Application Support Document

Energy Ventures No1 Ltd

Selby Energy Recovery Plant

14th August 2025

Project No.: SOL_24_PO76_PCM

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Application Support Document

Selby Energy Recovery Plant

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CONTENTS

List of Tables

List of Figures

NON-TECHNICAL SUMMARY

Energy Ventures No.1 Ltd (the 'Applicant' or the 'Operator') is making a New Bespoke Installation Permit Application for the proposed operation of a newly constructed energy recovery plant at their site in Sherburn in Elmet, Leeds.

The facility is located at Aviation Road, Sherburn in Elmet, Leeds, LS25 6NF (Grid Reference: SE 51183 33256).

The proposed development is an energy recovery facility which has been designed to recover energy from Refuse Derived Fuel (RDF) and mixed municipal waste feedstocks using combustion, specifically for the production of electricity. The facility will produce a high temperature flue gas which is then used to raise steam and generate electricity, through steam cycle turbine generation.

The facility is designed to combust pre-prepared waste feedstocks for produce heat to raise steam in a conventional tube boiler for subsequent utilisation in a steam turbine for the production of renewable electrical with a gross electrical output of 25MWe.

The plant has been designed to produce a gross electrical generation of 25MWe. Approximately 13MWe will be exported to the National Grid, 3MWe will be used by the plant as parasitic load and 2MWe will be exported to the neighbouring and co-located Kingspan facility via private connection. The remaining 6MWe will be available for a future hydrogen plant, which will be addressed via a separate permit application. There will also be 3MWth available for export to the neighbouring Kingspan facility.

The Installation has been designed to process a maximum of 240,000 tonnes per annum of pre-prepared RDF and mixed municipal waste feedstocks.

The facility will be permitted by the Environment Agency as a Waste Incineration Activity and will be operated in accordance with the Environmental Permitting Regulations 2018 and Chapter IV of the Industrial Emissions Directive (IED).

The proposed process meets the definition of an Installation as defined by Section 5.1 'Incineration and Co-Incineration of Waste' paragraph A(1)(b) namely:

'The incineration of non-hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity exceeding 3 tonnes per hour.'

General Overview

Pre-prepared waste feedstock will be delivered directly to the Fuel Reception Hall, either in baled or loose form. Walking floor HGV's will reverse into the unloading lane and unload directly into the reception bunker, during which a visual inspection will take place. The reception bunker has been designed to hold 7,888m^3 / 1,972 tonnes of waste, which equates to approximately 3 days fuel supply. The bunker will be served by a dedicated crane which will mix and break up the bales, if required.

Additionally, baled RDF may be delivered to site and stored externally in the baled waste storage area in order for the plant to carry on operating during extended public and national holiday periods. Bales will be stored in four bays, each able to hold 230m^3 and have been designed to meet the EA's Fire Prevention Plan Guidance. Bales will be appropriately wrapped to ensure no possibility of odour or dust emissions and stored in an area protected by a sealed drainage system and secondary containment. Incoming waste fuel feedstocks bales will be stored for no longer than 2 months prior to use.

The bunker crane will be utilised to move, mix and feed the feedstock into the feeding hopper, which subsequently automatically calls for more RDF when required.

Feedstock is then automatically transferred into the metering bin to allow for controlled feeding into the inclined moving grate combustion system. The grate consists of three separate grate sections in longitudinal direction, cooled by air. The design of the grate ensures maximum contact between combustion air and the waste thus insuring complete and efficient combustion.

The resultant flue gas is then directed to the boiler for the generation of high pressure steam which is expanded through the steam turbine producing a gross electrical generation of 25MWe.

The combustion air for the process is taken directly from the reception bunker to facilitate odour and fugitive emissions control whilst maintaining a partial negative pressure within the reception hall.

Exhaust steam from the turbine is then sent to an air cooled condenser (ACC) to be condensed and returned to the system.

Detailed Computational-Fluid-Dynamic modelling (CFD) of the combustion process will be carried out to demonstrate complete combustion of the fuels under varying conditions and also to guarantee the 2 seconds minimum combustion time above 850°C as compliance with IED.

Flue gas cleaning and pollution control consists of Selective Non-Catalytic Reduction (SNCR) through urea injection, a dry scrubbing system incorporating sodium bicarbonate injection for acid gas neutralisation, activated carbon powder injection for absorption and removal of heavy metals, dioxins, VOCs and other harmful substances and a fabric filter for particulates removal.

Emissions to Air

All emissions to atmosphere will be via a single 50m high stack (Emission Point A1).

All combustion products / flue gases are passed through multiple gas clean up stages and abatement stages resulting in all emissions to atmosphere being comfortably within the stipulated Emission Limit Values (ELVs) within the Waste Incineration BREF.

The air emissions from the proposed development have been modelled using the UK Atmospheric Dispersion Modelling System (ADMS) dispersion model. The air quality impact assessment considered the air impact to all identified residential, sensitive habitat and ecological receptors.

It is the conclusion of the modelling that the Installation is unlikely to have a significant impact at any of the receptor locations examined and is unlikely to have a significant impact on the environment.

All of the air emissions from the Installation have been risk assessed against their potential impact on human health. The results of the assessment are that the proposed installation will not present any risk to human health.

Fugitive Emissions

Due to the design of the building structure and the fully enclosed feedstock handling activities, there is very little potential for offsite odour emissions and impacts to arise from the site.

Any internal waste unloading and storage within the Fuel Reception Hall takes place under controlled conditions. The only external storage activities relate to the storage of baled RDF waste. The potential for

odour emissions arising from the external storage of baled wastes is limited due to the strict control measures in place. No odorous wastes will be accepted on site in accordance with the sites waste acceptance procedures, all bales are required to be well wrapped and a site inspection is undertaken twice daily. Any damaged, poorly wrapped or odorous bales are immediately removed and placed internally for processing.

Entry to the Fuel Reception Hall is via fast acting electrically controlled roller shutter doors to minimise fugitive emissions. All vehicles are required to reverse into the hall and discharge directly into the reception bunker. The discharge of fuel will only take place once the roller shutter doors are closed.

The primary means of odour mitigation at the site is through the internal extraction and subsequent thermal oxidisation of air from the Fuel Reception Hall via the primary combustion air fans. The extraction ensures that the building is maintained at slight negative pressure therefore minimising the escape of odours, whilst also providing a high level of volumetric air exchange and preferential working environment.

In the event of a breakdown, the plant will be equipped with a standby carbon filtration system for use in an emergency.

Noise Emissions

The site is located in a predominantly industrial location and is not considered to be sensitive to noise. The noise mitigation strategy for the site ensures that all major plant and equipment is located within buildings designed and constructed with acoustically resilient building fabric and any key external plant and equipment (fan enclosures, flue attenuators and screens) is appropriately abated. All emergency release points and vents are appropriately controlled.

An Environmental Noise Assessment has been undertaken and concludes that there will be no significant impact to nearby sensitive receptors as a result of the installation.

Emissions to Water

There will be no direct process emissions to controlled water arising from the Installation.

Uncontaminated clean surface water runoff captured from roof drainage and external roadways / car parking areas will be discharged to the surface water drainage system (W1).

Any effluent arising from the process plant will be collected in an effluent collection tank and discharged via sewer (S1). All domestic foul effluent arisings will also be discharged via sewer.

All emissions to sewer will be monitored in line with the sites effluent discharge consent once granted.

In the event of a significant site fire, the facility has been designed to fully contain any firewater run-off. In the event of a fire within the bunker, any water from the suppression system will be contained within the bunker. The external baled area will be protected by a sealed drainage system and secondary containment which has also been designed to contain any firewater runoff. The firewater collected will be tankered off site for disposal.

Emissions to Land

There will be no emissions to land arising from the Installation.

Waste Management

There are two principal types of solid by-products produced from the operation of the combustion facility. These are:

- Bottom Ash; and
- APC Residue (Air Pollution Control (APC) residues).

The by-products will be collected in suitable sealed containers and exported off site for reprocessing / disposal.

1. INTRODUCTION

This document has been prepared on the behalf of Energy Ventures No.1 Ltd (the 'Applicant' or the 'Operator') by Sol Environment Ltd and provides supporting evidence as required by Environmental Permit Application Forms B2 and B3 issued by the Environment Agency (EA).

The Applicant is making this application for a Bespoke Part A(1) Installation Permit Application under The Environmental Permitting (England and Wales) (Amendment) Regulations 2018 for the proposed operation of an energy recovery plant.

The facility is located at Aviation Road, Sherburn in Elmet, Leeds, LS25 6NF (Grid Reference: SE 51183 33256).

The proposed development is an energy recovery facility which has been designed to recover energy from Refuse Derived Fuel (RDF) and mixed municipal waste feedstocks using combustion, specifically for the production of electricity. The facility will produce a high temperature flue gas which is then used to raise steam and generate electricity, through steam cycle turbine generation.

The facility is designed to combust pre-prepared waste feedstocks for produce heat to raise steam in a conventional tube boiler for subsequent utilisation in a steam turbine for the production of renewable electrical with a gross electrical output of 25MWe. Approximately 13MWe will be exported to the National Grid, 3MWe will be used by the plant as parasitic load and 2MWe will be exported to the neighbouring and co-located Kingspan facility via private connection. The remaining 6MWe will be available for a future hydrogen plant, which will be addressed via a separate permit application. There will also be 3MWth available for export to the neighbouring Kingspan facility.

The Installation has been designed to process a maximum of 240,000 tonnes per annum of pre-prepared RDF and mixed municipal waste feedstocks.

The main features of the proposed Installation, as described in this document are as follows:

- Fuel Reception Hall – for the delivery and reception of fuel feedstocks;
- Grate Combustion System – one incineration line for the thermal combustion of waste;
- Steam Boiler – for the production of high-pressure steam using heat recovered from the flue gases from the furnace;
- Air Cooled Condenser (ACC) – for the condensing of the exhaust steam;
- Steam Turbine Generator – comprising a steam turbine and generator for the conversion of steam into electricity; and
- Fuel Gas Treatment – consisting of Selective Non-Catalytic Reduction (SNCR) through urea injection, a dry scrubbing system incorporating sodium bicarbonate injection for acid gas neutralisation, activated carbon powder injection for absorption and removal of heavy metals, dioxins, VOCs and other harmful substances and a fabric filter for particulates removal.

The Installation will make an important contribution to regional waste management and local renewable energy generation and will provide a single treatment facility for materials that would otherwise be destined for landfill or foreign export.

The facility will be permitted by the Environment Agency as a Waste Incineration Activity and will be operated in accordance with the Environmental Permitting Regulations 2018 and Chapter IV of the Industrial Emissions Directive (IED).

The proposed process meets the definition of an Installation as defined by Section 5.1 '*Incineration and Co-Incineration of Waste'* paragraph A(1)(b) namely:

'The incineration of non-hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity exceeding 3 tonnes per hour.'

The remainder of this application support document is structured accordingly:

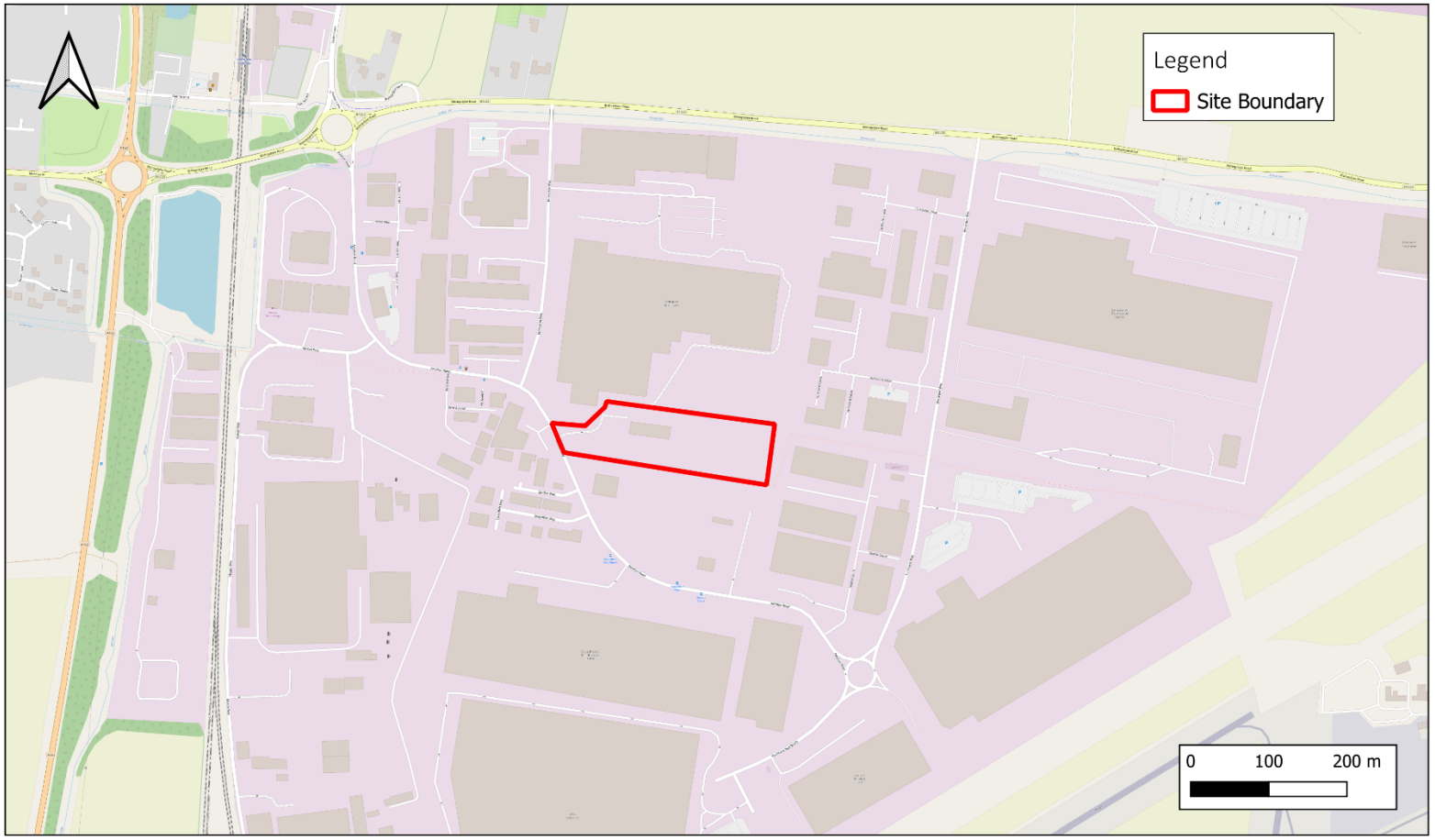
- Section 2: Provides a detailed planning history of the site and associated activities;
- Section 3: Provides specific details associated with the New Bespoke Installation Permit Application;
- Section 4: Provides specific nature and detailed description of the emissions to air, water emissions and waste associated with the Installation;
- Section 5: Provides details of all environmental monitoring associated with the Installation;
- Section 6: Provides a BAT description of the proposed technology and provides a comparison against the applicable guidance and emission limit values for the Installation; and
- Section 7: Provides an Environmental Impact and Assessment of the Installation against the requirements of the Habitats Directive.

All technical appendices associated with the Installation are included within the technical annexes and comprise the following:

- Annex A: Site Plans;
- Annex B: Technical Information;
- Annex C: Environmental Risk Assessment;
- Annex D: Air Quality Assessment and HHRA;
- Annex E: Noise Impact Assessment;
- Annex F: Site Condition Report;
- Annex G: EMS Summary;
- Annex H: Accident Management Plan;
- Annex I: Fire Prevention Plan;
- Annex J: Odour Management Plan;
- Annex K: CHP Assessment;
- Annex L: Global Warming Potential (GWP).

The site location and Installation Boundary is provided overleaf in Figure 1.1 and 1.2.

The site layout is provided in Figure 1.3.



Project Number: SOL_24_P076_PCM Map Title: Site Location Date: 23/03/2025 Drawn by: CH Checked by: SR	Site Address: Aviation Road Sherburn in Elmet Leeds LS26 6NF	1. Do not scale off this drawing 2. All dimensions to be confirmed on site 3. This drawing is copyright of Sol Environment Ltd 4. This drawing is to be read in conjunction with relevant consultant drawings and specifications 5. QMS Reference: QMS_7.5.39_TEM - Template - GIS Drawing - Horizontal v1

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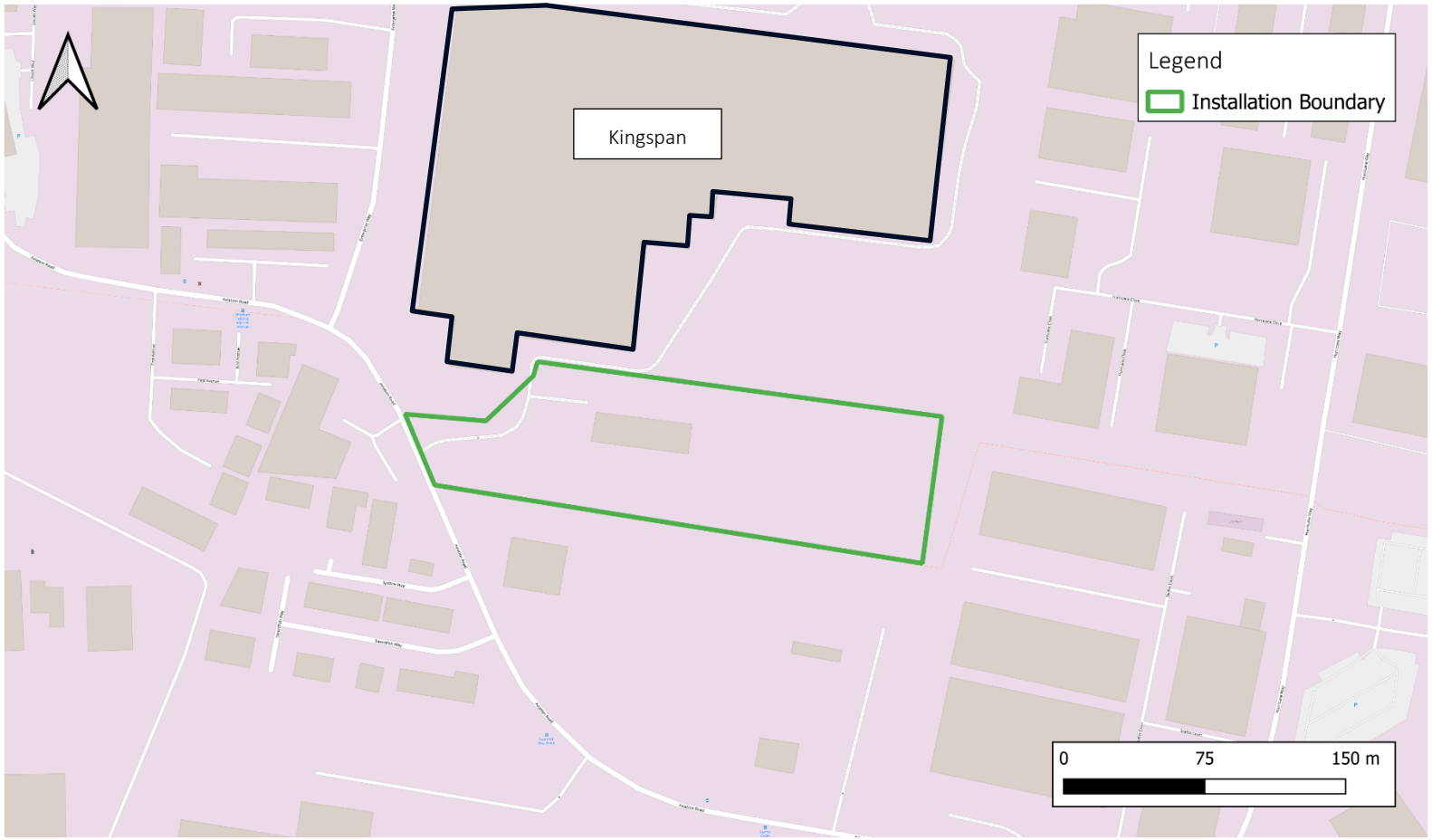
Figure 1.1 – Site Location



Project Number: SOL_24_P076_PCM Map Title: Installation Boundary Date: 23/03/2025 Drawn by: CH Checked by: SR	Site Address: Aviation Road Sherburn in Elmet Leeds LS26 6NF	1. Do not scale off this drawing 2. All dimensions to be confirmed on site 3. This drawing is copyright of Sol Environment Ltd 4. This drawing is to be read in conjunction with relevant consultant drawings and specifications 5. QMS Reference: QMS_7.5.39_TEM - Template - GIS Drawing - Horizontal v1

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Figure 1.2 – Installation Boundary

Figure 1.3 – Site Layout Plan (labelled version shown in Annex A)

2. PLANNING STATUS

The site benefits from existing planning determined by North Yorkshire Council.

Please refer to Table 2.1 below for details pertaining to all known planning permissions.

Table 2.1 – Planning History

Reference	Description	Status	Date Granted
2021/1402/S73	Section 73 application to vary conditions 02 (approved plans), 14 (vehicle access, parking, manoeuvring and turning areas) and 22 (refuse derived fuel fired combined heat and power plant) of approval 2020/0355/S73 Section 73 application to vary/remove condition 02 (approved plans) of planning permission reference 2018/0898/EIA Section 73 application to vary condition 02 of approval 2016/1456/EIA Proposed Installation of a Refused Derived Fuel (RDF) fired Combined Heat and Power (CHP) plant with 8000m^2 Factory Extension and Associated Infrastructure granted on 03 April 2019 granted on 12 February 2021	Granted	24/03/2022
2020/0829/S73	Section 73 application to vary condition 04 and 05 of planning permission 2018/0898/EIA Section 73 application to vary condition 02 of approval 2016/1456/EIA Proposed Installation of a Refused Derived Fuel (RDF) fired Combined Heat and Power (CHP) plant with 8000m2 Factory Extension and Associated Infrastructure granted on 03.04.2019	Granted	02/02/2021
2020/0355/S73	Section 73 application to vary/remove condition 02 (approved plans) of planning permission reference 2018/0898/EIA Section 73 application to vary condition 02 of approval 2016/1456/EIA Proposed Installation of a Refused Derived Fuel (RDF) fired Combined Heat and Power (CHP) plant with 8000m2 Factory Extension and Associated Infrastructure granted on 03 April 2019	Granted	12/02/2021
2020/0247/S73	Section 37 application to vary condition 18 of approval 2018/0898/EIA Section 73 application to vary condition 02 of approval 2016/1456/EIA Proposed Installation of a	Granted	24/02/2021

	Refused Derived Fuel (RDF) fired Combined Heat and Power (CHP) plant with 8000m2 Factory Extension and Associated Infrastructure		
2018/0898/EIA	Section 73 application to vary condition 02 of approval 2016/1456/EIA Proposed Installation of a Refused Derived Fuel (RDF) fired Combined Heat and Power (CHP) plant with 8000m^2 Factory Extension and Associated Infrastructure	Granted	03/04/2019
2016/1456/EIA	Proposed Installation of a Refused Derived Fuel (RDF) fired Combined Heat and Power (CHP) plant with 8000m2 Factory Extension and Associated Infrastructure	Granted	09/12/2016

3. PROPOSED ACTIVITIES

3.1 Type of Permit

The Applicant is making an application for a Bespoke Installation Permit for the proposed operation of an energy recovery plant located at Aviation Road, Leeds.

The Installation will typically accept 240,000 tonnes of prepared RDF and municipal waste feedstocks which will be thermally treated through a combustion system, producing high temperature flue gas for the production of steam to produce renewable electricity with a gross electrical output of 25MWe.

The use of combustion and the generation of heat and power meets the definition of an 'Incineration Plant' as defined by Chapter 5 '*Waste Management*' of Schedule 1 of the Environmental Permitting Regulations.

The Installation has been designed to accept non-hazardous feedstocks in accordance with stringent site waste acceptance procedures and agreed specification. All waste will be contracted and supplied to meet the specification provided in Table 3.2. All incoming waste feedstocks will be subject to a suite of pre-acceptance, acceptance and inspection procedures. Any non-conforming wastes will be rejected, separated and quarantined.

The applicant is making an application for an Environmental Permit to carry out the following listed activities:

Table 3.1 – Permitted Activities

Activity Listed in EP Regulations	Description of Specified Activity	Limits of Specified Activity	Specified Waste Management Operation
Section 5.1 '*Incineration and Co-incineration of Waste*' paragraph A(1)(b)	The incineration or co-incineration of non-hazardous waste in a waste incineration plant with a capacity exceeding 3 tonnes per hour.	The reception, storage and combustion of non-hazardous RDF and municipal waste feedstocks to produce steam for the generation of renewable electricity. Installation includes all ancillary activities including emissions abatement and electrical generation.	R1: Use principally as a fuel or other means to generate electricity. R13: Storage of waste pending the operations numbered R1.
Directly Associated Activities			
Electricity Generation	Generation of 25MWe (gross) electrical power using a steam turbine from energy recovered from the flue gas.	From receipt of steam to export of electricity for on-site use, export to the grid or use by Kingspan (private wire).	n/a

Back-up Generator	For providing emergency electrical power to the plant in the event of supply interruption.	From receipt of fuel to generation of electricity for on-site use.	n/a

The technical guidance notes used in the preparation of this application document are:

- Waste Incineration BREF;
- EPR – The Incineration of Waste (reference EPR 5.01); and
- Environment Agency Guidance on Environmental Permits.

The main issues identified within these guidance documents and the relevant Best Available Techniques have been built into the site operation procedures that will form the management systems and working plans for the site.

3.2 Installation Boundary

All proposed operations will be contained within the installation boundary. A figure showing the proposed building configuration and Installation boundary has been provided in Section 1, Figure 1.2.

A Site Condition Report that provides a baseline conceptual model for the site has been completed and included within *Annex F – Site Condition Report* of this document.

The Site Condition Report neither indicates that the site presents a significant contamination risk, nor does it identify any aspect of the new Installation that presents a potential risk to the environment.

All aspects of the new Installation have been designed in accordance with the Environment Agency's Pollution Prevention Guidance and Horizontal Guidance Notes.

3.3 Infrastructure and Design

The facility is to be newly constructed in its entirety including all drainage, foundation works, steel structure and structural slabs, intermediate floors, stairs, external clad walls, roof system, glazing and external doors.

The facility will consist of the following:

- Fuel Reception Hall consisting of a reception bunker;
- External Baled Storage Area;
- Fuel Handling Crane System;
- Grate Combustion System;
- Steam Generation Plant;
- Flue Gas Treatment (FGT) System;
- By-product Storage Area;
- A 50m high exhaust stack;
- Steam Turbine Hall;

- Air Cooled Condenser Area;
- Emergency Generator and Tank; and
- Water Treatment Plant and Effluent Storage Area.

Site Drainage

There will be no direct process emissions to controlled water arising from the Installation.

Uncontaminated clean surface water runoff captured from roof drainage and external roadways / car parking areas will be discharged to the surface water drainage system (W1).

Any effluent arising from the process plant will be collected in an effluent collection tank and discharged via sewer (S1). All domestic foul effluent arisings will also be discharged via sewer.

All emissions to sewer will be monitored in line with the sites effluent discharge consent once granted.

In the event of a significant site fire, the facility has been designed to fully contain any firewater run-off. In the event of a fire within the bunker, any water from the suppression system will be contained within the bunker. The external baled area will be protected by a sealed drainage system and secondary containment which has also been designed to contain any firewater runoff. The firewater collected will be tankered off site for disposal.

Tanks and Bunds

All storage tanks will be installed with secondary containment and be designed to comply with the necessary standards and pollution prevention guidance.

All raw materials storage associated with the process are detailed within Table 3.4.

Roadways and External Areas

An internal roadway system has been designed to give safe access to all areas of the site.

Segregated pedestrian walkways and car parking areas have been provided to allow for safe access and egress of all personnel at site.

3.4 Description of the Process

The Applicant proposes to employ a conventional technology, namely moving grate combustion as a means of recovering energy from waste feedstocks. Heat will be recovered via a boiler to raise steam and generate energy via a steam turbine.

The principal components of the process comprise the following:

- *Waste Acceptance and Reception:* Pre-prepared fuel will be delivered directly to the Fuel Reception Hall, either in baled or loose form. Walking floor HGV's will reverse into the unloading lane and unload directly into the reception bunker, during which a visual inspection will take place. Additionally, baled RDF may be delivered to site and stored externally in the baled waste storage area in order for the plant to carry on operating during extended public and national holiday periods. A bunker crane will be utilised to move, mix and feed the feedstock into the feeding hopper, which subsequently automatically calls for more RDF when required

- *Incineration:* The site will have a single incineration and combustion line comprising a reciprocating grate. RDF will be fed to the grate from the feed hopper. Primary combustion air is fed under the grate and secondary combustion air fed above the grate to ensure complete combustion. The reciprocating bars spread the RDF and cause it to travel down the grate at a controlled rate to ensure complete combustion.
- *Heat Recovery:* Heat is recovered from the hot flue gases produced in the combustion chamber via a steam boiler, producing 111 tonnes per hour of superheated steam at 44 bar pressure at 400^{o}C.
- *Electricity Generation:* The superheated steam then passes to a single condensing steam turbine-generator to generate gross electrical generation of 25MWe. Approximately 13MWe will be exported to the National Grid, 3MWe will be used by the plant as parasitic load and 2MWe will be exported to the neighbouring and co-located Kingspan facility via private connection. The remaining 6MWe will be available for a future hydrogen plant, which will be addressed via a separate permit application. There will also be 3MWth available for export to the neighbouring Kingspan facility.
- *Flue-Gas Cleaning:* Flue gas cleaning and pollution control consists of Selective Non-Catalytic Reduction (SNCR) through urea injection, a dry scrubbing system incorporating sodium bicarbonate injection for acid gas neutralisation, activated carbon powder injection for absorption and removal of heavy metals, dioxins, VOCs and other harmful substances and a fabric filter for particulates removal.
- *Residue Handling:* Bottom ash (IBA) from the end of the grate is quenched and conveyed to a bunker storage area where it is mixed with boiler ash prior to export offsite for recovery. APC residue is exported for disposal as hazardous waste.

A more detailed process description has been included within Section 3. A simplified process layout is provided in Figure 3.1 below.

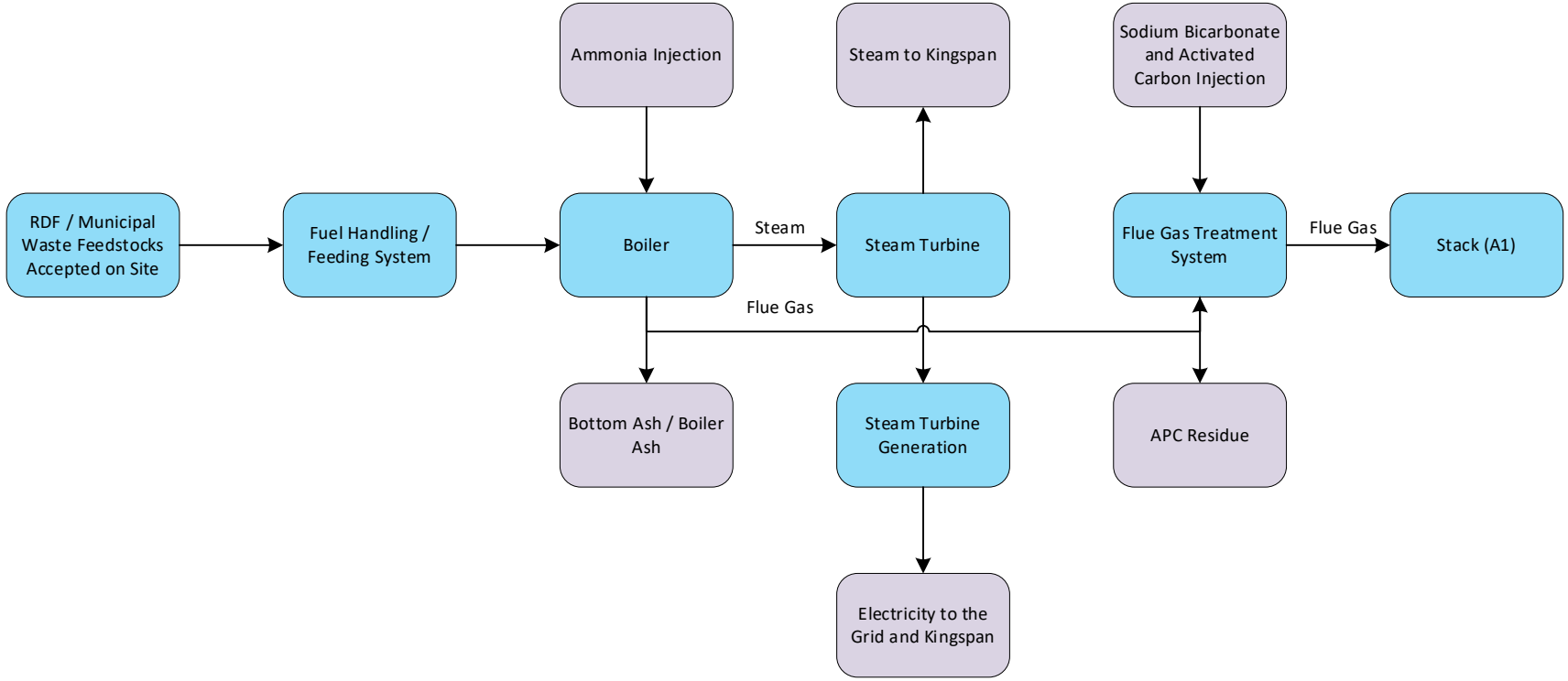

Figure 3.1 – Process Schematic

3.5 Raw Materials

Waste Feedstocks

The Installation has been designed to process up to 240,000 tonnes per annum of pre-prepared RDF and mixed municipal waste feedstocks.

Prior to processing, all feedstock accepted on site will be subjected to stringent waste acceptance criteria in accordance with the site environmental management plan and associated procedures.

Table 3.2 below describes the feedstock specification:

Table 3.2 – Fuel Specification

Parameter	Units	Lowest Operating CV	Highest Operating CV
Calorific Value (LHV)	MJ/kg	9.0	12.0
Moisture	% ar	30.0	10.0
Inert Matter	% ar	23.38	36
Carbon	% dry, ash free	56.56	56.67
Hydrogen	% dry, ash free	8.81	8.83
Oxygen	% dry, ash free	31.88	31.70
Nitrogen	% dry, ash free	1.45	1.50
Sulphur	% dry, ash free	0.30	0.40
Chlorine	% dry, ash free	1.00	0.90

A list of European Waste Catalogue (EWC) codes of wastes that will be accepted by the Installation is provided in Table 3.3.

Table 3.3 – Proposed EWC Codes and Types

Waste Code	Description
19	**WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE**
19 12	**wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified**
19 12 10	combustible waste (refuse derived fuel)

19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11
20	**MUNICIPAL WASTE AND SIMILAR MATERIALS FROM COMMERCE AND INDUSTRY**
20 03	**other municipal wastes**
20 03 01	other municipal wastes

Notwithstanding the EWC's codes stipulated in Table 3.3 above, feedstock shall not be accepted at the site which has any of the following characteristics:

- Hazardous wastes;
- Consisting solely or mainly of dusts, powders, loose fibres or liquids;
- Defined as Infectious;
- Drummed waste; or
- Malodourous wastes.

Process Consumables

Table 3.4 details the process consumable used by the plant.

Table 3.4 – Process Consumables

Material	Nature of Storage	Location	Fate
Refuse Derived Fuel and Municipal Waste	Stored internally within the reception bunker	Internal Fuel Storage Hall	Combusted
Industrial Heating Oil	Stored externally within bunded compound Tank size TBC	External	Used as start-up and support fuel
Lubrication, Hydraulic and Turbine Oils	Internal bunded tank Approximately 1,000 litre tank	Internal	Used within main plant
Ammonia	Stored externally within bunded compound Tank size TBC	External	Reacts with flue gas
Sodium Bicarbonate	Internal bunded silo Silo size TBC	Internal	Reacts with acid gases and discharged as APC residue

Activated Carbon	Internal bunded silo Silo size TBC	Internal	Reacts with acid gases and discharged as APC residue
Boiler Chemicals	Internal 1m^3 IBCs	Internal	Used within the boiler plant
Water Treatment Chemicals	Internal bunded storage tanks Tank size TBC	Internal	Used within water treatment system
CEMS Calibration Gases	Stored within 50l cylinder	Internal	Used within the CEMS equipment

3.6 Detailed Process Description

Feedstock Reception and Pre-Processing

All vehicles will enter the site and report to the weighbridge at the site entrance to weigh and record the delivered feedstock in accordance with the sites waste acceptance procedures. All incoming and outgoing HGV delivery vehicles will be recorded via the weighbridge.

All vehicles delivering feedstock will be directed from the weighbridge to the Feedstock Reception Hall. Walking floor HGV's will reverse into the unloading lane and unload directly into the reception bunker, during which a visual inspection will take place. The reception bunker has been designed to hold 7,888m^3 / 1,972 tonnes of waste, which equates to approximately 3 days fuel supply. The bunker will be served by a dedicated crane which will mix and break up the bales, if required. In the event of a breakdown, feedstock may be stored for longer periods of time (no longer than 3 months).

Additionally, baled RDF may be delivered to site and stored externally in the baled waste storage area in order for the plant to carry on operating during extended public and national holiday periods. Bales will be stored in four bays, each able to hold 230m^3 and have been designed to meet the EA's Fire Prevention Plan Guidance. Bales will be appropriately wrapped to ensure no possibility of odour or dust emissions and stored in an area protected by a sealed drainage system and secondary containment. Bales will be stored for a maximum of 2 months.

All waste will be stored in accordance with the sites Fire Prevention plan which is provided within *Annex I – Fire Prevention Plan.*

To avoid any odour emissions from the Fuel Reception Hall, the building is kept at slight negative pressure, through a ventilation extraction system. Air from within the building is extracted into the intake of the primary combustion air fans and thermally destroyed. A back-up ventilation system incorporating activated carbon filtration is additionally installed in case of plant breakdown / shutdown and is released via the main stack.

Feed System

Within the fuel bunker, a crane will be utilised to move, mix, and stack the feedstock. Once stacked, the crane will feed the waste from the bunker to the boiler feeding hopper.

Although the system is automatic, it will be possible to operate the loading cranes manually, allowing for clearance of the hoppers via crane in the case of any blockages and removal of oversize / reject materials where identified.

The bunker will be fitted with a dedicated fire detection and suppression system. Details of the fire detection and suppression system is provided Fire Prevention Plan provided within *Annex I – Fire Prevention Plan.*

Combustion System

The site proposes to utilise conventional inclined moving grate combustion technology, supplied by Mitsubishi Power Europe GMBH.

After being transferred onto the grate, the RDF travels at a controlled rate down the grate through the reciprocating action of the grate bars, which ensure an even spread of fuel within the combustion chamber.

The fuel feed rate is controlled through the speed and stroke length of the RDF pushers in the metering section, which in turn is calculated via a boiler thermal balance method from measurements of the following parameters:

- Steam outlet pressure and temperature;
- Steam flow;
- Feedwater temperature;
- Exhaust gas temperature;
- Ambient air temperature; and
- RDF mass flow.

There are three sections of moving grate, cooled by air. Primary air is fed into the combustion chamber below the grate within 6 air zones, with secondary air injected above in 2 air zones to ensure complete combustion of the feedstock. Control of the combustion air is achieved through speed controlled fans and motor driven dampers for each air zone.

The grate system has a feed control rate of 70 – 110% of the thermal design basis, achieved by speed and stroke length of the pushers in the metering section.

Heat is recovered from the grate cooling systems via evaporator water walls behind the refractory lining and transferred to the main steam condensate return to the deaerator.

The plant has been designed to ensure compliance with statutory regulations including the 2 seconds minimum combustion retention time above 850^{o}C IED Requirement. Detailed Computational-Fluid-Dynamic modelling (CFD) of the combustion process will be carried out to demonstrate complete combustion of the fuels under varying conditions and also to guarantee the 2 seconds minimum flue gas combustion time above 850°C.

Auxiliary Fuel (Industrial Heating Oil) Burner

In order to comply and maintain the IED 850°C / 2 second temperature and residence time requirements, the facility will have two auxiliary fuel oil burners which will be used in the following operations:

- Start-up to create an environment of 850°C within the combustion system prior to fuel start; and
- To maintain a minimum of 850°C during normal operating conditions should the temperature fall because of loss of energy from the fuel supply.

Slag / Ash Removal System

Slag and boiler ash will be collected within a common concrete lined storage bunker. Riddling and slag from the grate are transported beneath the grate via water filled conveyors to the bunker. Boiler ash is quenched via water trough conveyor or humidifier prior to transportation to the bunker. This quenching both cools and prevents dust emissions during handling and storage.

The ash quench water system utilises waste water blow down from the boiler water treatment system which is ultimately removed from site within the ash. The use of treated waste water blowdown as a quenching medium is a recognised BAT measure and minimises both the water demands and waste water discharges of the plant.

Steam Boiler

The boiler system has been specially designed to process the hot gases produced from the combustion of the incoming waste and is of corner tube type with both vertical and horizontal passes. The net efficiency of the heat recovery boiler is 89.4% at maximum design capacity.

The boiler system has three vertical water passes followed by a horizontal section of super heater and evaporator coils and then two vertical passes including economisers and condensate pre-heating coils to produce superheated steam.

Boiler feedwater is pre-heated in the economiser, located within two sections in the 4th and 5th boiler pass. This then evaporates within membrane 'waterwalls' located in the combustion chamber and radiant passes, producing saturated steam which flows to the steam drum. All evaporation takes place within the water walls. Saturated steam from the steam drum passes to the superheater where superheated steam is generated.

The boiler is fitter with a spray-type de-superheater to regulate the steam conditions and ensure steady steam flow. Under normal operating conditions, 100% of the high pressure steam is expanded through the single condensing steam turbine. The plant is fitted with a high pressure steam bypass which can be operated in the unlikely event that the steam turbine trips, which will direct the steam to the air cooled condenser directly.

Feedwater is provided to the boiler from the boiler feedwater tank which incorporates a deaerator / heater. Provisions are in place to add make-up water from the water treatment plant if required.

Flue gas exits the boiler after the condensate pre-heater and is directed to the downstream flue gas treatment plant.

Superheaters

The two boiler superheaters are of vertical convection type and comprise hanging U bend tube elements forming multi passages and two headers per superheater. A two-stage external control attemperator will be fitted between the superheaters consisting of spray type de-superheaters.

The fitting of nickel-chromium cover plates to the first rows of superheater tubes will help to increase corrosion resistance and boiler tube lifespan.

Fly ash fouling on the vertical superheater and evaporation tube banks is removed through a mechanical 'knocking' tube cleaning system. This uses pneumatic hammers, and the ash falls into the collection hoppers.

Economisers

The economiser sizing and design ensures the flue gas exit temperature doesn't fall below the dew point. Multiple economiser tube banks are formed of closely spaced continuous loop elements, each connected by U bends forming an integral loop and welded at both ends to the terminal headers. Following the final economiser is a condensate pre-heater tube bank.

An additional automatically controlled waster-side economiser bypass will be fitted to ensure the final exhaust gas temperature is greater than 150°C as required for the downstream flue gas treatment system.

Boiler Feedwater

The deaerator is located within the boiler feedwater tank and is heated by the bleed steam supplied by the steam turbine (Bleed Line 1). The temperature is regulated to 138.5^{o}C to control the deaerator operating pressure (3.5 bar). In addition, as temperatures are above 100^{o}C, any air and hence oxygen in the feedwater is vented, which helps to minimise corrosion in the boiler.

To account for steam and condensate loss through blowdown, soot blowing, traps etc, make-up water from the towns water tank is introduced to the feedwater tank. Make-up water is first treated through the water treatment plant which comprises base-exchange softening, carbon filtration, reverse osmosis, electro-deionisation units and a mixed bed polisher. Treated (demineralised) make-up water is fed to the blowdown system to be pre-heated by waste heat from the boiler blowdown prior to entering the deaerator/feedwater tank.

Feedwater is fed to the boiler economiser through high pressure pumps which are also used for boiler steam temperature control through two spray water type attemperator valves.

Water quality is continuously monitored at the economiser inlet, boiler steam drum, condensate pump and boiler high pressure steam delivery point for the following parameters; conductivity, sodium, silica, iron and copper. This information is used to control the dosage rate of boiler treatment chemicals (oxygen scavenger and alkalinity builder) injected into the boiler feed water between the deaerator/feedwater tank and the feedwater pumps.

Cleaning Devices

The plant will be equipped with four automatic explosion devices to clean the walls and the roof of the second empty pass intermittently while the boiler is in operation as well as three automatic explosion devices to clean the external economisers.

A rapping cleaning system will also be provided for the horizontal pass by use of individually operated pneumatic rams.

Boiler Blowdown

Continuous boiler blowdown removes impurities and solids to minimise scale, carryover and corrosion within the boiler. The rate of blowdown is controlled by continuous measurement of total dissolved solids (TDS) in the blowdown water to minimise water use. Blowdown is fed to a heat recovery flash tank, pre-heating make-up water and allowing flash steam to be recovered to the deaerator tank.

Urea Injection (Selective Non-Catalytic Reduction (SNCR)

The NOx that is formed during the combustion process is abated using a Selective Non-Catalytic Reaction (SNCR) system. Urea is injected into the gas stream in the boiler first pass and mixed with the combustion products. Urea reacts selectively in the presence of oxygen and primarily reduces the nitrogen oxides (NOx) to molecular nitrogen (N_2) and water vapor (H_2O).

Please refer to Table 3.5 for the BAT justifications regarding the combustion and boiler system on site.

Table 3.5 – Indicative BAT Requirements for the Combustion and Boiler System

Minimise Dioxin Production by Boiler Design and Operation	
Avoidance of slow rates of combustion gas cooling between 450 and 200°C.	The system has been designed to ensure that flue gas is rapidly cooled through the critical de novo synthesis temperature. Boiler passes are progressively decreased in volume so that the gas velocity increases through the boiler. The design of the boiler ensures that boundary layers of slow moving gas are prevented.
Prevention of boiler fouling.	The boiler has been designed with the following control methods to prevent fouling: • Uniform waste feeding and combustion rates; • Supply of uniform and homogeneous waste feedstocks; • High degree of control over combustion air; and • On-line cleaning and off-line cleaning.
NOx reduction techniques may also help to minimise dioxin emissions.	NOx reduction is achieved through the use of SNCR in the first boiler pass. All NOx limits are within BAT ELV's.
Minimising releases to water from boilers	
Reducing boiler blow down.	Blowdown rate is controlled through continuous measurement of TDS to minimise water loss and make-up

	water requirement. Blowdown is treated at the WWTP prior to discharge.
Reduction in water treatment and de-ionisation plant effluent.	Waste water streams are mixed together and treated in the Waste Water Treatment Plant (WWTP). The waste water system blowdown is then reused within the system.
Treatment of wash water and cleaning solutions.	Any waste water will be collected in the effluent collection tank and treated in the WWTP.

Steam Turbine and Generator Set

The high pressure steam from the steam boiler is routed to the steam turbine-generator located in the Turbine Building. The thermal energy of the steam is converted into mechanical energy so that the turbine drives the generator.

The turbine will be condensing type with radial / axial exhaust. The three turbine bleeds will be directed to the feedwater heater and deaerator tank respectively. The first bleed will be directed to the Kingspan heat exchanger. A gland steam condenser (heat exchanger) is included to prevent venting of gland steam to atmosphere. Condensed steam is discharged to the foul drainage system and exchanged heat recovered to preheat the condensate.

Air Cooled Condenser

Low pressure exhaust steam from the turbine is directed to the air cooled condenser (ACC) with the resultant condensate stored in the condensate storage tank. Condensate is sent to the deaerator via the surface condenser, gland steam condenser, LPPH sub-cooler and condenser and condensate pre-heater which uses boiler exhaust gas.

Under normal operation, 100% of the steam produced by the boiler is fed to the steam turbine. However in the event of a turbine trip the plant is fitted with a steam bypass. Bypassed steam would be transferred to the ACC directly. The bypass valve is fitted with steam cooling water injection and can provide safe shut-down in cases of emergency and be used for start-up purposes in the closed cycle without venting steam to atmosphere.

The turbine bypass system has been designed to have a capacity equal to the maximum boiler capacity.

Energy Generation

The steam turbine is coupled to a generator. The plant has been designed with a gross electrical output of 25MWe. Approximately 13MWe will be exported to the National Grid, 3MWe will be used by the plant as parasitic load and 2MWe will be exported to the neighbouring and co-located Kingspan facility via private connection. The remaining 6MWe will be available for a future hydrogen plant, which will be addressed via a separate permit application. There will also be 3MWth available for export to the neighbouring Kingspan facility.

The generator itself is water cooled and connected to a closed dry cooling system, which also provides cooling for the oil system. Primary cooling can be either air or water and the secondary cooling is provided by the sites closed loop cooling water system.

Flue Gas Treatment

The flue gas treatment stages consist of the following:

- Selective Non-Catalytic Reduction (SNCR) through urea injection within the combustion chamber;
- Dry flue gas scrubbing using sodium bicarbonate and activated carbon;
- Bag filters for reducing dust particulate quantity in flue gases;
- ID Fan;
- 50m Stack (A1); and
- Continuous Flue Gas Monitoring system to monitor all dust and gas emissions.

The plant has been designed to ensure compliance with the New Plant Waste Incineration BREF Guidance Emission Limit Vales (ELVs).

DeNOx System

Achieving the new plant BREF Emission Limit Values is achieved with the primary control measures of controlled two stage combustion and use of Selective Non Catalytic Reduction (SNCR) technology with injection of urea into the hot flue gasses.

Acid Gas Removal

Prior to the bag filters, sodium bicarbonate is injected to enable to neutralisation of SO_2, HCl and HF acids in the flue gas. The advantage of dry flue gas scrubbing is that there is no waste water from the process. Sodium bicarbonate is metered and injected into flue gas duct, where it reacts with and neutralises acid gases such as HCl, HF and SO_2.

Activated carbon is also injected into flue gases in order to remove any residual PCCD / DF, PAH, PCB and Hg (heavy metals).

Bag Filters

Flue gases are cleaned by a dry fabric filter system consisting of bag filters with automatic pneumatic blow-down cleaning.

Cleaning of the fabric filter bags is automatically and sequentially enacted while the plant is online through compressed air injection. Compressed air is injected into a row of filter bags creating an over-pressure which stops filtration and causes abrupt inflation which dislodges the dust cake which falls to the below hoppers before transport to the storage silo.

ID Fan

The ID-fan is placed between the bag filter and the stack. The ID-fan serves two purposes:

- Maintaining the desired pressure level in the furnace and boiler; and

- Overcoming the pressure drop generated in the ducts, the silencer and the bag filtration system.

Stack (A1)

There will be a single wind shield stack (50m) for the discharge of cleaned flue-gas to atmosphere.

All emissions from the stack will be monitored using a fully compliant MCERTS accredited Continuous Emissions Monitoring System (CEMS) which meets the requirements of BS EN 15259.

The CEMS will be IED complaint and monitor HCl, NOx, NH_3, O_2, SO_2, VOC, particulates, H_2O, temperature, pressure and flow. TOC will be analysed by a Flame Ionisation Detector. HF will be calculated through the measurement of HCl as a surrogate.

3.7 Controls and Environmental Management System

The site shall be operated in accordance with corporate standards and procedures as part of a wider Environmental Management System. The system will be designed to meet the requirements of ISO14001:2015.

All aspects of the operation will be managed in accordance with a formal Environmental Management and Working Plan. The plan will define all activities throughout the lifecycle of the treatment process (i.e. pre-acceptance, acceptance, reception).

The Environmental Management and Working Plan will be structured to meet the requirements of the Environmental Permitting Regulations and associated pollution prevention guidance.

The EMS will be designed to ensure:

- The identification of all foreseeable environmental impacts and risk that the Operators activities pose to the environment.
- Prevention or minimisation of any identified risks to practical minimum.
- Legal Compliance assurance.
- Identification of risks of pollution including those arising from operations, maintenance, accidents, incidents, non-conformances and complaints, and how these will be minimised.
- Activities at the site will be managed in accordance with the management system, which will be subject to continuous review, audit and improvement. Specific detailed management system reviews will take place if there is a significant change to the activities, following an accident or if a non-compliance is found.
- Furthermore, the whole management system will be subject to annual external audit by competent third parties.
- The key aspects of the EMS for the site will include:
    - Preventative maintenance;
    - Operator requirements;
    - Training and Competence;
    - Emergency response and incident management; and

- Monitoring, measurement and reporting.

The environment management system and procedures will be written to ensure that the environmental risk and impact of the normal running of the site activities are documented and minimised.

The EMS will be fully developed, implemented and in operation at the time of plant commissioning and permit issue and a copy of the management system will be kept at a convenient location on site. Please find a copy of the EMS Summary provided within *Annex G – EMS Summary.*

Site Maintenance

All maintenance activities on site will be carried out in accordance with the manufacturers' recommendations and will be integrated within the company's environmental management system.

The key aspects of the maintenance management programme will include:

- A programme of Planned Preventative Maintenance (PPM) is undertaken to ensure ongoing management and replacement of key plant and equipment rather than waiting for the equipment to fail and the maintenance of any critical environmental equipment.
- The inspection and maintenance schedules that the manufacturer recommends are adhered to, including any period of recommended shut-down.
- Predictive maintenance (e.g. assessment of vibration from bearings in motors) is carried out to prevent any catastrophic breakdown.
- Real time data collection and plant condition monitoring.

The detailed management system operated by the site will include procedures for ensuring that adequate maintenance is undertaken at the site.

The maintenance programme will ensure that all equipment or infrastructure that is deemed essential in the prevention of pollution to the environment (e.g. hard-standing, bunds, abatement plant etc) or the prevention of local nuisance impacts (e.g. noise abatement equipment etc) is maintained and kept in good operating condition.

All maintenance activities for critical pollution control equipment (abatement etc) will form a key part of the certified EMS that will be established prior to the commencement of operations at site.

During planned periods of maintenance, if any of the following situations arise, waste will cease to be charged until normal operations can be restored:

- Continuous monitoring shows that emissions are exceeding any ELVs due to failure of the abatement systems or CEMS are out of service for a total of 4 hours;
- The cumulative duration of the periods of abnormal operation over 1 calendar year has reached 60 hours; or
- The continuous emission monitors are unavailable.

The planned period of abnormal operation will end at the earliest of the following:

- When the failed equipment is repaired and brought back into normal operation;

- When the operator initiates a shutdown of the combustion activity;
- When a period of four hours has elapsed from the start of the period of abnormal operation; or
- When, in any calendar year, an aggregate of 60 hours has been reached for planned periods of abnormal operation.

3.8 Operator Competence

The facility will be fully automated to the point that all process activities will be PLC controlled and SCADA monitored. The installation will have on-line monitoring which can be administered remotely to ensure the process is optimised and operating correctly.

Notwithstanding the above, the site will be staffed at all times by the Operations team. The primary role of day staff is to ensure and oversee plant loading operations, fuel transfers and management.

Additional activities will include general site housekeeping and administration activities. Additional staff attending the site will be visiting engineers from the equipment manufacturers who are adequately trained to perform their duties at site. The operator will maintain written operation instructions for all plant and monitoring equipment present on site.

All personnel working at the facility will be trained in the necessary sections of the EMS and Working Plan and any associated Procedures. All staff working for and on the behalf of the site will be suitably trained and competent (e.g. professional maintenance engineers, electricians, equipment operators etc.).

The Operations Team will employ on a full-time basis a site manager / technically competent person who holds the necessary qualifications.

No operations (pre-conditional or otherwise) that involve the acceptance, handling or processing of any wastes will take place without a technically competent person being employed by the Operator.

Operational Times

The site will be operated on a continuous 24/7 basis in accordance with the agreed operational and planned maintenance outage schedule.

Additional activities will include general site housekeeping and administration activities. The site will maintain written operation instructions for all plant and monitoring equipment present on site.

All personnel working at the facility will be trained in the necessary sections of the Working Plan and associated Procedures.

3.9 Site Security

The site will incorporate the relevant security measures including:

- A perimeter fence which will be inspected periodically to ensure that the site security has not been compromised;
- CCTV monitoring of the external and internal areas of the Installation;
- External on-line monitoring and administration of the waste-to-energy process from a remote location;

- All personnel and vehicles entering the site are strictly controlled and managed; and
- No vehicles or personnel will be allowed access to the facility without prior authorisation.

3.10 Accidents and Emergencies

Fire Protection Strategy

The fire protection strategy for the Installation includes the following fire mitigation and suppression measures:

- An automatic fire detection and alarm system will be installed;
- An automatic suppression system will be installed;
- A suitable number of manual break-glass call points will be installed;
- Appropriate first aid fire-fighting equipment will be provided throughout the site;
- Planning inspection, maintenance and testing procedures will be established and used to ensure that all fire protection systems can be operated effectively. A component person will regularly test and inspect all fire safety equipment, installations and systems; and
- Fire extinguishers throughout the plant and in the control and electrical room areas.

All escape routes will be designed as per the building regulations and Fire and Service Rescue Acts.

Fire Prevention Plan

The site has developed a Fire Prevention Plan that complies with the Environment Agency Guidance *'Fire prevention plans: environmental permits'.*

The Fire Prevention Plan relates to the internal storage of all fuel product and provides the necessary information on site infrastructure, storage locations, storage practices, monitoring equipment and emergency response procedures.

The Fire Prevention Plan is included as part of *Annex I – Fire Prevention Plan.*

Accident Management Plan

The Applicant has developed a draft Accident Management Plan based around the specific risks associated with the site operations.

The key aspects of the Sites Accident Management Plan are:

- Reviewed by the Site Management annually and as soon as practicable after an accident.
- Considers hazards presented by:
    - Emergency shut-down procedures;
    - Actions in case of fire / explosion;
    - Actions in case of fire / emergencies;
    - Contaminated firewater;
    - Failure of any equipment;
    - Failure of abatement plant;

- Spillages and uncontrolled release;
- Plant or equipment failure (e.g. over-pressure of vessels and pipework, blocked drains);
- Vandalism; and
- Flooding.

- Identify events or failures that could damage the environment;
- Assesses the likelihood and the potential environmental consequences from accidents at the site; and
- Proposes action to minimise the potential causes and consequences of accidents.

In the event of an accident, the EA will be immediately informed and necessary measures to limit the environmental impact of the accident will be carried out, as well as measures to prevent further possible accidents.

The draft Accident Management Plan has been included in *Annex H – Accident Management Plan.*

Specific emergency response procedures will be developed by the Operator in conjunction with the plant manufacturer. These procedures will be completed prior to operations commencing at the site.

Incident Reporting

The reporting of incidents and non-conformities will form a key component of the companies Environmental Management System. Identified non-conformities under the system include, but are not limited to the following:

- Uncontrolled leaks and spillages of any materials with the potential to cause pollution to the environment (hydraulic fluid / oils, unabated dust emission to atmosphere);
- Non-compliance to any permitted condition or consent limit (emissions excursions, missing of reporting deadlines, breach of any permitted consent limits);
- Internal Audit findings (legal non-compliances, EMS procedural breaches, system non-compliances);
- External and Internal Complaints; and
- Whenever a plant malfunction, breakdown or failure, or any near miss occurs.

The company's EMS will undergo periodic external audit and review to ensure that both compliance and continuous improvement is achieved. The EMS requires that all identified incidents and non-conformities will be investigated and closed out.

All plant and equipment will be PLC controlled, monitored and alarmed using a 'SCADA' / Distributed Control System (DCS) system, thus ensuring that continuous plant diagnostics can be facilitated.

Furthermore, the site management system will have documented procedures and registers to:

- Ensure that any members of the public / residents are alerted and informed if a significant plant issue arises (fire, explosion etc);
- Record, report and investigate any internal or external complaints to ensure that any necessary measures are taken to prevent, or where that is not possible to minimise, the causes; and

- Inform any members of the public about the nature of the site, key contacts and sources of further information.

4. EMISSIONS AND THEIR ABATEMENT

4.1 Emissions to Air

All point source emissions from the plant are detailed in the table below. This table provides details of the predicted emissions parameters, concentrations and source.

All concentrations from the plant will be in line with the BREF emission limits for New Plant.

Please refer to Tabe 4.1 for more information.

Table 4.1 – Stack Technical Data

Parameter	Value
Stack height (m)	50
Flue exit diameter (m)	2.0
Temperature of release (ºC)	190
Actual flow rate (Am^3/s)	77.6
Moisture content (%v/v)	14.5
Oxygen content (%v/v dry)	8.0
Normalised flow rate (Nm^3/s)	51.0 (a)
Emission velocity at flue exit (m/s)	24.7
Emission Concentration (mg/Nm^3) (a)	**ELV**
PM_{10}	5
TOC	10
HCl	6
HF	1
CO	50
SO_2	30
NOx	120
Group I (Cd, Tl)	0.02
Group II (Hg)	0.02
Group III (Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V)	0.3
Dioxins and Furans	6.0×10^{-8}
PAHs (as B[a]P)	9.0×10^{-5}
PCBs	5.0×10^{-3}
NH_3	10
(a) At 11% O_2 273K, 101.3 kPa, dry	

Detailed emission modelling to full IED requirements has been carried out as part of this Application. All details are provided within *Annex D – Air Quality Assessment and HHRA.*

The following table summarises the BAT justifications regarding the emissions from site.

Table 4.2 – BAT Justification for Emissions to Air

Indicative BAT	Justification
Emissions identification and benchmark comparison	The emissions benchmarks in the Sector Guidance Note can be met.
Vent and chimney height dispersion capacity and assessment of emitted substances fate in the environment	An impact assessment has been carried out and is referenced in Section 7 of this document.
Visible particulate plumes	Controlled by the particulate abatement system (bag filter system).
Visible condensed water plumes	There will be no visible plume from the facility under a majority of climatic conditions.
Particulate matter	Controlled by the particulate abatement system (bag filter system).
NOx – Primary Measures	
Fuel selection	Industrial Heating Oil used for start-up burners.
Combustion chamber design	This is compliant with IED and represents BAT.
Air control – primary and secondary	Automated air control at the point of final combustion – dilution air valve.
Temperature control	Temperature control is a key aspect of the control system, as is a uniform temperature gradient.
NOx – Secondary Measures	
Flue gas recirculation	Flue gas recirculation is not necessary as NOx limits can be met without.
SNCR	Urea injection will be used and is considered BAT.
SCR	SCR is not required as NOx limits can be met with the primary measures and SNCR.
Acid Gases and Halogens	
Primary acid gas measures	The waste feed will exclude hazardous waste and will not contain significantly chlorinated or halogenated components. Each supplier is governed by the fuel specification and supply contract.

Secondary acid gas measures	Sodium bicarbonate and PAC injection will be used in order to control acid gases.
Alkaline reagent selection	Sodium Bicarbonate has been chosen the grounds that it is the most efficient reagent for acid gas abatement purposes. Lime, despite being a cheaper commodity requires larger storage and handling equipment and also presents a caustic hazard to operators.
Acid gas control: cost/benefit study	As this installation is a newly built facility, all measures employed are BAT, for this reason a cost benefit study on the merits of primary and secondary measures is not required. Careful consideration has been made during the design stage of this project to ensure that releases of acid gases and halogens are well managed by appropriate primary and secondary measures. All incoming feedstock is contracted to a specification that prevents high sulphur and chlorine conditions.
Carbon Dioxide	All measures to increase energy efficiency will also reduce CO_2 emissions.
Carbon monoxide and VOCs	CO is not significantly influenced by the conventionally employed abatement techniques. Reduction of both CO and VOCs is achieved by control of combustion conditions in the boiler.
Dioxins and Furans	The primary method of reducing the emissions of dioxins is through the combination of incoming waste feedstock control, careful control of the conditions in the combustor and abatement. Boiler residence time is controlled to minimise de-novo formation. PAC injection will remove dioxins and furans from the gas phase, followed by bag filters which will provide efficient particulate abatement.
Metals	PAC gives reliable and effective heavy metal (e.g. mercury) reductions, and for the majority of metals particulate abatement is the main means of ensuring that releases are minimised.

4.2 Emissions to Controlled Water

There will be no direct process emissions to controlled water arising from the Installation.

Uncontaminated clean surface water runoff captured from roof drainage and external roadways / car parking areas will be discharged to the surface water drainage system (W1).

In the event of a significant site fire, the facility has been designed to fully contain any firewater run-off. In the event of a fire within the bunker, any water from the suppression system will be contained within the bunker. The external baled area will be protected by a sealed drainage system and secondary containment which has also been designed to contain any firewater runoff. The firewater collected will be tankered off site for disposal.

4.3 Emissions to Sewer

Any effluent arising from the process plant will be collected in an effluent collection tank and discharged via sewer (S1).

All domestic foul effluent arisings will also be discharged via sewer.

All emissions to sewer will be monitored in line with the sites effluent discharge consent once granted.

Table 4.3 – BAT Justification for Emissions to Water

Indicative BAT	Justification
Water Use	Water use will be minimised and recycled where possible.
Contamination identification and fate analysis	Sampling, monitoring and analysis will be carried out, once the installation is operational, in agreement with the Agency.
Filtration	No further filtration necessary.
Off-site treatment	No off-site treatment.
Benchmark comparison	IED Chapter IV requirements do not apply.
BAT Justification for Emissions to Groundwater	
Identification of List I substances	N/A
Identification of List II substances	N/A
Prior investigation	Please refer to *Annex F – Site Condition Report.*
Surveillance	N/A

4.4 Emissions to Land

There will be no emissions to land arising from the Installation.

4.5 Odour

Due to the design of the building structure and the fully enclosed processing activities, there is very little potential for offsite odour emissions and impacts to arise from the site. Furthermore, the fundamental design of the facility has a hierarchy of odour control and abatement measures to ensure that the potential for odour impacts is eliminated.

Any internal waste unloading and storage within the Fuel Reception Hall takes place under controlled conditions. The only external storage activities relate to the storage of baled RDF waste. The potential for odour emissions arising from the external storage of baled wastes is limited due to the strict control measures in place. No odorous wastes will be accepted on site in accordance with the sites waste acceptance procedures, all bales are required to be well wrapped, and a site inspection is undertaken twice daily. Any damaged, poorly wrapped or odorous bales are immediately removed and placed internally for processing.

Entry to the Fuel Reception Hall is via fast acting electrically controlled roller shutter doors to minimise fugitive emissions. All vehicles are required to reverse into the hall and discharge directly into the reception bunker. The discharge of fuel will only take place once the roller shutter doors are closed.

The primary means of odour mitigation at the site is through the internal extraction and subsequent thermal oxidisation of air from the Fuel Reception Hall via the primary combustion air fans. The extraction ensures that the building is maintained at slight negative pressure therefore minimising the escape of odours, whilst also providing a high level of volumetric air exchange and preferential working environment.

During periods where the plant is in shut down, such as for maintenance on equipment related to the air extraction system this air ventilation and odour treatment system will not be operational and there will be some waste still stored on site. As such a backup ventilation and odour treatment facility, comprising a ventilation unit with activated carbon filter media will be in place. All discharges from the carbon plant are extracted via authorised emission point A1.

Although it is considered that there is very little potential for odour emissions from site due to the control measures described above, an Odour Management Plan has been produced as part of the sites Environmental Management System. Please refer to *Annex J – Odour Management Plan* for more information.

Table 4.4 – Odour Management System

Tier	Reference	Description
1	Inventory Control	The Installation will process a maximum of 240,000 tonnes per annum of RDF. Under normal operation, the Fuel Reception Hall will be operated such that there is never more than 3 days' inventory awaiting processing and will be managed in a manner that prevents wastes being accepted into the site in the event that the site is inoperable. The bales will be stored for a maximum of 2 months, however due to being wrapped and the stringent mitigation measures on site, the risk of odour emission from this part of the site is low. All wastes accepted on site will be required to be pre-declared and be deemed acceptable by the site manager prior to the transportation and delivery to site. All waste accepted on site will be inspected on arrival.
2	Enclosed Building	Entry to the waste reception area is via electrically controlled fast acting roller shutter doors. Vehicles will enter backwards and discharge the waste into the fuel bunker. The doors are complete with air curtains to prevent any odourous emissions escaping during the unloading of waste. Once unloaded the vehicles will exit the building and the roller shutter doors are closed.
3	Controlled Extraction System	To avoid any odour emissions from the Fuel Reception Hall, the building is kept at slight negative pressure. An air extraction system will be in place resulting in odourous air within the building being thermally destroyed by the combustion system.

Although no odour from the plant is anticipated, odour shall be monitored daily at points around the site boundary and observations shall be noted in the site diary and / or on a daily monitoring document.

In the unlikely event that there is any discernible odour detected at the site boundary and the odour is judged to be 'moderate' (i.e. odour Intensity Rank 3), then the Site Manager will be notified immediately, and the olfactory survey will continue to attempt to determine the source and extent of the odour plume, as follows:

- A suitable location downwind of the site and potentially sensitive receptor at which the odour plume is unlikely to extend will be selected for assessment;
- Survey will continue toward the facility until a site-related odour is perceived; and
- Assessment points perpendicular to the plume axis and equidistant from the site will then be monitored, subject to access requirements.

The main aim of monitoring will be to test if any odours emitted from the site will be causing the nearest receptors nuisance. In scenarios where nuisance is being caused then operations will be suspended until the

conditions improve. The Site Manager may deem it necessary to find the precise source of the odour and attempt to eliminate it or neutralise it immediately.

The following table shows the BAT justification for odour prevention on site.

Table 4.5 – BAT Justification for Odour

Indicative BAT	Justification
Containment	
The Operator should maintain the containment and manage the operations to prevent its release at all times.	Entry to the Reception Hall is via electrically controlled roller shutter doors and waste unloading only takes place when the roller shutter doors are closed. Air extraction within the Fuel Reception Hall maintains a slight negative pressure to prevent escape of potentially odours air. Extracted air is utilised as primary combustion air resulting in the thermal destruction of odorous compounds prior to release to atmosphere.
Assessment and Management	
For existing installations, the releases should be modelled to demonstrate the odour impact at sensitive receptors. The target should be to minimise the frequency of exposure to ground level concentrations that are likely to cause annoyance.	N/A – not existing Installation
For new installations, or for significant changes, the releases should be modelled and it is expected that the Operator will achieve the highest level of protection that is achievable with BAT from the outset.	Dispersion modelling has been undertaken assessing the combustion gases from the facility. Odour is considered low risk and is controlled by the onsite measures therefore no odour modelling is considered necessary however an odour management plan has been produced as part of this application.
Where there is no history of odour problems then modelling may not be required although it should be remembered that there can still be an underlying level of annoyance without complaints being made.	N/A
Where, despite all reasonable steps in the design of the plant, extreme weather or other incidents	N/A

are liable, in the view of the Regulator, to increase the odour impact at receptors, the Operator should take appropriate and timely action, as agreed with the Regulator, to prevent further annoyance (these agreed actions will be defined either in the Permit or in an odour management statement).	
Where odour generating activities take place in the open, (or potentially odorous materials are stored outside) a high level of management control and use of best practice will be expected.	External activities are limited to short term storage of baled feedstock. Potential for odour is carefully controlled through management of the bales. All bales are wrapped and inspected on a twice daily basis. Any damaged or potentially odorous bales are immediately removed and stored internally for immediate processing. The bales will be stored for a maximum of 3 months prior to processing.
Where an installation releases odour but has a low environmental impact by virtue of its remoteness from sensitive receptors, it is expected that the Operator will work towards achieving the standards described in this Note, but the timescales allowed to achieve this might be adjusted according to the perceived risk.	N/A

Specific Odour Control Techniques

Enclosing odorous areas (applicable to all).	All appropriate areas will be enclosed.
Enclosing odorous waste all the way to the furnace (ACI, CWI).	All appropriate areas will be enclosed.
Confining waste to designated areas (all).	Designated areas designed into the layout.
Ensuring that putrescible waste is incinerated within an appropriate timescale (MWI, CWI, ACI, SSI).	Storage times on site are minimised. No putrescible wastes will be processed on site.
Refrigeration of such waste which is to be stored for longer than an appropriate timescale (CWI, ACI).	N/A
Regular cleaning and (for putrescible wastes) disinfection of waste handling areas (all).	All areas will be regularly inspected, cleaned and maintained.
Design of areas to facilitate cleaning (all).	The facility is new and designed to ease cleaning.
Ensuring that the transport of waste and ash is in covered vehicles, where appropriate (all).	All vehicles will be covered.

Ensuring good dispersion at all times from any release points (all).	The emissions stack has been designed aided by modelling to ensure adequate dispersion. The location and height have been optimised.
Preventing anaerobic conditions by aeration, turning of waste and short timescales (SSI, MWI).	Storage times are minimal internally (3 days) and waste is continuously mixed within the storage bunker. External storage of RDF bales will be for a maximum of 2 months.
Chlorination of waters being returned to STW or in storage (SSI) drawing air from odorous areas at a rate which will ensure that odour is captured (all) and treating such extracted air prior to release to destroy the odours - see below.	N/A
The use of these techniques should obviate the need for odour masking or counteractants.	No masking agents or counteractants have been specified at the plant.
Treatment of Odour	
The use of odorous air e.g. air from the waste handling area or air displaced from tanks, as furnace air is an ideal way of treating odours. The quantity of contaminated air that can be handled this way is obviously limited by the needs of the furnace. A disadvantage is the need to consider provision for odour control when the incinerator is not operating.	Odorous air is not anticipated to be a problem. Air from the Fuel Reception Hall is utilised as primary combustion air for the grate thereby thermally destroying any odorous compounds prior to discharge to atmosphere.
Biofilters.	Biofilters will neither be used nor required.
Scrubbing for odour control.	Scrubbing for odour control will not be required.
Carbon filters.	The back up ventilation system includes carbon filtration and will be utilised at any time that the plant is not in operation.
For a new plant it would normally be the case that the imposition of conditions achieving BAT also secures that no significant pollution (including odour) is caused.	The proposed plant has no potential for significant odour pollution.

4.6 Noise Impacts

The design of the Installation has taken into account the potential impacts on the environmental and neighbouring receptors with regards to noise. The plant and building have been designed to abate and control noise, odour and fugitive emissions. The building is fully enclosed and nominally air tight.

The processing plant and associated equipment has been designed in accordance with best practice and to ensure that internal noise does not present an issue to the employees at the site under the Control of Noise at Work Regulations and to ensure that noise breakout does not lead to noise nuisance at the identified sensitive receptors.

A noise assessment in accordance with statutory noise guidance has been carried out, including detailed modelling shown in *Annex E – Noise Impact Assessment.*

The report concludes that the total, aggregate environmental noise impact arising from the proposed operation of the plant, in full compliance with the plant noise specification as presented within the report, results in a "low" noise impact at the worst affected noise sensitive receptors, all as assessed in accordance with British Standard BS4142: 2014+A1: 2019.

Table 4.6 below shows the BAT justification for noise prevention on site.

Table 4.6 – BAT Justification for Noise

Indicative BAT	Justification
Maintenance • Plant • Equipment • Fans • Bearings • Vents • Building Fabric • Other	Appropriate preventative maintenance will be provided for the various elements of the installation. This will ensure no deterioration of plant or equipment that would give rise to increases in noise.
Control Techniques and comparison with BAT indicative thresholds	Control techniques will be in line with BAT. The noisiest equipment is housed in acoustic enclosures and / or within separate appropriately signed and controlled acoustic housings.
Reasonable Cause for Annoyance – Sensitive Receptors/Complaints?	The facility will not give rise to reasonable cause for annoyance. In the unlikely event that complaints are received measures described in the integrated management system will be put in place.
Noise Survey	A noise assessment in accordance with statutory noise guidance has been carried out, including

	detailed modelling shown in *Annex E – Noise Impact Assessment.*

4.7 Fugitive Emissions

The plant has been designed to ensure that all odour, vapour and fugitive emissions are contained. An air extraction system will be in place for odour and dust control within the Fuel Reception Hall.

Table 4.7 shows the BAT justification for preventing fugitive emissions from the proposed development.

Table 4.7 – BAT Justification for Fugitive Emissions

Indicative BAT	Justification
Dust Controls	
Covering of skips and vessels	There will be no open skips or vessels at the facility which could give rise to fugitive emissions.
Avoidance of outdoor or uncovered stockpiles (where possible)	External storage is limited to wrapped bales of RDF for short periods of time. No damaged or loosely wrapped bales will be stored externally at any time.
Where dust creation is unavoidable, use of sprays, binders, stockpile management techniques, windbreaks and so on.	N/A
Regular wheel and road cleaning (avoiding transfer of pollution to water and wind blow)	Due to the nature of the operations, problems with wheel contamination are not expected to be significant. All areas of the site will have hardstanding.
Closed conveyors, pneumatic or screw conveying (noting the higher energy needs), minimising drops. Filters on the conveyors to clean the transport air prior to release	Feed systems are simple and enclosed.
Regular housekeeping	The site staff will be fully trained and regularly audited through the EMS to ensure that housekeeping measures are appropriate to the nature and scale of the activities and that there is minimum possibility of uncontrolled emissions.
The recycling of by-products	All waste will be removed from site by covered vehicles or enclosed tanker.

Enclosed containers or sealed bags used for smaller quantities of fine materials	Small volumes of materials for maintenance etc. shall be stored in appropriate containers / sealed so as to prevent fugitive emissions.
Mobile and stationary vacuum cleaning	Mobile and stationary vacuum cleaning will be used if necessary.
Closed storage with automatic handling system	All storage is closed and transferred using an automated handling system.
Sealed charging system	The charging system is fully enclosed.
VOC control measures	N/A

4.8 Waste Generation and Management

Types and Amounts of Waste

The combustion process will not inherently produce significant quantities of waste.

The main solid by-products produced from the operation of the facility will be:

- Bottom Ash; and
- APC Residue (Air Pollution Control (APC) residues).

Bottom ash from the combustion system will fall to the ash conveyor at the base of the grate where it will be quenched prior to storage within a storage bunker. Boiler ash is collected and conveyed to the same common bunker. Bottom ash is then transported offsite for recovery.

APC Residue is collected within the hopper at the base of the bag house and conveyed to an enclosed ash silo prior export offsite via enclosed dry powder tanker. Table 4.8 below shows a tabular summary of site wastes.

Table 4.8 – BAT Justification for Fugitive Emissions

Waste	EWC Code	Approximate Quantities (tonnes / yr)	Source	R / D Code	Environmental Fate
Bottom Ash	10 01 15	40,950	Combustion Grate	R5 (Off-site Recycling)	Reused as a re-cycled aggregate
APC Residue	19 01 05*	22,560	Gas Clean-up Equipment	R5 (Off-site Recycling)	Exported off site to an appropriate waste disposal facility

All waste produced at the site will be sampled and analysed. Additional samples will be taken if the disposal or recovery route changes or it is suspected that the nature or composition of the waste has changed such that it may no longer be appropriate for its environmental fate.

Throughput of Waste

All wastes will be sourced from commercial and industrial sources and comprise of Refuse Derived Fuel (RDF) and mixed municipal waste that meets with the plant's agreed waste feedstock specification.

The Installation has been designed to process approximately 240,000 tonnes per annum of non-hazardous waste.

Waste Storage

The design of the installation has taken into account the potential impacts on the environmental and neighbouring receptors.

All incoming fuel feedstocks will be stored either within the Fuel Reception Hall or in the external baled storage area. All other waste materials, will be clearly identified, sealed and stored internally within a secured area protected by secondary containment.

Table 4.10 summarises the BAT justification for the proposed storage of wastes on site.

Table 4.10 – BAT Justification for Storage on Site

Indicative BAT	Justification
Subsurface Structures	N/A
Appropriate surfacing and containment or drainage facilities for all operational areas, taking into consideration collection capacities, surface thicknesses, strength/reinforcement; falls, materials of construction, permeability, resistance to chemical attack, and inspection and maintenance procedures	Surfacing has been designed in accordance with the design standards for similar installations. All joints are appropriately sealed. The surfacing is designed to ensure that it is of the appropriate strength, reinforcement and thickness to withstand the heavy traffic which will pass over it during operations. The installation will have an extensive maintenance programme in place which will include provision for the inspection of all appropriate plant and structures. The detailed inspection of the impervious surfaces and containment will be in line with the construction engineer's recommendations. Routine inspections will be undertaken on a daily basis by site personnel as part of the daily site checks. Since this is a new installation BAT will be demonstrated from commencement of operations.

Above-ground Tanks	Above ground bulk storage tanks containing liquids will be appropriately constructed to ensure they are impermeable. Supervised deliveries will ensure that the risk of contamination of surface water is negligible. All tanks and facilities containing potentially contaminative substances will be installed with secondary containment and be designed to comply with the necessary standards and guidance requirements.
Storage areas (IBCs, drums, bags etc.)	All non-bulk storage (IBCs etc), where used, shall be stored within the fully contained building. In the event of a release it will not be possible for the materials to enter the surface water drainage system.

5. ENVIRONMENTAL MONITORING

5.1 Emissions to Air

All emissions to atmosphere (as identified within Table 4.1) will arise from the main combustion plant stack.

The plant will have continuous emissions monitors (CEMS) located on the exhaust flue of the combustion plant (Emission Point A1).

The CEMS system will monitor the stack emissions and provide data reporting. The system features a single-point extraction and includes monitors for CO, O_2, NOx, SO_2, ammonia slip and dust.

The CEMS will be IED compliant and continuously monitor, HCl, NO, NO_2, N_2O, NOx, NH_3, O_2, SO_2, VOC, particulates, H_2O, temperature, pressure and flow. TOC will be analysed by a Flame Ionisation Detector. HF will be assessed through the surrogate monitoring of HCl.

The dust monitor provides added flow, stack pressure and temperature. All analysers are provided with remote control, calibration and maintenance.

The continuous monitoring equipment will operate on a 24-hour basis and will include the facility for on-line monitoring of the gas concentrations and provide for any out-of-tolerance indications to be monitored by remote staff.

All CEMS equipment and associated platforms and sampling ports installed on site will meet the requirements of BS EN 15259 Air quality – Measurement of Stationary Source Emissions and Environment Agency Technical Guidance Note M2. All CEMS equipment shall be MCERTS approved.

Procedures will be created for monitoring undertaken at the site. These procedures will conform to M1 and M2 guidance and those required by the operator monitoring and assessment scheme and are incorporated into the sites EMS system.

The CEMS will be used such that:

- The values of the 96% confidence intervals of a single measured result at the daily ELV shall not exceed the following percentages:
    - Carbon Monoxide – 10%;
    - Sulphur Dioxide – 20%;
    - Oxides of Nitrogen (NO and NO_2) – 20%;
    - Particulate Matter – 30%;
    - Total Organic Carbon – 30%;
    - Hydrogen Chloride – 40%.

- Valid half-hourly average values or 10-minute averages shall be determined within the effective operating time from the measured values;
- Where is it necessary to calibrate or maintain the monitor resulting in data not being available for a complete half hour period, the half-hourly average or 10-minute average shall in any case be considered valid if measurements are available for a minimum of 20 minutes or 7 minutes during the half-hour or 10-minute period respectively;

- Daily average values shall be determined as the average of all valid half-hourly average or 10-minute average values within a calendar day; and
- No more than ten daily average values per year shall be determined not to be valid.

5.2 Emissions to Controlled Water

There will be no direct process emissions to controlled water arising from the Installation.

Uncontaminated clean surface water runoff captured from roof drainage and external roadways / car parking areas will be discharged to the surface water drainage system (W1).

As this is uncontaminated runoff only, no monitoring will be required.

5.3 Emissions to Sewer

Any effluent arising from the process plant will be collected in an effluent collection tank and discharged via sewer (S1).

All domestic foul effluent arisings will also be discharged via sewer.

All emissions to sewer will be monitored in line with the sites effluent discharge consent once granted.

5.4 Emissions to Land

There are no process emissions to land arising from the process.

No monitoring is required.

5.5 Monitoring Frequency

The process will be subject to a range of process monitoring which has been designed to comply with the requirements of the EA M1, M2, IED and WI BREF Guidance.

Table 5.1 – Monitoring Frequency

Emission Point	Parameter	Monitoring Frequency	Methodology
A1	• Oxides of nitrogen (NO and NO_2 expressed as NO_2) • Nitrous oxide (N_2O) • Particulate Matter • Hydrogen Chloride • Carbon Monoxide • Sulphur Dioxide • Ammonia • Total Organic Carbon	Continuous daily average and ½ hour average for all parameters	MCERTS certified CEMS equipment
A1	• Cadmium and thallium and their compounds (total) • Mercury and its compounds	Periodic as detailed within permit	EA Monitoring Guidance M1 / M2 compliant extractive sampling

	• Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total) • Hydrogen Fluoride • Polybrominated dibenzo-dioxins and furans • Dioxins and Dioxin like PCB's • Specific Individual PAH's		
W1	N/A	N/A	N/A
S1	TBC	TBC	TBC

Records will be kept of all monitoring carried out at site. The records will be made as soon as practicable and will be retained for at least 6 years from the date the records were made. More information regarding the environmental monitoring and record keeping will be detailed within the sites EMS.

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6. BAT APPRAISAL

6.1 Technology Appraisal

There is a number of potentially suitable Energy from Waste (EfW) technologies which have been considered for the application Site. Although all of the technologies reviewed are capable of treating refuse derived fuels and municipal wastes, a majority have been rejected on ground of environmental impact, operational cost or efficiency.

Moving grate combustion has a number of advantages for waste incineration for a number of factors:

- Capable of dealing with waste streams that are not necessarily homogeneous;
- High temperatures to achieve 850^{o}C for 2 seconds retention time in combustion chamber;
- Allows continuous feed disposal;
- Fully automated and thus ensuring safe operation even at extreme temperatures;
- Inclined moving (riddling) grate configuration increases mechanical turbulence to optimise destruction of wastes;
- An increase of mechanical turbulence to optimise destruction of wastes;
- Thermal oxidation of combustion gases within the secondary combustion chamber; and
- Proven, reliable technology with typically modular design allowing ease of installation and future maintenance.

A summary of the advantages and disadvantages of the available combustion technologies is included in Table 6.1.

The processes proposed for this facility have been selected against detailed criteria which are based on the application of BAT, both to the particular process operation and to the combined process as a whole.

The objectives for the process were established as follows:

- To provide a combustion technology that can produce energy from waste;
- To reliably achieve the emission limit values (ELVs) stipulated in Chapter IV of the IED and the latest iteration of the Waste Incineration BREF BAT conclusions;
- To achieve a high degree of plant availability and reliability;
- To offer a cost effective and financially low risk solution for the generation of renewable power; and
- To utilise conventional unit operation techniques and technologies which meet the above aims and are established as BAT.

The design principles for the process were therefore defined as follows:

- To provide equipment with a suitable level of robustness and redundancy for the process duty and the inherent risk associated with that duty;
- To utilise conventional technologies to avoid the business and reliability risks associated with appliances which are not yet commercially proven or widely available;

- To utilise primary NOx control combined with SNCR urea injection and dry flue gas treatment system; and
- To achieve excellent acid gas removal utilising dry or semi-dry injection (high acid gas removal efficiency).

Table 6.1 – BAT Comparison for Combustion Technologies

BAT Criteria	Moving Grate (MG) Combustion	Fluidised Bed Combustion	Gasification	Pyrolysis
Waste	Untreated (or partially treated) municipal waste is main application.	Generally only suitable for reasonably homogenous material. Can be operated at scale however generally with lower operational efficiency than moving grate systems.	Highly homogenous feedstock required. Numerous examples of operating and processing difficulties on RDF and residual wastes.	Highly homogenous feedstock required. Pyrolysis not typically suited at scale proposed. Preferred system for smaller modular waste treatment and chemical recycling plants – not considered further.
Emissions	Abated emissions meet required ELVs, lower levels are achieved by many plants.	Lower temperature leads to low NOx levels, but abatement will still be required to guarantee required ELVs.	Abated emissions meet required ELVs, and lower levels are achievable.	Technology not suitable at scale.
Residue Generation	Produces bottom ash (<3% carbon) and air pollution control (APC) residues.	Produces larger volumes of residues for disposal. Known issues with slagging. Higher parasitic loads than moving grate combustion.	Raw material consumption is lower than conventional incineration options and hence residue production is lower. Produces bottom ash (<5% TOC/3% LOI) and APC residues.	Technology not suitable at scale.
Odour	Odour management typically avoids nuisance.	Odour management typically avoids nuisance.	Odour management typically avoids nuisance. Due to pre-treated feedstock less likely to be odour producing than untreated municipal waste.	Technology not suitable at scale.

Raw Materials	Depends on flue gas treatment option selected.	Higher OPEX and Maintenance costs due to fluidisation sand requirements.	Selection of appropriate flue gas treatment minimises raw material consumption. Typically, less than conventional incineration options.	Technology not suitable at scale.
Noise	With appropriate abatement noise can successfully be controlled.	Similar to Moving Grate combustion systems.	Additional plant associated with OFA, bed recirculating systems can lead to higher noise levels than conventional systems, however with appropriate abatement noise can successfully be controlled.	Technology not suitable at scale.
Accidents	Proven technology with a large number of operational facilities. Similar accident potential as for other incineration options, mainly related to loss of storage of FGT reagents, supplementary fuel and residues.	Some operational experience, with mixed performance. Similar accident potential as for other incineration options, mainly related to loss of storage of FGT reagents, supplementary fuel and residues.	Operated on a smaller scale to conventional incineration options. Increased accident potential from storage of oxygen and pressurised oxygen delivery systems.	Technology not suitable at scale.

Electricity Generation

A condensing steam turbine and generator system has been determined as BAT for the project for the following reasons:

- Higher electrical generation efficiency than ORC systems;
- Higher reliability for sustained high power output;
- Allows configuration for reliable CHP configuration ensuring the plant is 'CHP ready' in the event of any viable offtakers.

Internal combustion systems, such as a gas turbine or a spark ignition gas engine are not suitable for conventional incineration processes utilising steam boilers.

Flue Gas Clean-up Technologies

The flue gas cleanup requirements for combustion systems are relatively minimal due to the combustion of the gases at relatively high temperatures.

NOx reduction is achieved primarily through the use of Selective Non-catalytic Reduction (SNCR). The SNCR system comprises the injection of urea into the first pass of the boiler. SNCR additionally has the benefit of inhibiting dioxin formation and is considered BAT for the facility.

Flue gas recirculation is not required in order to achieve the required NOx emissions and avoids potential additional operational expenditure issues associated with the operation of additional fans, flues and corrosion issues associated with the recirculation of untreated flue gases.

Acid gas removal is achieved by the use of a dry or semi-dry scrubbing system, utilising a sodium bicarbonate based reagent.

Dry scrubbing techniques compare favorably with wet scrubbers and generally achieve the best acid gas removal efficiencies. They also eliminate any water effluent treatment requirements and allows for use with other reagents such as activated carbon for the absorption and removal of heavy metals, dioxins, VOC and other harmful substances.

Dry Flue Gas Treatment (FGT) has become the predominant solution for modern flue gas facilities. The basic FGT consists of a filtration unit combined with an injection of dry sorbent. The actual acid gas neutralisation takes place in the duct and on the surface of the filter bags.

Benefits of dry FGT over wet scrubbing systems include:

- Low Investment Cost;
- Simplicity of design and operation;
- Proven ability to meet stringent emission limits;
- Small physical footprint;
- Lower parasitic loads;
- Flexible operation with regards to temperature and capacity; and
- Easy stabilisation of dry residues.

Lime, despite being a cheaper commodity requires larger storage and handling equipment and also presents a caustic hazard to operators. Sodium bicarbonate has therefore been selected as BAT for this facility.

The Installation will have a fabric filtration system which is designed to have the capacity to remove dust particles within anticipated emission limit values of the Industrial Emission Directive.

6.2 The Industrial Emissions Directive (IED) and Waste Incineration BREF Compliance

Chapter VI of the IED describes all aspects of management and operation of a process as well as the environmental impact but allows for the Member State to vary the requirements of the IED where there is good reason. Please refer to Table 6.4 that provides a detailed review against the IED requirements.

The Waste Incineration BREF was issued in December 2018 and requires all waste incineration plants to meet the necessary BAT conclusions. Please refer to Table 6.5 below that provides a detailed review against the BAT conclusions.

Table 6.2 – IED Chapter IV Compliance

IED Technical Requirement	Justification
Article 41 – 45	NA
Article 46 Control of Emissions Waste gases from waste incineration plants and waste co-incineration plants shall be discharged in a controlled way by means of a stack the height of which is calculated in such a way as to safeguard human health and the environment.	Significant ground level pollution will not arise as a result of this installation. Section 4 and 7 of this application discuss this in detail. Atmospheric Dispersion Modelling and Human Health Risk Assessment have been completed and provided as part of this application.
Emissions into air from waste incineration plants and waste co-incineration plants shall not exceed the emission limit values set out in parts 3 and 4 of Annex VI or determined in accordance with Part 4 of that Annex. If in a waste co-incineration plant more than 40 % of the resulting heat release comes from hazardous waste, or the plant co-incinerates untreated mixed municipal waste, the emission limit values set out in Part 3 of Annex VI shall apply.	All Chapter IV IED Emission Limit Values will be met by the Installation.
Discharges to the aquatic environment of waste water resulting from the cleaning of waste gases shall be limited as far as practicable and the concentrations of polluting substances shall not exceed the emission limit values set out in Part 5 of Annex VI.	There are no waste water discharges resulting from the gas cleaning process. The exhaust gases will be cleaned using dry processes, namely sodium bicarbonate / activated carbon injection and fabric filters. There will be no aqueous gas cleaning effluents.
The Emission Limit Values shall apply at the point where waste waters from the cleaning of waste gases are discharged from the waste incineration plant or waste co-incineration plant. When waste waters from the cleaning of waste gases are treated outside the waste incineration plant or waste co-incineration plant at a treatment plant intended only for the treatment of this sort of waste water, the emission limit values set out in Part 5 of Annex VI shall be applied at the point where the waste waters leave the treatment plant. Where the waste water from the cleaning of waste gases is treated collectively	N/A There are no waste water discharges resulting from the gas cleaning process. The exhaust gases will be cleaned using dry processes, namely sodium bicarbonate / activated carbon injection and fabric filters. There will be no aqueous gas cleaning effluents.

with other sources of waste water, either on site or off site, the operator shall make the appropriate mass balance calculations, using the results of the measurements set out in point 2 of Part 6 of Annex VI in order to determine the emission levels in the final waste water discharge that can be attributed to the waste water arising from the cleaning of waste gases. Under no circumstances shall dilution of waste water take place for the purpose of complying with the emission limit values set out in Part 5 of Annex VI.	
Waste incineration plant sites and waste co-incineration plant sites, including associated storage areas for waste, shall be designed and operated in such a way as to prevent the unauthorised and accidental release of any polluting substances into soil, surface water and groundwater. Storage capacity shall be provided for contaminated rainwater run-off from the waste incineration plant site or waste co-incineration plant site or for contaminated water arising from spillage or fire-fighting operations. The storage capacity shall be adequate to ensure that such waters can be tested and treated before discharge where necessary.	There will be an environmental management system (EMS) in place to include procedures to manage waste delivery and reception. Hazardous waste will not be accepted at the Installation. Roadways, floor and store surfaces will be designed and constructed so as to prevent any emissions to groundwater, surface water and soil. The majority of waste handling activities and the main processes will take place inside the process buildings. External activities onsite are limited to periodic and temporary external storage of wrapped RDF bales on a dedicated area of impermeable hardstanding with sealed drainage. All fire water will be contained onsite and tankered away to a suitable water treatment facility. Uncontaminated clean surface water runoff captured from roof drainage and external roadways / car parking areas will be discharged to the surface water drainage system (W1).
Without prejudice to Article 50(4)(c), the waste incineration plant or waste co-incineration plant or individual furnaces being part of a waste incineration plant or waste co-incineration plant shall under no circumstances continue to incinerate waste for a period of more than 4 hours uninterrupted where emission limit values are exceeded. The cumulative duration of operation in such conditions over 1 year shall not exceed 60 hours.	The plant will be operated with a CEMS which will be linked into the controls system. In the unlikely event of CEMS failure, a full replacement CEMS is held onsite which can be utilised in replacement of the duty CEMS unit.

The time limit set out in the second subparagraph shall apply to those furnaces which are linked to one single waste gas cleaning device.	
Article 47 Breakdown In the case of a breakdown, the operator shall reduce or closedown operations as soon as practicable until normal operations can be restored.	The feed system for the process is automated and in the event of temperature loss or departure from operating conditions the process will automatically shut down in a controlled manner.
Article 48 Monitoring of Emissions Member States shall ensure that the monitoring of emissions is carried out in accordance with Parts 6 and 7 of Annex VI.	Monitoring will meet all the requirements of Article 48. The plant is designed to have continuous emissions monitors (CEMS) located on the exhaust stack of the plant (Emission Point A1). The CEMS will be IED Ch IV complaint and monitor HCl, CO, NOx, NH_3, O_2, SO_2, VOC, particulates, H_2O, temperature, pressure and flow. TOC will be analysed by a Flame Ionisation Detector.
The installation and functioning of the automated measuring systems shall be subject to control and to annual surveillance tests as set out in point 1 of Part 6 of Annex VI.	The plant will be operated with a CEMS which will be linked into the controls system. In the unlikely event of CEMS failure, a full replacement CEMS is held onsite which can be utilised in replacement of the duty CEMS unit. Please see section 5.1 for more details.
The competent authority shall determine the location of the sampling or measurement points to be used for monitoring of emissions.	The exact positions of all sampling points will be agreed with the Environment Agency prior to commencement of operation.
All monitoring results shall be recorded, processed and presented in such a way as to enable the competent authority to verify compliance with the operating conditions and emission limit values which are included in the permit.	Reporting format will be agreed with the Environment Agency prior to commencement of operation and will reflect the requirements of the permit. CEMS will be backed up by non-continuous check monitoring to comply with the IED.
As soon as appropriate measurement techniques are available within the Union, the Commission shall, by means of delegated acts in accordance with Article 76 and subject to the conditions laid down in Articles 77 and 78, set the date from which continuous measurements of emissions into the air of heavy metals and dioxins and furans are to be carried out.	Should such a technique become available, it will be adopted as required.

Article 49 Compliance with the Emission Limit Values The emission limit values for air and water shall be regarded as being complied with if the conditions described in Part 8 of Annex VI are fulfilled.	The plant has been designed to comply with the specific ELV's stipulated by Part 8 of Annex VI of the IED. The reference conditions in the exhaust gas will be Temperature 273 K; Pressure 101.3 kPa, 11% oxygen; Dry Gas.
Article 50 Operating Conditions (1) Waste incineration plants shall be operated in such a way as to achieve a level of incineration such that the total organic carbon content of slag and bottom ashes is less than 3 % or their loss on ignition is less than 5 % of the dry weight of the material. If necessary, waste pre-treatment techniques shall be used.	The waste streams will be treated so the recoverable organic fraction will be removed by upstream processing. Bottom ash will therefore comply with the 3% TOC / 5% LOI limits. Testing will be undertaken quarterly for the first year and annually thereafter to demonstrate this. The design, which incorporates a combustion chamber, ensures that the minimum temperature of 850°C is met at the final point of combustion whenever waste is being fed, and the residence time of combustion gases at or above this temperature exceeds 2 seconds. The EMS includes procedures for the checking of waste composition and removal of contaminants.
(2). Waste incineration plants shall be designed, equipped, built and operated in such a way that the gas resulting from the incineration of waste is raised, after the last injection of combustion air, in a controlled and homogeneous fashion and even under the most unfavourable conditions, to a temperature of at least 850°C for at least two seconds. Waste co-incineration plants shall be designed, equipped, built and operated in such a way that the gas resulting from the co-incineration of waste is raised in a controlled and homogeneous fashion and even under the most unfavourable conditions, to a temperature of at least 850 °C for at least two seconds. If hazardous waste with a content of more than 1% of halogenated organic substances, expressed as chlorine, is incinerated or co-incinerated, the temperature required to comply with the first and second subparagraphs shall be at least 1100°C.	Combustion conditions in the combustion chamber and temperatures within the boiler ensure that both the waste and the resultant gas meet a temperature of 850°C for at least 2 seconds.

In waste incineration plants, the temperatures set out in the first and third subparagraphs shall be measured near the inner wall of the combustion chamber. The competent authority may authorise the measurements at another representative point of the combustion chamber.	
(3) Each combustion chamber of a waste incineration plant shall be equipped with at least one auxiliary burner. This burner shall be switched on automatically when the temperature of the combustion gases after the last injection of combustion air falls below the temperatures set out in paragraph 2. It shall also be used during plant start-up and shut-down operations in order to ensure that those temperatures are maintained at all times during these operations and as long as unburned waste is in the combustion chamber. The auxiliary burner shall not be fed with fuels which can cause higher emissions than those resulting from the burning of gas oil as defined in Article 2(2) of Council Directive 1999/32/EC of 26 April 1999 relating to a reduction in the sulphur content of certain liquid fuels, liquefied gas or natural gas.	The combustor will be fitted within two auxiliary fuel oil burners to ensure combustion temperature reaches 850°C prior to waste introduction. The auxiliary burners will be fired on industrial heating oil.
(4). Waste incineration plants and waste co-incineration plants shall operate an automatic system to prevent waste feed in the following situations: (a) at start-up, until the temperature set out in paragraph 2 of this Article or the temperature specified in accordance with Article 51(1) has been reached; (b) whenever the temperature set out in paragraph 2 of this Article or the temperature specified in accordance with Article 51(1) is not maintained; (c) whenever the continuous measurements show that any emission limit value is exceeded due to disturbances or failures of the waste gas cleaning devices.	Fuel is transferred from the reception bunker to the grate hopper where the feed rate is controlled via metering a metering system. This is an automated system. The feed system will have automatic shutdown to prevent waste feed if the temperature in the combustor at the final point of combustion is <850^{o}C, or if emission limit values, obtained via the CEMS, look to be breached.
Article 51 Authorisation to change operating conditions	No requests to change operating conditions will be required.
Article 52 Delivery and reception of waste The operator of the waste incineration plant or waste co-incineration plant shall take all necessary precautions concerning the delivery and reception of waste in order to	All waste will be received directly into a purpose designed Fuel Reception Hall. All pollution abatement and prevention methodologies are detailed in this main application document.

prevent or to limit as far as practicable the pollution of air, soil, surface water and groundwater as well as other negative effects on the environment, odours and noise, and direct risks to human health.	
The operator shall determine the mass of each type of waste, if possible according to the European Waste List established by Decision 2000/532/EC, prior to accepting the waste at the waste incineration plant or waste co-incineration plant.	The site will only receive non-hazardous refuse derived fuels and mixed municipal waste feedstocks. The range of waste codes from the List of Wastes (England) Regulations 2005 that will constitute this prepared fuel is included in Section 3.5 of the application. This will be weighed at the weighbridge. Unsuitable material and material that is hazardous, or contains unwanted materials, will not be accepted. All materials charged into the combustion system will be via a metering system including weighted conveyors.
Prior to accepting hazardous waste at the waste incineration plant or waste co-incineration plant, the operator shall collect available information about the waste for the purpose of verifying compliance with the permit requirements specified in Article 45(2).	No hazardous waste will be accepted into the plant. All wastes will be non-hazardous refuse derived fuel only.
Prior to accepting hazardous waste at the waste incineration plant or waste co-incineration plant, at least the following procedures shall be carried out by the operator:	No hazardous waste will be accepted into the plant. All wastes will be non-hazardous refuse derived fuel only.
Article 53 Residues Residues shall be minimised in their amount and harmfulness. Residues shall be recycled, where appropriate, directly in the plant or outside.	It is a new installation so a waste minimisation audit is yet to be carried out. This will be done in compliance with the permit condition specified. Bottom ash will be recycled for use as aggregate where appropriate.
Transport and intermediate storage of dry residues in the form of dust shall take place in such a way as to prevent dispersal of those residues in the environment.	Bottom ash from the moving grate is immediately quenched for storage prior to export. Boiler ash is transferred through a humidifier for dampening prior to storage in a common bunker with the bottom ash. APC residue is removed from the filter hoppers and collected in an enclosed silo.

Prior to determining the routes for the disposal or recycling of the residues, appropriate tests shall be carried out to establish the physical and chemical characteristics and the polluting potential of the residues. Those tests shall concern the total soluble fraction and heavy metals soluble fraction.	Chemical analysis will be undertaken regularly.

Table 6.3 – Waste Incineration BREF BAT Conclusion Comparison

BAT Reference	BAT Conclusion	Justification
BAT 1	In order to improve the overall environmental performance, BAT is to elaborate and implement an environmental management system (EMS) that incorporates the features provided within the BREF document.	Energy Ventures No1 Ltd will have an Environmental Management System in place that incorporates the features provided within the BREF document.
BAT 2	BAT is to determine either the gross electrical efficiency, the gross energy efficiency, or the boiler efficiency of the incineration plant as a whole or of all the relevant parts of the incineration plant.	The gross electrical efficiency of the plant is 31.86%.
BAT 3	BAT is to monitor key process parameters relevant for emissions to air and water including those given in the Guidance.	Emissions to air will be monitored by CEMS as described in the permit application. In addition, in accordance with the BREF Guidance: • Flue-gas from the incineration of waste will be continuously monitored for flow, oxygen content, temperature, pressure and water vapour content; and • Combustion chamber will be continuously monitored for temperature. There will be no emissions to water from flue gas cleaning as the proposed system uses dry techniques. There is no bottom ash treatment carried out on site. Boiler blow down will be used for ash wetting to prevent dust production.
BAT 4	BAT is to monitor channeled emissions to air with at least the frequency given below and in accordance with EN standards. If the EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	CEMS will monitor the relevant emissions to air detailed within the guidance. The waste accepted on site will have a low mercury content, therefore periodic monitoring is considered appropriate. Periodic testing of the fuel will provide confirmation of substance levels which are not continuously monitored.

BAT 5	BAT is to appropriately monitor channeled emissions to air from the incineration plant during OTNOC	Emissions to air will be monitored appropriately during abnormal emissions.
BAT 6	BAT is to monitor emissions to water from FGC and/or bottom ash treatment with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	There will be no emissions to water from flue gas cleaning as the proposed system uses dry techniques. There is no bottom ash treatment carried out on site.
BAT 7	BAT is to monitor the content of unburnt substances in slags and bottom ashes at the incineration plant with at least the frequency given below and in accordance with EN standards.	TOC's will be monitored once every three months in accordance with the guidance.
BAT 8	For the incineration of hazardous waste containing POPs, BAT is to determine the POP content in the output streams (e.g. slags and bottom ashes, flue-gas, waste water) after the commissioning of the incineration plant and after each change that may significantly affect the POP content in the output streams.	n/a – no hazardous waste is incinerated.
BAT 9	In order to improve the overall environmental performance of the incineration plant by waste stream management (see BAT 1), BAT is to use all of the techniques (a) to (c) given below, and, where relevant, also techniques (d), (e) and (f).	The sites EMS will be complete with details on the following: • The waste that can be processed on site; • Pre-acceptance procedures; • Waste acceptance procedures; • A waste tracking system and inventory; and • Waste segregation.
BAT 10	In order to improve the overall environmental performance of the bottom ash treatment plant, BAT is to set up and implement an output quality management system (see BAT 1).	n/a – there is no bottom ash treatment plant on site.

BAT 11	In order to improve the overall environmental performance of the incineration plant, BAT is to monitor the waste deliveries as part of the waste acceptance procedures (see BAT 9 c) including, depending on the risk posed by the incoming waste, the elements given in the guidance.	The waste acceptance procedure will include the monitoring of waste deliveries for: • Weighing of the waste deliveries; • Visual inspection; and • Periodic sampling of waste deliveries and analysis of key properties/substances (e.g. calorific value, content of halogens and metals/metalloids). Due to the type of waste and the UK radioactive substances regulation minimising the risk of radioactive material accidently arriving at the site radioactivity detection will not be provided.
BAT 12	In order to reduce the environmental risks associated with the reception, handling and storage of waste, BAT is to use both of the techniques given in the guidance.	Waste reception, waste handling and the storage of waste will take place within the relevant storage areas on impermeable surfaces with sealed drainage. No waste will be accepted on site unless the site has adequate waste storage capacity. This will be achieved by: • The maximum waste storage capacity being clearly established on site; and • Regular monitoring of the waste stored on site against the maximum allowed storage capacity.
BAT 13	In order to reduce the environmental risk associated with the storage and handling of clinical waste, BAT is to use a combination of the techniques given in the guidance.	n/a – no clinical waste is accepted on site.
BAT 14	In order to improve the overall environmental performance of the incineration of waste, to reduce the content of unburnt substances in slags and bottom ashes, and to reduce emissions to air from the	RDF and mixed municipal waste will be delivered directly to the Fuel Reception Hall. Walking floor HGV's will reverse into the unloading lane and unload directly into the reception bunker, during which a visual

	incineration of waste, BAT is to use an appropriate combination of the techniques given in the Guidance.	inspection will take place. The crane system ensures sufficient blending and mixing of the waste. The plant will be controlled by an advanced DCS control system which will optimise and control the process with special attention at combustion, abatement, flue gas treatment and monitoring.
BAT 15	In order to improve the overall environmental performance of the incineration plant and to reduce emissions to air, BAT is to set up and implement procedures for the adjustment of the plant's settings, e.g. through the advanced control system (see description in Section 5.2.1), as and when needed and practicable, based on the characterisation and control of the waste (see BAT 11).	The plant will be controlled by an advanced DCS control system which will optimise and control the process with special attention at combustion, abatement, flue gas treatment and monitoring.
BAT 16	In order to improve the overall environmental performance of the incineration plant and to reduce emissions to air, BAT is to set up and implement operational procedures (e.g. organisation of the supply chain, continuous rather than batch operation) to limit as far as practicable shutdown and start-up operations.	Procedures will be in place to limit shut-down and start-up operations as far as practically possible.
BAT 17	In order to reduce emissions to air and, where relevant, to water from the incineration plant, BAT is to ensure that the FGC system and the waste water treatment plant are appropriately designed (e.g. considering the maximum flow rate and pollutant concentrations), operated within their design range, and maintained so as to ensure optimal availability	The flue gas cleaning system and water treatment plant are appropriately designed for the facility, will be operated within the design range and maintained to ensure optimal availability.
BAT 18	In order to reduce the frequency of the occurrence of OTNOC and to reduce emissions to air and, where relevant, to water from the incineration plant during OTNOC, BAT is to set up and implement a risk-based OTNOC management plan as part of the environmental	An abnormal operation risk based management plan will be produced as part of the EMS in accordance with the guidance.

	management system (see BAT 1) that includes all of the elements within the guidance.	
BAT 19	In order to increase the resource efficiency of the incineration plant, BAT is to use a heat recovery boiler.	A steam boiler will be used on site and is considered BAT. The resultant steam is then passed to a steam turbine and generator set which produces electricity.
BAT 20	In order to increase the energy efficiency of the incineration plant, BAT is to use an appropriate combination of the techniques given in the guidance.	In accordance with the guidance, the following techniques are used to increase energy efficiency: • Reduction of the flue-gas flow; • Minimisation of heat losses; • Optimisation of the boiler design; and • High steam conditions.
BAT 21	In order to prevent or reduce diffuse emissions from the incineration plant, including odour emissions, BAT is to: store solid and bulk pasty wastes that are odorous and/or prone to releasing volatile substances in enclosed buildings under controlled subatmospheric pressure and use the extracted air as combustion air for incineration or send it to another suitable abatement system in the case of a risk of explosion; store liquid wastes in tanks under appropriate controlled pressure and duct the tank vents to the combustion air feed or to another suitable abatement system; control the risk of odour during complete shutdown periods when no incineration capacity is available, e.g. by sending the vented or extracted air to an alternative abatement system, e.g. a wet scrubber, a fixed adsorption bed;	An air extraction system will be in place resulting in odourous air within the building / reception bunker being thermally destroyed by the combustion system. In the event of a shutdown where no incineration capacity is available, no more waste deliveries will be accepted on site. If any waste stored on site exceeds the maximum storage times on site, the waste will be removed off site. This is considered BAT for the site.

	minimising the amount of waste in storage, e.g. by interrupting, reducing or transferring waste deliveries, as a part of waste stream management (see BAT 9); storing waste in properly sealed bales.	
BAT 22	In order to prevent diffuse emissions of volatile compounds from the handling of gaseous and liquid wastes that are odorous and/or prone to releasing volatile substances at incineration plants, BAT is to feed them to the furnace by direct feeding.	n/a – no gaseous and liquid wastes are processed on site.
BAT 23	In order to prevent or reduce diffuse dust emissions to air from the treatment of slags and bottom ashes, BAT is to include in the environmental management system (see BAT 1) the following diffuse dust emissions management features: identification of the most relevant diffuse dust emission sources (e.g. using EN 15445); definition and implementation of appropriate actions and techniques to prevent or reduce diffuse emissions over a given time frame.	n/a – there is no treatment of slags and bottom ashes on site.
BAT 24	In order to prevent or reduce diffuse dust emissions to air from the treatment of slags and bottom ashes, BAT is to use an appropriate combination of the techniques given in the guidance.	n/a – there is no treatment of slags and bottom ashes on site.
BAT 25	In order to reduce channeled emissions to air of dust, metals and metalloids from the incineration of waste, BAT is to use one or a combination of the techniques given in the guidance.	Particulate is controlled by the bag filter system. Activated carbon (dry sorbent injection) is used which gives reliable and effective heavy metal (e.g. mercury) reductions, and for the majority of metals particulate abatement is the main means of ensuring that releases are minimised. This is considered BAT for the plant and the BAT-AEL's will be met.
BAT 26	In order to reduce channeled dust emissions to air from the enclosed treatment of slags and bottom ashes with extraction of air (see BAT 24 f), BAT is to treat the extracted air with a bag filter (see Section 5.2.2).	n/a – there is no treatment of slags and bottom ashes on site.

BAT 27	In order to reduce channeled emissions of HCl, HF and SO_2 to air from the incineration of waste, BAT is to use one or a combination of the techniques given below.	Acid gas removal is achieved by the use of a dry scrubbing system, utilising a sodium bicarbonate based reagent. This is considered BAT for the plant.
BAT 28	In order to reduce channeled peak emissions of HCl, HF and SO2 to air from the incineration of waste while limiting the consumption of reagents and the amount of residues generated from dry sorbent injection and semi-wet absorbers, BAT is to use technique (a) or both of the techniques given in the guidance.	Reagent dosage will be automated based on continuous monitoring. This is considered BAT for the plant and the BAT-AEL's will be met. Recirculation of reagents is not necessary due to the reagents used being of a high surface area.
BAT 29	In order to reduce channeled NOX emissions to air while limiting the emissions of CO and N2O from the incineration of waste and the emissions of NH3 from the use of SNCR and/or SCR, BAT is to use an appropriate combination of the techniques given in the guidance.	The NOx that is formed during the combustion process is abated using a Selective Non-Catalytic Reaction (SNCR) system. This is considered BAT for the plant and the BAT-AEL's will be met.
BAT 30	In order to reduce channeled emissions to air of organic compounds including PCDD/F and PCBs from the incineration of waste, BAT is to use techniques (a), (b), (c), (d), and one or a combination of techniques (e) to (i) given in the guidance.	The primary method of reducing the emissions of dioxins is by careful control of the conditions in the combustor. Boiler residence time is controlled to minimise de novo formation. PAC injection will remove dioxins and furans from the gas phase, followed by bag filters which will provide efficient particulate abatement. In addition, in line with BAT the following techniques will be used: • Optimisation of the incineration process; • Control of the waste feed; • On-line and off-line boiler cleaning; • Rapid flue-gas cooling; and • Dry Sorbent Injection. This is considered BAT for the plant and the BAT-AEL's will be met.
BAT 31	In order to reduce channeled mercury emissions to air (including mercury emission peaks) from the incineration of waste, BAT is to use one or a combination of the techniques given in the guidance..	Activated carbon (dry sorbent injection) is used which gives reliable and effective heavy metal (e.g. mercury) reductions, and for the majority of metals

		particulate abatement is the main means of ensuring that releases are minimised. In line with BAT the following noted techniques are used. This is considered BAT for the plant and the BAT-AEL's will be met.
BAT 32	In order to prevent the contamination of uncontaminated water, to reduce emissions to water, and to increase resource efficiency, BAT is to segregate waste water streams and to treat them separately, depending on their characteristics	Uncontaminated clean surface water runoff captured from roof drainage and external roadways / car parking areas will be discharged to the surface water drainage system (W1). Any effluent arising from the process plant will be collected in an effluent collection tank and discharged via sewer (S1). All domestic foul effluent arisings will also be discharged via sewer. Water streams are collected and treated separately and this is considered BAT for this site.
BAT 33	In order to reduce water usage and to prevent or reduce the generation of waste water from the incineration plant, BAT is to use one or a combination of the techniques given in the guidance.	A dry scrubbing system is proposed for flue gas cleaning which does not generate waste water.
BAT 34	In order to reduce emissions to water from FGC and/or from the storage and treatment of slags and bottom ashes, BAT is to use an appropriate combination of the techniques given below, and to use secondary techniques as close as possible to the source in order to avoid dilution.	A dry scrubbing system is proposed for flue gas cleaning which does not generate waste water. There is no treatment of slags and bottom ashes on site. The site will undertake the primary process outlined in the BREF which is to optimise the incineration process and FGC systems in order to reduce organic compounds within the ash.
BAT 35	In order to increase resource efficiency, BAT is to handle and treat bottom ashes separately from FGC residues.	Bottom ash and APC Residue (Air Pollution Control (APC) residues) are handled separately.
BAT 36	In order to increase resource efficiency for the treatment of slags and bottom ashes, BAT is to use an appropriate combination of the techniques given below based on a risk assessment depending on the hazardous properties of the slags and bottom ashes.	n/a – there is no treatment of slags and bottom ashes on site.

BAT 37	In order to prevent or, where that is not practicable, to reduce noise emissions, BAT is to use one or a combination of the techniques in the guidance.	A noise impact assessment has been carried out as part of the permit application which demonstrates that the noise impacts from site will have an insignificant effect on existing residential receptors due to the appropriate design, mitigation and intervening distances to the nearest residential receptors. All operational measures provided within the guidance will be carried out with noise attenuation being used where necessary. In line with BAT the following techniques will be used on site: • Appropriate location of equipment and buildings; • Operational measures; • Low-noise equipment; • Noise Attenuation; and • Noise-control equipment / infrastructure.

EPR 5.01 The Incineration of Waste – BAT Review

The following BAT demonstration is based on the EPR 5.01 The Incineration of Waste. The BAT demonstration is summarised in the following tables. These detail all of the indicative BAT requirements insofar as they apply to this process.

Table 6.4 – EPR 5.01 BAT Justification

Indicative Requirement	BAT Justification
Waste code	The proposed technology uses non-hazardous refuse derived fuel. The waste codes from the List of Wastes (England) Regulations 2005 are identified in Table 3.3.
Pre-treatment	Before entering the combustion system, the feedstock will be pre-processed.
EMS	The Applicant will operate to an environmental management system (ISO14001) which will ensure that procedures are in place for fuel input and raw material management. All necessary operating procedures will be in place and documented and stored within the company EMS. The Applicant will aim for certification of the renewable energy facility to ISO14001 within the first year of operation.
Odour control – internal storage	Entry to the waste reception area is via electrically controlled fast acting roller shutter doors. Vehicles will enter backwards and discharge the waste onto the floor of the waste reception hall. The doors are complete with air curtains to prevent any odourous emissions escaping during the unloading of waste. Once unloaded the vehicles will exit the building and the roller shutter doors are closed. To avoid any odour emissions, the building is kept at slight negative pressure. An air extraction system will be in place resulting in odourous air within the building being thermally destroyed by the combustion system. During periods of planned shutdown, the feedstock within the storage system will be run down prior to the shutdown. All doors will remain closed as far as practicable. Fuel stores will only start to be increased again slightly in advance of the planned recommencement date. If there are extended periods of unplanned shutdowns deliveries will be diverted to other suitably permitted facilities. For longer unplanned shutdowns the feedstock will be removed from site.
Fire fighting	The feedstock is not volatile or easily combustible. An automatic fire detection and suppression system will be installed on site. All fire water will enter the drainage system and be contained within the building. All fire water will then be tankered away to a suitable water treatment facility. A Fire Prevention Plan is included in *Annex I – Fire Prevention Plan*. The Fire Prevention Plan relates to the internal storage of all fuel product and provides

	the necessary information on site infrastructure, storage locations, storage practices, monitoring equipment and emergency response procedures.
Storage of fuel and treatment chemicals	Treatment chemicals will be stored in drums, tanks or bags (whichever are required for the quantity needed to be held in storage). These will be stored in the building and on hardstanding, within bunded areas that can contain 110% of the largest drum or 25% of the total storage capacity, whichever is the greater.
Preventing rainwater contamination	There are no external processes on site. Surface water run-off from the site roads will enter the existing surface water drainage system.
Incoming waste covered	Incoming waste will be delivered in covered vehicles with walking floor trailers and discharged internally with the Fuel Reception Hall.
Litter avoidance	It is not anticipated that litter will be a problem. If litter does arise a litter patrol will be initiated at the end of each working day.
Maximisation of homogeneity of feed	Homogeneity of the waste is achieved by pre-treatment. A fuel specification is in place which stipulates the parameters that must be achieved.
Inspection and removal	The waste acceptance procedures will include the validation of a load against the pre-acceptance documentation. Loads may be inspected at the weighbridge and during unloading. A waste rejection procedure will be in place for unsuitable loads / part loads / items within a load.
Feed transfer	The combustion system has an independent fuel feed system. RDF is transferred to a fuel feeding system to allow continuous feed into the combustion system. This is an automated system. The control system automatically controls the feed of feedstock to the system. The Fuel Reception Hall can hold approximately 3 days of waste and along with the external bale storage area it allows the continuous operation of the combustion system without major load reduction.
Control of dust emissions	The waste will neither be dry or friable (i.e. the moisture content will be sufficiently high so to avoid excessive dust) therefore dust generation is unlikely. The waste is also delivered and stored within an enclosed building and enclosed conveyors so dust generation is further minimised. Bag filters are used to reduce dust emissions from the main process. Ash residues will be stored in enclosed vessels and removed from the facility in enclosed vehicles.
Odour prevention. Storage time within the buffer store	Entry to the waste reception area is via electrically controlled fast acting roller shutter doors. Vehicles will enter backwards and discharge the waste onto the floor of the waste reception hall. The doors are complete with air curtains to prevent any odourous emissions escaping during the unloading of waste. Once unloaded the vehicles will exit the building and the roller shutter doors are closed.

	To avoid any odour emissions, the building is kept at slight negative pressure. An air extraction system will be in place resulting in odourous air within the building being thermally destroyed by the combustion system. The process itself has no significant potential for odours as the combustion system thermally oxidises any odorous compounds. During short-term shutdowns the storage areas will be kept closed and the stocks of feedstock will be reduced. During long-term shutdowns in addition to the previous actions, no incoming waste will be accepted. The Applicant will operate to an environmental management system (EMS) that includes procedures relating to all reception and handling areas.
Automatic waste feed prevention system	The combustion system has an independent fuel feed system. The installation is provided with a control system that automatically controls the feed of waste to the combustion system. At start-up waste cannot be fed to the system until the combustor reaches the required operating conditions. The feed system for the process is automated and in the event of temperature loss or departure from operating conditions the process will automatically shut down in a controlled manner.
Furnace interlock	The waste feed system is interlocked with the combustion vessel conditions to prevent feed taking place when combustion is inadequate or other parameters are not within limits.
Airtight charging design, with interlock for chute or hopper	The transfer of waste to the combustion system is controlled. The combustion system has an independent fuel feed system. The waste will be transferred via a conveyor system into the metering bins. This is then continuously fed into the combustion system. The conveyors also ensure that the fuel is compressed and air free to allow controlled combustion to take place. In the event of the combustion system deviating from its normal operating conditions, the control system will automatically alter the waste feed rate to ensure optimum conditions are achieved.
Charging rate and firing diagram, throughput rate, optimised combustion, waste residence time	Please refer to the firing diagram provided within *Annex B – Technical Information.*
Pyrolysis and Gasification	N/A
Feed of RDF	Before entering the combustion plant, the feedstock will be transferred through the pre-processing plant.
Furnace Requirements	Combustion typically takes place at temperatures typically between 850 to 1,000°C.

	CFD modelling of the combustor will be undertaken to demonstrate that residence times are above 850°C in excess of 2 seconds. Following commissioning of this installation, the results will be validated. No waste that contains a significant chlorinated or otherwise halogenated component is accepted. This is to ensure that halogen content cannot exceed 1% (as chlorine). The combustion process is controlled on temperature and remains above 6% O_2 at all times.
Validation of combustion conditions	CFD modelling of the combustor will be undertaken to demonstrate that residence times above 850°C in excess of 2 seconds. This will inform the design of the combustor. Testing using plug flow methodologies will be undertaken by the operator as part of the commissioning process.
Measuring oxygen levels	Measurement of oxygen is taken by extractive measurement in the stack as part of the emissions monitoring package to allow sample data to be converted to standard conditions.
Combustion Control	There are numerous temperature measuring positions throughout the thermal process which ensure correct combustion conditions at all times including at the point of final combustion.
Dump stacks and by-passes	There will not be any dump stacks or by-passes during normal operation at the installation.
Flue gas recirculation	Flue gas recirculation is not considered necessary as NOx limits can be met without. Grate cooling achieves similar 'Low NOx' emissions.
Cooling systems	Cooling will be provided by an air-cooled condenser. The purpose of the condenser is to condense the steam by dissipating low grade heat to the atmosphere. The condensate recovered is returned to the deaerator and makes up the majority of the boiler feed water. There will be no cooling towers required, therefore, there will be no use of biocides in any cooling water systems and no release to land.
Boiler design	The boiler design has been chosen to prevent as far as possible the formation of dioxins and furans. The boiler, connecting duct work and economiser sections are designed to minimise the residence time of gases. This is in order to minimise the formation of dioxins and furans by de-Novo synthesis.
Environmental Performance Indicators	Key process performance indicators will be devised in discussion with the Agency prior to commencement of operation of the facility.

6.3 Resource Efficiency and Climate Change

Basic Energy Efficiency Measures

The plant and ancillaries have been designed to operate with a high level of energy efficiency. Key energy efficiency measures that have been included within the design of the plant are as follows:

- All plant and equipment will be individually monitored and controlled using a DCS monitoring system and PLC controls, optimised for efficiency of operation;
- All heat generated by the combustion plant will be recovered and used for the generation of electricity;
- All aspects of the combustion plant are controlled in real time to ensure maximum thermal efficiency and operational control;
- All plant energy data will be monitored and recorded and targeted to ensure optimal plant performance; and
- As part of the company's environmental management system, targets will be set regarding the increased thermal efficiency of the plant and the potential export of heat to neighbouring facilities.

Development of KPI's

The Operator will establish Key Performance Indicators (KPIs) when site electricity generation figures are available. The composition of the waste materials in the process will not vary greatly over the life of the plant. Should any site equipment or technology be replaced, efforts will be made to replace the unit with one which is more energy efficient, if available.

The Operator will create KPIs based on monitoring data from how much energy is used to run the site and whether this can be reduced. Within six months of operating the Applicant will produce a report detailing the energy uses at the site and where energy use improvements, if any, can be made.

Basic Design Principles

The Installation has been designed to ensure that all potential electrical energy is generated and supplied to the grid. A summary of the basic measures has been provided below:

- Wherever possible the plant utilises the waste heat to generate steam, which is used to generate electricity;
- All parasitic loads of the plant will be provided by the generated electricity, and hence the net energy imports are required to power and operate the plant;
- All pipelines and thermal processes are lagged and insulated to ensure that heat loss is minimised and prevented;
- The steam turbine specified for the plant has a high electrical and thermal efficiency;
- All ancillary plant (fans and motors) have been specified with high efficiency electrical motors and variable speed drives;

- The plant is controlled by PLC and optimised to ensure maximum efficiency and minimal operation of ancillary components where required;
- The Installation uses high efficiency electrical generation technology (i.e. steam turbine).
- Waste heat will be used for internal uses where possible i.e. preheating combustion air etc;
- The overall energy efficiency of the plant has been designed around to achieve 31.86% efficiency which is in line with the efficiency target stipulated for incineration processes; and
- The plant will be maintained at steady capacity to avoid downtime.

Raw Materials and Water Usage

- The plant has been designed to ensure that all residues are reused or recycled where possible; and
- The net water use meets the sector average (250 – 1100kg per tonne of material processed).

Avoidance, Recovery and Disposal of Waste

- All feedstock delivered to the site will be subject to an acceptance and pre-acceptance process that should ensure that the potential for inappropriate feedstock delivery is minimised;
- The site has a detailed inspection process to avoid unsuitable wastes to be introduced to the process; and
- The safe storage of rejected loads has been provided within and procedures will be in place for dealing with such loads to ensure that they are safely stored and dispatched for onward disposal. The storage times will be minimised.

An Energy Balance has been provided within *Annex B – Technical Information.*

6.4 CHP-Ready Assessment

The plant has been configured to maximise power generation and can be configured for CHP mode operation. The turbine has the capacity to operate in a CHP mode and steam could be diverted to heat exchangers if required (CHP-ready).

Please refer to *Annex K – CHP Assessment* for more information.

7. IMPACT TO THE ENVIRONMENT

7.1 Impacts to Air

An assessment has been carried out to determine the potential air quality impacts associated with the proposed combustion plant.

Scope of the Assessment

The scope of the assessment has been determined in the following way:

- Review of air quality data for the area surrounding the site, including data from the Defra Air Quality Information Resource (UK-AIR);
- Desk study to confirm the location of nearby areas that may be sensitive to changes in local air quality; and
- Review and modelling of emissions data which has been used as an input to the UK Atmospheric Dispersion Modelling System (ADMS) dispersion model.

The assessment for the facility comprises a review of emission parameters for the installation and dispersion modelling to predict ground-level concentrations of pollutants at sensitive human and habitat receptor locations.

Predicted ground level concentrations are compared with relevant air quality standards for the protection of health and critical levels/ loads for the protection of sensitive ecosystems and vegetation.

This modelling is presented within *Annex D – Air Quality Assessment and HHRA.*

7.2 Sensitive Human Health Receptors

Specific receptors have been identified where people are likely to be regularly exposed for prolonged periods of time (e.g. residential areas). The location of the discrete sensitive receptors is presented in Table 7.1 below.

Table 7.1 – Sensitive Human Health Receptors

Ref.	Receptor	Type	Easting	Northing
R1	Cafe	Leisure	450968	433368
R2	Fitness Studio	Leisure	450994	433215
R3	Lennerton Lodge	Residential	452100	432936
R4	Bishopdyke Road	Residential	452248	433619
R5	Low Hall Farm	Residential	453045	433465
R6	New Lennerton Lane	Residential	452867	433730
R7	Bishopdyke Road	Residential	451650	433678
R8	Bishopdyke Road	Residential	450971	433718
R9	Bishopdyke Road	Residential	450803	433713
R10	Moor Lane	Residential	450458	433717
R11	Saxon Court	Residential	450423	433514

R12	Saxon Mews	Residential	450415	433409
R13	Damson Drive	Residential	450227	433315
R14	Blenheim Garth	Residential	450072	433063
R15	Norden's Barn Farm	Residential	451253	431805
R16	Proposed housing (Local Plan)	Residential	450376	432869

The report concludes that the predicted maximum off-site concentrations are well below the relevant air quality standards for all pollutants considered.

This modelling presented within *Annex D – Air Quality Assessment and HHRA.*

7.3 Impact on Sensitive Habitat Sites

The Environment Agency's risk assessment guidance [1] states that the impact of emissions to air on vegetation and ecosystems should be assessed for the following habitat sites within 10 km of the source:

- Special Areas of Conservation (SACs) and candidate SACs (cSACs) designated under the EC Habitats Directive[2];
- Special Protection Areas (SPAs) and potential SPAs designated under the EC Birds Directive[3]; and
- Ramsar Sites designated under the Convention on Wetlands of International Importance[4].

Within 2 km of the source:

- Sites of Special Scientific Interest (SSSI) established by the 1981 Wildlife and Countryside Act;
- National Nature Reserves (NNR);
- Local Nature Reserves (LNR);
- local wildlife sites (Sites of Interest for Nature Conservation, SINC and Sites of Local Interest for Nature Conservation, SLINC); and
- Ancient woodland.

The location of the local habitat sites is presented in Table 7.2 below.

Table 7.2 – Habitat Sites

Receptor	Primary Habitat	Approx. Location (Relative to Site)
H1. Pasture Opposite Gypsum Works LWS	Grassland	1.4 km north
H2. Ash Tree Dike and Ponds LWS	Open water and woodland	1.6 km south southwest

1 https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

2 Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora.

3 Council Directive 79/409/EEC on the conservation of wild birds

4 Ramsar (1971), The Convention of Wetlands of International Importance especially as Waterfowl Habitat.

The report concludes that the predicted process contributions are negligible compared with the critical levels for airborne NOx, SO_2, NH_3 and HF and critical loads for nutrient nitrogen deposition and acidification at nearby sensitive habitat sites.

Please refer to *Annex D – Air Quality Assessment and HHRA* for more information.

7.4 Human Health Risk Assessment

A human health risk assessment has been carried out to assess the possible impacts on human health arising from dioxins and furans (PCDD/F) and dioxin-like PCBs emitted from the proposed facility. The assessment has been carried out under the worst-case scenario, namely that of an individual exposed for a lifetime to the effects of the highest airborne concentrations and consuming mostly locally grown food.

The assessment has identified and considered the most plausible pathways of exposure for the individuals considered (farmer and resident). Deposition and subsequent uptake of the compounds of potential concern (COPCs) into the food chain is likely to be the more numerically significant pathway over direct inhalation.

The maximum contribution of the facility to the COT TDI is 3.5% for the farmer receptors and 0.2% for the residential receptors. For the farmer this assumes as a worst-case that these receptors are located at the closest farming area to the facility and all of their food is reared and grown at this location and represents an extreme worst-case. Therefore, taking into account the worst-case assumptions, the impact of emissions on local sensitive receptors is considered to be not significant.

The report concludes that it has been demonstrated that for the maximally exposed individual, exposure to dioxins, furans and dioxin-like PCBs is not significant.

Please refer to *Annex D – Air Quality Assessment and HHRA* for more information.

7.5 Global Warming Potential

The global warming potential of the plant has been addressed within *Annex L – Global Warming Potential.*

7.6 Impacts to Land

There are no impacts to land relating to this permit application.

7.7 Impacts to Controlled Water

There are no impacts to controlled water relating to this permit application.

7.8 Impacts to Sewer

Any effluent arising from the process plant will be collected in an effluent collection tank and discharged via sewer (S1).

All domestic foul effluent arisings will also be discharged via sewer.

All discharges will be made under consent to Yorkshire Water.