

Annual performance report for:

Equitix ESI CHP (Sheff) Limited

Holbrook Community REC

Permit Number:

EPR/EPR/VP3737RS

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	Equitix ESI CHP (Sheff) Limited Holbrook Community REC Rother Valley Way Holbrook Sheffield South Yorkshire S20 3RW
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 current permit allows for up to 55,300 tonnes of wood fuel to be imported to the site on an annual basis, which equates to an average daily fuel consumption of 168 tonnes. This amount of wood is the equivalent of 29.4 MW thermal input spread evenly across two process lines (14.7 MW each). In normal operating conditions both lines would be operating creating a total demand for the installation of 7.009 tonnes per hour of wood fuel.

As permitted, it is anticipated that approximately 52,000 Megawatt hours (MWh) of renewable electricity will be generated per annum.

A summary of the overall process is as follows:

- Lorries will deliver the pre-prepared wood chips into the fuel hall (refer Plan H40/V3/01) and will leave by site traffic management system.
- After inspection, sampling and verification, a front-end loader (FEL) will then load the wood on to the two walking floors, which will have six push rods to feed two conveyors.
- Each conveyor will feed a hopper and ram feeder at each line that further feeds fuel into each of the thermal units/boilers.

- The heat from the boiler heats a thermal oil, Therminol 66 which in turn heats the cyclopentane in a sealed heat exchanger
- The heated cyclopentane, being a very dense liquid, is vaporised and the vapours will drive the Organic Rankine Cycle (ORC) Turbine.
- The turbine in turn provides the mechanical energy to drive the electricity generator
- The cyclopentane is cooled to a liquid phase again and re-circulated into the ORC system.
- The resultant flue gasses from the thermal unit pass through an Electrostatic Precipitator, and bag filters in order to clean the emissions and remove any particulate matter prior to the exhaust gases exiting via the flue stack.

A key design consideration is the choice of thermal oil technology in which the thermal oils and cyclopentane are sealed, (PED certified closed circuit) within a low pressure systems operating at <10bar. This creates much less vibration and noise from the generation process than conventional steam driven processes.

In terms of the heat element, the CHP system has been designed to provide 1.2 MW of useful thermal energy. This is achieved by installing heat exchangers into the exhaust gas streams of both boilers to impart thermal energy into the district heating circuits. The heat element is the secondary result of the process, with the generation of electrical energy the primary output. The design of this system ensure that electricity output remains constant and is unaffected by the thermal demands of the heat supply

Summary of the year

The plant was still undergoing commissioning activities until the 29/05/2018.

It was then officially moved into its operation phase. The availability of the plant over the first two months of operation was high but the plant had to be shut down at the end of July due to external constraints (Insurance policy).

Line A restarted the 21/10 and was shutdown again the 19/12.

Line B was never restarted.

The quarterly periodic monitoring were carried out in:

June – Line A and B

September – unable to test as the 2 lines were shutdown

December – Line A only

3. Summary of Plant Operation

Waste wood (biomass) received	20,530 tonnes
Total waste received	20,530 tonnes
Total plant operational hours	Line A 4272 hours Line B 2870.5 hours
Total hours of “abnormal operation” (see permit for definition)	Line A – 16 hours Line B – 5.5 hours
Total quantity of incinerator bottom ash (IBA) produced	355.7 tonnes
Disposal or recovery route for IBA	Hazardous landfill
Did any batches of IBA test as hazardous? If yes, state quantity	All
Total quantity of air pollution control (APC) residues produced	312.4 tonnes
Disposal or recovery route for APC residues	Hazardous landfill
Total electricity generated for export to the National Grid	13,480 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.

The Continuous monitoring records have been submitted on a monthly basis on their raw format extracted from the CEMS system. The operator will use the EA template in full for the 2019 report.

4.2 Summary of periodic monitoring results for emissions to air

The table below shows the results of periodically monitored substances.

The periodic monitoring results for emissions to air have been submitted within the quarterly report through the year. The operator will use the EA template in full for the 2019 report.

4.3 Summary of monitoring results for emissions to water

The periodic monitoring results for emissions to water have been submitted within the quarterly report through the year. The operator will use the EA template in full for the 2019 report.

5. Summary of Permit Compliance

5.1 Compliance with permit limits for continuously monitored pollutants

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
08/06/18	Emissions to air from point A2 - line B flue stack CO - TOC - Dust (all 30 min ELV)	This was a result of the activation of the safety chain, resulting in the plant going onto gas (from wood). An investigation showed the likely trigger was a level switch in the emergency oil cooler bund.	The switch has been inspected and performs satisfactorily. Veolia will continue to monitor the performance of the switch
11/06/18	Emissions to air from point A2 - line B flue stack CO - TOC (all 30 min ELV) 10/06/2018 @ 17:29	This was a result of the activation of the safety chain, resulting in the plant going onto gas (from wood). An investigation showed the trigger was due to a problem with the ID fan. The fan error corrected itself and recovered within minutes	Veolia will call Siemens out to investigate this issue further
12/06/18	Emissions to air from point A2 - line B flue stack CO - TOC (all 30 min ELV) 17:29 on 11/06/18	This was a result of the activation of the safety chain, resulting in the plant going onto gas (from wood). An investigation showed the trigger was due to a problem with the ID fan. The fan error corrected itself and recovered within minutes	Siemens/Schneider are due to attend site 14/15 June2018 to rectify
12/06/18	Emissions to air from point A2 - line B flue stack CO - TOC (all 30 min ELV) 21:29 on 11/06/18	This was a result of the activation of the safety chain, resulting in the plant going onto gas (from wood). An investigation showed the trigger was due to a problem with the ID fan. The fan error corrected itself and recovered within minutes	Siemens/Schneider are due to attend site 14/15 June2018 to rectify

13/06/18	Emissions to air from point A2 - line B flue stack CO - TOC (all 30 min ELV) 12/06/2018 @ 16:29	This was a result of the activation of the safety chain, resulting in the plant going onto gas (from wood). An investigation showed the trigger was due to a problem with the ID fan. The fan was reset and recovered	Siemens/Schneider are due to attend site 14/15 June2018 to rectify
14/06/18	Emissions to air from point A2 - line B flue stack CO - TOC (all 30 min ELV) 12/06/2018 @ 19:59 to 13/06/2018 @ 04:29	This was a result of the activation of the safety chain, resulting in the plant going onto gas (from wood). An investigation showed the trigger was due to a problem with the ID fan. The fan was reset and recovered	Siemens/Schneider are due to attend site 14/15 June2018 to rectify
18/06/18	Emissions to air from point A1 - line A flue stack CO - TOC - DUST (all 30 min ELV) 17/06/2018 @ 7:29 to 17/06/2018 @ 16:00	This was a result of the activation of the safety chain, resulting in the plant going onto gas (from wood). An early investigation showed the trigger was due to a problem with low Thermal oil level alarm.	This is still being investigated by the manufacturer
28/06/18	Emissions to air from point A1 - line A flue stack CO - TOC - DUST (all 30 min ELV) 27/06/2018 @ 16:00 to 27/06/2018 @ 17:00	Turboden carried out an interrogation of trends and software to determine the cause	Veolia await a report from Turboden

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.
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The plant was taken-over the 01/06/2018 by the operator.
Since then, the following actions or retrofit have been implemented to improve the environmental performances.

ID fan – the supplier resolved the issue which was the cause of numerous trip of the ID fan line B in June 2018. Trips resulted in emergency shutdown with combustion disruption and short terms breaches of ELV for CO and TOC.

In addition, the operator is investigating a modification to improve the control of the Urea injection and improve the performance of the SNCR (reducing the risk of ammonia slip)

During the period, the improvement conditions number 3 (commissioning report) and number 9 (dioxins testing) have been discharged.

The other Improvement Conditions set out in the environmental permit have been either submitted in draft or an extension of time has been agreed. This was necessary due to the limited operating time since the beginning of operation.

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.
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None

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

The operator is investigating a modification to improve the control of the Urea dosing and improve the performance of the SNCR (reducing the risk of ammonia slip)