

Non-Technical Summary

The Environmental Permit for an advanced thermal conversion plant at Hooton Park has been approved and issued by the Environment Agency - Reference EPR/YP3039EX/A001 Hooton Park Sustainable Energy Facility.

This Environmental Permit Application for Substantial Variation allows for the revision of the technical details for the process following changes made in the development process.

Following this development process and specifically the detail design study, the plant to be installed is smaller than that originally permitted. The Application for Variation shows the reduced size and the changes to the gasification technology over that gasification technology originally proposed for installation at the plant. The new gasification technology selected is that supplied by Kobelco Japan who offer a significant number of reference plant across South East Asia. It is a proven technology utilising Best Available Techniques and already has an UK Environmental Permit reference at the same scale of operation in Walsall.

The technology of the revised development is very similar to that permitted in that it uses a Refuse Derived Fuel (RDF) fuel derived from residual waste, but has a lower design thermal input at 95MWe, lower electrical output (ca 28MWe vs 40MWe) and smaller thermal throughput (260,000tpa) than the originally permitted process. The amount of RDF material throughput has not quite dropped in proportion to the reduced electrical output owing to a contracted supply of a RDF fuel which has a lower calorific value than that originally proposed. The technology utilised remains the same as an advanced thermal conversion technology and uses broadly the same equipment as in the existing permit (specifically waste fuel preparation, waste fuel handling, gasifier, boiler, turbine, air pollution control equipment and stack) as that proposed previously to achieve compliance with the Industrial Emissions Directive. This Kobelco technology is Incineration Sector Best Available Techniques BAT with a permit reference in the UK. There will be two independent operational gasification lines with a single turbine.

The applicant and permit holder Hooton Bio Power Ltd understand that as an Environmental Permit examines the techniques and technology of an installation. It is required to detail all of details of the technology and operator in a comprehensive document detailing these design changes. This document is an application for a substantial variation to a permitted installation comprising a combustion plant, Hooton Bio Power, to be located at Eastham Wirral SJ373800.

The plant is classified as an incineration plant under the Industrial Emissions Directive 2010/75/EU and uses a refined refuse derived fuel (RDF) This is the same type of fuel and operation as the existing Environmental Permit. The listed activity relevant to the site is combustion activities under Section 5.1 A (1) (b) "The incineration of non-hazardous waste in an incineration or co-incineration plant with a capacity exceeding 3 tonnes per hour" of the Environmental Permitting (England and Wales) Regulations (2010). The plant environmental impacts will be controlled under the Waste Incineration Directive 2000/76/EC and the Industrial Emissions Directive (IED) 2010/75/EU.

Hooton Bio Power Ltd, the owner and operator, will take delivery of residual waste from specialist licensed contractor(s) and prepare a fuel product refuse derived fuel (RDF) onsite to a specification for the facility. The prepared fuel is specified with a typical dry calorific value of ca.10.5MJ/kg chlorine levels less than 1.2%. This RDF material can also be imported ready-prepared onto site to the required specification. The final prepared shredded material will then be thermally treated to create a syngas fuel (similar to town gas), mainly consisting of hydrogen and carbon monoxide as the combustible elements, before being used as the fuel in combustion tube linked to boiler and steam turbine. This allows energy recovery for both electricity and heat generation. There are two identical

independent process lines. It should be noted here that the combustion plant and the boiler of each line are inextricably linked so that neither the combustion nor heat recovery part can operate independently on a single line.

The rotating mechanical energy produced by the turbine is converted to electrical energy by the alternators for supplying to the National Grid. The plant will achieve a minimum net power output of 24 MWe (ISO conditions), for export to the adjacent Industrial Park and the National Grid. Gross power output is 28MWe. Planning permission has been granted for the development (reference number APP14/00314). The plant is classified as R3 Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes) under Directive 2008/98/EC.

The installation will import source segregated commercial and industrial waste and residual municipal derived (without putrescible material) suitable for use within the facility. This material will then be prepared to a specification appropriate for use in the facility. Significant recyclables will be recovered from this process (principally metals). The prepared RDF material will be fed into two independent lines consisting of gasifier secondary combustion chamber boiler and air pollution control equipment (APC). There is a single steam turbine generator. There will be a single emission point to air which is from a single combined exhaust stack, A1.

The installation will have one release point to the sewerage system, which will take treated process effluents including treated process liquors and boiler blow down and domestic effluent from the office facilities (S1). In addition to this there will be an uncontaminated surface water release to the local storm water drainage system (S2). There will be two on site contributions to this uncontaminated surface water release:- One will be surface run-off from the yard areas, which will go to an interceptor prior to being released to the storm drainage system; The other will be from roof water run-off which goes to a storage tank with the overflow running to pipework leading to the storm sewer. 5800m² or over 14% of the active site area is used for rainwater recovery and rainwater is reclaimed as part of a sustainable drainage system (SUDS). The majority of the roof runoff will be harvested as a sustainable source of plant water and will be used where possible within the process primarily for process and for the washing of the air-cooled condenser. These contributions join before leaving the installation as one combined release. There are no releases to land or groundwater.

The licensed site will store and handle a number of chemicals in small quantities, mainly for the treatment of the cooling tower and cooler feed water. In addition to this the installation will generate and store a number of wastes and co-products. The thermal treatment process will give rise to an inert IBA ash which as a vitrified or glassy product and is potentially used as aggregate. There will be a separate small quantity of Air Pollution Control (APC) ash residues which will be collected and disposed in an appropriate manner by licensed contractors. These remain in type and composition unchanged from that permitted.

RDF is a low dust material owing to its moisture content. Nevertheless there is a small potential for fugitive dust emissions to be generated from the handling of the prepared shredded RDF material for the thermal treatment units. The dust will be contained within the building and will be controlled via appropriate equipment design, suppression and preventative maintenance programme. Where (and when) appropriate, ventilation systems will be employed that filter air prior to emission from the building, specifically most of the reception building air is used and treated within the process.

An Application Site Report (ASR) land assessment study has been prepared for the installation and is included as part of this application, but as a separate document. This includes details of how fugitive emissions to surface water, sewer and groundwater are minimised. The plant contains a sustainable drainage roofwater collection system and will minimise water usage and reuse water wherever possible. The ASR includes a flood risk assessment even though the site is outside the flood risk area

as determined by the Environment Agency. There is a drainage plan considered for this and the future phases of the development.

Care has been undertaken in the selection of the fuel and the design and operation of the reception area such that the process is continuous.

Noise from operation has been assessed and appropriate noise control measures are planned to be in place to ensure emissions are minimised. This has been assessed through the planning process.

Hooton Bio Power through its subcontracts with the main contractor and operator BWSC intends to implement a total plant management system based upon, ISO 18001, ISO 9001 and will also be certified to ISO14001:2004. This is a similar approach to that agreed for the Wirral plant. The owner Hooton Bio Power will manage the facility through a management service agreement with CoGen.

A draft closure plan has been included. The majority of the plant construction material is suitable for reuse or recycling.

RDF throughput	260,000 tonnes wet authorised amount for thermal conversion	2*15 tonnes/hour (wet)
Operational Hours	8000 hours per annum	
Waste processed	RDF	
Number of lines	Two conversion lines each consisting of fluidised bed advanced thermal conversion gasifier unit feeding into a secondary combustion chamber, a boiler and dedicated air pollution control , single turbine genset, common multiflue stack. Ash slagging furnace to provide inert vitrified Incinerator bottom ash residue.	
Furnace technology	Gasification with vitrification of ash	
Acid gas abatement	In bed injection of limestone. Proven combustion sector best available techniques abatement (BAT) using spray dry injection of lime followed by bag filter.	
NOx abatement	Fuel preparation. Control of combustion temperatures in Two stage combustion. Low NOx combustion. Exhaust flue gas recirculation (FGR) and SNCR using aqueous ammonia installed from commissioning. These are sector BAT for process of <100MWth.	
Reagent consumption	Limestone -210 tonnes per annum	

	<p>Lime – 2700 tonnes per annum Liquid ammonia - 350 tonnes/annum. Activated Carbon – 15 tonnes per annum. Light Fuel Oil 210 tonnes per annum annum (start-up and support)</p>	
Flue gas recirculation	<p>Flue gas recirculation (FGR) in an intrinsic part of the process and gasification reaction ca 20% of flue gas flow recirculated. Also Low NOx combustion enhanced through the use of two stage combustion and using a low calorific value (CV) fuel gas, both of which contribute to the minimisation of emissions of NOx through reduction of thermal NOx generation.</p>	
Dioxin abatement	<p>High combustion efficiency. Two stage combustion including >850°C, >2 seconds residence time in secondary combustion chamber, Please refer section 18.</p> <p>Selection of fuel:- Low precursors and trace elements such as copper in waste fuel. Avoidance of boiler deposits through the use of gasification with low particulate loadings in gas, and the use of soot blowers. Avoidance of the temperature zones which lead to de-novo synthesis of Dioxins. High efficiency Bag filters and powder activated carbon injection are sector BAT</p>	
Stack	Height = 80 m	Diameter =3.6m twin flue (ID equivalent)
Flue gas	150,000m ³ /h at 128°C	Velocity, 18 m/s
Electricity generated	KWe	
Electricity exported	>23 MWe	>184,000 MW a ⁻¹
Hot water	Recirculated water TBA BWSC	TBA MWth
Water conditions	Temperature: 90 °C	Pressure: 1 bar/MPa
Waste heat use	<p>Heat will be reused to heat the process buildings and offices and the warming and drying of the feedstock. In addition, the plant will be CHP-Ready with the ability to export heat via a heat main installed to the North Road and has been considered from the earliest design phase. Vauxhall and other local industries have been contacted for heat and power take offs. The plant will be registered for RHI and CHPQA. It is classified as CHP ready in accordance with the latest Guidance. Please refer Appendix 23</p>	
Operator and permit holder	Hooton Bio Power Ltd	