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Consulting Engineers Limited

Killoch Energy Recovery Facility

Barr Environmental Limited

Non-Technical Summary

ENGINEERING CONSULTING

Document approval

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1 Introduction

Barr Environmental Limited (herein referred to as Barr) (the Applicant) is applying to the Scottish Environment Protection Agency (SEPA) under the Pollution Prevention and Control (PPC) regulations for a PPC permit to operate an Energy Recovery Park (ERP), (herein referred to as the Facility), in Killoch, East Ayrshire.

The Facility will comprise of an Energy Recovery Facility and associated infrastructure. The Facility will be fuelled by pre-processed municipal and commercial & industrial non-hazardous waste (herein referred to as waste).

1.1 The applicant

Barr is one of Scotland's leading waste management companies, operating a variety of waste treatment, recycling and residual disposal facilities throughout the West of Scotland. Barr's head office is located at Killoch in East Ayrshire along with the Killoch Training Centre

1.2 The site

The site on which Killoch ERF will be located is in Killoch in East Ayrshire. The site is owned by Barr's parent company, McLaughlin & Harvey Construction Ltd, from where they operate their waste management company. As part of this operation the site already has a number of buildings such as offices, workshops and labs as well as a large area of hardstanding to the west of the current buildings.

The Facility will be located at the location of an old colliery. The Facility is bounded to the north and west by a coal storage yard owned by Hargreaves and to the south by the A70. Agricultural fields lie to the east of the site. Aside from the villages of Ochiltree and Drongan and the town of Cumnock, the surrounding land is largely agricultural. The closest private dwelling is Killochside which is c.300m west of the site. There are some other scattered private dwellings nearby, the closest being c 350m from the site boundary.

1.3 The Activities

Activities covered by this application include:

1. A single line thermal treatment of waste plant processing incoming waste which is delivered to the site from off-site sources;
2. the generation of power and export to the National Grid, and the future generation of heat and export to local heat users;
3. production of inert bottom ash material that will be transferred off-site to a suitably licensed waste treatment facility for recovery/disposal; and
4. generation of an air pollution control residue that will be transferred to a suitably licensed hazardous waste facility for disposal or recovery.

The Facility includes a single waste treatment/energy recovery line, waste reception, waste storage, fuel oil storage and supply systems for auxiliary burners, water and air supply systems, facilities for the treatment of exhaust gases, on-site facilities for treatment or storage of residues and wastewater, flues, stack, devices and systems for controlling operation of the Facility, recording and monitoring conditions.

The Facility has been designed as a combined heat and power plant and will have the capacity to provide heat to local users subject to technical and economic considerations, and to supply power to both the National Grid and local users.

The Facility has been designed to thermally treat waste with a range of net calorific values (NCVs) and will have a boiler with a thermal capacity of approximately 54.3 MW_{th}. The nominal design capacity of the Facility will be approximately 18.8 tph of residual waste with a design NCV of 10.5 MJ/kg. This equates to approximately 166,000 tonnes per annum of residual waste assuming 8,760 hours availability.

An indicative process diagram for the Facility is presented in Appendix A of the supporting information.

2 Details of the Facility

2.1 Waste incineration process

A summary of the main components of the waste incineration process is presented as follows:

1. Waste will be delivered to the facility and unloaded into the waste reception bunker.
2. Waste will be transferred from the waste bunker into the feed hopper for the boiler.
3. The boiler will utilise a conventional moving grate combustion system.
4. Bottom ash from the end of the grate will be mixed with boiler ash and quenched with water to contain dust releases.
5. Emissions of nitrogen oxides will be controlled by the injection of urea solution into the combustion chamber.
6. Hot gases from the waste combustion will be passed through a boiler to raise steam. The steam will then be passed to a steam turbine to generate electricity for export to the National Grid. There will be the potential for the export of heat to local users.
7. The combustion gases will be cleaned in a flue gas treatment plant. This will include the injection of carbon, primarily to control dioxin and heavy metal emissions, the injection of lime to control acid gas emissions, and the use of a fabric filter to remove dust. Air Pollution Control residues (APCr) will be collected and transported off-site to be disposed of as a hazardous waste.
8. The cleaned exhaust gases will be released to atmosphere via a stack.

2.2 Raw materials and feedstocks

The Facility will utilise a number of different chemicals and raw materials within the different waste treatment processes. The chemicals and raw materials used at the site will include, but not be limited to, the following:

1. waste;
2. natural gas;
3. urea;
4. lime;
5. powdered activated carbon; and
6. water treatment chemicals.

These will be supplied to standard specifications offered by different suppliers. All chemicals will be handled in accordance with COSHH Regulations as part of the quality assurance procedures and full product data sheets will be made available.

Periodic reviews of all materials used will be made in the light of new products and developments. Any significant change of material, where it may have an impact on the environment, will not be made without firstly assessing the impact and seeking approval from SEPA.

In accordance with the proposed management systems for the Facility, Barr will maintain a detailed inventory of raw materials used and will have procedures for the regular review of developments in raw materials used.

2.3 Emissions

2.3.1 Emissions to air

Emissions from the thermal treatment process will be released from a 75 m stack. Detailed air dispersion modelling of emissions from the stack has been undertaken and is presented in Appendix D of the supporting information. This has demonstrated that the potential impact on local air quality as a result of the Facility is likely to be small and is unlikely to have any significant impact on the health of people living and working nearby, or the surrounding environment as a whole.

Emissions to air from the Facility will comply with the BAT AELs for a 'new facility' in the Waste Incineration BREF.

2.3.2 Emissions to water and sewer

The Facility will give rise to surface water run-off from roads, vehicle parking areas, building roofs, hard-standings and hard landscaped areas. Surface water will be discharged (via silt and oil interceptors where appropriate) into a dedicated attenuation system. The surface water will discharge to a surface water drainage culvert.

The use of rainwater harvesting will be examined during the detailed design of the Facility.

There will be no process effluent requiring discharge during 'normal' operation of the Facility. Where practicable, process effluents will be re-used within the process. In the event of excess effluents being generated, such as during periods of maintenance, the excess effluents will either be discharged to sewer in accordance with a Trade Effluent Consent or transferred off-site, via road tanker, to a suitable licensed waste management facility for further treatment.

An indicative water flow diagram for the Facility is presented within Appendix A of the supporting information.

2.4 Monitoring

There will be continuous monitoring of emissions to air from the Facility plant for oxygen, carbon monoxide, hydrogen chloride, sulphur dioxide, nitrogen oxides, ammonia, VOCs, and particulates (dust). Other pollutants will be monitored by spot measurements at regular intervals. All continuous emissions measurements will be recorded, and operators will be alerted if emissions to air approach or exceed the permitted limits.

The results of emissions monitoring will be reported to SEPA in accordance with the requirements of the PPC permit.

Solid residues generated by the Facility will be sampled on a regular basis to assess bottom ash burnout and to monitor parameters such as total organic carbon.

The Facility will utilise modern control systems, which incorporate the latest advances in control and instrumentation technology. These will be used to control operations and optimize the operation of the Facility.

2.5 Ground conditions

An Initial Site Report (Appendix B) has been developed which explains the ground conditions at the time of submission of the PPC application.

All chemicals will be stored in an appropriate manner incorporating the use of suitable secondary containment where appropriate (such as bunding) and other measures (such as acid and alkali resistant coatings) to ensure appropriate containment of chemicals. Secondary containment facilities will have capacity to contain whichever is the greater of 110% of the tank capacity or 25% of the total volume of materials being stored, in case of failure of the storage systems.

Storage facilities for chemicals will be designed in accordance with Environment Agency Pollution Prevention Guidance PPG 2, PPG 3 and PPG 18. Deliveries of all chemicals will be supervised, with chemicals transferred to suitable storage facilities. Tanker loading and off-loading will take place within areas where the drainage is contained with the appropriate capacity to contain a spill during delivery. The potential for accidents, and associated environmental impacts, is therefore limited.

Upon cessation of the activities on site, a Closure Plan will be implemented. Any pollution risks will be removed from the site, and the ground will be returned to a '*satisfactory state*'.

2.6 Technology selection

The processes have been designed in order that the objectives of the Industrial Emissions Directive (IED) are met and the Facility is capable of complying with the requirements of the BAT-AEL's as stated within the Waste Incineration BREF. Best Available Techniques will be employed for the Facility to minimize its impact on the environment.

A quantitative BAT Assessment has been completed for the proposed waste an abatement incineration technologies, refer to Appendix E of the application. This has demonstrated that the proposed techniques for the Facility will represent BAT in accordance with the Waste Incineration BREF.

2.7 Residues

The two primary solid residues generated at the Facility are as follows:

- Incinerator bottom ash (IBA); and
- Air Pollution Control residues (APCr).

It is intended that the IBA from the Facility will be transferred to an off-site IBA processing facility. If a suitable recovery facility will not accept the residue, it may be transferred for disposal in an off-site non-hazardous landfill.

APCr is classified as hazardous and requires specialist disposal or treatment. It may be possible to send the residue to a waste treatment contractor, to be used to neutralise acids and similar materials. Using the residues in this way avoids the use of primary materials. If these options are not considered to be '*available*' then it will be sent to a suitably licensed hazardous waste landfill for disposal as a hazardous waste.

2.8 Management

To ensure effective management of the Facility, Barr will ensure that the Facility is operated in accordance with a documented management system. The Environmental Management System (EMS) will be certified to the ISO 14001 standard. The management systems will be developed during the detailed design of the Facility and will clearly define the management structure for the Facility, as well as setting out the roles and responsibilities of all staff.

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