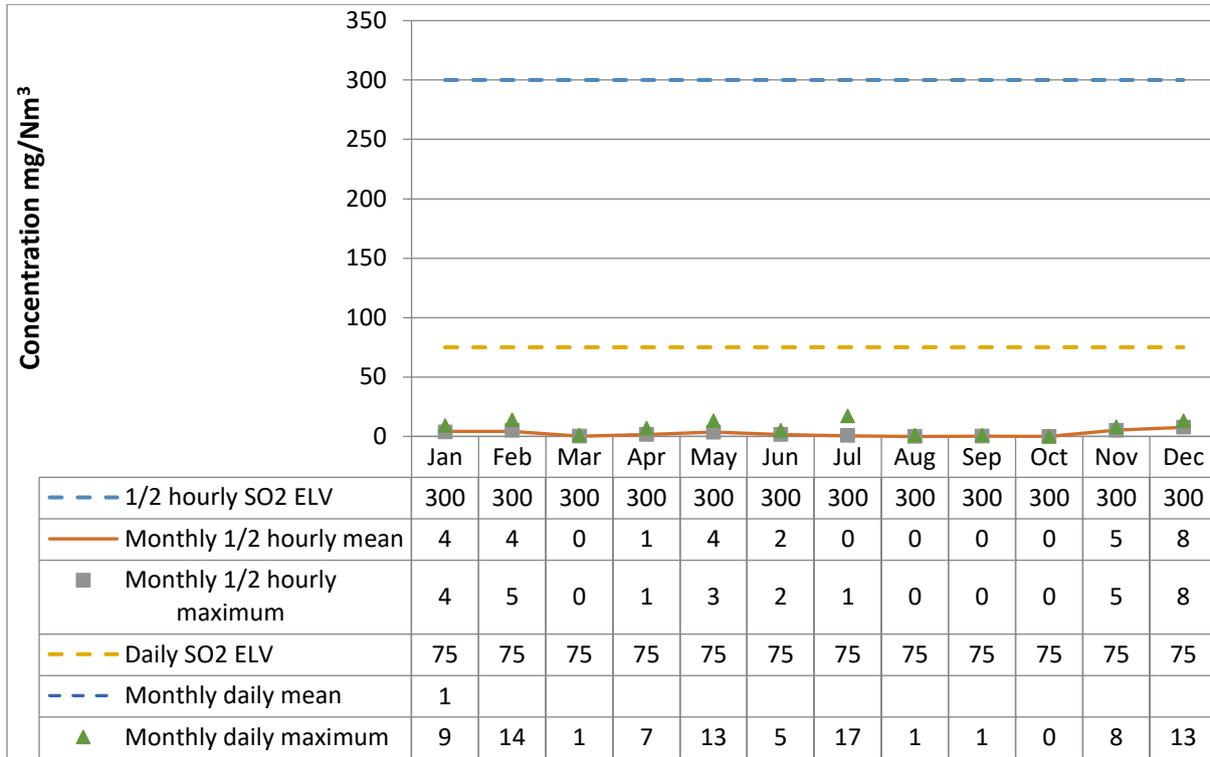
Monthly emissions summary incl half-hou

Line 1 - Hydrogen chloride

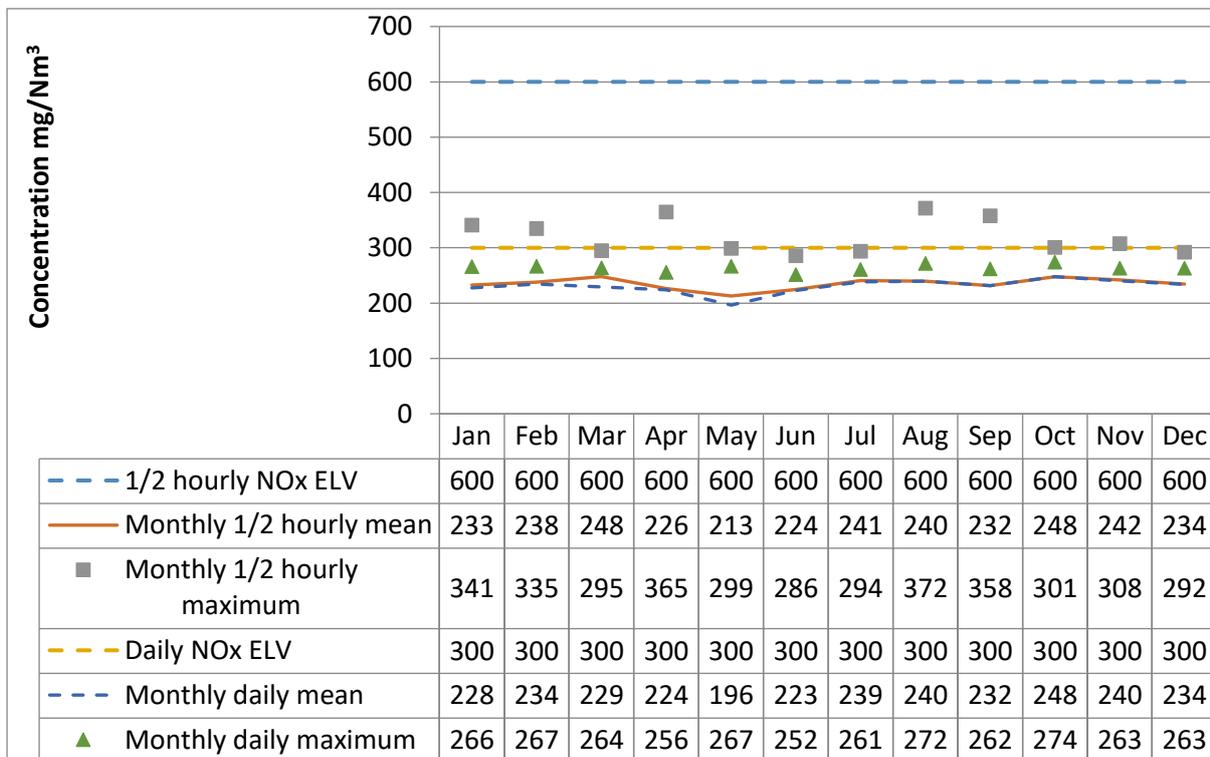


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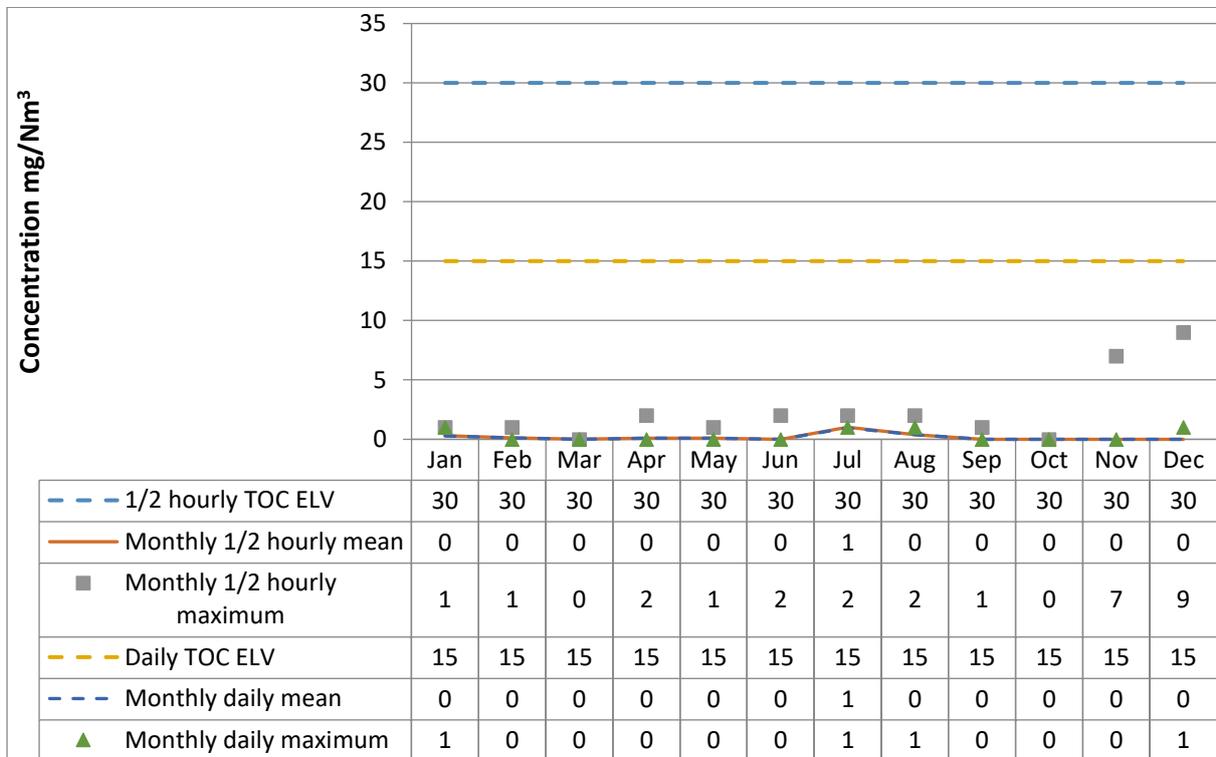
Line 1 – Sulphur dioxide



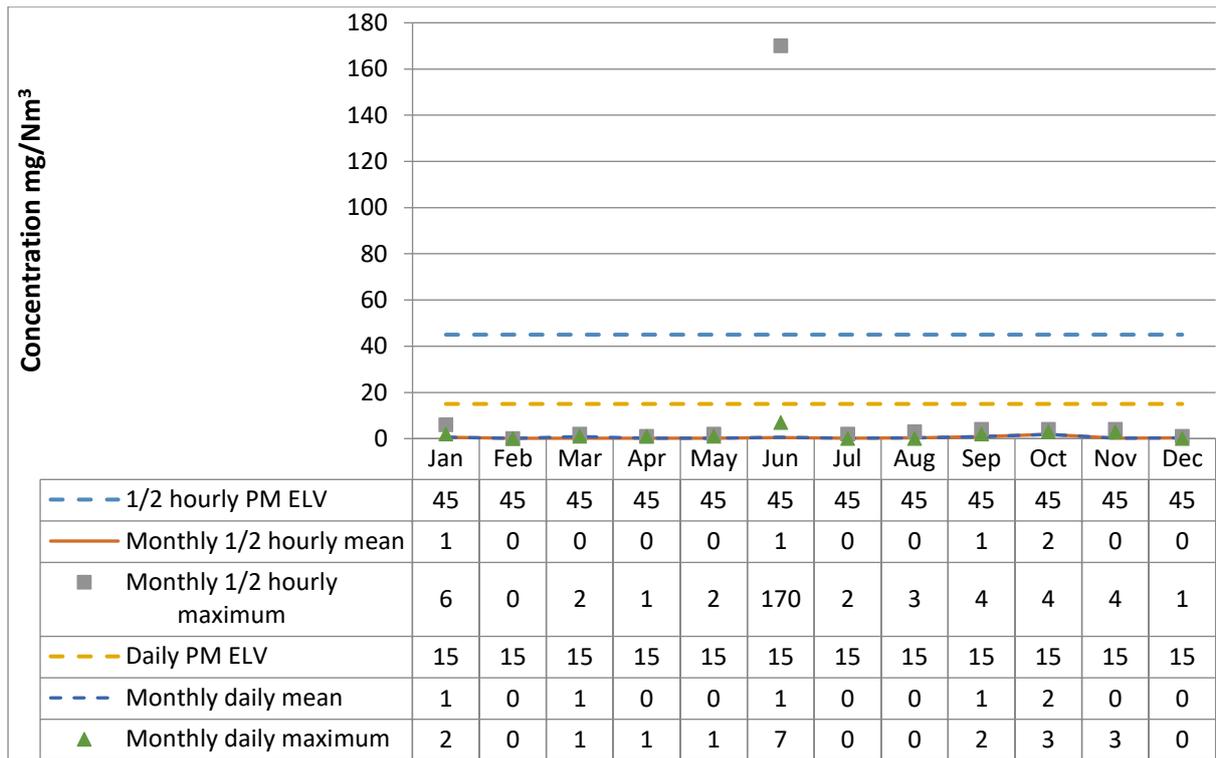
Line 1 – Oxides of nitrogen



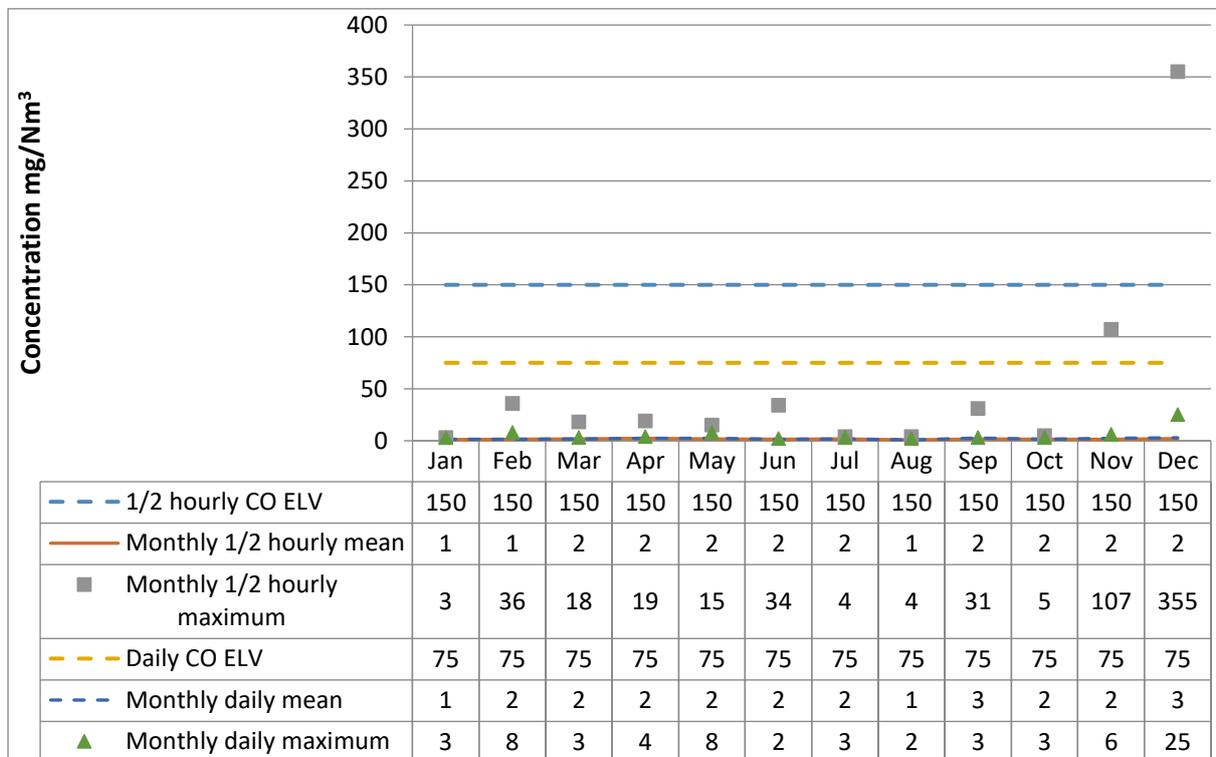
Line 1 – Total organic carbon



Line 1 – Particulates



Line 1 – Carbon monoxide



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 (Dates of monitoring campaign)		
		10-13/04/18	12/07/18	3-6/12/18
Mercury and its compounds	0.05 mg/m ³	0.001 mg/m ³		0.0008 mg/m ³
Cadmium & thallium and their compounds (total)	0.05 mg/m ³	0.001 mg/m ³		<0.001 mg/m ³
Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.5 mg/m ³	0.36 mg/m		0.0242 mg/m ³
Dioxins and furans (I-TEQ)	0.1 ng/m ³	0.12 ng/m ³	0.018 ng/m ³	0.0076 ng/m ³
Hydrogen Fluoride	2 mg/m ³	0.03 mg/m ³	X mg/m ³	0.27 mg/m ³

4.3 Summary of monitoring results for emissions to water

There are no emissions to water from the process [other than clean surface water].

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 (3.s.f.)	
	Half-hourly limit	Daily limit
Particulates	100 %	100 %
Oxides of nitrogen	100 %	100 %
Sulphur dioxide	100 %	100 %
Carbon monoxide	100 %	100 %
Total organic carbon	100 %	100 %
Hydrogen chloride	100 %	100 %
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
05/04/18	Dioxins and Furans emissions of 0.12mg/nm ³ against a limit of 0.01mg/nm ³	Notification of quarterly spot emissions testing above the permit limit but, within tolerance.	Re-testing scheduled and dosing method changed.
15/06/18	Notification for a half-hourly dust ELV exceedance	CEMs system blockage giving false readings.	Reduced MCR and stopped waste wood feed. Investigated instrumentation and bag filter outlet for any signs of dust/ burst bag. Cleaned and reinserted dust probe – readings returned to previous low level.
16/06/18	Notification for a half-hourly dust ELV exceedance		
18/06/18	Notification for a half-hourly dust ELV exceedance.		
26/11/18	CEMS in alarm and fault on fuel system meant CEMS recorded N/A rather than OFF	Faulty feed screw contactor	Replacement of contactor and increased PPM inspections
25-26/12/18	Notification for 4 half-hourly CO ELV exceedances	Exceedances following plant re-start and high moisture content waste feedstock.	Meeting held with waste feedstock supplier to address high moisture content issues which lead to waste feed system blockage and unplanned outage time.

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
The plant has not received any complaints.			

6. Summary of plant improvements

Summary of any permit improvement conditions that have been completed within the year and the resulting environmental benefits.		
Ref.	Improvement Condition	Result
IC7	The Operator shall submit a written report to the EA on the implementation of its Environmental Management System and the progress made in the certification of the system by an external body or if appropriate submit a schedule by which the EMS will be certified.	ISO 14001 audit undertaken and certification achieved.
IC8	<p>The Operator shall carry out an assessment of the impact of emissions to air of the following component metals subject to emission limit values:</p> <ul style="list-style-type: none"> - Arsenic (As) - Chromium (Cr). <p>A report on the assessment shall be made to the EA. Emissions monitoring data obtained during the first year of operation shall be used to compare the actual emissions with those assumed in the impact assessment submitted with the Application. An assessment shall be made of the impact of each metal against the relevant EQS/EAL. In the event that the assessment shows that an EQS/EAL can be exceeded, the report shall include proposals for further investigative work.</p>	<p>Exova Catalyst were commissioned by the Operator to undertake an atmospheric dispersion modelling exercise, to characterise the expected dispersion of emissions from the A1 - Main Stack at Birmingham Bio Power. Modelling results were assessed against applicable Environmental Quality Standards (EQS) for the protection of human health at identified sensitive receptors and using 5 years of local meteorological data. Consideration was also given to significant criteria in the Environment Agency's Environmental Risk Assessment Framework which gives advice on assessing the impact of releases to air. To identify sensitive receptors, careful consideration was given to the concept of relevant exposure. Areas of relevant exposure are defined as outdoor locations (which can be above or below ground) where members of the public are regularly present, and are likely to be exposed for a period of time appropriate to the EQS averaging period. Modelling results should not be compared to Environmental Quality Standards used in this modelling exercise if provisions concerning health and safety at work would apply or where members of the public would not have regular access.</p> <p>The report showed that non-maximum ground level concentrations were predicted to exceed the relevant Environmental Quality Standards (EQS) as a result of the emissions for the modelled emissions points. The highest of site process contribution and</p>

		<p>concentration was for NO₂ measured as a n annual mean, which was predicted to be 69.9% of the EQS. The location where this occurs is close to the boundary to the North East of the site. The modelled process contribution compared to the ground level concentration at this location is low with the majority coming from background sources.</p> <p>Furthermore, the report showed that ground level concentration was not predicted to exceed the relevant EQS at any of the identified sensitive receptors as a result of emissions from the modelled emission points. The highest PEC was for NO₂ measured as an annual mean, which was predicted to be approximately 68.8% of the EQS the sensitive receptor (St. Cyprians Church, Hay Mills).</p>
IC9	<p>The Operator shall conduct a review of NOx emissions from the Installation using emissions monitoring data obtained during the first year of operation. The review shall cover the following:</p> <ul style="list-style-type: none"> - A comparison of actual NOx emissions to those assumed within the application. - An updated Air Quality Report (for NOx emissions) using actual emissions data. - A re-appraisal of Best Available Techniques (BAT) for preventing, and where that is not possible minimising emissions of NOx. <p>A report detailing the review and its findings shall be submitted to the EA. Where any improvements are identified, the Operator shall submit proposals for their implementation including timescales to be agreed in writing by the EA.</p> <p>The findings shall be used to determine whether a reduction to the NOx Emission Limit Value is required.</p>	As above

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

Area	Improvement	Benefit
IT System	Supply and install BBPL platform. Procure and manage Active manuals and other support for share point transfer.	Improved Management System and environmental controls
Feedstock Handling	Install dust control curtain in feed-hall and seal conveyors. Steel fuel feed baffle plates Replace walking floor hydraulic couplings and controls to eliminate 90 degree elbows. Reroute fire pump exhaust.	Dust suppression
Feedstock Conveyors	Interlocked access hatches. Unloading conveyor sprockets, chain and distribution baffles. Elevating conveyor hinged access hatches. Elevating conveyor access walkway and access interlock.	Prevent blockages which can result in downtime and lead to emissions breaches.
Screen Area	Dust extract and treatment system.	Dust control
Oversize Conveyor	Buy the existing conveyor that's on hire. Reinstate perimeter fence	Improved residues handling
Gasification	Pile height radar lens access improvement. Reroute pressure instrument pipework. Gasifier 4 controls	Increased efficiency and thus less IBA production
Oxidiser	Make the temporary Comate dosing system permanent.	Reduced dioxins and furans emissions
Ash Conveyors	Add access hatches under each discharge hopper	Improved residues handling
Ash skips	Rental of GAPO Ask skips (x2)	Improved residues handling
Boiler	Additional cleaning ports	Increased efficiency and therefore greater electrical product and less residues removal.
Baghouse	Replacement of filter bags and cages	Improved emissions abatement efficiency resulting in lower emissions and less residues.
Lime Injection	Replace hoses and one spare.	

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

Area	Improvement	Benefit
	Additional dioxin/furan tests to verify Minsorb	
Syngas	Improve syngas cleaning system	Facilitate plant analysis and subsidies claims
ACC	Trace heat and lag	Improved efficiency
Control	Improve data communications systems - mods Implement service contract. GAP analysis and optimisation.	Improved management and controls systems.
Stock	Raise stock of lifecycle spares	Reduce downtime
Fire Suppression	Upgrade of fire suppression system.	Ensure fire management and fighting systems and BAT.