APPLICATION FOR AN ENVIRONMENTAL PERMIT UNDER THE ENVIRONMENTAL PERMITTING (ENGLAND AND WALES) REGULATIONS 2016 (AS AMENDED)

NON-TECHNICAL SUMMARY

FCC WASTE SERVICES (UK) LIMITED,
GRANGETOWN PRARIE, GRANGETOWN,
REDCAR, TS6 6TY.

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ACRONYMS/TERMS USED IN THE TEXT

ADMS	**Air Dispersion Modelling Study**
ANPR	**Automatic Number Plate Recognition**
APCr	**Air Pollution Control Residues**
ASCR	**Application Site Condition Report**
BAT	**Best Available Techniques**
Bref	**Best Available Techniques Reference**
CEMS	**Continuous Emissions Monitoring System**
CHP	**Combined Heat and Power**
CO_2	**Carbon Dioxide**
CV	**Calorific Value**
C&I	**Commercial and Industrial**
DAA	**Directly Associated Activities**
EA	**Environment Agency**
ECL	**Environmental Compliance Limited**
EFW	**Energy from Waste**
ELVs	**Emission Limit Values**
EMS	**Environmental Management System**
ERA	**Environmental Risk Assessment**
ERF	**Energy Recovery Facility**
EP	**Environmental Permit**
EP Regulations	**Environmental Permitting Regulations**
FCC	**FCC Waste Services (UK) Limited**
FGR	**Flue Gas Recirculation**
FPP	**Fire Prevention Plan**
GWP	**Global Warming Potential**
HHRA	**Human Health Risk Assessment**
HZI	**Hitachi Zosen Innova**

ACRONYMS/TERMS USED IN THE TEXT

IBA	**Incinerator Bottom Ash**
ID	**Induced Draft**
IED	**Industrial Emissions Directive**
IMS	**Integrated Management System**
LPN	**Load Point Nominal**
IED	**Industrial Emissions Directive**
IMS	**Integrated Management System**
LPN	**Load Point Nominal**
LP1	**Load Point 1**
MCERTS	**Monitoring Certification Scheme**
NaCl	**Sodium Chloride**
NAPL	**Non-aqueous Phase Liquids**
NO_x	**Oxides of Nitrogen**
POCP	**Photochemical Ozone Creation Potential**
PPM	**Planned Preventative Maintenance**
PPMR	**Planned Preventative Maintenance Regime**
SCR	**Selective Catalytic Reduction**
SHEQ	**Safety, Heath, Environment and Quality**
SNCR	**Selective Non-Catalytic Reduction**
STDC	**South Tees Development Corporation**
SUDS	**Sustainable Urban Drainage System**
The Installation	**Tees Valley Energy Recovery Facility**
TOC	**Total Organic Carbon**
UKAS	**United Kingdom Accreditation Service**
UPS	**Uninterruptable Power Supply**
VOCs	**Volatile Organic Compounds**
WTN	**Waste Transfer Note**

1. INTRODUCTION

1.1. Environmental Compliance Limited ("ECL") has been commissioned by FCC Waste Services (UK) Limited ("FCC") to produce an Environmental Permit ("EP") application for the proposed Tees Valley Energy Recovery Facility ("ERF") located at Grangetown Prairie, Grangetown, Redcar, TS6 6TY, hereafter referred to as "the Installation".

1.2. FCC are one of the UK's leading waste and resource management companies operating a range of waste management sites including Material Recycling Facilities, ERF and landfill sites. A strategic partnership has been formed with Hitachi Zosen Inova ("HZI") to provide the technology that will support the generation of low carbon energy through the use of non-recyclable waste.

1.3. The proposed Installation will cover an area of approximately 10 hectares and is located within the western footprint of the former Cleveland Steel Works, now part of the South Tees Development Corporation ("STDC") and is contained within the Dorman Point Zone of the Teesworks Development, a 4,500-acre site comprising eleven zones on and around the banks of the River Tees. The surrounding land is largely industrial or formerly industrial.

1.4. The proposed Installation will thermally process 512,000 tonnes per annum of non-hazardous municipal solid waste, together with non-hazardous commercial and industrial waste ("C&I"). The associated Waste Transfer Station will provide storage capacity for waste during shutdown of one or both of the proposed incinerator lines.

1.5. The proposed ERF has been designed and configured as a Combined Heat and Power ("CHP") plant and will have the capability to export electricity to the National Grid and heat to local users, employing highly regulated technology to extract low carbon and renewable energy from the wastes.

1.6. The Installation will use existing, proven technologies and is designed in accordance with the requirements of the Industrial Emissions Directive 2010/75/EU ("IED"). The requirements of the IED will be implemented through the Environmental Permitting Regulations 2016 as amended ("EP Regulations") under which the activities at the Installation will fall under Part 2 of Schedule 1 to the Regulations, Section 5.1 Part A(1)(b) '*Incineration of non-hazardous waste, with the exception of waste which is biomass or animal carcasses, in an incineration or co-incineration plant'.*

1.7. FCC further considers that all aspects of the design, management, operation and performance of the ERF will comply with the relevant BAT requirements.

1.8. The Installation has a live outline planning consent from Redcar and Cleveland Council under Planning Reference R/2019/0767/OOM. The consent is for the following description of development: *'Outline application for the construction of an Energy Recovery Installation and associated development'.* By the closure of the bid process in late February 2022, a final set of reserved matters and conditions discharge applications will have been submitted to Redcar and Cleveland Council for determination.

2. INSTALLATION ACTIVITIES

2.1. The proposed Schedule 1 Activity and Directly Associated Activities ("DAA") under the EP Regulations is provided in Table 1 below.

Table 1: Proposed Schedule 1 Activities

Activity Reference	Activity listed in Schedule 1 of the EP Regulations	Description of Specified Activity	Limits of Specified Activity
A1	Section 5.1 Part A(1) (b))	Incineration of non-hazardous waste, with the exception of waste which is biomass or animal carcasses, in an incineration or co-incineration plant.	From the receipt of waste to the emission of exhaust gas, storage of untreated Incinerator bottom ash ("IBA") and disposal of Air Pollution Control Residue ("APCr") waste arisings.
DAA			
Electricity Generation		Generation of a maximum of 49.9MWe gross electrical production	
Back Up Electrical Generation		Providing emergency electrical power to the plant in the event of supply interruption.	
Waste Shredding		Shredding of bulky waste prior to incineration within Waste Reception Hall.	
Waste Storage		Storage of municipal and commercial waste during temporary shutdown of one or both incinerator lines.	

2.2. The proposed ERF will be a twin line moving grate incinerator capable of generating a nominal 49.9 Megawatts electric ("MWe") of low carbon and renewable energy. Through detailed design, it is estimated that 49.42MWe can be generated through the thermal treatment of up to 512,000 tonnes per annum of residual municipal, commercial and industrial wastes at 8.438 Megajoules/Kilogram ("MJ/kg"). Of the 49.42MWe energy generated, 4.72 MWe will be the parasitic load required for the ERF, with the remaining circa 44.7 MWe exported to the local electricity grid.

2.3. The Installation will additionally comprise an on-site waste storage and transfer operation during shutdown of one or both incinerator lines.

2.4. The proposed waste codes to be accepted at the Installation are provided in Section 4 of this application submission.

3. MANAGEMENT OF THE INSTALLATION

3.1. Management Structure

3.1.1. The Installation's General Manager will have overall responsibility for operational and technical aspects of the Installation. Environmental matters will be the responsibility of the Environment Manager, who will also take on the role of ensuring compliance with the Environmental Permit.

3.1.2. The Environment Manager will have the following specific responsibilities in relation to the Installation's Integrated Management System ("IMS"):

- ensure the effective operation and implementation of the IMS;
- audit the IMS at regular intervals and report the findings of the audits to senior management;
- audit any sub-contractor's Environmental Management Systems ("EMS") or IMS; and
- review the IMS to ensure its continued suitability and effectiveness.

3.2. Integrated Management System

3.2.1. The FCC Group operates an IMS based on the requirements on the international quality management standard ISO 9001, the international environmental management standard ISO 14001 and the international occupational health and safety management standard ISO 45001. It is FCC's intention that an IMS will be developed at the Tees Valley ERF that is consistent with the FCC Group IMS policies and procedures, and will also become certified to ISO 9001, ISO 14001, and ISO 45001 within approximately one year of being fully operational.

3.2.2. The following key drivers will apply to the Tees Valley ERF IMS:

- to meet all relevant legal requirements, regulations and standards;
- to work to:
  - improve standards;
  - increase environmental awareness;
  - improve customer relations;
  - improve service levels;
  - improve commitment amongst staff through training, and
  - encourage the adoption of sound environmental and quality principles amongst contractors, suppliers, and customers; and
- to respond positively to all quality and environmental developments and review such issues with the local community and other stakeholders.

3.2.3. The proposed IMS for the Tees Valley ER**F** will incorporate/address the following:

- Environmental Policy;
- structure and responsibilities;
- planning, implementation and resources;
- legal compliance;
- environmental impacts and aspects;

- objectives and targets;
- management programme;
- training and competence;;
- internal and external communication;
- documentation, manuals and records;
- documentation and data control;
- standard operating procedures;
- emergency preparedness and response;
- inspection and corrective action;
- performance, monitoring and measuring systems;
- environmental incidents corrective and preventative actions;
- environmental incident record management;
- systems audit, internal and external; and
- management reviews.

3.2.4. The IMS will be based on the Plan-Do-Check-Act approach of ISO 14001. All elements of the ERF will be covered by and incorporated into the IMS.

3.3. Planned Preventative Maintenance

3.3.1. Appropriate Planned Preventative Maintenance ("PPM") will reduce the likelihood of plant malfunctions and thereby minimise any environmental risk resulting from such malfunctions at the Tees Valley ERF.

3.3.2. All elements of the Installation including fixed and mobile plant will be incorporated into the Planned Preventative Maintenance Regime ("PPMR") with particular reference to those whose failure on site could lead to an impact on the environment.

4. OPERATING TECHNIQUES

4.1. Overview

4.1.1. The installation shall have a nominal operating regime of 8,000 hours per year. The total incinerator capacity of the Installation will be circa 28 tonnes per hour per grate (depending on the calorific value ("CV") of the waste. The maximum capacity of each grate is 32 tonnes per hour. Consequently the max throughput would be 512,000 tonnes per annum (or 560,640 tonnes per annum assuming 8760 hours of operation).

4.1.2. It should be noted some assessments have been undertaken based on different operating conditions. These are specified in the relevant sections.

4.1.3. In accordance with Annex IIB of the Waste Framework Directive (as amended), the operations at the Installation will be classed as

- R1 – Use principally as a fuel or other means to produce energy; and
- R13 - Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced).

4.2. Waste Acceptance and Storage

4.2.1. Waste will be delivered to the Installation by road. All incoming waste delivery vehicles will pass through an automated number plate recognition ("ANPR") system and be weighed on entry. Following weighing, delivery vehicles will be directed to the Waste Reception Building where the waste will be tipped into one of the tipping bays. All waste handling activities will be undertaken within the confines of the building.

4.2.2. Waste will be rejected should the following circumstances arise:

- the load is in an unauthorised vehicle;
- the load is delivered with an incomplete duty-of-care waste transfer note ("WTN"); and
- the load contains waste which would breach the conditions of the EP.

4.2.3. If prohibited materials are observed in the load, these materials will either be isolated within the Waste Reception Area or moved to the Quarantine Area which is to be located in the main process building adjacent vehicle unloading area and fuel bunker prior to removal off-site to an appropriately licenced facility or installation.

4.2.4. Where vehicles are identified to possess smouldering loads, the Operator shall implement a Hot Load Vehicle policy as part of the IMS. The load will be directed to a separate Hot Load Quarantine Area. The Hot Load Quarantine Area is located a significant distance from any buildings and personnel. Additionally, the Installation will benefit from a RCV emergency hot load discharge area. This area will enable the hot load to be discharged from the vehicle for fire-fighting with the aim to protect the RCV from fire damage. The waste will be removed off-site as soon as practicable.

4.2.5. The waste acceptance checks will continue to be undertaken during shutdown of one or both of the incinerator lines and the waste transfer station building is being utilised.

4.2.6. The Installation is designed with a single fuel bunker. The bunker has a capacity of approximately 9,000 tonnes, which, in turn, equates to approximately five to seven days storage capacity. The bunker is designed to be water-retaining.

4.2.7. The air from the bunker is continually extracted and used as combustion air (primary air) during normal operation. This produces a slight negative pressure in the bunker helping to prevent dust and odour being emitted to the external environment.

4.2.8. In the event of shutdown of one or both incinerator lines, the waste transfer station building will be utilised. This building will benefit from four waste storage bays with a total capacity of 706 tonnes which will enable the waste from refuse collection vehicles to be stored at the Installation once the bunker storage is at maximum capacity.

4.3. Waste Treatment

4.3.1. Waste will be tipped directly into the fuel bunker which has a capacity of approximately 9,000 tonnes and fed into the moving grate and associated combustion chamber by means of a feed hopper/feed chute arrangement where waste is dried, degassed, and incinerated at temperatures in excess of 850^{o}C in line with IED requirements.

4.3.2. The HZI-designed ERF comprises a fuel bunker and shredding operation for bulky wastes, as well as the following elements **per line**:

- feed hopper and feed chute;
- grate and combustion chamber;
- combustion air system;
- auxiliary burners;
- combustion air system;
- selective non-catalytic reduction ("SNCR") denitrification system;
- boiler;
- water/steam system;
- turbine;
- condensate system;
- cooling system;
- boiler water treatment system;
- flue gas treatment system (reactor; hydrated lime and activated carbon injection system and bag filter);
- induced draught fan;
- emissions measuring devices; and
- discharge stack.

4.4. SNCR System

4.4.1. An advanced selective non catalytic reduction ("SNCR") system has been included in the design to minimised oxides of nitrogen ("NO_x") emissions from the combustion process. The SNCR system proposed utilises an ammonia solution to chemically reduce the NO_x to nitrogen and water. The lower BAT Associated Emission Level ("AEL") of 100mg/m^3 will be guaranteed by HZI through the additional use of infra-red pyrometers (5 per boiler) and installed boiler nozzles. This enables the gas temperature measured to ensure reagent is

injected at the most effective position in the boiler to minimise NOx emissions.

4.5. Boiler

4.5.1. Heat contained within the flue gases leaving the combustion stage will be recovered by means of a high-efficiency integral water tube boiler.

4.6. Energy Recovery Arrangements

4.6.1. The power generation plant and auxiliaries include a steam turbine, power generator, air condenser and connection point for a potential district heating system. The turbine will be used to convert the steam energy into kinetic energy and drive a generator to produce electrical power in a highly efficient manner.

4.7. Flue Gas Cleaning Arrangements

4.7.1. After heat recovery, the flue gases pass through the flue gas treatment plant. The technique selected is dry flue gas treatment and uses calcium hydroxide (hydrated lime) to reduce the concentrations of acid gases (hydrogen chloride, hydrogen fluoride and sulphur dioxide) in the flue gas stream.

4.7.2. Powdered activated carbon is used as an adsorbent to remove volatile heavy metals and organic micropollutants (in particular, dioxins and furans). The use of dry calcium hydroxide has been demonstrated to represent BAT by means of a BAT assessment.

4.7.3. A bag filter is used to remove entrained particulate material in the treated gas stream, which is composed of dust from the combustion process, calcium salts resulting from the reaction of calcium hydroxide with the acid gases and untreated lime and activated carbon.

4.8. Induced Draught Fan/Discharge Stack

4.8.1. A variable speed Induced Draft (“ID”) fan draws the treated flue gas from the flue gas treatment plant and discharges it to atmosphere via discharge stacks, designated A1 and A2, which both discharge to atmosphere at a height of 90m. The suitability of the discharge height has been determined by means of a stack height screening assessment.

4.9. Continuous Emission Monitoring System

4.9.1. The discharge stacks will be equipped with a range of Continuous Emission Monitoring Systems (“CEMS”) which meet the relevant requirements of the IED. The following determinands will be continuously monitored:

- particulate matter (i.e. total dust);
- carbon monoxide;
- oxides of nitrogen (NO and NO_2 expressed as NO_x);
- ammonia;

- sulphur dioxide;
- Volatile Organic Compounds ("VOCs") (expressed as Total Organic Carbon ("TOC"));
- hydrogen chloride;
- oxygen, wet (and dry if necessary);
- moisture;
- temperature;
- pressure; and
- velocity and flow.

4.9.2. Duplicate CEMS systems will be installed to ensure that, in the event of a failure of the system, continuous monitoring of the emissions to air will continue using the stand-by system. The CEMS system will be provided with an Uninterruptable Power Supply ("UPS") so that in the event of a power interruption at the plant, emissions will continue to be monitored.

4.9.3. All CEMS systems installed at the Tees Valley ERF to monitor emissions to air will be certified under the Environment Agency ("EA") Monitoring Certification ("MCERTS") scheme and the associated software package will be configured to provide data in a format that will meet EA and IED requirements.

4.10. Ventilation and Atmosphere/Odour Control Arrangements

4.10.1. The Installation will be equipped with an efficient and effective atmosphere and odour control system which has been designed to take account of BAT requirements. Air from the Waste Reception Hall and Waste Bunker will be ducted to the combustion chamber to be used as combustion air within the incineration process.

4.10.2. The system also incorporates an air atomiser spray system which will be used in the event of a planned or unplanned shutdown. The spray system will also be installed within the Waste Transfer Station building and activated when the building is operational during shutdown of one or both incinerator lines.

4.11. Emergency Diesel Generator

4.11.1. An emergency diesel generator will be provided to ensure a safe shutdown of process equipment in the event of a total loss of electrical power. This will provide power to essential items of plant in the event of such an occurrence.

4.12. Process Control Arrangements

4.12.1. The proposed FCC Installation shall be operated and controlled via a comprehensive range of fully networked system management, control, and safety measures and systems to ensure that all elements of the plant can be safely operated at maximum efficiency at all times.

4.13. System Interlocks and Alarms

4.13.1. The proposed Installation will be equipped with a comprehensive range of interlocks designed to ensure that the plant will be operated in an appropriate manner and the potential for uncontrolled releases to the environment will be minimised. In particular, the interlock arrangements will comply with the requirements of the IED.

4.14. Emergency Shutdown Arrangements

4.14.1. In the event of a major system failure, the plant will have the capability of being closed down in a controlled manner though an integrated emergency stop procedure initiated in the Control Room.

4.15. Fire Suppression Arrangements

4.15.1. The Tees Valley ERF will incorporate a comprehensive range of fire suppression and protection systems including fire walls, outdoor hydrants, hose reels and cannons, fire extinguishers, sprinklers and deluge systems. The Installation shall also benefit from a firewater storage tank which is connected to the local water supply.

4.15.2. All such measures shall comply with the relevant British and European Standards and relevant Codes of Practice and are detailed within the Installation's Fire Prevention Plan ("FPP") (Document Reference ECL.007.04.01/FPP) provided in Section 7 of this application submission.

5. EMISSIONS

5.1. Emissions to Air

5.1.1. The Installation will discharge releases to atmosphere from the incineration process at a height of 90m via two dedicated discharge stacks (designated release points A1 and A2).

5.1.2. The concentrations of the pollutants in the releases from the process discharge stack shall not exceed the Emission Limit Values ("ELVs") listed in Part 3 of Annex VI of the IED and any future ELVs as lower ELVs are proposed in the BAT Conclusions Document for the Waste Incineration Sector.

Air Dispersion Model

5.1.3. An Air Dispersion Modelling Study ("ADMS") (ECL.007.04.01/ADM) has shown that the impact of the predicted process contributions ("PCs"), associated with the operation of the ERF, are within the long-term and short-term air quality objectives and are assessed as not significant for most pollutants considered.

5.1.4. For pollutants with potentially significant impacts, further screening has demonstrated that it is unlikely that any air quality standards ("AQS") will be exceeded as a result of emissions from the Installation at the maximum point of ground level concentration ("GLC") or at any of the human receptor locations with potentially significant impacts.

5.1.5. At the sensitive ecological sites, whilst the assessment of the predicted PCs has shown there are potentially significant impacts for certain pollutants (i.e., for the critical levels of oxides of nitrogen and for nutrient nitrogen deposition – for the in-combination assessment in particular), further ecological assessments have demonstrated that the predicted PCs are very small compared to elevated background levels. Emissions arising from the ERF are therefore considered unlikely to have an adverse effect on the conservation status of any qualifying species and hence the integrity of the Teesmouth and Cleveland Coast SPA / Ramsar habitat site.

5.1.6. The ADMS report has shown that it can be concluded that the proposed ERF at Tees Valley will not have a detrimental impact on local air quality, human health or sensitive habitat sites.

Human Health Risk Assessment

5.1.7. An assessment of the possible effects on the health of humans due to emissions of dioxins and furans, and dioxin like polychlorinated biphenyls ("PCBs") from the Installation has been undertaken as part of a Human Health Risk Assessment (ECL.007.04.01/HHRA) contained in Section 6 of this application submission. The assessment was based on an individual's exposure to the worst-case emission level of dioxins and furans over a lifetime and consuming a proportion of locally grown food. This worst case scenario is demonstrated by the Farmer scenario at the maximum point of ground level concentration of emissions.

5.1.8. It has been concluded that potential exposure to emissions from the Installation, or from the Installation in combination with the Redcar Energy from Waste ("EFW") Installation, will not pose unacceptable risk to receptors identified in the assessment

Fugitive Emissions to Air

5.1.9. There is the potential for the release of fugitive emissions of dust and odour from the Installation, however, it is considered that a combination of design and control measures in addition to good management and operational practices shall minimise the potential for any such releases.

5.2. Emissions to Water

5.2.1. There will be no process- related releases from the Installation to surface watercourses.

5.2.2. The Installation shall incorporate an on-site Sustainable Urban Drainage System ("SUDS") for surface water run off which discharges to an attenuation basin on-site, and ultimately to a controlled watercourse, Holme Beck, located on the western boundary.

5.2.3. Comprehensive control measures shall be in place across the Installation including bespoke drainage systems for oil and chemical delivery areas, oil separators and an automatic shut off valve, enabling the site drainage to be isolated from the surface water in the unlikely event of a pollution incident.

5.2.4. Domestic effluent from the Installation will discharge into packaged treatment plants across the Installation. The treated effluent from the packaged treatment plants shall then be discharged to site surface water drainage system. Monitoring/sampling points shall be provided downstream of each plant and prior to the final discharge emission point.

5.2.5. It is considered that, given the control measures which will be in place, there will be no risk of fugitive emissions to surface water or groundwater arising from the Installation's activities.

5.2.6. There is no connection to foul sewer at the Installation, therefore, there is no risk of fugitive emissions to sewer arising from the Installation's activities.

5.3. Emissions to Land

5.3.1. There will be no emissions to land from the activities undertaken at the proposed Installation.

6. RAW AND AUXILLIARY MATERIALS

6.1. Raw Materials

6.1.1. The main raw materials that will be processed at the Installation will be non-hazardous municipal waste, as well as commercial and industrial wastes. FCC will have in place a documented incoming waste acceptance procedure at the Installation, the primary purpose of which is to ensure that all incoming wase meets the relevant specifications.

6.2. Auxiliary Materials

6.2.1. The main auxiliary raw materials which will be used at the Installation will be ammonia, (for use in the SNCR system), hydrated lime (for the treatment of acid gases) and activated carbon (to assist in the removal of volatile heavy metals and organic micro pollutants). These materials will be stored in suitable storage silos and provided with appropriate bunding.

6.2.2. In addition, the following will be used:

- demineralised water plant regeneration salt (sodium chloride (NaCl)) this will be stored in powder or pellet form;
- boiler treatment chemicals, these will be stored in a bunded area;
- low-sulphur gas oil for the auxiliary burners, this will be stored in a double walled, bunded storage tank;
- water, the primary use of which will be as feedwater for the demineralisation plant.

6.2.3. Operating conditions for the Installation will be optimised as part of the Commissioning Programme. This will result in operating conditions being such that the use of auxiliary raw materials is minimised and will help ensure that waste production of air pollution control residues for example, is also minimised.

7. EMISSIONS MONITORING

7.1. Emissions to Air Monitoring

Continuous Monitoring Arrangements for Emissions to Air

7.1.1. The Tees Valley ERF will be equipped with a comprehensive range of CEMS certified under the EA's MCERTS scheme that comply with the requirements of the IED. The Installation will comprise one CEMS per incinerator line with an additional CEMS stand-by providing 3 systems in total.

7.1.2. A comprehensive range of process variables will be continuously monitored in order to provide operational staff at the Installation with a current operational status report for all elements of the plant.

Non-continuous (Periodic) Monitoring Arrangements for Emissions to Air

7.1.3. Continuous monitoring will be supplemented by a regime of periodic monitoring that covers all pollutants which are not monitored on a continuous basis and meet the requirements of the IED and the BAT Conclusions Document within the BAT Reference Document ("Bref") for the Waste Incineration Sector. All such periodic monitoring shall be undertaken by an organisation suitably United Kingdom Accreditation Service ("UKAS") accredited and holds the necessary certifications under the MCERTS Scheme; all sampling personnel will hold the appropriate personal accreditations.

Recording and Reporting of Emissions to Air Data

7.1.4. All emissions to air monitoring data, continuous and periodic, shall be recorded and output to enable direct comparison with relevant Emission Limit Values ("ELVs") for releases to air that will be assigned to the proposed Installation.

7.1.5. Should any of the ELVs be exceeded, the EA will be informed without delay and FCC will take the necessary action to ensure compliance is promptly restored.

7.1.6. All emissions monitoring data shall be retained by FCC for a minimum of four years, or for a period otherwise agreed with the EA.

7.1.7. Reporting of air emission data shall be in the manner agreed with the EA and in accordance with the requirements of the Installation's Permit and Part 3 of Annex VI of the IED.

Assessment of Sampling Locations for Emissions to Air

7.1.8. Assessment of sampling locations will be undertaken to the current requirements of the relevant CEN, or ISO sampling standards and the EA'S online guidance *'Monitoring stack emissions: techniques and standards for periodic monitoring'* (Updated February 2021) and Technical Guidance Note (Monitoring) M1 'Sampling requirements for stack emissions monitoring' (Version 8, August 2017).

7.2. Emissions to Groundwater Monitoring

7.2.1. In accordance with European Commission Guidance concerning baseline reports under Article 22(2) of Directive 2010/75/EU on industrial emissions, groundwater monitoring will be undertaken at least every 5 years.

7.3. Emissions to Surface Water Monitoring

7.3.1. All surface water drains shall be conveyed through appropriately sized oil separators which discharge into the attenuation basin which serves the entirety of the Installation. Roof water shall discharge directly to the SuDS basin.

7.3.2. All site effluent (site surface runoff and treated effluent from the package plants) will discharge via W1 to Holme Beck. Monitoring/sampling points shall be provided downstream of each package treatment plant, as well as prior to the final site discharge point.

7.4. Emissions to Sewer Monitoring

7.4.1. There is no proposed foul sewer connection at the Installation. Consequently, no monitoring is proposed.

7.5. Emissions to Land Monitoring

7.5.1. Although there will be no emissions to land from the activities which will be undertaken at the proposed Installation, in accordance with the European Commission Guidance concerning baseline reports under Article 22(2) of Directive 2010/75/EU on industrial emissions, soil monitoring will be undertaken at least every 10 years.

7.6. Incinerator Bottom Ash Monitoring

7.6.1. Samples of IBA will be taken and analysed once every three to confirm compliance with TOC and loss on ignition ("LOI") requirements in accordance with the EA's Technical Guidance Note M4 '*Guidelines for Ash Sampling and Analysis'* (June 2016).

8. GENERAL REQUIREMENTS

8.1. Environmental Risk Assessment

8.1.1. The Environmental Risk Assessment ("ERA") (ECL.007.04.01/ERA) submitted in Section 5 of this application submission has demonstrated that emissions of substances not controlled by emission limits (i.e. fugitive emissions) are not considered to be significant.

8.1.2. FCC are proposing comprehensive control measures for managing odour including retaining the waste reception hall at negative pressure, a spray atomiser system to neutralise odours and strict housekeeping and working practices, consequently, an Odour Management Plan is not required as part of this application.

8.1.3. A Noise Assessment (BWB-ZZ-ZZ-RP-YA-0001_NIA_S0_P01) has been undertaken. The results of a detailed noise modelling exercise have been assessed against adopted noise level limits that were set based on a series of baseline noise measurements at nearest sensitive receptors. The results of the assessment indicate that, based on the current design, appropriate noise levels are likely to be achieved at the nearest sensitive receptors. Adopting an active approach to noise management and implementing control measures, it is considered that the Installation is low risk from a noise perspective.

8.1.4. It is considered that the measures proposed for controlling noise and vibration emissions from the Installation constitute BAT and will be appropriate and proportionate for the nature and scale of activities that will be undertaken and the risks that will be posed to the environment by these activities. This will ensure that there shall be no significant increase in noise emissions from the activities that will be undertaken at the Installation. As such, a Noise Management Plan is not required as part of this application.

8.1.5. The ERA details proposed control measures for managing dust at the Installation. As a result of the implementation of the control measures, which include the handling of all materials within an enclosed system, negative pressure in the reception hall and strict housekeeping, a Dust Management Plan is not deemed to be required as part of this application submission.

8.1.6. Due to the strict housekeeping and good working practices which will be incorporated into the Installations IMS, the risk of the attraction of pests, such as rodents and flies, is deemed not significant as detailed in the ERA. Consequently, a Pest Management Plan is not considered to be necessary as part of this application.

8.2. Fire Prevention Plan

8.2.1. The Installation will store combustible waste as defined by the EA, consequently, a Fire Prevention Plan (ECL.007.04.01/FPP) has been prepared and will be implemented as part of the IMS. The Fire Prevention Plan contained in Section 7 of this submission has been designed to meet the 3 objectives; minimise the likelihood of a fire occurring, aiming to extinguish a fire within four hours and minimising the spread of a fire within the installation to neighbouring sites in a fire event.

9. APPLICATION SITE CONDITION REPORT

9.1. Overview

9.1.1. An Application Site Condition Report ("ASCR") has been prepared forming part of this Environmental Permit application submission. The ASCR (ECL.007.04.01/ASCR) is contained within Section 4 of this application submission.

9.1.2. The aim of the ASCR is to describe the condition of the land at the Installation and, in particular, to identify any substance in, on, or under the land which may present a pollution risk.

9.1.3. The ASCR, therefore, sets out the initial (i.e. current) condition of the site and takes into account any pollution incidents that may have occurred at the site and details of any measures put into place to mitigate the effects of any such incidents. It serves two main purposes:

- firstly, it will act as a reference point, along with operating records, for measuring any deterioration of the site whilst operating under the permit (on surrender of the permit, another site report must be prepared, identifying any changes to the condition of the site from that described in the original report); and
- secondly, the ASCR will give information on the physical attributes and vulnerability of the site; it will assist in understanding the environmental setting of the site, and understanding the nature, extent and behaviour of any contaminants that may be present; local hydrology, hydrogeology, geology and general setting are taken into account.

9.1.4. The desk study conducted as part of the ASCR indicated that historic land usage at the Installation was heavily industrial and included use as a steelworks.

9.1.5. The baseline site condition report undertaken as part of the ASCR in accordance with the European Commission guidance concerning baseline reports under Article 22(2) of Directive 2010/75/EU on industrial emissions' (May 2014) found that the risk of pollution from relevant hazardous substances to be used at the proposed Installation was not significant with the implementation of the Installation's proposed control and mitigation measures. However, due to its industrial past, a number of intrusive site investigations have taken place at the Installation since the closure of the former steelworks and have identified the presence of non-aqueous phase liquids ("NAPL") and asbestos fibres within the soil.

9.1.6. In preparation for redevelopment, the land has been cleared and remediated. The Final Remediation and Earthworks Verification Report covering the site in its entirety has been utilised in the ASCR. However, FCC also propose to undertake additional intrusive works which will not aim to repeat works already undertaken but will collect data on the potentially polluting substances that will be used during the life of the ERF in order to establish and set baseline conditions.

10. PLANNING AND ENVIRONMENTAL IMPACT ASSESSMENT

10.1. Planning Status

8.1.1 The Installation has a live outline planning consent from Redcar and Cleveland Council under Planning Reference R/2019/0767/OOM. The consent is for the following description of development: *'Outline application for the construction of an Energy Recovery Installation and associated development'.*

10.1.2. By the closure of the bid process in late February 2022, a final set of reserved matters and conditions discharge applications will have been submitted to Redcar and Cleveland Council for determination.

10.2. Environmental Impact Assessment

10.2.1. An Environmental Statement was prepared as part of the planning application.

10.2.2. Furthermore, a detailed Drainage Strategy and updated Air Dispersion Modelling Study will be submitted as part of the reserved matters and conditions discharge applications. These reports are contained in Section 5 and 6 of the application submission respectively.

11. RESOURCE EFFICIENCY AND CLIMATE CHANGE

11.1. BAT Assessments Overview

11.1.1. A series of BAT assessments has been undertaken in accordance with the indicative BAT outlined within the EA guidance document, 'How to comply with your environmental permit, additional guidance for: The Incineration of Waste' (EPR 5.01).

11.1.2. The BAT assessments addressed combustion techniques, nitrogen oxide abatement and acid gas abatement.

11.2. Combustion Options

11.2.1. With regards to combustion techniques, the following technologies were considered:

- fixed stepped hearth;
- moving grate;
- pulsed hearth;
- rotary kiln;
- fluidised bed;
- pyrolysis; and
- gasification.

11.2.2. Of the techniques listed above, fixed stepped hearth, pulsed hearth, pyrolysis and gasification were initially ruled out as not being suitable for the following:

- fixed stepped hearth, not suitable for the large throughputs required;
- pulsed hearth, there have been problems in achieving reliable and effective burnout of the waste; and
- pyrolysis and gasification, primarily on the grounds of unproven performance and cost.

11.2.3. Consequently, only moving grate, rotary kiln, and fluidised bed were considered in the BAT assessment.

11.2.4. Following an assessment of the environmental performance, which took into account emissions to air, deposition to land, emissions to water, photochemical ozone creation potential ("POCP"), global warming potential ("GWP"), raw materials and waste streams, and associated costs of each option, it was concluded that moving grate represented BAT for the proposed Tees Valley ERF. This is also corresponds to the chosen technology of the contracting authority.

11.3. Acid Gas Abatement

11.3.1. The following technologies were considered for acid gas abatement:

- wet scrubbing;
- semi-dry scrubbing; and
- dry scrubbing.

11.3.2. Wet scrubbing was ruled on the basis that it would generate a large volume of hazardous liquid effluent combined. Accordingly, only semi-dry scrubbing and dry scrubbing were considered in the BAT assessment.

11.3.3. After an assessment of the environmental performance, including emissions to air, deposition to land, emissions to water, POCP, GWP, raw materials and waste streams, it was concluded that dry scrubbing represented BAT for the proposed Tees Valley ERF.

11.3.4. The succeeding stage of the assessment was to select an appropriate dry scrubbing reagent; calcium hydroxide (hydrated lime) was selected. Optimised and automated reagent dosing will be incorporated into the design.

11.4. Nitrogen Oxides Abatement

11.4.1. The following technologies were considered with regards to nitrogen oxides abatement:

- SNCR;
- selective catalytic reduction ("SCR"); and
- SNCR with flue gas recirculation ("FGR").

11.4.2. It should be noted that either ammonia or urea can be used for SNCR or SCR. However, urea has not been considered further as it tends to give rise to higher nitrous oxide - which is a potent greenhouse gas - formation.

11.4.3. As discussed in Section 4.4, an advanced Selective Non-Catalytic Reduction ("SNCR") system has been included in the design to minimise oxides of nitrogen ("NO_x") emissions from the combustion process. The lower BAT Associated Emission Level ("AEL") of 100mg/m^3 will be guaranteed by HZI through the additional use of infra-red pyrometers (5 per boiler) and installed boiler nozzles. Therefore, the use of SNCR is considered BAT.

11.5. Energy Consumption

11.5.1. The annual energy consumption for the Installation is estimated to be approximately 2,620.26 MWh, comprising 72MWh of electricity and 2,548.26MWh of low sulphur fuel oil. Due to the Installation being a twin line incinerator, it is considered a rare occurrence when both lines will be non-operational and therefore, not producing its own electricity and requiring public supply from the grid.

11.6. Energy Efficiency Arrangements

R1 Calculation

11.6.1. During normal operation, the R1 Factor Calculation indicates that the Installation will achieve an R1 energy efficiency of 0.822 and will therefore, surpass the minimum requirement of 0.65 to be classified as an R1 Recovery Operation under the Waste Hierarchy. The R1 calculation is provided in Section 10 of this application submission.

Overview of Energy Efficiency Measures

11.6.2. The plant has been designed to achieve a high thermal efficiency and there will be a comprehensive range of energy efficiency measures – both plant and infrastructure – designed into the plant to minimised energy use. Regular maintenance under the Installation's planned preventative maintenance regime ("PPMR") will ensure continued high efficiency operation.

11.7. Efficient Use of Raw and Other Materials

11.7.1. A BAT assessment concludes that BAT is to use SNCR for oxides of nitrogen abatement. Calcium hydroxide has been selected for acid gas abatement.

11.7.2. With regards to water use, approximately 57,920m^3 of water will be used annually as part of the Installation activities. Water saving measures will be implemented at the Installation to reduce water use, closed loop systems will be used where practicable and a rainwater harvesting system shall also be provided.

11.8. Waste/Residue Minimisation

11.8.1. In acting to minimise the generation of waste and residues, operating conditions shall be optimised as part of the plant Commissioning Programme. This includes optimising incineration conditions to ensure that the IBA produced is of the requisite quality.

11.8.2. Waste minimisation audits shall also be carried out at a frequency of once within the first two years of commissioning of the proposed operation and at least every four years thereafter. Information gleaned from the audit(s) shall be used in improving efficiency and reducing waste.

12. COMPLIANCE WITH IED AND BAT

12.1. Industrial Emissions Directive

12.1.1. It is considered that the proposals outlined for the technology and associated techniques which are to be used at the Installation comply with the relevant requirements of the IED for waste incineration plants.

12.2. Best Available Technique

12.2.1. The BAT requirements for the proposed Installation have been taken from the European Commission Bref document for Waste Incineration and the EA's 'How to comply with your environmental permit Additional guidance for: The Incineration of Waste' (EPR 5.01). It is considered that the techniques which will be in use at the Installation will constitute BAT and will be appropriate and proportionate for the scale of the activities at the Installation and the risks which are posed to the environment.

13. HEAT RECOVERY

13.1. Combined Heat and Power

13.1.1. The plant shall be configured as a CHP ready incineration plant. A CHP-R Assessment (LIT_c2772c CWC) has been prepared and is provided in Section 9 of this application submission.

14. RESIDUE MANAGEMENT

14.1. Process Residues

14.1.1. The two main process-related wastes that will be produced at the Installation will be IBA and APCr. The IBA will be stored in a dedicated storage bunker and the APCr will be stored in two dedicated storage silos. The IBA is classed as non-hazardous waste, whilst APCr are classed as hazardous waste.

14.1.2. An additional waste stream that will arise from the activities undertaken at the Installation is used filter bags from the filter bag system. These will be classed as hazardous waste.

14.1.3. FCC will, wherever possible, seek to recover, recycle or re-use any waste streams arising from the Installation's activities. In particular, IBA will be exported from site and reprocessed and has a number of actual and possible uses, such as producing a sustainable recycled aggregate. APCr will also be exported from site for further treatment/processing. Possible uses for APC residues include production of an aggregate that can be used in block manufacture.

15. ABNORMAL OPERATIONS

15.1. Abnormal Scenario Assessment

15.1.1. As part of the ADMS (ECL.007.04.01/ADM), two scenarios were considered to assess the impact of the plant under abnormal operating conditions. The results of the study found that under both of the scenarios tested, emissions would be assessed as not significant.

16. INCOMBINATION ASSESSMENT

16.1. Scenarios Considered

16.1.1. In addition to the proposed Installation, there are several other developments in the surrounding area which may have the potential to impact both human health and ecological health when considered in combination.

16.1.2. Proposed developments with relevant available data have been included within the ADMS (ECL.007.04.01/ADM) contained in Section 6 of this submission. The results of the cumulative assessment demonstrated that the impact from the Installation in combination with the Redcar EFW Installation, will not pose unacceptable risk to human health or the environment.