ADVANCED ENERGY RECOVERY FACILITY, HAPTON VALLEY TRANSFER STATION - PERMIT APPLICATION SUPPORTING DOCUMENT

ETGAS Burnley Limited

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1 Introduction

1.1 Overview

1.1.1 This document contains supporting information which accompanies the Schedule 13 Environmental Permit (EP) application being submitted for an Advanced Energy Recovery (AER) facility being installed at Hapton Valley Transfer Station, Burnley. This application has been completed on behalf of Etgas Burnley Limited by Oaktree Environmental Limited.

1.2 Context of Application

1.2.1 The proposals are for the operation of an AER facility at Hapton Valley Transfer Station, Burnley. This will be fuelled by Solid Recovered Fuel (SRF) produced at the adjacent recycling facility to produce heat and power, which will be used to provide the required power and heat for the recycling operation, removing reliance on fossil fuel based power and heat generation.

1.2.2 The SRF is a non-hazardous waste and is already produced at the adjacent recycling facility. The SRF is a residual waste arising after easily recyclable materials have been removed and is a high calorific fuel from which valuable energy can be harnessed. The SRF that is to be utilised in the AER facility would otherwise be transported away from site for further recovery and therefore this results in a further saving in carbon emissions and other potential emissions that would otherwise be associated with transportation of the waste.

1.2.3 Therefore, the operation of the AER facility will significantly reduce the carbon footprint of the adjacent recycling operation.

1.3 Proposed Activities

1.3.1 The proposed process will be regulated under Schedule 13 of the Environmental Permitting (England and Wales) Regulations 2016 (“the regulations”) as a Small Waste Incineration Plant (SWIP). The activities being applied for are summarised in the table below.

Table 1.1 – Proposed Activities

Site Name	Reference Under Permitting Regulations	Description of the Activity	Activity Capacity	Activity Limits
ETGAS Burnley ATR Plant	Schedule 13	Small Waste Incineration Plant with a capacity of 3 tonnes/hour or less of non-hazardous waste	24,000 tonnes/annum	From receipt of waste to emission of exhaust gas and disposal of waste arisings

1.4 Details of Site Operator

1.4.1 This permit has been applied for by ETGAS Burnley Limited.

1.5 Permit Boundary

1.5.1 Reference should be made to Appendix I for a map showing the proposed permit boundary for the site.

1.6 Documents Consulted

1.6.1 Legislation

1.6.1.1 The following legislative and guidance documents have been consulted for the purpose of completing this supporting document:

- Environmental Permitting (England and Wales) Regulations 2016 (as amended).
- Permitting Risk Assessment Guidance on government website (https://www.gov.uk/government/collections/risk-assessments-for-specific-activities-environmental-permits);
- https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit; and,
- Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on Industrial Emissions (Integrated Pollution Prevention and Control)(Recast).

2 Operating Techniques

2.1 Overview

2.1.1 The proposals are for the installation of an AER facility for the recovery of heat and power from SRF.

2.1.2 Reference should be made to Appendix I for the proposed site layout plan.

2.1.3 The land that comprises all of the property to which this Environmental Permit application relates is situated at Hapton Valley Transfer Station, Hapton Valley Estate, Accrington Road, Hapton, Burnley, Lancashire, BB11 5QG with an approximate National Grid reference (NGR) 380898 , 431376

2.1.4 The proposed permit boundary area is located on a small plot within the existing Envirofuel site. The plot has historically been used for waste storage and the mechanical processing / shredding of waste material. The plot is now vacant as operations have moved to a new purpose-built building on the Envirofuel site.

2.1.5 The site is bound on three sides by other waste operation areas or roads connecting them. To the rear boundary of the site are established trees. The site is secured by an approximately 2m high perimeter boundary fence.

2.1.6 The proposed permit boundary area comprises a concreted industrial plot with an existing open-sided single-storey industrial waste storage building. The existing building is an open-fronted structure currently used for storage. The rectangular concrete hardstanding is unutilised and approximately 0.11 Ha (0.28 acres) in size.

2.2 Detailed Description of Process

2.2.1 Site Infrastructure

2.2.1.1 The development will require the removal of the existing open sided storage building but the concrete pad will be retained for the installation of the following modular plant and equipment:

- 2 No. EV9-DB Gasifier Units with thermal energy captured and utilised for the heating of the solid-to-gas advanced thermochemical recycling conversion vessels. The vessels utilise waste feedstock at a rate of 2.5 to 3 tonnes per hour (combined);
- 3 No. Jenbacher J620 GS E55 engines housed within acoustic containers with thermal energy captured and provided to Envirofuel in the form of hot water / thermal oil for waste drying utilisation. Electricity to be supplied to Envirofuel with spill to the National Grid;
- 1 No. Thermal Oxidiser operating on diesel pilot then syngas pilot;
- 1 No. Combined Stack containing exhaust from 1 No. Thermal Oxidiser and 3 No. engines. The combined multi flue stack will be 26m in height from ground level;
- 1 No. Continuous Emissions Monitoring System (CEMS) housed within kiosk with probes to four exhaust flues;
- Concrete pads to appropriate depth/specification for equipment loads within existing concrete apron;
- Pre-fabricated welfare and office facility cabins with potable water supply and parking.
- Foul water tank; water periodically removed from site by road tanker to appropriate processing facility;
- Perimeter fencing with vehicular and pedestrian access. Steel mesh – 1.8m height;
- Underground high voltage cable from the existing 6.6 kV network, transformer (within fenced enclosure) to low voltage with cable to LV Distribution Panel housed within kiosk; and,
- Surface drainage system with fall to a Class 1 interceptor then discharge to the wider site drainage system.

2.2.1.2 Pelleted SRF feedstock will be received from the adjacent site via enclosed conveyor. This material will be fed directly to the EV9-DB Units. It is key to note that fuels will be delivered to an agreed manufactured specification and do not require any further processing in advance of gasification. Each modular EV9-DB Unit has a dedicated feed hopper and associated transfer conveyor which is totally sealed with no potential for emissions to atmosphere.

2.2.1.3 Ash in the feedstock is transformed to a vitrified ash 'stone' or a fly ash powder. Ash residues are stored in enclosed vessels for periodic removal to an appropriately licensed facility or for re-use.

2.2.2 Technical Process Description

2.2.2.1 The SRF material will be fed into the ETGAS EV9-DB Units which thermochemically recycle the waste using the principles of gasification, converting the waste from a solid into a high-quality syngas product. Each EV9-DB Unit has two heating vessels which operate sub-stoichiometrically above the ash-fusion flow temperature. The waste is fed directly into the EV9-DB Units within which thermal conversion is undertaken and solid waste is irreversibly transformed to a product gas. The transformation occurs at a molecular level with the high temperature disassembling the complex molecules within the waste gas into permanent fuel molecules.

2.2.2.2 The EV9-DB Units operate at high temperature (above the ash fusion temperature of the feedstock) causing thermal molecular disassembly. The high temperature splits the complex molecular forms present in the initial pyrolysis gas and converts them into the simple, permanent fuel molecules, producing a hydrocarbon gas that is 'clean' at the exit of the reactor. ETGAS do not employ any chemical scrubbers, the syngas is cooled and a carbon bed used as a final 'police filter'. The carbon beds require infrequent replenishment – typically once a quarter, the spent sorbent being sent for off-site reactivation or disposal. The ETGAS proprietary technology enables this process using air (not oxygen) as a gasification medium.

2.2.2.3 The energy value of the produced syngas is principally from hydrogen and carbon monoxide. The syngas is piped to a spark ignition internal combustion engine (a natural gas engine slightly modified by the manufacturer for operation on synthesis gas). The use of a 'natural gas' engine demonstrates the 'cleanliness' and calorific value stability of the synthesis gas. The syngas is produced in the EV9-DB Units and utilised directly in the engines and no gas storage is required. The engines operate to a set-point kW output with one engine working to variable load – balancing the marginal fluctuations in syngas flow.

2.2.2.4 At start-up from cold, the EV9-DB Unit normally requires 40 minutes for the syngas product to have a suitable calorific value for use in a CHP Engine. During this time the syngas will be directed to a Thermal Oxidiser.

2.2.2.5 Syngas generation can be stopped in less than two minutes, simply by ceasing the waste and air supply to the heating vessels. It is important to note that the ETGAS EV9-DB Units' heating vessels are not filled with waste material – the traditional method of generating syngas via gasification. This traditional method means that syngas generation cannot be stopped quickly as the stored feedstock has been heated and will continue to release syngas for some time. The ETGAS technology continuously feeds a small amount of waste material in the heating vessels – so halting this input flow, and the associated air supply, immediately ceases syngas generation.

2.2.2.6 Following the creation of syngas in the EV9-DB heating vessels, the syngas is cooled in a series of heat exchangers with the heat captured and used to pre-heat the heating vessel in a close-coupled configuration.

2.2.2.7 The majority (>85%) of the mineral fraction / ash within the waste is removed as vitrified 'stones' as the heating vessels operate above the ash fusion flow temperature. Essentially the ash is converted into a glass, or glassy substance by heat and fusion. These 'stones' have the appearance of MOT Type 1 sub-base and have an ash content of above 99%. A small amount of ash is entrained within the syngas and this is taken out as fly ash in a baghouse filter – this char is a mix of fixed carbon and typically >60% ash and is a black powder. All ash residue is removed automatically into sealed storage containers and removed off-site for re-use or disposal.

2.2.2.8 The syngas is then cooled to below the dew point and condensate collected. The condensate is low volume (<200 litres/hr), clean and odour free and will be stored in a tank for periodic removal from site in a road tanker to a suitable treatment facility. The EV9-DB unit does not consume any potable water.

2.2.2.9 Once the syngas product is utilised in a CHP Engine, the exhaust gases pass to air via the stack, the height of which has been determined to be 26m by atmospheric dispersion modelling. The stack will be equipped with a Continuous Emissions Monitoring (CEMS) system. The Thermal Oxidiser exhaust gas also passes to air through the stack which will have four internal flows to aid dispersion. The CEMS system will have probes on each of the flues for continuous monitoring of emissions, in accordance with the relevant guidance.

2.2.2.10 Heat will be recovered as far as possible, using the principles of Best Available Techniques (BAT), for use by Envirofuel in the drying of waste materials. Heat shall also be captured from the cooling of the syngas for use in heating the EV9-DB Units. The heat from the CHP engines and Thermal Oxidiser will also be utilised by Envirofuel in the drying of waste in a series of belt driers, avoiding the requirement to combust natural gas to provide heat for drying.

2.2.2.11 The EV9-DB Units and the containerised CHP engines will sit outside on concrete pads. The EV9-DB Unit solid to gas conversion process is silent and air blowers are housed in acoustic containers. Similarly, the engines are housed in custom engineered acoustic containers.

2.2.2.12 The plant will operate on a continuous basis for 24 hours a day, 7 days a week, for a minimum of 48 weeks per year. There will be periods of programmed maintenance but the modular nature of the plant means that the facility will have a high level of availability, in this respect it is anticipated that operation will be in excess of 8,000 hours per annum with electricity generated outside of Envirofuels’ operating hours exported to the National Grid via an established Grid Connection with the Distribution Network Operator.

2.2.3 Process Control

2.2.3.1 The EV9-DB Unit will operate automatically utilising a sophisticated Supervisory Control and Data Acquisition (SCADA) control system. Start-up from cold to supplying syngas to the engines typically takes forty minutes. During such time, syngas will be directed to a diesel powered thermal oxidiser. Syngas will also be diverted to the thermal oxidiser during planning shutdowns.

2.2.3.2 In the unlikely event of emergency, syngas generation can be stopped in less than two minutes (full load to standstill). During such time, syngas would be vented via an emergency vent on top of the gasifier unit and venting would be for less than 1 minute. The applicant advises that a maximum of 20 to 30m^3 of syngas would be released in such scenario. Such emergency scenarios might include the failure of engine or gasifier. The engines are industry standard Jenbacher engines, understood to have a proven track record of operation and the gasifier is precisely controlled and a controlled (non emergency) shut-down would occur if any operational parameter is nearing set-point limits. Both are controlled by a linked SCADA system. The operator anticipates that the emergency scenarios outlined above would amount to substantially less than 60 hours per year and are therefore compliant with Article 46(6) and 50(4)(c) of the Industrial Emissions Directive, which relate to abnormal operation.

2.2.3.3 Details of any abnormal operation would be recorded by the operator along with details of subsequent investigation and actions taken.

2.2.4 Residues

2.2.4.1 The ash content of the waste feedstock is largely removed as a vitrified ash, the ash entering the AER Unit being heated to above its ash fusion flow temperature. The ash therefore becomes a liquid and flows down through the AER heating vessel, being removed as small ‘stones’ of vitrified ash. The applicant has advised that laboratory analysis shows that the vitrified material is over 99% ash with less than 1% carbon. This material is expected to replace fresh aggregate in concrete construction blocks and bitumen macadam slab or be suitable for use as a filler for other construction products.

2.2.4.2 A small proportion of the ash within the waste feedstock is entrained within the syngas. This fly ash is removed by the low temperature baghouse filter as a powder. The applicant has advised that laboratory analysis shows that the ash content is over 60% with the carbon <40%. ETGAS have developed a solution whereby this material is returned to the inlet of the AER Unit to further improve the carbon conversion efficiency, eliminate a waste and allow recovery of all the ash content in the waste feed as a vitrified material suitable for use in construction.

2.2.5 Emissions Abatement

2.2.5.1 Exhaust gases arising from the process will be abated to meet the relevant emission limits, which are set out in the Industrial Emissions Directive (EU Directive 2010/75/EU). This will include the following primary and secondary abatement measures:

- Capture of Organic Compounds (VOCs) from syngas using carbon filter;
- Baghouse filtration to remove particulate matter from syngas; and,
- Use of Jenbacher engines with LEANOX technology to ensure emissions of NO_x are fully controlled.

2.2.5.2 The exhaust gasses are then routed into the exhaust stack, where they are released to atmosphere for further dilution and dispersion of residual emissions.

2.2.5.3 Pollution control residues will be disposed at suitably permitted facilities, as required.

2.2.6 Description of Plant

2.2.6.1 The model of gasification unit to be installed is an ETGAS EV9-DB unit, of which two units will be installed. These units will be started up using electricity. Jenbacher LEANOX technology engines will be used to combust cleaned syngas to produce heat and power. A portion of the heat will be used to sustain the gasification process. The Jenbacher engines were all manufactured in 2009 and have the following serial numbers:

- 5956031;

- 5956032; and,
- 5956033.

2.2.6.2 The site will include 2 gasification units, with a combined rated thermal input of $15.8MW_h$

2.2.6.3 The maximum SRF throughput rate will be 3 tonnes/hour.

2.2.7 Proposed Exhaust Stack

2.2.7.1 The proposed exhaust stack will be 26m in height from ground level and will comprise a multi flue stack containing 3 CHP exhaust flues and thermal oxidiser exhaust flue. The efflux temperature will be 740K and efflux velocity $23m.s^{-1}$.

2.2.8 Heat/Energy Recovery

2.2.8.1 The CHP units will be used to generate electrical energy will be used to power the adjacent waste recycling facility with the remainder to be exported to the National Grid. Heat from the process will be used to dry wastes at the adjacent waste recycling site as well as provide heat for sustaining the gasification process. The above ensures that heat is captured as far as is possible from the process and also displaces the requirement to use fossil fuels to generate power and heat for use at the adjacent recycling facility, whilst in turn providing a sustainable outlet for residual wastes arising from the recycling operations.

2.2.9 Residence Time and Temperature

2.2.9.1 The CHP units will combust syngas at a temperature in excess of 1,000C, which meets the requirements of Article 50(2) of the Industrial Emissions Directive . However, the applicant requests a derogation from the requirement for compliance with the 2 second residence time, in accordance with Article 51(1), which states the following:

"Article 51(1). Conditions different from those laid down in Article 50(1), (2) and (3) and, as regards the temperature, paragraph 4 of that Article and specified in the permit for certain categories of waste or for certain thermal processes, may be authorised by the competent

authority provided the other requirements of this Chapter are met. Member States may lay down rules governing these authorisations."

2.2.9.2 Combustion residence times in internal combustion engines are typically significantly less than 2 seconds and usually a small number of milliseconds. As such, it is not possible to meet the 2 second residence time. However, the syngas will be combusted at a temperature significantly in excess of the minimum required temperature of 850C, to ensure complete combustion of the syngas.

2.2.9.3 The purpose of the 2 residence time is to enable complete combustion and maximise destruction of dioxins and furans in exhaust gases. The syngas is expected to contain less than 0.3%, hydrocarbon slip through the engine is in the low PPM range and the entrained flow gasifier and high operating temperatures are anticipated to create high conversion. The applicant proposes an emissions test upon commissioning of the plant to provide demonstration that the plant can meet emission limits within the Industrial Emissions Directive.

2.2.10 Quantifying Waste Input

2.2.10.1 All waste input to the plant will be metered/weighed prior to entry to the gasification units.

2.2.11 Firewater

2.2.11.1 The site will not include any storage of combustible wastes and as such the risk of fire is considered to be relatively low. However, the site will include appropriate containment for contaminated run-off from fire fighting operations. The site is concreted with a wall to two sides and falls to a surface drainage collection point which drains to a sump ($30m^3$) with interceptor, which then goes to sewer. Discharge to sewer from the sump can be prevented in the event of contaminated drainage arising as a result of fire fighting residues.

2.2.12 Odour Abatement

2.2.12.1 The potential for odour may arise from the wastes which are used. However, these will be produced/stored on the adjacent site under separate permit and transferred to the plant via enclosed conveyor, ensuring that all wastes and potential odours are contained. As such, odour is not anticipated to present a significant issue.

2.2.13 Environmental Management System

2.2.13.1 An Environmental Management System (EMS) will be implemented on a day to day basis at the site. This will contain measures and procedures to ensure operations and associated emissions are sufficiently controlled to prevent potential for adverse impacts on air, land or water and to ensure that site staff are appropriately trained to carry out their duties with protection of the environment as a fundamental requirement. Reference should be made to Appendix III for a copy of the EMS.

2.2.14 Accident and Emergency Procedures

2.2.14.1 Reference should be made to Appendix VI for Accident and Emergency Procedures that will be in place for the operation.

2.3 Raw Materials and Resources

2.3.1 The site operator will use appropriate measures to ensure that raw materials and resources are used efficiently and records will be maintained of raw material and resource use.

2.3.2 Manufacturer's guidelines will be followed when using specific fuels and consideration will be given to environmental impacts when purchasing new plant and equipment for the site. Any raw materials and resources will be used as recommended by specialist suppliers. Any quantities of materials used will be the minimum necessary to undertake the required process. A review of raw and auxiliary materials used on site will be carried out on a periodic basis to assess whether any alternative materials can be used which would result in improved environmental performance. The reviews will ensure raw materials and resources used are appropriate, are used efficiently and any options for reduction in use identified, as applicable.

2.3.3 Water use will be regularly monitored and will be kept to a minimum as far as is practicably possible. Opportunities for reduction in water use will be regularly reviewed.

3 Wastes and Residues

3.1 The table below outlines the anticipated wastes and residues, EWC code, relevant disposal or recovery code and quantities.

Table 3.1 – Types and Quantities of Wastes and Recovery/Disposal Routes

Waste Stream	Annex IIA or IIB (Disposal and Recovery Codes) Description	European Waste Catalogue (EWC) Code	Reason for Waste Arising	Quantity
SRF	R1	19 12 04 19 12 10 19 12 12	Feedstock for SWIP	Maximum plant capacity is 24,000 tonnes/annum
Gas cleaning residues – solid wastes from gas treatment	D14, D15	To be determined through analysis – expected to be non-hazardous	Residue from pollution abatement plant	640 tonnes/annum
Spent activated carbon	D14, D15	19 01 10*	Residue from pollution abatement plant	4 filters per annum
Bottom ash/vitrified stones	R11	To be determined through analysis – expected to be non-hazardous	Residue from process	3,064 tonnes/annum
Process condensate	To be determined	To be determined through analysis	Residue from process	1,504 tonnes/annum

3.2 EC Directive 2006/12/EC consolidated and replaced directive 75/442/EC but maintained the duty on member states to encourage the hierarchy approach to managing waste whereby the most desirable option is to prevent/minimise waste. The site operator is committed to following the above requirements and will carry out an annual review to demonstrate that the best environmental options are being used for dealing with the waste from the installation and to ensure that resource efficiency is maximised.

4 Emissions to Air, Land and Water

4.1 Fugitive Emissions to Air

4.1.1 There will be limited potential for fugitive emissions. The SRF to be used in the plant will be prepared at the adjacent facility and transferred via enclosed conveyor to the gasification units. All residues will be stored in sealed vessels/containers.

4.2 Point Source Emissions to Air

4.2.1 There will be one point source emission to air, which includes the stack serving the CHP units and thermal oxidiser. Exhaust from both processes will be routed to a single multi-flue stack, 26m in height from ground level. Therefore, the stack will contain four flues.

4.2.2 Reference should be made to the layout plan in Appendix I for details of the proposed stack location.

4.2.3 The three CHP units will routinely combust the syngas to produce heat and power. The gasification units require a 40 minute start up period for the syngas to have suitable calorific value for use in the CHP engines. As such, the syngas will be directed to thermal oxidiser at these times. Syngas will also be directed to the thermal oxidiser during planned shutdowns.

4.2.4 Residual emissions arising from the plant will need to comply with the Emission Limit Values (ELVs) contained within Annex VI of the Industrial Emissions Directive[1]. The emission limits are presented in the table below. Compliance with these ELVs will need to be demonstrated through continuous and periodic emissions monitoring during operation of the plant, which

[1] Directive 2010/75/EU on Industrial Emissions (Integrated Pollution Prevention and Control)

will be a condition within the Environmental Permit. Proposed monitoring arrangements are outlined later within this document.

Table 4.1 – Air Emission Limits

Pollutant	Daily Average ELV ($mg.m^{-3}$)[(a)]	Half Hourly Average ELV (97%) ($mg.m^{-3}$) [(a)]	Half Hourly Average ELV (100%) ($mg.m^{-3}$) [(a)]	Average Over Minimum of 30 Minutes to Maximum of 8 Hours ELV ($mg.m^{-3}$)[(a)]	Average Over Minimum of 6 Hours and Maximum of 8 Hours ELV ($mg.m^{-3}$)[(a)]
Nitrogen monoxide (NO) and nitrogen dioxide (NO_2), expressed as NO_2	200	200	400	-	-
Sulphur dioxide (SO_2)	50	50	200	-	-
Carbon monoxide (CO)	50	-	100	-	-
Total dust	10	10	30	-	-
Gaseous and vaporous organic substances, expressed as Total organic carbon (TOC)	10	10	20	-	-
Hydrogen chloride (HCL)	10	10	60	-	-
Hydrogen fluoride (HF)	1	2	4	-	-
Mercury and it's compounds	-	-	-	0.05	-
Group 1 Metals (cadmium and thallium and their compounds (total))	-	-	-	0.05	-
Group 3 Metals (antimony, arsenic, lead, chromium, cobalt, copper, manganese, nickel, vanadium)	-	-	-	0.5	-
Polychlorinated dibenzo-dioxins and polychlorinated dibenzo furans (Dioxins and furans)	-	-	-	-	1×10^{-7}

N.B (a) Based upon the following reference conditions: 11% oxygen, dry gas, 273.15K, 101.3KPa

4.2.5 Potential impacts associated with residual air emissions from the process have been assessed in the emissions modelling assessment submitted as part of this application. Reference should be made to Appendix II for a copy of this assessment. The following is concluded within the assessment, confirming that the stack is of sufficient height:

"Detailed air quality modelling using the UK ADMS dispersion model has been undertaken to predict the impacts associated with stack emissions from the proposed development. Emissions from the site have been assumed to occur at the IED emission limit values.

For a proposed stack height of 26 m, predicted maximum off-site concentrations are assessed as 'not significant' and well below the relevant air quality standards for all pollutants considered.

The predicted process contributions are 'not significant' compared with the critical levels for NO_x, SO_2 and HF and critical loads for nutrient nitrogen deposition and acidification at the European habitat sites and local wildlife sites considered."

4.2.6 Abatement measures to be used to control emissions to within statutory emission limits from the process were outlined earlier within this document.

4.3 Point Source Emissions to Water

4.3.1 There will be no point source emissions to water from the process. All process effluents will be contained and kept separate from clean surface water, tankered off-site for disposal elsewhere at a suitably authorised facility.

4.4 Point Source Emissions to Land

4.4.1 There will be no point source emissions to land from the process.

4.5 Point Source Emissions to Sewer

4.5.1 There will be no point source emissions to sewer from the process. Clean surface water drainage will be directed to a sump via interceptor, prior to release to sewer.

4.6 Odour Emissions

4.6.1 Wastes will be handled in such a manner that odour will not present a significant issue. All SRF feedstock will be delivered to the process via enclosed conveyor system, ensuring that odour does not present a significant issue.

4.7 Noise Emissions

4.7.1 Consideration has been given to potential sources of noise during the detailed plant design stage. Therefore, adequate noise abatement measures have been integrated into plant design. Plant and machinery will be subject to regular maintenance in accordance with manufacturer recommendations to ensure all equipment is in good working order. Any defects/faults that should occur will be rectified/repaired as soon as is practicably possible.

4.7.2 The best practicable means will be used in all materials handling and other operations to ensure that noise levels do not exceed agreed levels.

4.7.3 A quantitative assessment of noise has been submitted as part of this application, which has demonstrated that potential impacts from noise will not be significant. Reference should be made to Appendix V for a copy of the Noise Assessment. The following is concluded within the assessment:

"It is the conclusion of this environmental noise assessment 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 herein, 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."

5 Point Source Emissions Monitoring

5.1 Point Source Air Emissions

5.1.1 The following table outlines proposed frequency for monitoring of point source emissions to air and measurement method, in accordance with the relevant legislation and guidance. Reference should be made to the site layout drawing within Appendix I for details of emission point location.

Table 5.1 – Point Source Air Emissions Monitoring

Emission Point	Source of Emission Release	Parameter	Emission Limit	Limit Reference Period	Monitoring Frequency	Monitoring Standard/Method
A1	CHP Engines and Thermal Oxidiser	Total dust	30mg.Nm^{-3}	30 Minute Average	Continuous	EN 14181
			10mg.Nm^{-3}	Daily Average	Continuous	EN 14181
		TOC	20mg.Nm^{-3}	30 Minute Average	Continuous	EN 14181
			10mg.Nm^{-3}	Daily Average	Continuous	EN 14181
		NO_x	400mg.Nm^{-3}	30 Minute Average	Continuous	EN 14181
			200mg.Nm^{-3}	Daily Average	Continuous	EN 14181
		CO	100mg.Nm^{-3}	30 Minute Average	Continuous	EN 14181
			50mg.Nm^{-3}	Daily Average	Continuous	EN 14181
		HCL	60mg.Nm^{-3}	30 Minute Average	Continuous	EN 14181
			10mg.Nm^{-3}	Daily Average	Continuous	EN 14181
		SO_2	200mg.Nm^{-3}	30 Minute Average	Continuous	EN 14181
			50mg.Nm^{-3}	Daily Average	Continuous	EN 14181

Emission Point	Source of Emission Release	Parameter	Emission Limit	Limit Reference Period	Monitoring Frequency	Monitoring Standard/Method
A1	CHP Engines and Thermal Oxidiser	HF	4mg.Nm^{-3}	30 Minute Average	Periodic. Every three months during first year of operation. Bianually thereafter	CEN TS 17340
			1mg.Nm^{-3}	Daily Average		
		Mercury and it's compounds	0.05mg.Nm^{-3}	Average Over Minimum of 30 Minutes to Maximum of 8 Hours	Periodic. Every three months during first year of operation. Bianually thereafter	BS EN 13211
		Cadmium and thallium and their compounds	0.05mg.Nm^{-3}	Average Over Minimum of 30 Minutes to Maximum of 8 Hours	Periodic. Every three months during first year of operation. Bianually thereafter	BS EN 14385
		Antimony + Arsenic + lead + chromium + cobalt + copper + manganese + nickel + vanadium	0.5mg.Nm^{-3}	Average Over Minimum of 30 Minutes to Maximum of 8 Hours	Periodic. Every three months during first year of operation. Bianually thereafter	BS EN 14385
		Dioxins and furans (I-TEQ)	0.1ng.Nm^{-3}	Average Over Minimum of 6 Hours to Maximum of 8 Hours	Periodic. Every three months during first year of operation. Bianually thereafter	BS EN 1948 Parts 1, 2 and 3
		Oxygen	No limit	N/A	Continuous	EN 14181
		Temperature	No limit	N/A	Continuous	EN 14181
		Moisture	No limit	N/A	Continuous	EN 14181
		Pressure	No limit	N/A	Continuous	EN 14181

5.1.2 All sampling platforms and ports for continuous and periodic monitoring will be compliant with the relevant guidance, such as Environment Agency M1 and M2 guidance, the latter now replaced by equivalent guidance on the government website.

5.2 Monitoring of Point Source Emissions to Water, Land and Sewer

5.2.1 No monitoring is required for point source emissions to water, land or sewer.

6 Environmental Risk Assessment

6.1 Reference should be made to the Environmental Risk Assessment (ERA) within Appendix IV for a summary of potential risks to the environment and summary of mitigation that will be used to control potential impacts to an acceptable level.

Appendix I

Site Location Plan, Permit Boundary Plan and Site Layout Plan

Appendix II

Emissions Modelling Assessment

Appendix III

Environmental Management System

Appendix IV

Environmental Risk Assessment

Appendix V

Environmental Noise Assessment

Appendix VI

Accident and Emergency Procedures