BLACK BROOK CHP LIMITED
MEDIUM COMBUSTION PLANT

Process Description

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Client: Iona Capital Limited

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REPORT SCHEDULE

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Client: Iona Capital Limited

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APPENDICES

1. INTRODUCTION

1.1. Environmental Permit Application

1.1.1. Black Brook CHP Limited is making an application for an environmental permit for the Black Brook CHP Limited Medium Combustion Plant Facility to allow the operation of a Combined Heat and Power (CHP) engine with associated surplus heat boiler.

1.1.2. The plant will constitute a directly associated activity (DAA) to the main GLW Feeds Limited Section 6.8 food and drink production activity

1.1.3. The Facility will be located at and provide heat and power to the existing GLW Feeds Ltd permitted facility (reference GP3133TW).

1.1.4. The site is located at the GLW Feeds Limited, Lindum Mill, Shepshed, Loughborough, Leicestershire, LE12 9BS, NGR SK 48766 18480.

1.1.5. Planning permission for development of the MCP site was granted on 19th February 2021 ref P/20/1514/2.

1.1.6. The plant is owned and will be operated by Black Brook CHP Limited. An operations and maintenance contract will be in place with a specialist contractor (Edina Limited) who will undertake ongoing maintenance and monitoring activities as instructed by the owner permit holder.

1.1.7. The nearest SSSI's are located at approximately 250m and 1.5km from the site, although it is not anticipated that the sites will be sensitive to emissions from the CHP due to the geological nature of their designation.

1.1.8. The location of the permit boundary for the proposed CHP (MCP) site lies partly within the permitted boundary of the adjacent GLW Feeds Facility and partly without. A minor variation application has been submitted alongside this application with respect to adjustments required to the GLW Feeds permit to accommodate the addition of a new DAA as part of a multi operator installation (MOI). The area of land that will now be occupied by the CHP permitted area will be removed from the GLW Feeds boundary as part of this variation and will be taken into the permitted area of the Black Brook CHP.

1.1.9. A private foul sewer that is owned and under the control of the adjacent BOAL site is routed under the ground below the proposed location of the MCP permit.

1.1.10. This sewer is the point of discharge for boiler blowdown arising from the adjacent GLW Feeds gas fired boiler and will also be the point of discharge for boiler blowdown arising from the surplus heat boiler associated with the Black Brook CHP Limited MCP.

1.1.11. GLW Feeds Limited have a trade effluent discharge consent from Severn Trent water to discharge boiler blowdown to the main public sewer that runs beneath the A152 Ashby Road. The boiler blowdown enters the public sewer via that private sewer owned by BOAL. GLW Feeds Limited have an agreement in place with BOAL to grant access for use of their sewer in this way.

1.1.12. The trade effluent discharge consent issued by Severn Trent Water Limited is included with this document as Appendix 1, and a copy of the original email communication stream with BOAL is included as Appendix 2.

1.1.13. The GLW Feeds site operator will have access to the Black Brook CHP permitted area in order to carry out any discharge activities, and monitoring, sampling or maintenance associated with the boiler blowdown.

2. TECHNCIAL DESCRIPTION

2.1. Technical Description of Operations

2.1.1. Black Brook CHP Limited (the Operator) will operate a Combined Heat and Power (CHP) engine and associated surplus heat boiler at the GLW Feeds Limited Facility in Shepshed, Leicestershire. The surrounding area is characterised by a mixture of industrial premises, residential properties, national road networks, and countryside/farming activities.

2.1.2. The CHP engine proposed is a MWM 1560kWel gas engine with a thermal input of 3696kW. The CHP and surplus heat boiler will be located on a sealed concrete surface inside insulated containerised units in a fenced dedicated compound. The Data Sheet for the engine is provided as Appendix 3 to this document.

2.1.3. The operation is designed to receive a single fuel of natural gas only to produce heat and power to be supplied to the adjacent GLW Feeds Facility. Natural gas will be supplied directly to the facility via pipeline to the CHP engine that will produce both heat and power that will be transferred to the GLW Feeds Limited facility via direct connections. This will create improved energy efficiency at the GLW Feeds Limited site.

2.1.4. The provision of heat and power generated by a CHP engine will be beneficial to the performance indicators for GLW feeds according to the terms of the Climate Change Agreement Scheme which they are members of.

2.1.5. No waste will be processed at the site. Small volumes of waste oils, oily rags and oil filters will be stored pending removal in secure purpose provided containers that are secondary contained in the case of liquid wastes.

2.1.6. The process of the facility is set out in detail in the P&I Diagram which is attached as Appendix 4.

2.1.7. Gas quality, pressure and production will be monitored on an ongoing basis. The overall process control will have a SCADA (Supervisory Control and Data Acquisition) operation interface which will send automatic messages to operational and maintenance staff 24 hours a day if process parameters exceed given limits. The staff will have remote access to this system 24 hours a day.

2.1.8. The engine and boiler will be subject to an ongoing proactive maintenance schedule according to the manufacturer's instructions.

2.1.9. The CHP is anticipated to operate for up to 8760 hours of the year at full load. This allows for 24/7 operations, although it is likely that the CHP may only run when the GLW facility is operational equating to a reduced hours rate of 7100 per annum.

2.1.10. The CHP and boiler units will be housed in insulated containerised units. Additional measures have been installed in the form of upgrade of key noise emitting components on the CHP as follows, the container body, the inlet and outlet ventilation attenuators on the container, the exhaust silencer, and the dry air cooler. The CHP has been positioned behind the boiler unit which is adjacent to the site boundary with the intent of providing maximum noise mitigation at sensitive receptors by this layout.

2.1.11. The Operator will ensure that the emissions from the CHP exhaust shall not exceed those required in the Environmental Permit for the site. These emissions will not exceed the limits as set out in the Medium Combustion Plant Directive. The CHP will be fitted with inline gas filters to remove dust and moisture that are replaced on a routine basis.

2.1.12. The whole facility will be operated in accordance with an Environmental Management System (EMS) that will also provide details of the interface between the operations at the adjacent GLW Feeds Limited facility.

2.1.13. The interface agreement will reflect the following.

- That GLW Feeds Limited will be given access to the Black Brook CHP site to make boiler blowdown discharge to sewer, and any associated monitoring, sampling, or maintenance activities. Any direct pipework connections to allow GLW feeds discharge access will be the responsibility of GLW Feeds Limited.
- GLW Feeds Limited will oversee deliveries of raw materials to the Black Brook CHP site where these deliveries take place from a vehicle located in their permitted area during the offloading activities.
- GLW Feeds Limited will undertake daily impact monitoring assessments for potential dust, noise and odours arising from the Black Brook CHP operations as part of their whole site daily monitoring checks, since the Black Brook CHP site will not be routinely attended by staff for the duration of normal weekly working hours.
- That GLW Feeds Limited will make available necessary connections to mains services required by the Black Brook CHP to maintain operations.
- GLW Feeds Limited will retain the current gas fired boiler facility and so will have a back-up or alternative heat generation source to the Black Brook CHP. Black Brook CHP Limited will be responsible for informing GLW Feeds Limited in advance of any significant planned maintenance or operational activities that are likely to require use of temporary backup facilities at the GLW Feeds Limited site.
- Black Brook CHP Limited will be responsible for providing GLW Feeds Limited with any documentation or monitoring or measurement data that is required by the operator to fulfil any whole site review, audit, or reporting requirements. This may include data such as raw materials storage and usage and operational engine monitoring data.
- GLW Feeds Limited will have access to the Black Brook CHP Limited site in the event of any incident or accident where access is needed in order to manage, mitigate, or prevent a pollution incident from occurring.
- GLW Feeds Limited will have the responsibility to carry out maintenance and monitoring on the pipe bridge and associated pipework and connection infrastructure.

2.1.14. The document HC1671-03 Summary of the EMS sets out the monitoring procedures that will be adhered to during the life of the permit.

2.1.15. Site layout, elevations, and connection drawings with respect to the adjacent GLW Feeds Limited site are included with this document as Appendix 5.

3. BAT APPRAISAL

3.1. Best Available Techniques (BAT)

3.1.1. Pollutant emissions from combustion plant with a rated input between 1 and 50 megawatts (MWth) are regulated through the Medium Combustion Plant Directive (MCPD), as issued by the European Parliament and the Council of the European Union, 2015. The MCPD was transposed into UK law in January 2018 through an amendment to the Environmental Permitting Regulations (2018).

3.1.2. The Environmental Permitting Regulations (2018) sets emission limits to be applied from December 2018 for new plant and from 2025 or 2030 for existing plant (depending on the rated input). In addition to addressing emissions from plant with a rated input of 1 to 50 MWth, as required by the MCPD, the amendment also introduces emission limits on all generator plant <1 MWth.

3.1.3. There is no sector BREF document for MCP. On this basis the Best Available Techniques requirement is accepted as being addressed by the emission limit values in the Environmental Permitting Regulations (2018).

3.1.4. The Operator commits to meeting all required best available techniques applicable to MCPs.

3.2. Applied Processes and Techniques

3.2.1. Process. The facility proposes only to accept a single fuel of natural gas to generate power and heat for supply to the adjacent GLW Feeds Limited permitted facility.

3.2.2. Acceptance. The facility will operate the MCP in accordance with its manufacturer's instructions to meet the required emission limit values and records will be made and retained to demonstrate this. The operator will keep periods of start-up and shut down of the MCP as short as possible. There will be no persistent emission of 'dark smoke' as defined in section 3(1) of the Clean Air Act 1993.

3.2.3. The operator will manage and operate the activities:

(a) in accordance with a written management system that identifies and minimises risks of pollution, so far as is reasonably practicable, including those risks arising from operations, maintenance, accidents, incidents, non-conformances and those drawn to the attention of the operator as a result of complaints; and

(b) using sufficient competent persons and resources.

3.2.4. Records demonstrating compliance will be maintained. Any person having duties that are or may be affected by the matters set out in the conditions of the environmental permit shall have convenient access to a copy of that permit.

3.2.5. Only incidental raw materials will be stored on site for maintenance of the CHP and surplus heat boiler. No waste will be accepted or stored on site other than those generated during maintenance activities.

3.3. Processing Equipment

3.3.1. The Applicant will install a new CHP that meets all relevant emission limit values as operated in accordance with the manufacturer's guidance.

3.3.2. The equipment is designed to be high performance, providing an efficient energy and heat production for use to achieve improved energy efficiency at the adjacent site.

3.3.3. The Applicant will implement a pro-active maintenance plan (through the issue of a service and maintenance contract) to ensure that the equipment is working as required to ensure that the impact associated with the use of the plant is minimised.

3.4. The Facility

3.4.1. The facility has been designed to provide a concrete surfaced base for the CHP and surplus heat boiler within a dedicated and secure compound.

3.4.2. Any maintenance fluids will be stored in dedicated tanks inside the CHP container, and all delivery and offtake coupling points will be located within the CHP container to ensure containment in the event of any spillages during these activities.

3.4.3. Noise emissions have been considered in a Noise Impact Assessment and a report outlining the findings of this assessment is included with this application (see HC1671-0 Appendix 1 Noise Impact Assessment). The assessment demonstrates that the noise emissions form the facility are within acceptable limits. The facility upgrade measures recommended in the report will be installed at the site and these measures will ensure that noise emissions are within acceptable limits. Upgrades of key noise emitting components on the CHP will be installed as follows, the container body, the inlet and outlet ventilation attenuators on the container, the exhaust silencer, and the dry air cooler.

3.4.4. The Noise Impact Assessment has been reviewed by the local authority and accepted as part of the planning application process.

3.4.5. The facility will be operated in accordance with an Environmental Management System that identifies how the Applicant will manage potential impacts and monitor the emissions to ensure compliance with required emission limit values.

3.5. Air Quality Assessment

3.5.1. An Air Quality Impact Assessment has been undertaken to support the development of the facility and has been reviewed and accepted as part of the planning process for the facility. See HC1671-06 Appendix 2.

3.5.2. This Air Quality Assessment (AQA) considers the potential for human-health-related air quality impacts associated with the proposed operation of the Black Brook CHP Limited CHP unit.

3.5.3. The AQA identifies the CHP as having emissions that have the potential to impact on air quality. The key parameter considered is Nitrogen Dioxide. The fuel is a single fuel of natural gas only. The AQA considers all relevant guidance including the Medium Combustion Plant Directive requirements.

3.5.4. Where appropriate the assessment has followed a worst-case approach, so as not to underestimate the impacts of the proposed CHP.

3.5.5. The impacts of emissions from the proposed facility have been modelled using the ADMS-5.2 dispersion model. ADMS-5.2 is a new generation model that incorporates a state-of-the-art

understanding of the dispersion processes within the atmospheric boundary layer. The model input parameters are set out in the AQA and the model input files are provided with this application.

3.5.6. The AQA concludes that emissions from the Black Brook CHP Limited Permitted Facility, operating a 1.56MWe CHP discharging through a 22m tall stack, will not have a significant effect on local air quality.

4. RESOURCE EFFICIENCY

4.1. Resource and Energy Efficiency

4.1.1. The adjacent GLW Feeds Limited Permitted Facility is an installation, and as such the operator will need to comply with permit conditions that require measures to be taken to ensure that energy and resources are used efficiently. The operator will also need to carry out four yearly reviews to continually identify potential savings in energy efficiency on site.

4.1.2. The proposed operations have been designed to specifically deliver a more efficient way of providing heat and power to the adjacent GLW Feeds Facility and in this way is in line with the requirements of resource efficiency.

4.1.3. The generation of heat and power via a mains gas powered CHP engine will be beneficial to the performance indicators for GLW feeds according to the terms of the Climate Change Agreement Scheme which they are members of.

4.2. Energy Efficiency Measures Considered at Plant Design

4.2.1. The following Energy Efficiency Measures have been considered throughout the development of the project:

- Heat generated by the CHP will be recovered to provide heat to the adjacent permitted facility.
- Power generated from the burning of natural gas in the CHP engine will be used to provide electricity to the adjacent permitted facility.
- When purchasing plant components for the site construction, wherever possible the operator will consider purchasing the most energy efficient models where this is fit for purpose.

4.2.2. The very purpose of the facility is to offer a more efficient way of providing heat and power to the GLW Feeds Limited permitted facility and this way is considered to be in line with the requirements of resource efficiency.

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