Determination of an Application for an Environmental -Permit under the Environmental Permitting (England & Wales) Regulations 2016

Decision document recording our decision-making process

The Permit Number is:	EPR/TP3502MS/A001
The Applicant / Operator is:	Redcar Holdings Limited
The Installation is located at:	Land at Redcar Bulk Terminal, Redcar, TS10 5QW

What this document is about

This is a decision document, which accompanies a permit.

It explains how we have considered the Applicant's Application, and why we have included the specific conditions in the permit we are issuing to the Applicant. It is our record of our decision-making process, to show how we have taken into account all relevant factors in reaching our position. Unless the document explains otherwise, we have accepted the Applicant's proposals.

We try to explain our decision as accurately, comprehensively and plainly as possible. Achieving all three objectives is not always easy, and we would welcome any feedback as to how we might improve our decision documents in future. A lot of technical terms and acronyms are inevitable in a document of this nature: we provide a glossary of acronyms near the front of the document, for ease of reference.

Preliminary information and use of terms

We gave the application the reference number EPR/TP3502MS/A001. We refer to the application as "the **Application**" in this document in order to be consistent.

The number we have given to the permit is EPR/TP3502MS. We refer to the permit as "the **Permit**" in this document.

The Application was duly made on 29/06/2023.

The applicant is Redcar Holdings Limited. We refer to Redcar Holdings Limited as "the **Applicant**" in this document. Where we are talking about what would happen after the Permit is granted (if that is our final decision), we call Redcar Holdings Limited "the **Operator**".

Redcar Holdings Limited's proposed facility is located at Land at Redcar Bulk Terminal, Redcar, TS10 5QW. We refer to this as "the **Installation**" in this document.

How this document is structured

Contents

Glossary of acronyms used in this document

(Please note that this glossary is standard for our decision documents and therefore not all these acronyms are necessarily used in this document.)

AAD	Ambient Air Directive (2008/50/EC)
APC	Air Pollution Control
AQS	Air Quality Strategy
BAT	Best Available Technique(s)
BAT-AEL	BAT Associated Emission Level
BREF	Best Available Techniques (BAT) Reference Documents for Waste Incineration
BAT C	BAT Conclusions
CEM	Continuous emissions monitor
CFD	Computerised fluid dynamics
CHP	Combined heat and power
COMEAP	Committee on the Medical Effects of Air Pollutants
CROW	Countryside and rights of way Act 2000
CV	Calorific value
CWI	Clinical waste incinerator
DAA	Directly associated activity – Additional activities necessary to be carried out to allow the principal activity to be carried out
DD	Decision document
EAL	Environmental assessment level
EIAD	Environmental Impact Assessment Directive (85/337/EEC)
ELV	Emission limit value
EMAS	EU Eco Management and Audit Scheme
EMS	Environmental Management System
EPR	Environmental Permitting (England and Wales) Regulations 2016 (SI 2016 No. 1154) as amended
EQS	Environmental Quality Standard
ERF	Energy Recovery Facility
ES	Environmental standard
EWC	European waste catalogue
FGC	Flue gas cleaning
FPF	Fuel Preparation Facility
FPP	Fire prevention plan
FSA	Food Standards Agency

GWP	Global Warming Potential
HHRAP	Human Health Risk Assessment Protocol
HPA	Health Protection Agency (now UKHSA – UK Health Security Agency)
HW	Hazardous waste
HWI	Hazardous waste incinerator
IBA	Incinerator Bottom Ash
IBAA	Incinerator Bottom Ash Aggregate
IED	Industrial Emissions Directive (2010/75/EU)
I-TEF	Toxic Equivalent Factors set out in Annex VI Part 2 of IED
I-TEQ	Toxic Equivalent Quotient calculated using I-TEF
LCV	Lower calorific value – also termed net calorific value
LfD	Landfill Directive (1999/31/EC)
LOI	Loss on Ignition
MBT	Mechanical biological treatment
MSW	Municipal Solid Waste
MWI	Municipal waste incinerator
NOx	Oxides of nitrogen (NO plus NO_2 expressed as NO_2)
OTNOC	Other than normal operating conditions
PAH	Polycyclic aromatic hydrocarbons
PC	Process Contribution
PCB	Polychlorinated biphenyls
PEC	Predicted Environmental Concentration
PHE	Public Health England (now UKHSA – UK Health Security Agency)
POP(s)	Persistent organic pollutant(s)
PR	Public register
PXDD	Poly-halogenated di-benzo-p-dioxins
PXB	Poly-halogenated biphenyls
PXDF	Poly-halogenated di-benzo furans
RDF	Refuse derived fuel
RGN	Regulatory Guidance Note
SAC	Special Area of Conservation
SCR	Selective catalytic reduction

SNCR	Selective non-catalytic reduction
SPA(s)	Special Protection Area(s)
SS	Sewage sludge
SSSI(s)	Site(s) of Special Scientific Interest
SWMA	Specified waste management activity
TDI	Tolerable daily intake
TEF	Toxic Equivalent Factors
TGN	Technical guidance note
TOC	Total Organic Carbon
UHV	Upper heating value – also termed gross calorific value
UN_ECE	United Nations Environmental Commission for Europe
US EPA	United States Environmental Protection Agency
WFD	Waste Framework Directive (2008/98/EC)
WHO	World Health Organisation
WID	Waste Incineration Directive (2000/76/EC) – now superseded by IED

Links to guidance documents

The table below provides links to the key guidance documents referred to in this document. The links were correct at the time of producing this document.

Name of guidance document	Link
RGN 6: Determinations involving sites of high public interest	RGN 6
CHP Ready Guidance for Combustion and Energy from Waste Power Plants	CHP ready
Risk assessments for your environmental permit	Risk assessments
Guidance to Applicants on Impact Assessment for Group 3 Metals Stack Releases – version 4".	Metals guide
The Incineration of Waste (EPR 5.01)	EPR 5.01
Waste incineration BREF and BAT conclusions	BREF and BAT C
UKHSA: Municipal waste incinerators emissions: impact on health	UKHSA reports

1 Our decision

We have decided to grant the Permit to the Applicant. This will allow it to operate the Installation, subject to the conditions in the Permit.

We consider that, in reaching that decision, we have taken into account all relevant considerations and legal requirements and that the permit will ensure that a high level of protection is provided for the environment and human health.

This Application is to operate an installation which is subject principally to the Industrial Emissions Directive (IED).

The Permit contains many conditions taken from our standard Environmental Permit template including the relevant Annexes. We developed these conditions in consultation with industry, having regard to the legal requirements of the Environmental Permitting Regulations (EPR) and other relevant legislation. This document does not therefore include an explanation for these standard conditions. Where they are included in the permit, we have considered the Application and accepted that the details provided are sufficient and satisfactory to make use of the standard condition acceptable and appropriate. This document does, however, provide an explanation of our use of "tailor-made" or installation-specific conditions, or where our Permit template provides two or more options, an explanation of the reason(s) for choosing the option that has been specified.

2 How we reached our decision

2.1 Receipt of Application

The Application was duly made on 29/06/2023. This means we considered it was in the correct form and contained sufficient information for us to begin our determination but not that it necessarily contained all the information we would need to complete that determination: see section 2.3 below.

The Applicant made no claim for commercial confidentiality. We have not received any information in relation to the Application that appears to be confidential in relation to any party.

2.2 Consultation on the Application

We carried out consultation on the Application in accordance with the EPR, our statutory Public Participation Statement (PPS) and our own internal guidance RGN 6 for Determinations involving Sites of High Public Interest. RGN 6 was withdrawn as external guidance, but it is still relevant as Environment Agency internal guidance.

We consider that this process satisfies, and frequently goes beyond the requirements of the Aarhus Convention on Access to Information, Public

Participation in Decision-Making and Access to Justice in Environmental Matters, which are directly incorporated into the IED, which applies to the Installation and the Application. We have also taken into account our obligations under the Local Democracy, Economic Development and Construction Act 2009 (particularly Section 23). This requires us, where we consider it appropriate, to take such steps as we consider appropriate to secure the involvement of representatives of interested persons in the exercise of our functions, by providing them with information, consulting them or involving them in any other way. In this case, we consider that our consultation already satisfies the requirements of the 2009 Act.

We advertised the Application by a notice placed on our website, which contained all the information required by the IED, including telling people where and when they could see a copy of the Application. We also placed an advertisement in the Teesside Evening Gazette on 30 November 2023 that contained the same information.

We made a copy of the Application and all other documents relevant to our determination available to view on our Public Register. Anyone wishing to see these documents could do so and arrange for copies to be made.

We sent copies of the Application to the following bodies, which includes those with whom we have "Working Together Agreements":

- Local Authority Environmental Protection Department – Redcar and Cleveland Borough Council
- Local Authority Planning Department – Redcar and Cleveland Borough Council
- Food Standards Agency
- Health and Safety Executive
- Director of Public Health and UK Health Security Agency (Previously Public Health England)
- Fire & Rescue Service – Tyne and Wear
- Northumbrian Water
- National Grid

These are bodies whose expertise, democratic accountability and/or local knowledge make it appropriate for us to seek their views directly. Note under our Working Together Agreement with Natural England, we only inform Natural England of the results of our assessment of the impact of the installation on designated Habitats sites. We consulted with Natural England following our habitats assessments.

In addition to our advertising the Application, we undertook a programme of extended public consultation. Further details along with a summary of consultation comments and our response to the representations we received can be found in Annex 4. We have taken all relevant representations into consideration in reaching our determination.

2.3 Requests for Further Information

Although we were able to consider the Application duly made, we did in fact need more information in order to determine it and issued information notices on 22/03/2024, 20/09/2024, 11/11/2024 and 13/01/2025. A copy of each information notice was placed on our public register along with responses when received.

3 The legal framework

The Permit will be granted under Regulation 13 of the EPR. The Environmental Permitting regime is a legal vehicle which delivers most of the relevant legal requirements for activities falling within its scope. In particular, the regulated facility is:

- an *installation* and a *waste incineration plant* as described by the IED;
- an *operation* covered by the WFD, and
- subject to aspects of other relevant legislation which also have to be addressed.

We address some of the major legal requirements directly where relevant in the body of this document. Other requirements are covered in section 7 towards the end of this document.

We consider that in granting the Permit, it will ensure that the operation of the Installation complies with all relevant legal requirements and that a high level of protection will be delivered for the environment and human health.

We explain how we have addressed specific statutory requirements more fully in the rest of this document.

4 The Installation

4.1 Description of the Installation and related issues

4.1.1 The permitted activities

The Installation is subject to the EPR because it carries out several activities listed in Part 1 of Schedule 1 to the EPR:

- Section 5.1 Part A(1)(b) – incineration of non-hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity of 3 tonnes or more per hour.
- Section 5.4 Part A(1)(a)(iii) – disposal of non-hazardous waste with a capacity exceeding 50 tonnes per day for the pre-treatment of waste for incineration

- Section 5.4 Part A(1)(b)(ii) – recovery or a mix of recovery and disposal of non-hazardous waste with a capacity exceeding 75 tonnes per day involving pre-treatment of waste for incineration
- Section 5.4 Part A(1)(b)(iii) – recovery of non-hazardous waste with a capacity exceeding 75 tonnes per day for the treatment of slags and ashes

The IED definition of "waste incineration plants" and "waste co-incineration plants" says that it includes:

> *"all incineration lines or co-incineration lines, waste reception, storage, on-site pre-treatment facilities, waste, fuel and air supply systems, boilers, facilities for the treatment of waste gases, on-site facilities for treatment or storage of residues and waste water, stacks, devices for controlling incineration or co-incineration operations, recording and monitoring incineration or co-incineration conditions."*

Many activities which would normally be categorised as "directly associated activities" (DAA) for EPR purposes, such as air pollution control plant, (including storage and preparation of treatment chemicals e.g. lime slaking), and the ash storage bunker, are therefore included in the listed activity description for incineration.

Pre-treatment of non-hazardous waste is incorporated into the permit as a separate scheduled activity, as the facility / activity could operate independently, sending RDF off site. The IBA treatment facility is accepting IBA from off-site sources, and therefore IBA treatment is incorporated as a separate scheduled activity.

Ordinarily, pre-treatment of wastes intended for the facilities incinerator, and IBA treatment of wastes produced at the facilities incinerator would be included within the activity description for the Section 5.1 activity. In this case, to simplify the permit and to make it clear what measures apply to the activities, all preparation and pre-treatment is considered within the activity limits of the Section 5.4 Part A(1)(a)(iii) and 5.4 A(1)(b)(ii) activities, and all IBA treatment is considered within the activity limits of the Section 5.4 Part A(1)(b)(iii) activity. We have specified both Section 5.4 Part A(1)(a)(iii) and 5.4 A(1)(b(ii) to cover the treated waste going to an incinerator with R1 status and those without R1 status.

The installation comprises the following "directly associated activities" (DAAs):

- Storage of waste prior to pre-treatment
- Storage of recovered metals prior to collection and removal off-site
- Storage of IBA prior to treatment
- Storage of wastes recovered from the IBA treatment processes
- Uncontaminated surface water collection
- Collection and storage of contaminated surface water
- Generation of electricity using a steam turbine

- Steam supply system
- Back-up electricity generation for emergencies

Blending of waste aggregates with mechanically processed IBAA (prior to maturation) is undertaken; this is considered to be a waste operation.

Together, these listed activities, directly associated activities and waste operation comprise the Installation.

4.1.2 The Site

The site for the Installation is located on land at Redcar Bulk Terminal, Redcar, centred on National Grid reference NZ 55890 26032, with the nearest postcode listed as TS10 5QW.

To the south and east of the site are areas formerly associated with the Teesside Steel Works. To the West of the site is a storage area for the Redcar Bulk Terminal, and the Tees Estuary beyond. To the North of the site is the Teesmouth and Cleveland Coast SPA/Ramsar/SSSI.

The closest sensitive human receptor (industrial) is around 1.8km from the Installation boundary, and the closest residential receptor is around 2.3km from the Installation boundary. The following habitats are located within the relevant screening distances from the Installation:

- Special Protection Areas (SPA): Teesmouth and Cleveland Coast (300m)
- Ramsar: Teesmouth and Cleveland Coast (300m)
- Sites of Special Scientific Interest (SSSI): Teesmouth and Cleveland Coast (130m)
- National Nature Reserve (NNR): Teesmouth (1700m)

The Applicant submitted a plan which we consider is satisfactory, showing the site of the Installation and its extent. A plan is included in Schedule 7 to the Permit, and the Operator is required to carry on the permitted activities within the site boundary.

Further information on the site is addressed below at 4.3.

4.1.3 What the Installation does

The Applicant has described the facility as an Energy Centre comprising a Fuel Preparation Facility (FPF), an Energy Recovery Facility (ERF) and an IBA treatment/processing facility. Our view is that for the purposes of IED (in particular Chapter IV) and EPR, the installation comprises a waste incineration plant, a pre-treatment for incineration facility, an IBA processing facility, a waste operation for blending IBA and waste, and directly associated activities. Notwithstanding the fact that energy will be recovered from the ERF process; the process is nevertheless ‘incineration’ because it is considered that its main purpose is the thermal treatment of waste.

The key features of the Installation are summarised below:

Waste incineration plant:

The facility has been designed to incinerate a maximum of 500,000 tonnes of waste per year at a rate of 56.2 tonnes per hour (2 lines with a capacity of 28.1 tonnes per hour each), with a design NCV range of 7.5 – 11 MJ/kg.

Waste incinerated at this facility is primarily refuse derived fuel (RDF), municipal solid waste (MSW), and commercial and industrial wastes from off-site sources, and refuse derived fuel (RDF) produced on-site at the FPF.

Waste will be delivered to the Energy Recovery Facility (ERF) directly from off-site sources; enclosed vehicles tip directly into the storage bunker. RDF will also be delivered to the storage bunker via an enclosed conveyor from the Fuel Preparation Facility (FPF). Wastes are blended within the bunker and subsequently loaded into feed chutes and transferred onto the combustion grates by hydraulic powered feeding units.

Chutes will be kept full of waste to ensure no backward flow of combustion gases or premature ignition of waste. The waste charging and feeding systems are interlocked with furnace conditions. The incinerator is designed to optimise both primary and secondary combustion air distribution to improve efficiency of the combustion process and will be regulated by a combustion control system.

Primary combustion air is drawn from the waste reception area, maintaining negative pressure within the building. The extracted air is fed beneath the grate creating turbulence for complete combustion. Secondary combustion air is injected into the flame body above the grate to create turbulence and facilitate complete combustion of wastes whilst minimising levels of nitrogen oxides (NOx).

The furnaces are designed to ensure exhaust gases are raised to a minimum temperature of 850°C, with a minimum of two seconds gas residence time at this temperature. This is to ensure the destruction of dioxins, furans, PAHs and other organic compounds. If the temperature falls below 850°C, low NOx auxiliary burners would be initiated to maintain the minimum temperature.

Heat is recovered in two boilers, each with a thermal capacity of 82 MWth (164 MWth combined), which produces superheated steam to power one higher-efficiency steam turbine, generating up to 49.9 MWe of electricity and exporting approximately 44.9 MWe of that electricity. There is the potential to export approximately 10 MWth of heat to local users, subject to contractual agreements.

The main waste streams produced from the incineration process are Incinerator Bottom Ash (IBA) and Air Pollution Control (APC) residues. IBA will be quenched before it is transferred via an enclosed conveyor to the IBA

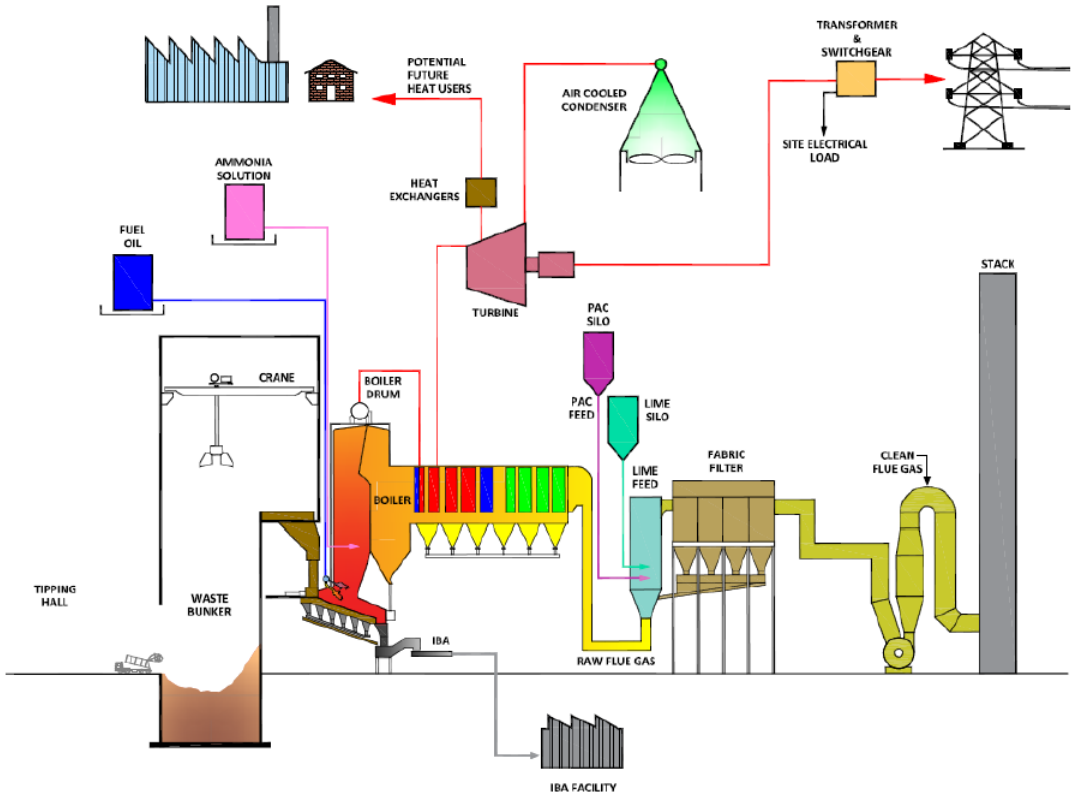
reception bunker in an enclosed building. A portion of APC residues are recycled back into the flue gas stream to minimise reagent use; the remainder is stored within silos and will be removed as a hazardous waste for treatment (if possible), or disposal, at a suitably licensed facility/landfill.

Air emissions at the site are minimised by:

a) Selective non-catalytic reduction (SNCR); injection of ammonia into the furnace to abate NOx emissions.
b) Injection of lime to abate acid gas emissions
c) Injection of activated carbon to abate organic compounds, metals, dioxins and furans
d) Use of a bag filter to abate particulate matter (including reagent solids produced from prior abatement techniques)

Uncontaminated surface water run-off (from non-process areas of the site) will be directed to an attenuation pond, passing through oil interceptors before discharge to the River Tees. Valves will be installed within the drainage system, to ensure that the effluent can be isolated in the event of an emergency / spill. The facility is designed as zero process effluent, whereby all process waste waters are reused for ash quench. During periodic maintenance there will be a requirement for the boiler to be emptied for cleaning. These effluents will be reused where possible, but if the system is at full capacity, they may be discharged to sewer under a trade effluent discharge consent.

The key features of the waste incineration plant are summarised below:



Waste throughput (max capacity)	250,000 tonnes / year for each line 500,000 tonnes / year total	28.1 tonnes / hour / line 56.2 tonnes / hour total
Waste processed	MSW, C&I, RDF	
Number of lines	2	
Furnace technology	Grate	
Auxiliary Fuel	Gas Oil	
Acid gas abatement	Dry	Lime
NOx abatement	SNCR	Ammonia
Reagent consumption	Auxiliary Fuel: 709 tonnes / year Ammonia: 10,635 tonnes / year Lime: 135 tonnes / year Activated carbon: 57,816 tonnes / year Process water:	
Flue gas recirculation	No	
Dioxin abatement	Activated carbon	
Stack	Grid Reference: Stack 1 (A1): NZ 55890 26032 Stack 2 (A2): NZ 55895 26030	
	Height, 120 m	Internal diameter, 2.1 m
Flue gas	Flow, 110.8 Nm^3/s	Exit velocity, 23 m/s
	Temperature 140 °C	
Electricity generated	49.9 MWe	399,200 MWh
Electricity exported	44.9 MWe	359,200 MWh
Steam conditions	Temperature, 430 °C	Pressure, 60 bar/MPa
Capacity for heat export	10MWh	
Waste heat use	The installation can export either hot water or high pressure steam. Local heat users have been identified (anticipated to be the wider Teesworks development); subject to contractual agreements.	

Fuel Preparation Facility (pre-treatment for incineration):

The Fuel Preparation Facility (FPF) processes up to 200,000 tonnes of commercial and industrial (C&I) and residual municipal solid waste (MSW) per annum. The FPF will process the following wastes:

- Baled material that is delivered to the EfW and requires shredding before entering the main EfW bunker via the bridge conveyor
- Loose material which will be stored in the FPF during any unplanned or planned shutdowns of the EfW and any overflow material from the main EfW bunker. This material will be stored in the concrete bays ready to be transferred to the main EfW bunker via the bridge conveyor

- Reject material from the main EfW bunker. This material will be tipped into the reject area ready to be shredded and then moved to the 6 x concrete bays in the middle of the FPF ready for the main EfW bunker
- Material that is out of specification material and rejected by the EfW that requires quarantine before being transported offsite and disposed of in a suitable manner.

All storage and treatment takes place inside the enclosed FPF building. The treatment processes within the FPF are mechanical, including a de-baler, a shredder and front loaders which provide some level of mixing/blending.

There are no direct emissions to air from the Fuel Preparation Facility (FPF). All activities are undertaken in the enclosed building; fast acting roller shutter doors will be in place to reduce the risk of fugitive emissions of dust or litter.

Process waters from the activities will be minimal, consisting mainly of washdown from the storage and treatment areas, to avoid build up of leachate and odours. The FPF has impermeable hardstanding and sealed drainage system; wastewater is directed to the Energy Recovery Facility and reused as ash quench.

IBA Treatment Process and Waste Blending Operation

The IBA recycling Facility processes a maximum of 180,000 tonnes of IBA per year. All unprocessed IBA, from both off-site deliveries and the ERF, is delivered into a bunker inside the enclosed IBA reception building. There are discrete bays within the IBA bunker to allow the maturing process to take place in batches. IBA is stored for maturation and kept at a moisture content of 15-20% to maximise metal extractions during the processing stage.

Processing consists of a series of sorting and separation stations using over-band magnets, eddy current separators, crushing and size separation using screens. All IBA treatment takes place inside individual enclosed buildings, with enclosed conveyors moving waste between the stations.

IBA is fed into a hopper with screening for oversize material, oversize material is then crushed. A magnetic separator is utilised to remove ferrous metals and an eddy current separator for non-ferrous metals. The IBA is then separated using a drum screen and wind sifter. A secondary over-band magnet is used to remove the finer particles of ferrous metals, to produce the IBAA. There are no direct emission points to air from any treatment or storage areas.

Where required, a front loader is used to blend the resultant processed IBAA fractions with waste aggregate to ensure the IBAA meets the relevant standard for the end-use as specified by the customer.

IBAA is stored outside in 3 sided-bays for an additional 2 – 4 week period of ageing, for pH stabilisation and reduction of leachability, at a moisture content

of 15-20% to prevent/minimise dust emissions. Following this period of ageing, the resultant IBA is sent off-site for recovery. Ferrous and non-ferrous metals from the treatment process are also sent off-site for recovery/recycling.

All process areas within the IBA Facility (external and internal) are covered in hardstanding. Drainage from the IBA facility, including the external storage yard, is collected within a separate sealed drainage system. Effluent is directed to a concrete settlement lagoon before re-use. We have set pre-operational condition PO11 which requires an engineer to confirm that the site surfacing and lagoon design meet CIRIA C736 standards.

4.1.4 Key Issues in the Determination

The key issues arising during determination of the Application were:

- Emissions to air
- Impacts on habitats sites
- Assessment of BAT

We describe how we determined these issues in greater detail in the body of this document.

4.2 The site and its protection

4.2.1 Site setting, layout and history

The installation is located at Land at Redcar Bulk Terminal, Redcar, TS10 5QW. The centre of the site is located at National Grid reference NZ 55890 26032. The site is located approximately 4.5km west of Redcar town centre, and 8.5km northeast of Middleborough city centre. The site currently comprises an area of the Redcar Bulk Terminal, which was formerly used for storage of materials; it is largely open ground.

The north and northeastern boundaries are formed of a high earth bund, beyond which lies the Teesmouth and Cleveland Coast SSSI. The eastern boundary is formed by coke ovens associated with the former Teesside Steel Works, with further areas of steel works to the southeast of the site. A storage area of the Redcar Bulk Terminal is to the western boundary, the Tees Estuary lies beyond.

The site is located on what were historically, tidal estuarine mudflats at the mouth of the River Tees. From the mid-19th century, the topography of the site has been significantly altered through repeated land reclamation and industrial development, which has raised ground levels of the site. The site is underlain by a Secondary Undifferentiated Aquifer associated with the Tidal Flat Deposits. The underlying Bedrock consists of the Mercia Mudstone Formation which is classified as a Secondary B Aquifer. There are no Source Protection Zones within 500m of the site. The site lies in Flood Zone 1; there are no Flood Zone 2 or 3 areas within 50m of the installation.

The installation is located on approximately 10 hectares of land and will comprise a number of buildings, two 120 m high stacks for release of air emissions, and an outside storage area at the IBA facility.

4.2.2 Proposed site design: potentially polluting substances and prevention measures

All wastes for the Fuel Preparation Facility and Energy Recovery Facility are delivered, handled and stored in an enclosed building, which have hardstanding and contained drainage. The waste bunker within the Energy Recovery Facility will be constructed of reinforced concrete and designed as a water retaining structure. Checks will be made during construction and commissioning to verify structural integrity. All effluents from the Fuel Preparation Facility and Energy Recovery Facility are collected within the sealed system in a 'dirty water pit', and subsequently reused for the initial ash quench within the Energy Recovery Facility.

All process areas within the IBA Facility (external and internal) are covered in hardstanding. Drainage from the IBA facility, including the external storage yard, is collected within a separate sealed drainage system. Effluent is directed to a concrete settlement lagoon before re-use. We have set pre-operational condition PO11 which requires an engineer to confirm that the site surfacing and lagoon design meet CIRIA C736 standards.

Uncontaminated surface-water runoff will be discharged into the surface water drainage system. All process effluents will be fully separated from the surface water drainage system to ensure that only uncontaminated surface water is discharged to surface water sewer. Surface water will be discharged into an attenuation pond at the northwest of the site, with the flow passing through an oil interceptor prior to discharge at emission point W1.

Firewater would either be contained within the waste incineration bunker, or within the surface water system. There will be a penstock valve within the surface water drainage system to ensure that in the event of an emergency (e.g. fire or spill), the system can be isolated, avoiding any emission of potentially hazardous substances.

All storage tanks containing liquids potentially hazardous to the environment will have appropriate containment systems in place. As a minimum, bunds will be designed to accommodate 110% of the storage capacity of the tank capacity, or 25% of the total volume of materials being stored, in line with CIRIA C736 standards. Regular preventative maintenance of bunds across the site will be undertaken, including frequent visual inspections. Spill kits will be available in suitable locations.

Under Article 22(2) of the IED the Applicant is required to provide a baseline report containing at least the information set out in paragraphs (a) and (b) of the Article before starting operation.

The Applicant submitted a site condition report. We have reviewed that report and consider that it does not adequately describe the condition of the soil and groundwater prior to the start of operations. We have therefore set a pre-operational condition (PO7) requiring the Operator to provide this information prior to the commencement of operations.

Pre-operational condition PO14 requires the Operator to submit a protocol confirming their soil and groundwater monitoring and maintenance plan, also confirming how they intend to decommission any redundant boreholes present. Pre-operational condition PO15 requires the Operator to submit a validation report confirming that the redundant boreholes have been decommissioned prior to the commencement of commissioning.

The baseline report is an important reference document in the assessment of contamination that might arise during the operational lifetime of the installation and at cessation of activities at the installation

4.2.3 Closure and decommissioning

Having considered the information submitted in the Application, we are satisfied that the appropriate measures will be in place for the closure and decommissioning of the Installation. Pre-operational condition PO1 requires the Operator to have an Environmental Management System in place before the Installation is operational, and this will include a site closure plan.

At the definitive cessation of activities, the Operator has to satisfy us that the necessary measures have been taken so that the site ceases to pose a risk to soil or groundwater, taking into accounts both the baseline conditions and the site's current or approved future use. To do this, the Operator will apply to us for surrender of the permit, which we will not grant unless and until we are satisfied that these requirements have been met.

4.3 Operation of the Installation – general issues

4.3.1 Administrative issues

The Applicant is the sole Operator of the Installation.

We are satisfied that the Applicant is the person who will have control over the operation of the Installation after the granting of the Permit; and that the Applicant will be able to operate the Installation so as to comply with the conditions included in the Permit.

4.3.2 Management

The Applicant has stated in the Application that they will implement an Environmental Management System (EMS) that will be certified under

ISO14001. A pre-operational condition (PO1) is included requiring the Operator to provide a summary of the EMS prior to commissioning of the plant and to make available for inspection all EMS documentation. The Environment Agency recognises that certification of the EMS cannot take place until the Installation is operational. An improvement condition (IC1) is included requiring the Operator to report progress towards gaining accreditation of its EMS.

We are satisfied that appropriate management systems and management structures will be in place for this Installation, and that sufficient resources are available to the Operator to ensure compliance with all the Permit conditions.

4.3.3 Site security

Having considered the information submitted in the Application, we are satisfied that appropriate infrastructure and procedures will be in place to ensure that the site remains secure.

4.3.4 Accident management

The Applicant has not submitted an Accident Management Plan. However, having considered the other information submitted in the Application, we are satisfied that appropriate measures will be in place to ensure that accidents that may cause pollution are prevented but that, if they should occur, their consequences are minimised. An Accident Management Plan will form part of the Environmental Management System and must be in place prior to commissioning as required by a pre-operational condition (PO1).

The Applicant submitted a Fire Prevention Plan. We are satisfied that the plan will minimise the risk of a fire and limit the impact of a fire if one occurred. There are elements of the FPP that will only be confirmed during the final design stage. Therefore, we have included pre-operational condition PO12 which requires an updated FPP to be submitted for our approval after the final design has been completed.

4.3.5 Off-site conditions

We do not consider that any off-site conditions are necessary.

4.3.6 Operating techniques

We have specified that the Applicant must operate the Installation in accordance with the following documents contained in the Application:

Description	Parts Included
The Application	EP Application Supporting Information document, dated 29/06/2023: Sections: • 1.4.2 • 1.4.5 • 2.2.2 • 2.6.1

	• 3.2.3.8 • 3.5.1.1 • 3.5.2 • 3.7.2 • 3.8.2 • 4.3
Response to Schedule 5 Notice dated 22/03/2024	Revised Odour Management Plan, dated 19/04/2024
Response to Schedule 5 Notice dated 13/01/2025	All of the response

The details set out above describe the techniques that will be used for the operation of the Installation that have been assessed by us as BAT; they form part of the Permit through Permit condition 2.3.1 and Table S1.2 in the Permit Schedules.

We have also specified the following limits and controls on the use of raw materials and fuels:

Raw Material or Fuel	Specifications	Justification
Gas Oil	< 0.1% sulphur content	As required by Sulphur Content of Liquid Fuels Regulations.

Article 45(1) of the IED requires that the Permit for the incineration activity must include a list of all types of waste which may be treated using at least the types of waste set out in the European Waste List established by Decision 2005/532/EC, EC, if possible, and containing information on the quantity of each type of waste, where appropriate.
The Application contains a list of those wastes, coded by the European Waste Catalogue (EWC) number, which the Applicant will accept in the waste streams entering the plant and which the plant is capable of burning in an environmentally acceptable way.

We have specified the permitted waste types, descriptions and where appropriate quantities which can be accepted at the installation, and for each activity, in Tables S2.2, S2.3, S2.4 and S2.5.

We are satisfied that the Applicant can accept the wastes contained in Table S2.2 of the Permit for incineration because:

(i) these wastes are categorised as municipal waste in the European Waste Catalogue or are non-hazardous wastes similar in character to municipal waste;
(ii) the wastes are all categorised as non-hazardous in the European Waste Catalogue and are capable of being safely burnt at the Installation;
(iii) these wastes are likely to be within the design calorific value (CV) range for the plant; and
(iv) these wastes are unlikely to contain harmful components that cannot be safely processed at the Installation.

The incineration plant will accept some waste which has not been source-segregated or separately collected or otherwise recovered, recycled or composted. The amount of recyclable material in the waste feed is largely outside the remit of this permit determination with recycling initiatives being a matter for the local authority. However, permit conditions 2.3.5 and 2.3.6 limit the burning of separately collected fractions in line with regulation 12 of the Waste (England and Wales) Regulations 2011.

We have limited the capacity of the incinerator to 500,000 tonnes per year. This is based on the installation operating 8,760 hours per year at a nominal capacity of 56.2 tonnes per hour.

The Installation will be designed, constructed and operated using BAT for the incineration of the permitted wastes. We are satisfied that the operating and abatement techniques are BAT for incinerating these types of waste. Our assessment of BAT is set out later in this document.

We are satisfied that the Applicant can accept the wastes contained in Table S2.3 of the Permit for the pre-treatment activity, and the output from this process will produce an RDF suitable for use in the adjacent incinerator.

Aside from IBA produced at the facility, the only additional waste accepted to the facility under the IBA processing activity (AR3) is non-hazardous bottom ash and slag, which is suitable for the activity.

We are satisfied that the waste aggregates listed within Table S2.5 are suitable for the IBAA blending activity described by the Applicant. We have ensured the Applicant is aware that IBAA produced from this blend could not be used against the current Regulatory Position Statement for IBAA use (RPS247). It is possible that it could be used within a bespoke deposit for recovery permit. We did not include the following wastes because they are not aggregates and would not be appropriate for a deposit for recovery permit:

19 01	**wastes from incineration or pyrolysis of waste**
19 01 16	boiler dust other than those mentioned in 19 01 15
19 01 19	sands from fluidised beds

4.3.7 Energy efficiency

(i) Consideration of energy efficiency

We have considered the issue of energy efficiency in the following ways:

1. The use of energy within, and generated by, the Installation which are normal aspects of all EPR permit determinations. This issue is dealt with in this section.

2. The extent to which the Installation meets the requirements of Article 50(5) of the IED, which requires *"the heat generated* during the incineration and co-incineration process is *recovered as far as*

practicable through the generation of heat, steam or power". This issue is covered in this section.

3. The combustion efficiency and energy utilisation of different design options for the Installation are relevant considerations in the determination of BAT for the Installation, including the Global Warming Potential of the different options. This aspect is covered in the BAT assessment in section 6 of this Decision Document.

4. The extent to which the Installation meets the requirement of Article 14(5) of the Energy Efficiency Directive which requires new thermal electricity generation installations with a total thermal input exceeding 20 MW to carry out a cost-benefit assessment to "*assess the cost and benefits of providing for the operation of the installation as a high-efficiency cogeneration installation*".
   Cogeneration means the simultaneous generation in one process of thermal energy and electrical or mechanical energy and is also known as combined heat and power (CHP)
   High-efficiency co-generation is cogeneration which achieves at least 10% savings in primary energy usage compared to the separate generation of heat and power – see Annex II of the Energy Efficiency Directive for detail on how to calculate this.

(ii) Use of energy within the Installation

Having considered the information submitted in the Application, we are satisfied that appropriate measures will be in place to ensure that energy is used efficiently within the Installation.

The Application details several measures that will be implemented at the Installation in order to increase its energy efficiency:

- The potential to supply steam/heat to local users
- High standards of cladding and insulation to avoid heat losses
- Use of energy efficient motors with high efficiency variable speed drives
- Boilers equipped with economisers and superheaters to optimise thermal efficiency
- Reuse of low grade heat from the turbine to preheat combustion air
- Cleaning of boiler heat exchange surfaces on a regular basis to ensure efficient heat recovery
- Recording and monitoring of energy usage to review areas for improvement.
- An Energy Efficiency Plan will be built into Operation and Maintenance procedures.

The Application states that the specific energy consumption, a measure of total energy consumed per unit of waste processed, will be 90 kWh/tonne. The installation capacity is 500,000 tonnes per year.

The BREF says that electricity consumption is typically between 60 KWh/t and 190 KWh/t depending on the LCV of the waste.

The LCV in this case is expected to be 10.5 MJ/kg. The specific energy consumption in the Application is in line with that set out above.

(iii) Generation of energy within the Installation - Compliance with Article 50(5) of the IED

Article 50(5) of the IED requires that *"the heat generated during the incineration and co-incineration process is recovered as far as practicable*".

Our combined heat and power (CHP) Ready Guidance - February 2013 considers that BAT for energy efficiency for Energy from Waste (EfW) plant is the use of CHP in circumstances where there are technically and economically viable opportunities for the supply of heat from the outset.

The term CHP in this context represents a plant which also provides a supply of heat from the electrical power generation process to either a district heating network or to an industrial / commercial building or process. However, it is recognised that opportunities for the supply of heat do not always exist from the outset (i.e. when a plant is first consented, constructed and commissioned).

In cases where there are no immediate opportunities for the supply of heat from the outset, we consider that BAT is to build the plant to be CHP Ready (CHP-R) to a degree which is dictated by the likely future opportunities which are technically viable and which may, in time, also become economically viable.

The BREF says that 0.4 – 0.8 MWh of electricity can be generated per tonne of waste.

Our technical guidance note, EPR S5.01, states that where electricity only is generated, 5-9 MW of electricity should be recoverable per 100,000 tonnes/annum of waste (which equates to 0.4 – 0.72 MWh/tonne of waste).

If operating as electricity only, the installation can maximise electrical output. The Sankey diagram in section 3.8.2 of the EP Application Supporting Information document shows 49.9 MW of electricity produced for an annual burn of 450,000 tonnes, which represents 11 MW per 100,000 tonnes/yr of waste burned (0.8 MWh/tonne of waste). The Installation is therefore within the indicative BAT range.

The Installation will primarily generate electricity but will also provide heat in the form of steam or hot water for other local customers, subject to contractual

agreement. The electrical output of the plant would be 48.4 MWe with 10 MWth used as heat.

The Applicant provided a calculation of the gross electrical efficiency and compared it to the BAT AEEL specified in BAT conclusions BAT 20.

The gross electrical efficiency was calculated as 30.4%.

The BAT AEEL for gross electrical efficiency is 25-35.

In accordance with BAT 2 table S3.6 of the Permit requires the gross electrical efficiency to be measured by carrying out a performance test at full load.

Guidance note EPR 5.01 and Chapter IV of the IED both require that, as well as maximising the primary use of heat to generate electricity; waste heat should be recovered as far as practicable.

The location of the Installation largely determines the extent to which waste heat can be utilised, and this is a matter for the planning authority. The Applicant carried out a feasibility study and provided a CHP-R assessment as part of their application, which showed there was potential to provide district heating to local businesses; suitable opportunities are being explored, though there are no firm commitments at this stage. There is provision within the design of the steam turbine to extract low-grade steam for a district heating scheme. Establishing a district heating network to supply local users would involve significant technical, financial and planning challenges such that this is not seen as a practicable proposition at present.

Our CHP-R guidance also states that opportunities to maximise the potential for heat recovery should be considered at the early planning stage, when sites are being identified for incineration facilities.

We consider that, within the constraints of the location of the Installation explained above, the Installation will recover heat as far as practicable, and therefore that the requirements of Article 50(5) are met.

(iv) R1 Calculation and the DEFRA Good Quality CHP Scheme

The R1 calculation and / or gaining accreditation under the DEFRA Good Quality CHP Scheme does not form part of the matters relevant to our determination.

The Applicant has not presented an R1 calculation with this application, nor have we received a separate application for a determination on whether the installation is a recovery or disposal facility.

(v) Choice of Steam Turbine

The facility is designed to deliver high temperature (430°C) and pressure (60 Bar) steam via appropriately insultated pipework into a single high-efficiency

steam turbine, which will generate approximately 49.9 MWe. We are satisfied that this is BAT.

The turbine will have a series of extractions at different pressures that can be used for preheating air and water in the water/steam cycle. There is the capacity to export either hot water or high pressure steam to local users – either high pressure steam could be extracted and piped directly, or low-pressure steam exiting the turbine could pass through an onsite heat exchanger to heat up water for use in a heat network.

(vi) Choice of Cooling System

The Applicant has chosen Air Cooled Condensers (ACC) for the cooling system. This was chosen above a once-through cooling system and an evaporative condenser as both of these systems require significant quantities of water, and a receiving watercourse for the off-site discharge of cooling water. Water abstraction would be required with mains water not an economically viable option.

The installation is approximately 800 – 900m from the closest watercourse (River Tees), however this area is designated as a SPA, Ramsar and SSSI. Due to the sensitivity of the receiving waters, the Applicant considers that water cooling systems are not suitable for the facility.

The Applicant notes that mitigation measures are applied to the site's design to ensure that the noise associated with operating ACCs is at an acceptable level; the noise profile was considered with our noise assessment with no significant impacts.

We agree that ACCs represent BAT for this facility.

(vii) Compliance with Article 14(5) of the Energy Efficiency Directive

The operator has submitted a cost-benefit assessment of opportunities for high efficiency co-generation within 15 km of the installation in which they calculated net present value. If the NPV is positive (i.e. any number more than zero) it means that the investors will make a rate of return that makes the scheme commercially viable. A negative NPV means that the project will not be commercially viable. The Applicant's assessment showed a net present value of 8.32 which demonstrates that operating as a high-efficiency cogeneration installation will be financially viable. We have therefore included conditions in the operator's permit as described in section [viii] below.

(viii) Permit conditions concerning energy efficiency

Improvement condition IC8 requires the Operator to submit a plan for implementing the proposed CHP scheme. We have retained pre-operational condition PO2 and conditions 1.2.2, 1.2.3 to require further review if commercial contracts for heat supply cannot be secured.

PO2 required the Operator to carry out a comprehensive review of the available heat recovery options prior to commissioning, in order to ensure that waste heat from the plant is recovered as far as possible.

Conditions 1.2.2 and 1.2.3 have also been included in the Permit, which require the Operator to review the options available for heat recovery on an ongoing basis, and to provide and maintain the proposed steam/hot water pass-outs.

The Operator is required to report energy usage and energy generated under condition 4.2 and Schedule 5 of the Permit. The following parameters are required to be reported: total electrical energy generated; electrical energy exported; total energy usage and energy exported as heat (if any). Together with the total MSW burned per year, this will enable the us to monitor energy recovery efficiency at the Installation and take action if at any stage the energy recovery efficiency is less than proposed.

There are no site-specific considerations that require the imposition of standards beyond indicative BAT, and so we accept that the Applicant's proposals represent BAT for this Installation.

4.3.8 Efficient use of water and raw materials

Having considered the information submitted in the Application, we are satisfied that the appropriate measures will be in place to ensure that the Operator will make efficient use of raw materials and water.

Water use will be minimised at the site, with re-use of waste waters within the processes. All waste waters from the fuel preparation facility and the energy recovery facility will be reused in the ash quench system. Furthermore, all waste waters from the IBA facility (mainly used for dust suppression and ensuring a suitable moisture content of the IBA) will be collected in a settlement lagoon and reused in the IBA process.

The Operator is required to report with respect to raw material usage under condition 4.2. and Schedule 4, including consumption of lime, activated carbon and ammonia used per tonne of waste burned. This will enable the Environment Agency to assess whether there have been any changes in the efficiency of the air pollution control plant, and the operation of the SNCR to abate NO_x. These are the most significant raw materials that will be used at the Installation, other than the waste feed itself (addressed elsewhere). The efficiency of the use of auxiliary fuel will be tracked separately as part of the energy reporting requirement under condition 4.2.1. Optimising reagent dosage for air abatement systems and minimising the use of auxiliary fuels is further considered in the section on BAT.

4.3.9 Avoidance, recovery or disposal with minimal environmental impact of wastes produced by the permitted activities

This requirement addresses wastes produced at the Installation and does not apply to the waste being treated there. The principal waste streams the Installation will produce are air pollution control (APC) residues, incinerator bottom ash aggregate (IBAA) and recovered metals.

The first objective is to avoid producing waste at all. Waste production will be avoided by achieving a high degree of burnout of the ash in the furnace, which results in a material that is both reduced in volume and in chemical reactivity. Condition 3.1.4 and associated Table S3.7 specify limits for total organic carbon (TOC) of <3% in bottom ash. Compliance with this limit will demonstrate that good combustion control and waste burnout is being achieved in the furnaces and waste generation is being avoided where practicable.

IBA will normally be classified as non-hazardous waste. However, IBA is classified on the European List of Wastes as a “mirror entry”, which means IBA is a hazardous waste if it possesses a hazardous property relating to the content of dangerous substances. Monitoring of IBA at the Installation will be carried out in accordance with the requirements of Article 53(3) of IED. Classification of IBA for its subsequent use or disposal is controlled by other legislation and so is not duplicated within the Permit.

APC residues from flue gas treatment are hazardous waste and therefore must be sent for disposal to a landfill site permitted to accept hazardous waste, or to an appropriately permitted facility for hazardous waste treatment. The amount of APC residues is minimised through optimising the performance of the air emissions abatement plant.

In order to ensure that the IBA residues are adequately characterised, pre-operational condition PO3 requires the Operator to provide a written plan for approval detailing the IBA sampling protocols. Table S3.7 requires the Operator to carry out an ongoing programme of monitoring.

The Application states that metal fractions will be recovered from the bottom ash by the use of a magnetic separator and sent for recycling. The IBA produced at the facility will be transported off site or treated on site for recovery.

Having considered the information submitted in the Application, we are satisfied that the waste hierarchy referred to in Article 4 of the Waste Framework Directive (WFD) will be applied to the generation of waste and that any waste generated will be treated in accordance with that Article.

We are satisfied that waste from the Installation that cannot be recovered will be disposed of using a method that minimises any impact on the environment. Standard condition 1.4.1 will ensure that this position is maintained.

5 Minimising the Installation's environmental impact

Regulated activities can present different types of risk to the environment, these include odour, noise and vibration; accidents, fugitive emissions to air and water; as well as point source releases to air, discharges to ground or groundwater, global warming potential (GWP) and generation of waste and other environmental impacts. Consideration may also have to be given to the effect of emissions being subsequently deposited onto land (where there are ecological receptors). All these factors are discussed in this and other sections of this document.

For an installation of this kind, the principal emissions are those to air, although we also consider those to land and water.

The next sections of this document explain how we have approached the critical issue of assessing the likely impact of the emissions to air from the Installation on human health and the environment and what measures we are requiring to ensure a high level of protection.

5.1 Assessment Methodology

5.1.1 Application of Environment Agency guidance 'risk assessments for your environmental permit'

A methodology for risk assessment of point source emissions to air, which we use to assess the risk of applications we receive for permits, is set out in our guidance 'Air emissions risk assessment for your environmental permit' and has the following steps:

- Describe emissions and receptors
- Calculate process contributions
- Screen out insignificant emissions that do not warrant further investigation
- Decide if detailed air modelling is needed
- Assess emissions against relevant standards
- Summarise the effects of emissions

The methodology uses a concept of "process contribution (PC)", which is the estimated concentration of emitted substances after dispersion into the receiving environmental media at the point where the magnitude of the concentration is greatest. The methodology provides a simple method of calculating PC primarily for screening purposes and for estimating process contributions where environmental consequences are relatively low. It is based on using dispersion factors. These factors assume worst case dispersion conditions with no allowance made for thermal or momentum plume rise and so the process contributions calculated are likely to be an overestimate of the actual maximum concentrations. More accurate calculation of process contributions can be achieved by mathematical dispersion models, which take into account relevant parameters of the release and surrounding conditions,

including local meteorology – these techniques are expensive but normally lead to a lower prediction of PC.

5.1.2 Use of Air Dispersion Modelling

For incineration applications, we normally require the Applicant to submit a full air dispersion model as part of their application. Air dispersion modelling enables the process contribution to be predicted at any environmental receptor that might be impacted by the plant.

Once short-term and long-term PCs have been calculated in this way, they are compared with Environmental Standards (ES) for air emissions. ES are described in our web guide 'Air emissions risk assessment for your environmental permit'.

Our web guide sets out the relevant ES as:

- Air Quality Standards Regulations 2010 Limit Values
- Air Quality Standards Regulations 2010 Target Values
- UK Air Quality Strategy Objectives
- Environmental Assessment Levels

Where a Limit Value exists, the relevant standard is the Limit Value. Where a Limit Value does not exist, target values, UK Air Quality Strategy (AQS) Objectives or Environmental Assessment Levels (EALs) are used. Our web guide sets out EALs which have been derived to provide a similar level of protection to human health and the environment as the limit values, target values and AQS objectives. In a very small number of cases, e.g. for emissions of lead, the AQS objective is more stringent that the Limit Value. In such cases, we use the AQS objective for our assessment.

Target values, AQS objectives and EALs do not have the same legal status as Limit Values, and there is no explicit requirement to impose stricter conditions than BAT in order to comply with them. However, they are a standard for harm and any significant contribution to a breach is likely to be unacceptable.

PCs are screened out as **Insignificant** if:

- the **long-term** PC is less than **1%** of the relevant ES; and
- the **short-term** PC is less than **10%** of the relevant ES.

The **long term** 1% PC insignificance threshold is based on the judgements that:

- It is unlikely that an emission at this level will make a significant contribution to air quality;
- The threshold provides a substantial safety margin to protect human health and the environment.

The **short term** 10% PC insignificance threshold is based on the judgements that:

- spatial and temporal conditions mean that short term process contributions are transient and limited in comparison with long term process contributions;
- the threshold provides a substantial safety margin to protect human health and the environment.

Where an emission is screened out in this way, we would normally consider the Applicant's proposals for the prevention and control of the emission to be BAT. That is because if the impact of the emission is already insignificant, it follows that any further reduction in this emission will also be insignificant.

However, where an emission cannot be screened out as insignificant, it does not mean it will necessarily be significant.

For those pollutants which do not screen out as insignificant, we determine whether exceedences of the relevant ES are likely. This is done through detailed audit and review of the Applicant's air dispersion modelling taking background concentrations and modelling uncertainties into account. Where an exceedance of an AAD limit value is identified, we may require the applicant to go beyond what would normally be considered BAT for the Installation or we may refuse the application if the applicant is unable to provide suitable proposals. Whether or not exceedences are considered likely, the application is subject to the requirement to operate in accordance with BAT.

This is not the end of the risk assessment, because we also take into account local factors (for example, particularly sensitive receptors nearby such as a SSSIs, SACs or SPAs). These additional factors may also lead us to include more stringent conditions than BAT.

If, as a result of reviewing the risk assessment and taking account of any additional techniques that could be applied to limit emissions, we consider that emissions **would cause significant pollution**, we would refuse the Application.

5.2 Assessment of Impact on Air Quality

The Applicant's assessment of the impact of air quality is set out in the Dispersion Modelling Assessment (Appendix E). Modelling was subsequently updated in reports submitted on 01/11/24, 23/12/24 and 11/02/25. The assessment comprises:

- Dispersion modelling of emissions to air from the operation of the incinerator.
- A study of the impact of emissions on nearby protected conservation areas

This section of the decision document deals primarily with the dispersion modelling of emissions to air from the incinerator chimney and its impact on local air quality. The impact on conservation sites is considered in section 5.4.

The Applicant has assessed the Installation's potential emissions to air against the relevant air quality standards, and the potential impact upon local conservation and habitat sites and human health. These assessments predict the potential effects on local air quality from the Installation's stack emissions using the air dispersion model software ADMS 6.0 dispersion model, which is a commonly used computer model for regulatory dispersion modelling. The model used 5 years of meteorological data collected from the weather station at Durham Tees Valley Airport between 2015 and 2019. The Applicant notes that this is the closest and most representative station available. The effect of the terrain surrounding the site upon plume dispersion was considered in the dispersion modelling.

The air impact assessments, and the dispersion modelling upon which they were based, employed the following assumptions.

- First, they assumed that the ELVs in the Permit would be the maximum permitted by Article 15(3), Article 46(2) and Annex VI of the IED. These substances are:
    - Oxides of nitrogen (NO_x), expressed as NO_2
    - Total dust
    - Carbon monoxide (CO)
    - Sulphur dioxide (SO_2)
    - Hydrogen chloride (HCl)
    - Hydrogen fluoride (HF)
    - Metals (cadmium, thallium, mercury, antimony, arsenic, lead, chromium, cobalt, copper, manganese, nickel and vanadium)
    - Polychlorinated dibenzo-para-dioxins and polychlorinated dibenzo furans (referred to as dioxins and furans)
    - Gaseous and vaporous organic substances, expressed as Total Organic Carbon (TOC)
    - Ammonia (NH_3)
- Second, they assumed that the Installation operates continuously at the relevant long-term or short-term ELVs, i.e. the maximum permitted emission rate (metals are considered further in section 5.2.3 of this decision document).
- Third, the model also considered emissions of pollutants not covered by Annex VI of IED, specifically, polycyclic aromatic hydrocarbons (PAH) and polychlorinated biphenyls (PCBs). Emission rates used in the modelling have been drawn from data in the Waste Incineration BREF and are considered further in section 5.2.2.

We are in agreement with this approach. The assumptions underpinning the model have been checked and are a reasonable worst-case.

The Applicant established the background (or existing) air quality against which to measure the potential impact of the incinerator, considering background values from a variety of sources including Defra background maps, diffusion tubes managed by Redcar and Cleveland Borough Council, national automatic monitoring networks, and APIS. We checked all available background data and considered the consultants chosen background pollution values to be either representative or reasonably conservative.

As well as predicting the maximum ground level concentration of the pollutants within the modelling domain, the Applicant has modelled several discrete receptor locations to represent human and ecological exposure.

The Applicant's use of the dispersion models, selection of input data, use of background data and the assumptions made, have been reviewed by our modelling specialists to establish the robustness of the Applicant's air impact assessment. The output from the model has then been used to inform further assessment of human health impacts and impact on protected conservation areas. Our audit takes account of modelling uncertainties. We make reasonable worst case assumptions and use the uncertainties (minimum 140%) in analysing the likelihood of exceeding any particular standard. Our sensitivity checks included using more conservative background values for some pollutants and using two additional years of UK Numerical Weather Prediction (NWP) data.

Our review of the Applicant's assessment led us to agree with the Applicant's modelled predictions and conclusions for human health. We agreed with the modelled predictions for habitats sites, however noted that critical levels within APIS had been updated during the determination of the permit (i.e. after the Applicant had completed their assessment).

The potential significance of the modelled process contributions against the new lower critical levels were considered further through our Habitat's Regulations Assessment (further detail is provided in Section 5.4 of this decision document). In agreement with Natural England, we concluded that there would be an unacceptable impact on a habitats site. The Applicant made several alterations to their installation (including revision of stack height, introduction of a monthly ammonia limit, and stack exit velocity) and subsequently provided updated modelling showing reduced impacts. Our review of the Applicant's updated assessment leads us to agree with the Applicant's conclusions.

We also audited the air quality and human health impact assessment and similarly agree that the conclusions drawn in the reports were acceptable.

The Applicant's modelling predictions are summarised in the following sections.

5.2.1 Assessment of Air Dispersion Modelling Outputs

The Applicant's modelling predictions are summarised in the tables below.

The Applicant's modelling predicted peak ground level exposure to pollutants in ambient air and at discreet receptors. The tables below show the maximum predicted ground level concentrations.

As part of our checks, we carry out sensitivity analysis of the data provided and conduct our own check modelling to ensure that the applicant's modelling predictions are reliable.

Whilst we have used the Applicant's modelling predictions in the table below, we have made our own simple verification calculation of the percentage PC and predicted environmental concentration (PEC). These are the numbers shown in the tables below and so may be very slightly different to those shown in the Application. Any such minor discrepancies do not materially impact on our conclusions.

Pollutant	ES		Back-ground	Process Contribution (PC)	
	µg/m^3	Reference period	µg/m^3	µg/m^3	% of ES
NO_2	40	Annual mean	26.68	0.20	0.50
	200	99.79th %ile of 1 hour means	57.36	9.72	4.86
PM_{10}	40	Annual mean	14.19	0.01	0.03
	50	90.41st %ile of 24 hour means	28.38	0.05	0.10
$PM_{2.5}$	20	Annual mean	8.82	0.01	0.05
SO_2	266	99.9th %ile of 15-min means	68.6	26.56	9.98
	350	99.73rd %ile of 1 hour means	68.6	15.74	4.50
	125	99.18th %ile of 24 hour means	68.6	0.60	0.48
HCl	750	1-hour mean	1.42	12.88	1.72
HF	16	Monthly mean	2.35	0.01	0.06
	160	1 hour mean	4.7	0.86	0.54
CO	10000	Maximum daily running 8 hour mean	662	11.26	0.11
	30000	1 hour mean	662	32.24	0.11

Pollutant	ES		Back-ground	Process Contribution (PC)	
	µg/m³	Reference period	µg/m³	µg/m³	% of ES
TOC*	5	Annual mean	0.7	0.03	0.60
	30	Daily mean	1.4	0.28	0.93
PAH**	0.00025	Annual mean	0.0013	$5.5x10^{-7}$	0.22
NH_3	180	Annual mean	1.55	0.02	0.01
	2500	1 hour mean	3.1	2.15	0.09
PCBs	0.2	Annual mean	0.000129	0.00001	0.01
	6	1 hour mean	0.000258	0.00107	0.02
* as benzene ** as benzo(a)pyrene					

Pollutant	ES		Back-ground	Process Contribution		Predicted Environmental Concentration	
	ng/m³	Reference period	ng/m³	ng/m³	% of EAL	ng/m³	% of EAL
Cd	5	Annual mean	0.12	0.06	1.20	0.18	3.6
	30	24-hour mean (short term)	0.24	0.55	1.83		
Hg	600	1 hour mean	4.20	4.30	0.72		
	60	24-hour mean (long term)	4.20	0.55	0.92		
Sb	5000	Annual mean	1.30	0.84	0.02		

	150000	1 hour mean	2.60	64.50	0.04		
Pb	250	Annual mean	4.30	0.84	0.34		
Cu	50	24-hour mean (long term)	4.40	8.30	16.60	12.70	25.40
Mn	150	Annual mean	4.10	0.84	0.56		
	1500000	1 hour mean	8.20	64.50	0.00		
V	1000	24 hr average (short term)	1.30	8.30	0.83		
As	6	Annual mean	0.39	0.84	14.00	1.23	20.05
Cr (II)(III)	2000	24-hour mean (long term)	3.20	8.25	0.41		
Cr (VI)	0.25	Annual mean	0.32	0.84	336.00	1.16	464.0
Ni	20	Annual mean	0.51	0.84	4.20	1.35	6.75
	700	1 hour mean	1.02	64.50	9.21		

(i) Screening out emissions which are insignificant

From the tables above the following emissions can be screened out as insignificant in that the PC is < 1% of the long term ES and <10% of the short term ES. These are:

- NO_2
- PM_{10}
- $PM_{2.5}$
- SO_2
- HCl
- HF
- CO
- TOC (as benzene)
- PAH (as benzo(a)pyrene)
- NH_3
- PCBs
- Hg, Sb, Pb, Mn, V, Cr (II)(III)

Therefore, we consider the Applicant's proposals for preventing and minimising the emissions of these substances to be BAT for the Installation subject to the detailed audit referred to below.

(ii) Emissions unlikely to give rise to significant pollution

Also, from the tables above the following emissions (which were not screened out as insignificant) have been assessed as being unlikely to give rise to significant pollution in that the PEC is less than 100% (taking expected modelling uncertainties into account) of both the long term and short term ES.

- Cd, Cu, As, Ni

For these emissions, we have carefully scrutinised the Applicant's proposals to ensure that they are applying BAT to prevent and minimise emissions of these substances. This is reported in section 6 of this document.

(iii) Emissions requiring further assessment

From the tables above the following emissions are considered to have the potential to give rise to significant pollution in that the Predicted Environmental Concentration exceeds 100% of the long term or short term ES.

- Cr (VI)

This metal is considered in further detail in section 5.2.3 of this decision document.

5.2.2 Consideration of key pollutants

(i) Nitrogen dioxide (NO_2)

The impact on air quality from NO_2 emissions has been assessed against the ES of 40 $\mu g/m^3$ as a long term annual average and 200 $\mu g/m^3$ as a short term hourly average.

The model assumes a 70% NO_X to NO_2 conversion for the long term and 35% for the short term assessment in line with Environment Agency guidance on the use of air dispersion modelling.

The above tables show that the maximum long term PC is less than 1% of the ES and the maximum short term PC is less than 10% of the ES and so can be screened out as insignificant. Therefore, we consider the Applicant's proposals for preventing and minimising the emissions of these substances to be BAT for the Installation.

(ii) Particulate matter PM_{10} and $PM_{2.5}$

The impact on air quality from particulate emissions has been assessed against the ES for PM_{10} (particles of 10 microns and smaller) and $PM_{2.5}$ (particles of 2.5 microns and smaller). For PM_{10}, the ES are a long term annual average of 40 $\mu g/m^3$ and a short term daily average of 50 $\mu g/m^3$. For $PM_{2.5}$ the ES of 20 $\mu g/m^3$ as a long-term annual average was used, having changed from 25 $\mu g/m^3$ in 2020.

The Applicant's predicted impact of the Installation against these ES is shown in the tables above. The assessment assumes that **all** particulate emissions are present as PM_{10} for the PM_{10} assessment and that **all** particulate emissions are present as $PM_{2.5}$ for the $PM_{2.5}$ assessment.

The above assessment is considered to represent a worst case assessment in that:

- It assumes that the plant emits particulates continuously at the IED Annex VI limit for total dust, whereas actual emissions from similar plant are normally lower.
- It assumes all particulates emitted are below either 10 microns (PM_{10}) or 2.5 microns ($PM_{2.5}$), when some are expected to be larger.

We have reviewed the Applicant's particulate matter impact assessment and are satisfied in the robustness of the Applicant's conclusions.

The above table shows that the predicted PC for emissions of PM_{10} is below 1% of the long term ES and below 10% of the short term ES and so can be screened out as insignificant. Therefore, we consider the Applicant's proposals for preventing and minimising the emissions of particulates to be BAT for the Installation.

The above table also shows that the predicted PC for emissions of $PM_{2.5}$ is also below 1% of the ES. Therefore, the Environment Agency concludes that particulate emissions from the installation, including emissions of PM_{10} or $PM_{2.5}$, will not give rise to significant pollution.

There is currently no emission limit prescribed nor any continuous emissions monitor for particulate matter specifically in the PM_{10} or $PM_{2.5}$ fraction. Whilst we are confident that current monitoring techniques will capture the fine particle fraction ($PM_{2.5}$) for inclusion in the measurement of total particulate matter, an improvement condition (IC2) has been included that will require a full analysis of particle size distribution in the flue gas, and hence determine the ratio of fine to coarse particles. In the light of current knowledge and available data however we are satisfied that the health of the public would not be put at risk by such emissions, as explained in section 5.3.3.

(iii) Acid gases, sulphur dioxide (SO_2), hydrogen chloride (HCl) and hydrogen fluoride (HF)

From the tables above, emissions of HCl and HF can be screened out as insignificant in that the process contribution is <10% of the short term ES. The ES for HCl is 750 μg/m^3, this is an hourly short term average, there is no long term ES for HCl. HF has 2 assessment criteria – a 1-hr ES of 160 μg/m3 and a monthly ES of 16 μg/m3. The Applicant has used ADMS v6 to predict the PC which does not allow the option of monthly averaging times. For screening purposes, we considered the max weekly HF PC and PEC against the HF monthly ES. The weekly HF PEC does not exceed the monthly HF ES and therefore we agree with the Applicant's conclusion that emissions from the operation would not cause a breach of the ES.

There is no long term EAL for SO_2 for the protection of human health. Protection of ecological receptors from SO_2 for which there is a long term ES is considered in section 5.4. There are three short term ES, hourly of 350 μg/m^3, 15 – minute of 266 μg/m^3 and daily of 125 μg/m^3.

From the above table, emissions of SO_2 can be screened out as insignificant in that the short term process contribution is <10% of each of the three short term ES values. Therefore, we consider the Applicant's proposals for preventing and minimising the emissions of these substances to be BAT for the Installation.

(iv) Emissions to air of carbon monoxide (CO), Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), Dioxins and ammonia (NH_3)

The above tables show that for CO and VOC emissions, the maximum long term PC is less than 1% of the ES and the maximum short term PC is less than 10% of the ES and so can be screened out as insignificant. Therefore, we consider the Applicant's proposals for preventing and minimising the emissions of these substances to be BAT for the Installation.

The Applicant has used the ES for benzene and also assessed against the ES for 1,3 butadiene for their assessment of the impact of VOC. This is based on 1,3 butadiene having the lowest ES of organic species likely to be present in VOC (other than PAH, PCBs, dioxins and furans).

The impact from VOCs was based on the emission limit set in the permit for total organic carbon.

The above tables show that for PAH and PCB emissions, the maximum long term PC is less than 1% of the ES and the maximum short term PC is less than 10% of the ES for PCBs and so can be screened out as insignificant. Therefore, we consider the Applicant's proposals for preventing and minimising the emissions of these substances to be BAT for the Installation.

The Applicant has used the ES for benzo[a]pyrene (BaP) for their assessment of the impact of PAH. We agree that the use of the BaP ES is sufficiently precautionary.

There is no ES for dioxins and furans as the principal exposure route for these substances is by ingestion and the risk to human health is through the accumulation of these substances in the body over an extended period of time. This issue is considered in more detail in section 5.3.

The above tables show that for ammonia emissions, the maximum long term PC is less than 1% of the ES and the maximum short term PC is less than 10% of the ES and so can be screened out as insignificant.

The ammonia emission is based on a daily average release concentration of 10 mg/m^3 and a monthly average release concentration of 7 mg/m^3. We are satisfied that this level of emission is consistent with the operation of a well controlled SNCR NO_x abatement system.

(V) Summary

For the above emissions to air, we have carefully scrutinised the Applicant's proposals to ensure that they are applying the BAT to prevent and minimise emissions of these substances. This is reported in section 6 of this document. We consider the Applicant's proposals for preventing and minimising emissions to be BAT for the Installation. Dioxins and furans are considered further in section 5.3.2.

5.2.3 Assessment of Emission of Metals

The Applicant has assessed the impact of metal emissions to air, as previously described.

There are three sets of BAT AELs for metal emissions:

- An emission limit value of 0.02 mg/m^3 for mercury and its compounds (formerly WID group 1 metals).
- An aggregate emission limit value of 0.02 mg/m^3 for cadmium and thallium and their compounds (formerly WID group 2 metals).
- An aggregate emission limit of 0.3 mg/m^3 for antimony, arsenic, lead, chromium, cobalt, copper, manganese, nickel and vanadium and their compounds (formerly WID group 3 metals).

In addition, the UK is a Party to the Heavy Metals Protocol within the framework of the UN-ECE Convention on long-range trans-boundary air pollution. Compliance with the IED Annex VI emission limits for metals along with the Application of BAT also ensures that these requirements are met.

In section 5.2.1 above, the following emissions of metals were screened out as insignificant:

- Mercury
- Antimony

- Manganese
- Vanadium
- Chromium (II)(III)

Also in section 5.2.1, the following emissions of metals whilst not screened out as insignificant were assessed as being unlikely to give rise to significant pollution:

- Cadmium
- Copper
- Arsenic
- Nickel

This left emissions of Chromium (VI) requiring further assessment. For all other metals, the Applicant has concluded that exceedences of the EAL for all metals are not likely to occur.

Where the BREF sets an aggregate limit, the Applicant's assessment assumes that each metal is emitted individually at the relevant aggregate emission limit value. This is a something which can never actually occur in practice as it would inevitably result in a breach of the said limit, and so represents a very much worst case scenario.

For Chromium (VI) the Applicant used representative emissions data from other municipal waste incinerators using our guidance note Please refer to "Guidance to Applicants on Impact Assessment for Group 3 Metals Stack Releases – version 4".

Measurement of Chromium (VI) at the levels anticipated at the stack emission points is expected to be difficult, with the likely levels being below the level of detection by the most advanced methods. Data for Cr (VI) was based on total Cr emissions measurements and the proportion of total Cr to Cr (VI) in APC residues, giving the following modelling prediction:

Pollutant	ES		Back-ground	Process Contribution	
	ng/m^3	Reference period	ng/m^3	ng/m^3	% of EAL
Cr (VI)	0.25	Annual mean	0.32	0.00038	0.15

Based on the above, the following emissions of metals were screened out as insignificant:

- Chromium (VI)

The installation has been assessed as meeting BAT for control of metal emissions to air. See section 6 of this document.

5.2.4 Consideration of Local Factors

(i) Impact on Air Quality Management Areas (AQMAs)

No AQMAs have been declared within an area likely to be affected by emissions from the Installation.

5.2.5 Consideration of Additional Measures to Control Emissions

Our initial Habitat's Regulation Assessment indicated that there would be an unacceptable impact from nitrogen deposition at the Teesmouth and Cleveland Coast SSSI. We issued a Schedule 5 notice on 20/09/2024 requesting the applicant to consider methods for reducing the impact to an acceptable level at the SSSI and provide updated modelling to support their proposal. The Applicant's updated modelling utilised a monthly average ammonia release concentration of 7 mg/m^3 and was based upon an anticipated 94% availability of the facility.

To ensure that impacts will be as modelled, we included an emission limit value of 7 mg/m^3 as a monthly average. We also calculated annual mass emission limits for oxides of nitrogen (328.45 tonnes per year) and ammonia (22.99 tonnes per year) which provide the equivalent protection of 94% availability. The Operator is required to monitor and report on both the monthly and annual limits.

5.3 Human health risk assessment

5.3.1 Our role in preventing harm to human health

The Environment Agency has a statutory role to protect the environment and human health from all processes and activities it regulates. We assessed the effects on human health for this application in the following ways:

i) Applying Statutory Controls

The plant will be regulated under EPR. The EPR include the requirements of relevant EU Directives, notably, the IED, the WFD, and ADD.

The main conditions in an EfW permit are based on the requirements of the IED. Specific conditions have been introduced to specifically ensure compliance with the requirements of Chapter IV of the IED. The aim of the IED is to prevent or, where that is not practicable, to reduce emissions to air, water and land and prevent the generation of waste, in order to achieve a high level of protection of the environment taken as a whole. IED achieves this aim by setting operational conditions, technical requirements and emission limit values to meet the requirements set out in Articles 11 and 18 of the IED. These requirements may in some circumstances dictate tighter emission limits and controls than those set out in the BAT conclusions (BAT-C) or Chapter IV of

IED on waste incineration and co-incineration plants. The assessment of BAT for this installation is detailed in section 6 of this document.

ii) Environmental Impact Assessment

Industrial activities can give rise to odour, noise and vibration, accidents, fugitive emissions to air and water, releases to air (including the impact on Photochemical Ozone Creation Potential (POCP)), discharges to ground or groundwater, GWP and the generation of waste. For an installation of this kind, the principal environmental effects are through emissions to air, although we also consider all of the other impacts listed. Section 5.1 and 5.2 above explain how we have approached the critical issue of assessing the likely impact of the emissions to air from the Installation on human health and the environment and any measures we are requiring to ensure a high level of protection.

iii) Expert Scientific Opinion

There is a significant amount of literature on whether there are links between operation of incineration plants and effects on health. We have not referenced them here, but we have included information on one of the most recent studies that was commissioned by the UK Health Security Agency (UKHSA), previously Public Health England (PHE). The overall weight of the evidence is that there is not a significant impact on human health.

UKHSA review research undertaken to examine suggested links between emissions from municipal waste incinerators and effects on health. UKHSA's risk assessment is that modern, well run and regulated municipal waste incinerators are not a significant risk to public health. While it is not possible to rule out adverse health effects from these incinerators completely, any potential effect for people living close by is likely to be very small.

UKHSA keep literature on health effects under review and would inform us if there were any changes to the above position. Similarly, we would consult UKHSA if new evidence was provided to us.

In 2012 the UK Small Area Health Statistics Unit (SAHSU) at Imperial College was commissioned by PHE to carry out a study to extend the evidence base and to provide further information to the public about any potential reproductive and infant health risks from municipal waste incineration (MWIs).

A number of papers have been published by SAHSU since 2012 which show no effect on birth outcomes. One paper in the study looked at exposure to emissions from MWIs in the UK and concluded that exposure was low. Subsequent papers found no increased risk of a range of birth outcomes (including stillbirth and infant mortality) in relation to exposure to PM_{10} emissions and proximity to MWIs, and no association with MWIs opening on changes in risks of infant mortality or sex ratio.

The final part of the study, published on 21/06/19, found no evidence of increased risk of congenital anomalies from exposure to MWI chimney

emissions, but a small potential increase in risk of congenital anomalies for children born within ten kilometres of MWIs. The paper does not demonstrate a causal effect, and it acknowledges that the observed results may well be down to not fully adjusting the study for factors such as other sources of pollution around MWIs or deprivation.

UKHSA have stated that ‘While the conclusions of the study state that a causal effect cannot be excluded, the study does not demonstrate a causal association and makes clear that the results may well reflect incomplete control for confounding i.e. insufficiently accounting for other factors that can cause congenital anomalies, including other sources of local pollution. This possible explanation is supported by the fact no increased risk of congenital anomalies was observed as a result of exposure to emissions from an incinerator.’

Following this study, UKHSA have further stated that their position remains that modern, well run and regulated municipal waste incinerators are not a significant risk to public health.

We agree with the view stated by the UKHSA. We ensure that permits contain conditions which require the installation to be well-run and regulate the installation to ensure compliance with such permit conditions.

iv) Health Risk Models

Comparing the results of air dispersion modelling as part of the Environmental Impact assessment against European and national air quality standards effectively makes a health risk assessment for those pollutants for which a standard has been derived. These air quality standards have been developed primarily to protect human health via known intake mechanisms, such as inhalation and ingestion. Some pollutants, such as dioxins, furans and dioxin like PCBs, have human health impacts at lower ingestion levels than lend themselves to setting an air quality standard to control against. For these pollutants, a different human health risk model is required which better reflects the level of dioxin intake.

Models are available to predict the dioxin, furan and dioxin like PCBs intake for comparison with the Tolerable Daily Intake (TDI) recommended by the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment, known as COT. These include the HHRAP model.

HHRAP has been developed by the US EPA to calculate the human body intake of a range of carcinogenic pollutants and to determine the mathematical quantitative risk in probabilistic terms. In the UK, in common with other European countries, we consider a threshold dose below which the likelihood of an adverse effect is regarded as being very low or effectively zero.

The TDI is the amount of a substance that can be ingested daily over a lifetime without appreciable health risk. It is expressed in relation to bodyweight to allow for different body size, such as for adults and children of different ages. In the UK, the COT has set a TDI for dioxins, furans and dioxin like PCBs of 2 picograms WHO-TEQ/kg-body weight/day (a picogram is a millionth of a millionth (10^{-12}) of a gram).

In addition to an assessment of risk from dioxins, furans and dioxin like PCBs, the HHRAP model enables a risk assessment from human intake of a range of heavy metals. In principle, the respective ES for these metals are protective of human health. It is not therefore necessary to model the human body intake.

The Committee on the Medical Effects of Air Pollution (COMEAP) developed a methodology based on the results of time series epidemiological studies which allows calculation of the public health impact of exposure to the classical air pollutants (NO_2, SO_2 and particulates) in terms of the numbers of “deaths brought forward” and the “number of hospital admissions for respiratory disease brought forward or additional”. Defra reviewed this methodology and concluded that the use of the COMEAP methodology is not generally recommended for modelling the human health impacts of individual installations.

Our recommended approach is therefore the use of the methodology set out in our guidance for comparison for most pollutants (including metals) and dioxin intake modelling using the HHRAP model as described above for dioxins, furans and dioxin like PCBs. Where an alternative approach is adopted for dioxins, we check the predictions ourselves.

v) Consultations

As part of our normal procedures for the determination of a permit application, we consult with Local Authorities, Local Authority Directors of Public Health, FSA and PHE. We also consult the local communities who may raise health related issues. All issues raised by these consultations are considered in determining the Application as described in Annex 4 of this document.

5.3.2 Assessment of Intake of Dioxins, Furans and Dioxin like PCBs

For dioxins, furans and dioxin like PCBs, the principal exposure route is through ingestion, usually through the food chain, and the main risk to health is through accumulation in the body over the lifetime of the receptor.

The human health risk assessment calculates the dose of dioxins and furans that would be received by local receptors if their food and water were sourced from the locality where the deposition of dioxins, furans and dioxin like PCBs is predicted to be the highest. This is then assessed against the Tolerable Daily Intake (TDI) levels established by the COT of 2 picograms WHO-TEQ / kg body weight/ day.

The results of the Applicant's assessment of dioxin intake are detailed in the table below (worst case results for each category are shown). The results showed that the predicted daily intake of dioxins, furans and dioxin like PCBs at all receptors, resulting from emissions from the proposed facility, were significantly below the recommended TDI levels.

Receptor	Adult (% of TDI)	Child (% of TDI)
Agricultural	5.17%	7.30%
Residential	0.12%	0.37%

Calculated maximum daily intake of dioxins over a lifetime by local receptors resulting from the operation of the proposed facility (WHO-TEQ/ kg-BW/day)

The maximum contribution is 5.17% of the TDI for an adult, and 7.30% of the TDI for a child. The UKHSA advise that overall, an additional dioxin intake of 10% of the TDI on the consumption by the average or high level adult consumer is unlikely to result in a significant effect on health.

Our modelling audit confirmed that human intake of dioxins, furans and dioxin-like PCBs are predicted to be below the 10% screening level agreed with UKHSA. Furthermore, we note that although the predictions are below the UKHSA screening threshold, they are also overly conservative. The Applicant has calculated combined intakes without adjustment for lifetime exposure. The percentage predictions should therefore not be used to make direct comparisons with the TDI over a more relevant long term exposure period (e.g. lifetime).

In 2010, the FSA studied the levels of chlorinated, brominated and mixed (chlorinated-brominated) dioxins and dioxin-like PCBs in fish, shellfish, meat

and eggs consumed in the UK. It asked COT to consider the results and to advise on whether the measured levels of these PXDDs, PXDFs and PXBs indicated a health concern ('X' means a halogen). COT issued a statement in December 2010 and concluded that "The major contribution to the total dioxin toxic activity in the foods measured came from chlorinated compounds. Brominated compounds made a much smaller contribution, and mixed halogenated compounds contributed even less (1% or less of TDI). Measured levels of PXDDs, PXDFs and dioxin-like PXBs do not indicate a health concern". COT recognised the lack of quantified TEFs for these compounds but said that "even if the TEFs for PXDDs, PXDFs and dioxin-like PXBs were up to four fold higher than assumed, their contribution to the total TEQ in the diet would still be small. Thus, further research on PXDDs, PXDFs and dioxin-like PXBs is not considered a priority."

In the light of this statement, we assess the impact of chlorinated compounds as representing the impact of all chlorinated, brominated and mixed dioxins / furans and dioxin like PCBs.

5.3.3 Particulates smaller than 2.5 microns

The Operator will be required to monitor particulate emissions using the method set out in Table S3.1 of Schedule 3 of the Permit. This method requires that the filter efficiency must be at least 99.5 % on a test aerosol with a mean particle diameter of 0.3 µm, at the maximum flow rate anticipated. The filter efficiency for larger particles will be at least as high as this. This means that particulate monitoring data effectively captures everything above 0.3 µm and much of what is smaller. It is not expected that particles smaller than 0.3 µm will contribute significantly to the mass release rate / concentration of particulates because of their very small mass, even if present. This means that emissions monitoring data can be relied upon to measure the true mass emission rate of particulates.

Nano-particles are considered to refer to those particulates less than 0.1 µm in diameter ($PM_{0.1}$). Questions are often raised about the effect of nano-particles on human health, in particular on children's health, because of their high surface to volume ratio, making them more reactive, and their very small size, giving them the potential to penetrate cell walls of living organisms. The small size also means there will be a larger number of small particles for a given mass concentration. However, the UKHSA statement (referenced below) says that due to the small effects of incinerators on local concentration of particles, it is highly unlikely that there will be detectable effects of any particular incinerator on local infant mortality.

The UKHSA addresses the issue of the health effects of particulates in their September 2009 statement 'The Impact on Health of Emissions to Air from Municipal Incinerators'. It refers to the coefficients linking PM_{10} and $PM_{2.5}$ with effects on health derived by COMEAP and goes on to say that if these coefficients are applied to small increases in concentrations produced, locally, by incinerators; the estimated effects on health are likely to be small. UKHSA note that the coefficients that allow the use of number concentrations in impact calculations have not yet been defined because the national experts have not

judged that the evidence is sufficient to do so. This is an area being kept under review by COMEAP.

In December 2010, COMEAP published a report on The Mortality Effects of Long-Term Exposure to Particulate Air Pollution in the United Kingdom. It says that "a policy which aims to reduce the annual average concentration of $PM_{2.5}$ by 1 $\mu g/m^3$ would result in an increase in life expectancy of 20 days for people born in 2008." However, "The Committee stresses the need for careful interpretation of these metrics to avoid incorrect inferences being drawn – they are valid representations of population aggregate or average effects, but they can be misleading when interpreted as reflecting the experience of individuals."

UKHSA also point out that in 2007 incinerators contributed 0.02% to ambient ground level PM_{10} levels compared with 18% for road traffic and 22% for industry in general. UKHSA noted that in a sample collected in a day at a typical urban area the proportion of $PM_{0.1}$ is around 5-10% of PM_{10}. It goes on to say that PM_{10} includes and exceeds $PM_{2.5}$ which in turn includes and exceeds $PM_{0.1}$. The National Atmospheric Emissions Inventory (NAEI) figures show that in 2016 municipal waste incineration contributed 0.03% to ambient ground level PM_{10} levels and 0.05% to ambient ground level PM2.5 levels. The 2016 data also shows that road traffic contributed to 5.35% of PM10 and 4.96% of PM2.5 and that domestic wood burning contributed 22.4% to PM10 and 34.3% of PM2.5 levels.

This is consistent with the assessment of this Application which shows emissions of PM_{10} to air to be insignificant.

A 2016 a paper by Jones and Harrison concluded that 'ultrafine particles (<100nm) in flue gases from incinerators are broadly similar to those in urban air and that after dispersion with ambient air ultrafine particle concentrations are typically indistinguishable from those that would occur in the absence of the incinerator.

We take the view, based on the foregoing evidence, that techniques which control the release of particulates to levels which will not cause harm to human health will also control the release of fine particulate matter to a level which will not cause harm to human health.

5.3.4 Assessment of Health Effects from the Installation

Our assessment of health impacts is summarised below

i. We have applied the relevant requirements of the Environmental legislation in imposing the permit conditions. We are satisfied that compliance with these conditions will ensure protection of the environment and human health.

ii. In carrying out air dispersion modelling as part of the environmental impact assessment and comparing the PC and PEC with the ES, the Applicant has effectively made a health risk assessment for many

pollutants. The ES have been developed primarily to protect human health. The Applicant's assessment of the impact from NO_2, PM10, $PM_{2.5}$, SO_2, HCl, HF, CO, TOC, PAH, NH_3, PCBs, Hg, Sb, Pb, Mn, V, Cr (II)(III), Cr(VI) have all indicated that the Installation emissions screen out as insignificant; where the impact of emissions of Cd, Cu, As, Ni have not been screened out as insignificant, the assessment still shows that the PEC are well within the ES.

iii. We have assessed the health effects from the operation of this installation in relation to the above (sections 5.3.1 to 5.3.3).

iv. We have reviewed the methodology employed by the Applicant to carry out the health impact assessment.

The Applicant considered the following pathways to be relevant to their assessment: direct inhalation and ingestion of soil, home grown produce, drinking water, eggs from home-grown chickens, home grown poultry, beef, pork, milk, and break milk (infants). The Applicant did not consider fish consumption within their HHRA as there are no fish farms within 10km of the facility; we agree with this approach. We agreed with the concentrations used within the HHRA and were able to replicate emission rates provided by the Applicant. We conducted our own HHRA screening checks based on the US EPA HHRAP to audit the Applicant's HHRA.

Overall, taking into account the conservative nature of the impact assessment (i.e. that it is based upon an individual exposed for a life-time to the effects of the highest predicted relevant airborne concentrations and consuming mostly locally grown food), it was concluded that the operation of the proposed facility will not pose a significant risk to human health.

v. We agree with the conclusion reached by UKHSA that modern, well run and regulated municipal waste incinerators are not a significant risk to public health. While it is not possible to rule out adverse health effects from these incinerators completely, any potential effect for people living close by is likely to be very small.

vi. UKHSA and the Local Authority Director of Public Health were consulted on the Application. They concluded that they had no significant concerns regarding the risk to the health of humans from the installation. The Local Authority Director of Public Health did not provide a response. The Food Standards Agency was also consulted during the permit determination process and did not provide a response to our consultation. Details of the response provided by UKHSA on this Application can be found in Annex 4.

We are therefore satisfied that the Applicant's conclusions presented above are reliable and we conclude that the potential emissions of pollutants including

dioxins, furans and metals from the proposed facility are unlikely to have a significant impact on human health.

5.4 Impact on protected conservation areas (SPAs, SACs, Ramsar sites and SSSIs and local nature sites)

5.4.1 Sites Considered

The following Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar) sites are located within 10 km of the Installation:

- Teesmouth and Cleveland Coast (SPA and Ramsar), approximately 300m from the installation

The following Sites of Special Scientific Interest (SSSI) are located within 2 km of the Installation:

- Teesmouth and Cleveland Coast (SSSI), approximately 130m from the installation

The following local nature sites (ancient woodlands, local wildlife sites and national and local nature reserves) are located within 2 km of the Installation:

- Teesmouth National Nature Reserve (NNR), approximately 1700m from the installation

5.4.2 Habitats Assessment

The Applicant's habitats assessment was reviewed by our technical specialists for air dispersion modelling and assessment and specialists for, habitats and conservation who agreed with the assessment's conclusions, that there would be no likely significant effect on the interest features of the Teesmouth and Cleveland Coast SPA and Ramsar. This was recorded in an Stage 1 Habitats Regulations Assessment form which we used to consult with Natural England who agreed with our assessment.

5.4.3 SSSI Assessment

The Applicant's initial assessment of SSSIs was reviewed by our technical specialists for air dispersion modelling and assessment and specialists for habitats and conservation. Following consultation with Natural England, we determined that the predicted levels of Nitrogen deposition on sand dune habitats were likely to damage the Teesmouth and Cleveland Coast SSSI.

We also noted that the appropriate critical Nitrogen deposition load range for sand dunes is 5 – 15 KgN. The 2023 Bobbink review of nitrogen critical loads indicates that calcareous dunes are often less sensitive to Nitrogen deposition,

and therefore the Applicant would need to support the use of a critical load higher than 5 with an ecological report.

The Applicant made alterations to the design of the installation, including increasing their stack height, proposing an additional monthly average limit on ammonia, increasing the stack exit velocity by reducing the stack's exit diameter, and provided an updated modelling report. The Applicant utilised a critical load of 10 kgN/ha/yr, which was accompanied by an ecological report supporting this.

The Applicant's modelling was reviewed by our technical specialists for air dispersion modelling and assessment and our specialists for habitats and conservation reviewed the ecological report. Following consultation with Natural England, we agreed with the updated assessment's conclusions, that the Installation will not damage the designated features of the SSSI.

5.4.4 Assessment of local nature sites

Conservation sites are protected in law by legislation which provides the highest level of protection for SACs and SPAs, and also for protection of protection for SSSIs. Finally, the Environment Act 1995 provides more generalised protection for flora and fauna rather than for specifically named conservation designations. It is under the Environment Act 1995 that we assess other sites (such as ancient woodlands, local wildlife sites and national and local nature reserves) which prevents us from permitting something that will result in significant pollution; and which offers levels of protection proportionate with other European and national legislation. However, it should not be assumed that because levels of protection are less stringent for these other sites, that they are not of considerable importance. Local sites link and support EU and national nature conservation sites together and hence help to maintain the UK's biodiversity resilience.

For SACs SPAs, Ramsars and SSSIs we consider the PC and the background levels in making an assessment of impact. In assessing the local nature sites under the Environment Act 1995 we look at the impact from the Installation alone to determine whether it would cause significant pollution. This is a proportionate approach, in line with the levels of protection offered by the conservation legislation to protect these other sites (which are generally more numerous than Natura 2000 or SSSIs) whilst ensuring that we do not restrict development.

Critical levels and loads are set to protect the most vulnerable habitat types. Thresholds change in accordance with the levels of protection afforded by the legislation. Therefore, the thresholds for SAC SPA and SSSI features are more stringent than those for local nature sites.

Therefore, we would generally conclude that the Installation is not causing significant pollution at these other sites if the PC is less than the relevant

critical level or critical load, provided that the Applicant is using BAT to control emissions.

PCs are <100% of the Environmental Standards for protected conservation areas. Therefore we have concluded no significant impact

5.5 Impact of abnormal operations

Article 50(4)(c) of the IED requires that waste incineration and co-incineration plants shall operate an automatic system to prevent waste feed whenever any of the continuous emission monitors show that an ELV is exceeded due to disturbances or failures of the purification devices. Notwithstanding this, Article 46(6) allows for the continued incineration and co-incineration of waste under such conditions provided that this period does not (in any circumstances) exceed 4 hours uninterrupted continuous operation or the cumulative period of operation does not exceed 60 hours in a calendar year. This is a recognition that the emissions during transient states (e.g. start-up and shut-down) are higher than during steady-state operation, and the overall environmental impact of continued operation with a limited exceedance of an ELV may be less than that of a partial shut-down and re-start.

For incineration plant, IED sets backstop limits for particulates, CO and TOC which must continue to be met during abnormal operation. The CO and TOC limits are the same as for normal operation, and are intended to ensure that good combustion conditions are maintained. The backstop limit for particulates is 150 mg/m^3 (as a half hourly average) which is five times the limit in normal operation.

Article 45(1)(f) requires that the permit shall specify the maximum permissible period of any technically unavoidable stoppages, disturbances, or failures of the purification devices or the measurement devices, during which the concentrations in the discharges into the air may exceed the prescribed emission limit values. In this case we have decided to set the time limit at 4 hours, which is the maximum period prescribed by Article 46(6) of the IED.

These abnormal operations are limited to no more than a period of 4 hours continuous operation and no more than 60 hours aggregated operation in any calendar year. This is less than 1% of total operating hours and so abnormal operating conditions are not expected to have any significant long term environmental impact unless the background conditions were already close to, or exceeding, an ES. For the most part therefore consideration of abnormal operations is limited to consideration of its impact on short term ESs.

In making an assessment of abnormal operations the following worst case scenario has been assumed:

- Dioxin emissions of 100 x normal
- Mercury emissions are 100 times those of normal operation
- NO_x emissions of 500 mg/m^3 (5 x normal)

- Particulate emissions of 150 mg/m^3 (5 x normal)
- Metal emissions other than mercury are 30 times those of normal operation
- SO_2 emissions of 450 mg/m^3 (2.25 x normal)
- HCl emissions of 900 mg/m^3 (15 x normal)
- PCBs (100 x normal)

This is a worst case scenario in that these abnormal conditions include a number of different equipment failures not all of which will necessarily result in an adverse impact on the environment (e.g. a failure of a monitoring instrument does not necessarily mean that the incinerator or abatement plant is malfunctioning). This analysis assumes that any failure of any equipment results in all the negative impacts set out above occurring simultaneously.

We checked the Applicant's assessment and agree that ES will not be exceeded.

We are therefore satisfied that it is not necessary to further constrain the conditions and duration of the periods of abnormal operation beyond those permitted under Chapter IV of the IED.

We have not assessed the impact of abnormal operations against long term ESs for the reasons set out above, except for dioxin emissions. We checked this in our audit and are satisfied that that human intake of dioxins, furans and dioxin-like PCBs are still predicted to be below the 10% screening level agreed with UKHSA.

6 Application of Best Available Techniques

6.1 Scope of Consideration

In this section, we explain how we have determined whether the Applicant's proposals are BAT / appropriate for this Installation.

- The first issue we address is the fundamental choice of incineration technology. There are a number of alternatives, and the Applicant has explained why it has chosen one particular kind for this Installation. We examined BAT considerations and appropriate measures for the waste pre-treatment and IBA treatment activities.

- Then, we consider in particular control measures for the emissions which were not screened out as insignificant in the previous section on minimising the installation's environmental impact.

- We also have to consider the combustion efficiency and energy utilisation of different design options for the Installation, which are relevant considerations in the determination of BAT for the Installation, including the GWP of the different options.

- Finally, the prevention and minimisation of Persistent Organic Pollutants (POPs) must be considered, as we explain below.

Chapter IV of the IED specifies a set of maximum ELV. Although these limits are designed to be stringent, and to provide a high level of environmental protection, they do not necessarily reflect what can be achieved by new plant. Article 14(3) of the IED says that BAT-C shall be the reference for setting the permit conditions. The BAT-C for incineration were published on 03/12/2019, and set BAT AELs for various substances mainly as daily average values which are in many cases lower than the chapter IV limits. We have also used waste treatment BAT-C, which was published on 10/08/2018.

Operational controls complement the ELV and should generally result in emissions below the maximum allowed; whilst the limits themselves provide headroom to allow for unavoidable process fluctuations. Actual emissions are therefore almost certain to be below emission limits in practice, because any Operator that sought to operate its installation continually at the maximum permitted limits would almost inevitably breach those limits regularly, simply by virtue of normal fluctuations in plant performance, resulting in enforcement action (including potentially prosecution, suspension or revocation) being taken. Assessments based on BAT AELs or Chapter IV limits are therefore "worst-case" scenarios.

We are satisfied that emissions at the permitted limits would ensure a high level of protection for human health and the environment in any event.

6.1.1 Consideration of Furnace Type

The prime function of the furnace is to achieve maximum combustion of the waste. Chapter IV of the IED requires that the plant (furnace in this context) should be designed to deliver its requirements. The main requirements of Chapter IV in relation to the choice of a furnace are compliance with air emission limits for CO and TOC and achieving a low TOC/LOI level in the bottom ash.

The BREF states that Municipal Waste can be incinerated in traveling grates, rotary kilns and fluidised bed technology. Fluidised bed technology requires MSW to be of a certain particle size range, which usually requires some degree of pre-treatment even when the waste is collected separately. The BREF describes other process such as gasification and pyrolysis. The BREF notes that some of the processes have encountered technical and economic problems when scaled up to commercial, industrial sizes. Some are used on a commercial basis in Japan and are being tested in demonstration plants in Europe but still only have a small share of overall capacity.

Section 4.3 of the BREF provides a comparison of combustion and thermal treatment technologies, used in Europe and factors affecting their applicability and operational suitability for various waste types. There is also some information on the comparative costs. The table below has been extracted from

the BREF tables. This table is also in line with the Guidance Note “The Incineration of Waste (EPR 5.01)). However, it should not be taken as an exhaustive list nor that all technologies listed have found equal application across Europe.

Overall, any of the furnace technologies identified in the BREF would be considered as BAT provided the Applicant has justified it in terms of:

- nature/physical state of the waste and its variability
- proposed plant throughput which may affect the number of incineration lines
- preference and experience of chosen technology including plant availability
- nature and quantity/quality of residues produced.
- emissions to air – usually NOx as the furnace choice could have an effect on the amount of unabated NOx produced
- energy consumption – whole plant, waste preparation, effect on GWP
- Need, if any, for further processing of residues to comply with TOC
- Costs

Summary comparison of thermal treatment technologies (reproduced from the Waste Incineration BREF)

Technique	Key waste characteristics and suitability	Throughput per line	Advantages	Disadvantages / Limitations of use	Bottom Ash Quality	Cost
Moving grate (air-cooled)	• Low to medium heat values (LCV 5 – 16.5 GJ/t) • Municipal and other • Heterogeneous solid wastes • Can accept a proportion of sewage sludge and/or medical waste with municipal waste • Applied at most modern MSW installations	• 1 to 50 t/h with most projects 5 to 30 t/h. • Most industrial applications not below 2.5 or 3 t/h.	• Widely proven at large scales. • Robust • Low maintenance cost • Long operational history • Can take heterogeneous wastes without special preparation	• Generally not suited to powders, liquids or materials that melt through the grate	TOC 0.5% to 3%	High capacity reduces specific cost per tonne of waste
Moving grate (liquid Cooled)	Same as air-cooled grates except: LCV 10 – 20 GJ/t	Same as air-cooled grates	As air-cooled grates but: • higher heat value waste is treatable • Better combustion control possible.	As air-cooled grates but: • risk of grate damage/ leaks • higher complexity	TOC 0.5% to 3%	Slightly higher capital cost than air-cooled

Technique	Key waste characteristics and suitability	Throughput per line	Advantages	Disadvantages / Limitations of use	Bottom Ash Quality	Cost
Rotary Kiln	Can accept liquids and pastes as well as gases Solid feeds more limited than grate (due to refractory damage) often applied to hazardous Wastes	<16 t/h	• Very well proven • Broad range of wastes • Good burn out even of HW	Throughputs lower than grates	TOC <3 %	Higher specific cost due to reduced capacity
Fluid bed - bubbling	• Wide range of CV (5-25 MJ/kg) • Only finely divided • consistent wastes. • Limited use for raw MSW • Often applied to sludges co fired with RDF, shredded MSW, sludges, poultry manure	Up to 25 t/h	• Good mixing • Fly ashes of good leaching quality	• Careful operation required to avoid clogging bed. • Higher fly ash quantities.	TOC <1%	FGT cost may be lower. Costs of waste preparation
Fluid bed - circulating	• Wide range of CV (6-25 MJ/kg) • Only finely divided consistent wastes. • Limited use for raw MSW • Often applied to sludges co-fired with RDF, coal, wood waste	Up 70 70 t/h	• Good mixing • High steam parameters up to 500oC • Greater fuel flexibility than BFB • Fly ashes of good leaching quality	• Cyclone required to conserve bed material • Higher fly ash quantities	TOC <1%	• FGT cost may be lower. • Costs of waste preparation

Technique	Key waste characteristics and suitability	Throughput per line	Advantages	Disadvantages / Limitations of use	Bottom Ash Quality	Cost
Spreader - stoker combustor	• RDF and other particle feeds • Poultry manure • Wood wastes	No information	• Simple grate construction • Less sensitive to particle size than FB	Only for well defined mono-streams	No information	No information
Gasification - fixed bed	• Mixed plastic wastes • Other similar consistent streams • Gasification less widely used/proven than incineration	Up to 20 t/h	• Low leaching residue • Good burnout if oxygen blown • Syngas available • Reduced oxidation of recyclable metals	• Limited waste feed • Not full combustion • High skill level • Tar in raw gas • Less widely proven	• Low leaching bottom ash • Good burnout with oxygen	High operating/ maintenance costs
Gasification - entrained flow	• Mixed plastic wastes • Other similar consistent streams • Not suited to untreated MSW • Gasification less widely used/proven than incineration	Up to 10 t/h	• Low leaching slag • Reduced oxidation of recyclable metals	• Limited waste feed • Not full combustion • High skill level • Less widely proven	low leaching slag	• High operation/ maintenance costs • High pre-treatment costs
Gasification - fluidised bed	• Mixed plastic wastes • Shredded MSW • Shredder residues • Sludges • Metal rich wastes • Other similar consistent streams • Gasification less widely used/proven than incineration	5 – 20 t/h	• Can use low reactor temperatures e.g. for Al recovery • Separation of main non combustibles • Can be combined with ash melting • Reduced oxidation of recyclable metals	• Limited waste size (<30cm) • Tar in raw gas • Higher UHV raw gas • Less widely proven	If combined with ash melting chamber ash is vitrified	Lower than other gasifiers

Technique	Key waste characteristics and suitability	Throughput per line	Advantages	Disadvantages / Limitations of use	Bottom Ash Quality	Cost
Pyrolysis	• Pre-treated MSW • High metal inert streams • Shredder residues/plastics • Pyrolysis is less widely used/proven than incineration	~ 5 t/h (short drum) 5 – 10 t/h (medium drum)	• No oxidation of metals • No combustion energy for metals/inert • In reactor acid neutralisation possible • Syngas available	• Limited wastes • Process control and engineering critical • High skill level • Not widely proven • Need market for syngas	• Dependent on process temperature • Residue produced requires further processing and sometimes combustion	High pre-treatment, operation and capital costs

The Applicant has carried out a review of the following candidate furnace types:

- Moving Grate Furnace
- Fixed Hearth
- Pulsed Hearth
- Rotary and Oscillating Kilns
- Fluidised Bed
- Pyrolysis / Gasification

Fixed hearth was initially discounted as the technology is not suitable for the large volumes of waste intended for incineration at the installation.

Pulsed health technology has previously been used for RDF and other solid wastes; however, the operator notes that there have been difficulties in achieving reliable and effective burnout. Therefore, pulsed hearth was discounted on the basis that burnout criteria required by Article 50(1) of the IED would be difficult to achieve and the system is therefore not considered practical.

The Applicant notes that rotary and oscillating kilns have a lower energy conversion efficiency than that of other thermal treatment technologies due to the large areas of refractory lined combustion chamber. Furthermore, rotary kilns have not been used in the UK for large volumes of waste derived fuels, and oscillating kilns have a maximum processing capacity of approximately 8 tonnes per hour. These furnace types are therefore considered to be impractical, and lead to significant efficiency losses, therefore these options were not considered further.

Whilst pyrolysis and gasification are established technologies, they are not considered to be a robust and proven technology for the treatment of residual MSW and C&I waste at the proposed scale of the facility. Therefore gasification and pyrolysis were discounted from further consideration.

The Applicant concluded that moving grate and fluidised bed incineration systems were the only technically proven options at large scale, for the waste streams identified, providing further quantitative assessment:

- Fluidised beds are designed for the combustion of relatively homogenous feed and are more sensitive to inconsistencies in the fuel. Therefore, all waste would require pre-treatment.
- NOx emissions from each option are similar. Fluidised bed systems achieve lower NOx, however secondary abatement would be required for both systems. Therefore, in practice, abated emissions would be similar, with fluidised bed benefitting from a lower ammonia consumption.
- Global Warming Potential is similar for both technologies; although we recognise that fluidised bed systems have a slightly higher parasitic load and therefore a slightly higher GWP.
- More non-hazardous ash is produced through fluidised bed technology due to the addition of sand as a fluidising medium.

- Annual raw material and residue costs are higher for a fluidised bed, and fluidised bed technology is typically 6% more expensive than a grate due to additional waste screening and fly ash separation equipment.

The Applicant has proposed to use a furnace technology comprising a moving grate (air cooled), identified in the table above as being considered BAT in the BREF for this type of waste feed at the scale of operation. Varying wastes will be delivered directly to the incineration waste bunker without pre-treatment, resulting in a less homogenous waste. Due to the robustness of the grate system and the ability to process large quantities of heterogenous waste, we consider this represents BAT for the proposed Installation.

The Applicant proposes to use low sulphur gas oil as support fuel for start-up, shut down and for the auxiliary burners. The Applicant considers LPG to be unsuitable for the site due to the explosion risk and the proximity of the site to other industry. Furthermore, the site is not connected to gas mains; given the overall small consumption expected (with proposed techniques helping to minimise the use of auxiliary burners), use of gas oil would be kept to a minimum. Emissions of sulphur will be minimised through the use of low sulphur gas oil, we therefore agree in this case, that this represents BAT for the Installation.

Boiler Design

In accordance with BAT 30 of the BAT-C and our guidance, EPR 5.01, the Applicant has confirmed that the boiler design will include the following features to minimise the potential for reformation of dioxins within the de-novo synthesis range:

- ensuring that the steam/metal heat transfer surface temperature is a minimum where the exhaust gases are within the de-novo synthesis range;
- design of the boilers using computerised fluid dynamics (CFD) to ensure no pockets of stagnant or low velocity gas;
- boiler passes are progressively decreased in volume so that the gas velocity increases through the boiler; and
- Design of boiler surfaces to prevent boundary layers of slow moving gas.

Any of the options listed in the BREF and summarised in the table above can be BAT. The Applicant has chosen a furnace technique that is listed in the BREF and we are satisfied that the Applicant has provided sufficient justification to show that their technique is BAT. This is not to say that the other techniques could not also be BAT, but that the Applicant has shown that their chosen technique is at least comparable with the other BAT options. We believe that, based on the information gathered by the BREF process, the chosen technology will achieve the requirements of Chapter IV of the IED for the air emission of TOC/CO and the TOC/LOI on bottom ash. We are also satisfied that the proposed boiler design will be BAT.

6.1.2 BAT for the Fuel Preparation Facility

Wastes accepted to the Fuel Preparation Facility have either been treated and baled prior to arrival, or are bulky wastes destined for shredding. Documented waste acceptance procedures will be developed prior to the commencement of operation and provided to the Environment Agency through Pre-operational condition PO5. The Applicant has broadly defined the stages of the pre-acceptance and acceptance, which we consider to be in line with BAT and our appropriate measures.

The facility is designed to optimise water consumption; washdown procedures are optimised to reduce water usage where possible. The facility has impermeable hardstanding with all waste waters draining to the Energy Recovery Facility 'dirty pit' for re-use in the process for ash quenching.

The facility will operate in accordance with the waste treatment BAT conclusions; details of how this is incorporated into the permit is included within Annex 1B.

6.1.3 – BAT for the IBA Treatment

There are three IBA treatment techniques the applicant considered – thermal treatment (nitrification), wet treatment (washing) and dry treatment (air maturation).

Thermal treatment was discounted in this instance due to the energy intensive nature of the process, which when processing IBA from MSW, can result in varying levels of immobilisation of pollutants from the IBA. A wet treatment system was also considered unsuitable as this requires a large amount of water, producing a large quantity of effluent requiring treatment. The Applicant notes that dry treatment uses relatively little water, producing a comparatively small amount of effluent, which can be reused. Furthermore, the equipment is significantly less energy intensive, and dry treatment facilities are the only technology currently used in the UK; therefore, the Applicant considers this to be proven in this setting. We agree that dry treatment of IBA is BAT for the installation.

Prior to metals extraction, IBA is stored in a bunker (with internal bays) in an enclosed building. The Applicant has confirmed that the IBA will be kept at a moisture content of 15 – 20 %, ensuring that IBA is kept in a less mobile state (reducing dust) and also optimising the amount of metals that can be extracted during the processing stage. Within the processing stage, ferrous and non-ferrous metals are removed using an over-band magnet and eddy current separator.

Following processing, the IBAA is mixed by front loader with waste aggregate to a specification required by the customer in an enclosed building. The resultant IBAA undergoes ageing for approximately 2-4 weeks in the storage yard. The Operator ensures the moisture content is between 15 and 20 %, to

favour the leaching of salts and the carbonation process, whilst helping to prevent dust emissions.

As required by pre-operational condition PO1, the Environmental Management System will include output quality management features for the bottom ash treatment plant, to ensure that the output is in line with expectations, using existing EN standards where available and applicable.

Many techniques, including enclosing / covering of equipment, protecting stockpiles against prevailing winds and optimising moisture control, are utilised at the facility to prevent or reduce diffuse dust emissions from the treatment activities. Pre-operational condition PO13 ensures that the Operator will update their Dust Management Plan following the final design of the facility, which must be approved by the Environment Agency before commissioning activities can commence.

6.2 BAT and emissions control

The only channelled air emissions from the Installation are resulting from the incineration process. The prime function of flue gas treatment within the incineration process is to reduce the concentration of pollutants in the exhaust gas as far as practicable. The techniques which are described as BAT individually are targeted to remove specific pollutants, but the BREF notes that there is benefit from considering the Flue Gas Cleaning System (FGC) system as a whole unit. Individual units often interact, providing a primary abatement for some pollutants and an additional effect on others.

The BREF lists the general factors requiring consideration when selecting FGC systems as:

- type of waste, its composition and variation
- type of combustion process, and its size
- flue-gas flow and temperature
- flue-gas content, including magnitude and rate of composition fluctuations
- target emission limit values
- restrictions on discharge of aqueous effluents
- plume visibility requirements
- land and space availability
- availability and cost of outlets for residues accumulated/recovered
- compatibility with any existing process components (existing plants)
- availability and cost of water and other reagents
- energy supply possibilities (e.g. supply of heat from condensing scrubbers)
- reduction of emissions by primary methods
- noise
- arrangement of different flue-gas cleaning devices if possible with decreasing flue-gas temperatures from boiler to stack

Taking these factors into account the BREF points to a range of technologies being BAT subject to circumstances of the Installation.

6.2.1 Particulate Matter

Particulate matter				
Technique	**Advantages**	**Disadvantages**	**Optimisation**	**Defined as BAT in BREF or TGN for:**
Bag / Fabric filters (BF)	Reliable abatement of particulate matter to below 5mg/m^3	Max temp 250°C Higher energy use than ESP Sensitive to condensation and corrosion	Multiple compartments Bag burst detectors	Most plants
Wet scrubbing	May reduce acid gases simultaneously.	Not normally BAT. Liquid effluent produced	Require reheat to prevent visible plume and dew point problems.	Where scrubbing required for other pollutants
Ceramic filters	High temperature applications Smaller plant.	May "blind" more than fabric filters		Small plant. High temperature gas cleaning required.
Electrostatic precipitators (ESP)	Low pressure gradient. Use with BF may reduce the energy consumption of the induced draft fan.	Not normally BAT by itself Risk of dioxin formation if used in 200-400^{o}C range		When used with other particulate abatement plant

The Applicant proposes to use fabric filters for the abatement of particulate matter. Fabric filters provide reliable abatement of particulate matter to below 5 mg/m^3 and are BAT for most installations. The Applicant proposes to use multiple compartment filters, which allows individual bag filters to be isolated in case of failure of an individual bag filter.

Emissions of particulate matter have been previously screened out as insignificant, and so we agree that the Applicant's proposed technique is BAT for the installation.

6.2.2 Oxides of Nitrogen

Oxides of Nitrogen : Primary Measures				
Technique	**Advantages**	**Disadvantages**	**Optimisation**	**Defined as BAT in BREF or TGN for:**
Low NOx burners	Reduces NOx at source		Start-up, supplementary firing.	Where auxiliary burners required.
Starved air systems	Reduce CO simultaneously.			Pyrolysis, Gasification systems.
Optimise primary and secondary air injection				All plant.
Flue Gas Recirculation (FGR)	Reduces the consumption of reagents used for secondary NOx control. May increase overall energy recovery	Some applications experience corrosion problems. Can result in elevated CO and other products of incomplete combustion		Justify if not used

Oxides of Nitrogen : Secondary Measures (BAT is to apply Primary Measures first)				
Technique	**Advantages**	**Disadvantages**	**Optimisation**	**Defined as BAT in BREF or TGN for:**
Selective catalytic reduction (SCR)	NOx emissions 40-150mg/ m^3 Reduces CO, VOC, dioxins	Expensive. Re-heat required – reduces plant efficiency		All plant
SCR by catalytic filter bags	50-120 mg/m^3			Applicable to new and existing plants with or without existing SNCR. Can be used with NH_3 as slip catalyst with SNCR

Selective non-catalytic reduction (SNCR)	NOx emissions 80 -180 mg/m^3 Lower energy consumption than SCR Lower costs than SCR	Relies on an optimum temperature around 900 °C, and sufficient retention time for reduction May lead to Ammonia slip	Port injection locations	All plant unless lower NOx release required for local environmental protection.
Reagent Type: Ammonia	Likely to be BAT	More difficult to handle Lower nitrous oxide formation Narrower temperature window		All plant
Reagent Type: Urea	Likely to be BAT	Higher N_2O emissions than ammonia, optimisation particularly important		All plant

The Applicant proposes to implement the following primary measures:

- Low NO_x burners – this technique reduces NO_x at source and is defined as BAT where auxiliary burners are required.
- Optimise primary and secondary air injection – this technique is BAT for all plant.

With regards to flue gas recirculation, this technique reduces the consumption of reagents for secondary NO_x control and can increase overall energy recovery, although in some applications there can be corrosion problems. The Applicant has confirmed that the use of flue gas recirculation is subject to the detailed design of the incinerator, therefore we have set a Pre-Operational Condition PO10 for the Operator to confirm whether this will be utilised.

There are three recognised techniques for secondary measures to reduce NO_x. These are Selective Catalytic Reduction (SCR), SCR by catalytic filter bags and Selective Non-Catalytic Reduction (SNCR) with or without catalytic filter bags. For each technique, there is a choice of urea or ammonia reagent.

SCR can reduce NO_x levels to below 50 mg/m^3 and can be applied to all plant, it is generally more expensive than SNCR and requires reheating of the waste gas stream which reduces energy efficiency, periodic replacement of the catalysts also produces a hazardous waste. The use of SCR by catalytic filter bags can reduce emissions to 50 -120 mg/m^3 with low investment costs. SNCR can typically reduce NO_x levels to between 80 and 180 mg/m^3, it relies on an optimum temperature of around 900 ^oC and sufficient retention time for

reduction. SNCR is more likely to have higher levels of ammonia slip. The technique can be applied to all plant unless lower NO_x releases are required for local environmental protection. Urea or ammonia can be used as the reagent with either technique, urea is somewhat easier to handle than ammonia and has a wider operating temperature window, but tends to result in higher emissions of N_2O. Both reagents are BAT, and the use of one over the other is not normally significant in environmental terms.

The Applicant proposes to use SNCR with ammonia as the reagent.

Emissions of NO_x have previously been screened out as insignificant, and so the Environment Agency agrees that the Applicant's proposed technique is BAT for the installation. We have set a mass annual limit for NO_x of 328.50 tonnes per year is included in the permit, to ensure impacts from Nitrogen Deposition at the Teesmouth and Cleveland Coast are insignificant.

The amount of ammonia used for NO_x abatement will need to be optimised to maximise NO_x reduction and minimise NH_3 slip. Improvement condition IC5 requires the Operator to report to the Environment Agency on optimising the performance of the NO_x abatement system. The BAT AEL for ammonia (10 mg/m^3 as a daily average) and an additional monthly average limit of 7 mg/m^3 have been set and the Operator is also required to monitor and report on N_2O emissions every quarter. A mass annual limit for NH_3 of 30.00 tonnes per year is also included within the permit, to ensure impacts from Nitrogen Deposition at the Teesmouth and Cleveland Coast SSSI are insignificant.

6.2.3 Acid Gases, SO_x, HCl and HF

Acid gases and halogens : Primary Measures				
Technique	**Advantages**	**Disadvantages**	**Optimisation**	**Defined as BAT in BREF or TGN for:**
Low sulphur fuel, (< 0.1%S gasoil or natural gas)	Reduces SOx at source		Start-up, supplementary firing.	Where auxiliary fuel required.
Management of waste streams	Disperses sources of acid gases (e.g. PVC) through feed.	Requires closer control of waste management		All plant with heterogeneous waste feed

Acid gases and halogens : Secondary Measures (BAT is to apply Primary Measures first)				
Technique	**Advantages**	**Disadvantages**	**Optimisation**	**Defined as BAT in BREF or TGN for:**
Wet	High reaction rates	Large effluent disposal and		Used for wide

	Low solid residues production Reagent delivery may be optimised by concentration and flow rate	water consumption if not fully treated for re-cycle Effluent treatment plant required May result in wet plume Energy required for effluent treatment and plume reheat		range of waste types Can be used as polishing step after other techniques where emissions are high or variable
Dry	Low water use Higher reagent consumption to achieve emissions of other FGC techniques but may be reduced by recycling in plant Lower energy use Higher reliability Lowest visible plume potential	Higher solid residue production Reagent consumption controlled only by input rate		All plant
Semi-dry (also described as semi-wet in the Bref)	Medium reaction rates Reagent delivery may be varied by	Higher solid waste residues than wet but lower than dry system		All plant

	concentration and input rate			
Direct injection into boiler	Reduced acid loading to subsequent cleaning stages. Reduced peak emissions and reduced reagent usage			Generally applicable to grate and rotary kiln plants.
Direction desulphurisation	Reduced boiler corrosion	Does not improve overall performance. Can affect bottom ash quality. Corrosion problems in flue gas cleaning system.		Partial abatement upstream of other techniques in fluidised beds
Reagent Type: Sodium Hydroxide	Highest removal rates Low solid waste production	Corrosive material ETP sludge for disposal		HWIs
Reagent Type: Lime	Very good removal rates Low leaching solid residue Temperature of reaction well suited to use with bag filters	Corrosive material May give greater residue volume if no in-plant recycle	Wide range of uses	MWIs, CWIs

Reagent Type: Sodium Bicarbonate	Good removal rates Easiest to handle Dry recycle systems proven	Efficient temperature range may be at upper end for use with bag filters Leachable solid residues Bicarbonate more expensive	Not proven at large plant	CWIs

The Applicant proposes to implement the following primary measures:

- Use of low sulphur fuels for start up and auxiliary burners – gas should be used if available, where fuel oil is used, this will be low sulphur (i.e. <0.1%), this will reduce SO_x at source. The Applicant has justified its choice of gas oil as the support fuel on the basis that LPG is an explosion risk, and there is currently no connection to the installation. Given the small amount of fuel likely required, we agree with the assessment.
- Management of heterogeneous wastes (blending within the bunker) – this will disperse problem wastes such as PVC by ensuring a homogeneous waste feed.

There are five recognised techniques for secondary measures to reduce acid gases, all of which can be BAT. These are wet, dry, semi-dry, boiler sorbent injection and direct desulphurisation. Wet scrubbing produces an effluent for treatment and disposal in compliance with Article 46(3) of IED. It will also require reheat of the exhaust to avoid a visible plume. Wet scrubbing is unlikely to be BAT except where there are high acid gas and metal components in the exhaust gas as may be the case for some hazardous waste incinerators. In this case, the Applicant does not propose using wet scrubbing, and we agree that wet scrubbing is not appropriate for the Installation. Direct desulphurisation is only applicable for fluidised bed furnaces.

The Applicant has considered dry and semi-dry abatement methods for acid gas abatement, both of these methods can be BAT for this type of facility.

Both dry and semi-dry methods rely on the dosing of powdered materials into the exhaust gas stream. Semi-dry systems (i.e. hydrated reagent) offer reduced material consumption through faster reaction rates, but reagent recycling in dry systems can offset this.

In both dry and semi-dry systems, the injected powdered reagent reacts with the acid gases and is removed from the gas stream by the bag filter system. The powdered materials are either lime or sodium bicarbonate. Both are effective at reducing acid gases, and dosing rates can be controlled from

continuously monitoring acid gas emissions. The decision on which reagent to use is normally economic. Lime produces a lower leaching solid residue in the APC residues than sodium bicarbonate and the reaction temperature is well suited to bag filters, it tends to be lower cost, but it is a corrosive material and can generate a greater volume of solid waste residues than sodium bicarbonate. Both reagents are BAT, and the use of one over the other is not significant in environmental terms in this case.

Direct boiler injection is generally applicable for all plants and can improve overall performance of the acid gas abatement system and reduce reagent usage. In this case, the Applicant notes that direct boiler injection would need to be accompanied by additional acid gas abatement, increasing costs and reagent use. As ELVs can be met without use of direct boiler injection, and gridded maximum PCs for SO_X, HF and HCl all screen out as insignificant, we are satisfied with the Operator's approach.

In this case, the Applicant proposes to use a dry system with lime, on the basis that this has a lower water requirement and global warming potential, along with the proven capability for recycling of reagents. Furthermore, the reaction temperature for lime systems matches well with the optimum adsorption temperature for carbon, which is dosed at the same time. We are satisfied that this is BAT for the Installation.

6.2.4 Carbon monoxide and volatile organic compounds (VOCs)

The prevention and minimisation of emissions of carbon monoxide and volatile organic compounds is through the optimisation of combustion controls, where all measures will increase the oxidation of these species.

Carbon monoxide and volatile organic compounds (VOCs)				
Technique	**Advantages**	**Disadvantages**	**Optimisation**	**Defined as BAT in BREF or TGN for:**
Optimise combustion control	All measures will increase oxidation of these species.		Covered in section on furnace selection	All plants

6.2.5 Dioxins and furans (and other POPs)

Dioxins and furans				
Technique	**Advantages**	**Disadvantages**	**Optimisation**	**Defined as BAT in BREF or TGN for:**
Optimise combustion control	All measures will increase oxidation of these species.		Covered in section on furnace selection	All plants

Avoid *de novo* synthesis			Covered in boiler design	All plant
Effective Particulate matter removal			Covered in section on particulate matter	All plant
Activated Carbon injection	Can be combined with acid gas absorber or fed separately. Metallic mercury is also absorbed.	Combined feed rate usually controlled by acid gas content.		All plant. Separate feed normally BAT unless feed is constant and acid gas control also controls dioxin release.
Catalytic filter bags	High destruction efficiency	Does not remove mercury. Higher cost than non-catalytic filter bags		

The prevention and minimisation of emissions of dioxins and furans is achieved through:

- optimisation of combustion control including the maintenance of permit conditions on combustion temperature and residence time, which has been considered in 6.1.1 above;
- avoidance of de novo synthesis, which has been covered in the consideration of boiler design;
- the effective removal of particulate matter, which has been considered in 6.2.1 above;
- injection of activated carbon. This can be combined with the acid gas reagent or dosed separately. Where the feed is combined, the combined feed rate will be controlled by the acid gas concentration in the exhaust. Therefore, separate feed of activated carbon would normally be considered BAT unless the feed was relatively constant. Effective control of acid gas emissions also assists in the control of dioxin releases.

In this case the Applicant proposes separate dosing systems for lime and carbon, with separate controls (although injected through same injection points) and we are satisfied their proposals are BAT.

6.2.6 Metals

Metals				
Technique	**Advantages**	**Disadvantages**	**Optimisation**	**Defined as BAT in BREF or TGN for:**
Effective Particulate matter removal			Covered in section on particulate matter	All plant
Activated Carbon injection for mercury recovery	Can be combined with acid gas absorber or fed separately. Can be impregnated with bromine or sulphur to enhance reactivity, for use during peak emissions.	Combined feed rate usually controlled by acid gas content.		All plant. Separate feed normally BAT unless feed is constant and acid gas control also controls dioxin release.
Fixed or moving bed adsorption	Mainly for mercury and other metals, as well as organic compounds			Limited applicability due to pressure drop
Boiler bromine injection	Injection during mercury peaks. Oxidation of mercury leading to improved removal in downstream removal method.	Consumption of aqueous bromine. Can lead to formation of polybrominated dioxins. Can damage bag filter. Effects can be limited use is restricted to dealing with peak emissions		Not suitable for pyrolysis or gasification. Can deal with mercury peaks.

The prevention and minimisation of metal emissions is achieved through the effective removal of particulate matter, and this has been considered in 6.2.1 above.

Unlike other metals however, mercury if present will be in the vapour phase. BAT for mercury removal is one or a combination of the techniques listed above. The Applicant has proposed dosing of activated carbon into the exhaust gas stream. This can be combined with the acid gas reagent or dosed separately.

Where the feed is combined, the combined feed rate will be controlled by the acid gas concentration in the exhaust. Therefore, separate feed of activated carbon would normally be considered BAT unless the feed was relatively constant.

In this case the Applicant proposes separate dosing systems for lime and carbon, with separate controls (although injected through same injection points) and we are satisfied their proposals are BAT.

6.3 BAT and global warming potential

This section summarises the assessment of greenhouse gas impacts which has been made in the determination of this Application. Emissions of carbon dioxide (CO_2) and other greenhouse gases differ from those of other pollutants in that, except at gross levels, they have no localised environmental impact. Their impact is at a global level and in terms of climate change. Nonetheless, CO_2 is clearly a pollutant for IED purposes.

The principal greenhouse gas emitted is CO_2, but the plant also emits small amounts of N_2O arising from the operation of secondary NO_x abatement. N_2O has a global warming potential 310 times that of CO_2. The Applicant will therefore be required to optimise the performance of the secondary NO_x abatement system to ensure its GWP impact is minimised.

The major source of greenhouse gas emissions from the installation is however CO_2 from the combustion of waste. There will also be CO_2 emissions from the burning of support fuels at start up, shut down and should it be necessary to maintain combustion temperatures. BAT for greenhouse gas emissions is to maximise energy recovery and efficiency.

The electricity that is generated by the Installation will displace emissions of CO_2 elsewhere in the UK, as virgin fossil fuels will not be burnt to create the same electricity.

The Installation is not subject to the Greenhouse Gas Emissions Trading Scheme Regulations 2012 therefore it is a requirement of the IED to investigate how emissions of greenhouse gases emitted from the installation might be prevented or minimised.

Factors influencing GWP and CO_2 emissions from the Installation are:
On the debit side

- CO_2 emissions from the burning of the waste;
- CO_2 emissions from burning auxiliary or supplementary fuels;
- CO_2 emissions associated with electrical energy used;
- N_2O from the de-NOx process.

On the credit side

- CO_2 saved from the export of electricity to the public supply by displacement of burning of virgin fuels;

The GWP of the plant will be dominated by the emissions of carbon dioxide that will be released as a result of waste combustion. This will be constant for all options considered in the BAT assessment. Any differences in the GWP of the options in the BAT appraisal will therefore arise from small differences in energy recovery and in the amount of N_2O emitted.

The Applicant considered energy efficiency and BAT for the de-NOx process in its BAT assessment. This is set out in sections 4.3.7, 6.1.1 and 6.2.2 of this document.

Note: avoidance of methane which would be formed if the waste was landfilled has not been included in this assessment. If it were included due to its avoidance it would be included on the credit side.

Taking all these factors into account, the Operator's assessment shows their preferred option is best in terms of GWP.

We agree with this assessment and that the chosen option is BAT for the installation.

6.4 BAT and POPs

International action on Persistent Organic pollutants (POPs) is required under the UN's Stockholm Convention, which entered into force in 2004. The EU implemented the Convention through the POPs Regulation (2019/1021), which is directly applicable in UK law. We are required by national POPs Regulations (SI 2007 No 3106) to give effect to Article 6(3) of the EC POPs Regulation when determining applications for environmental permits.

However, it needs to be borne in mind that this application is for a particular type of installation, namely a waste incinerator. The Stockholm Convention distinguishes between intentionally-produced and unintentionally-produced POPs. Intentionally-produced POPs are those used deliberately (mainly in the past) in agriculture (primarily as pesticides) and industry. Those intentionally-produced POPs are not relevant where waste incineration is concerned, as in fact high-temperature incineration is one of the prescribed methods for destroying POPs.

The unintentionally-produced POPs addressed by the Convention are:

- dioxins and furans;
- HCB (hexachlorobenzene)
- PCBs (polychlorobiphenyls) and
- PeCB (pentachlorobenzene)

The UK's national implementation plan for the Stockholm Convention, published in 2007, makes explicit that the relevant controls for unintentionally-produced POPs, such as might be produced by waste incineration, are delivered through the requirements of the IED. That would include an examination of BAT, including potential alternative techniques, with a view to

preventing or minimising harmful emissions. These have been applied as explained in this document, which explicitly addresses alternative techniques and BAT for the minimisation of emissions of dioxins.

Our legal obligation, under regulation 4(b) of the POPs Regulations, is, when considering an application for an environmental permit, to comply with article 6(3) of the POPs Regulation:

> "Member States shall, when considering proposals to construct new facilities or to significantly modify existing facilities using processes that release chemicals listed in Annex III, give priority consideration to alternative processes, techniques or practices that have similar usefulness but which avoid the formation and release of substances listed in Annex III, without prejudice to Directive 2010/75/EU of the European Parliament and of the Council"

The 1998 Protocol to the Convention recommended that unintentionally produced POPs should be controlled by imposing emission limits (e.g 0.1 ng/m^3 for MWIs) and using BAT for incineration. UN Economic Commission for Europe (Executive Body for the Convention) (ECE-EB) produced BAT guidance for the parties to the Convention in 2009. This document considers various control techniques and concludes that primary measures involving management of feed material by reducing halogenated substances are not technically effective. This is not surprising because halogenated wastes still need to be disposed of and because POPs can be generated from relatively low concentrations of halogens. In summary, the successful control techniques for waste incinerators listed in the ECE-EB BAT are:

- maintaining furnace temperature of 850^{o}C and a combustion gas residence time of at least 2 seconds
- rapid cooling of flue gases to avoid the *de novo* reformation temperature range of 250-450^{o}C
- use of bag filters and the injection of activated carbon or coke to adsorb residual POPs components.

Using the methods listed above, the UN-ECE BAT document concludes that incinerators can achieve an emission concentration of 0.1 ng TEQ/m^3.

We believe that the Permit ensures that the formation and release of POPs will be prevented or minimised. As we explain above, high-temperature incineration is one of the prescribed methods for destroying POPs. Permit conditions are based on the use of BAT and Chapter IV of the IED and incorporate all the above requirements of the UN-ECE BAT guidance and deliver the requirements of the Stockholm Convention in relation to unintentionally produced POPs.

The release of **dioxins and furans** to air is required by the IED to be assessed against the International Toxic Equivalence (I-TEQ) limit of 0.1 ng/m^3. Further development of the understanding of the harm caused by dioxins has resulted in the World Health Organisation (WHO) producing updated factors to calculate the WHO-TEQ value. Certain **PCBs** have structures which make them behave

like dioxins (dioxin-like PCBs), and these also have toxic equivalence factors defined by the WHO to make them capable of being considered together with dioxins. The UK's independent health advisory committee, the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) has adopted WHO-TEQ values for both dioxins and dioxin-like PCBs in their review of Tolerable Daily Intake (TDI) criteria. The Permit requires that, in addition to the requirements of the IED, the WHO-TEQ values for both dioxins and dioxin-like PCBs should be monitored for reporting purposes, to enable evaluation of exposure to dioxins and dioxin-like PCBs to be made using the revised TDI recommended by the COT. The release of dioxin-like PCBs and PAHs is expected to be low where measures have been taken to control dioxin releases. The Permit also requires monitoring of a range of PAHs and dioxin-like PCBs at the same frequency as dioxins are monitored. We have included a requirement to monitor and report against these WHO-TEQ values for dioxins and dioxin-like PCBs and the range of PAHs as listed in the Permit. We are confident that the measures taken to control the release of dioxins will also control the releases of dioxin-like PCBs and PAHs. Section 5.2.1 of this document details the assessment of emissions to air, which includes dioxins and concludes that there will be no adverse effect on human health from either normal or abnormal operation.

Hexachlorobenzene (HCB) is released into the atmosphere as an accidental product from the combustion of coal, waste incineration and certain metal processes. It has also been used as a fungicide, especially for seed treatment although this use has been banned in the UK since 1975. Natural fires and volcanoes may serve as natural sources. Releases of (HCB) are addressed by the European Environment Agency (EEA), which advises that:

> "*due to comparatively low levels in emissions from most (combustion) processes special measures for HCB control are usually not proposed. HCB emissions can be controlled generally like other chlorinated organic compounds in emissions, for instance dioxins/furans and PCBs: regulation of time of combustion, combustion temperature, temperature in cleaning devices, sorbents application for waste gases cleaning etc*." [reference http://www.eea.europa.eu/publications/EMEPCORINAIR4/sources_of_HCB.pdf]

Pentachlorobenzene (PeCB) is another of the POPs list to be considered under incineration. PeCB has been used as a fungicide or flame retardant, there is no data available however on production, recent or past, outside the UN-ECE region. PeCBs can be emitted from the same sources as for PCDD/F: waste incineration, thermal metallurgic processes and combustion plants providing energy. As discussed above, the control techniques described in the UN-ECE BAT guidance and included in the permit, are effective in controlling the emissions of all relevant POPs including PeCB.

We have assessed the control techniques proposed for dioxins by the Applicant and have concluded that they are appropriate for dioxin control. We are

confident that these controls are in line with the UN-ECE BAT guidance and will minimise the release of HCB, PCB and PeCB.

We are therefore satisfied that the substantive requirements of the Convention and the POPs Regulation have been addressed and complied with.

6.5 Other Emissions to the Environment

6.5.1 Emissions to water

There will be no process emissions to controlled waters from the Installation.

Uncontaminated surface water run-off from all non-process areas of hardstanding is discharged into a Sustainable Drainage System (SuDS). The surface water passes into a 4500m3 attenuation pond, through a Class-1 oil interceptor, before emission to a surface water sewer at emission point W1.

A penstock valve will be fitted to ensure the drainage system can be isolated, ensuring surface water can be prohibited from leaving the site, for example, in the event of a major spill or fire
.

Based upon the information in the Application we are satisfied that appropriate measures will be in place to prevent and /or minimise emissions to water.

6.5.2 Emissions to sewer

There will be no process emissions to sewer from the Installation during normal operation.

Process effluents from the Fuel Preparation Facility and the Energy Recovery Facility will be reused for ash quench, and process effluents from the IBA Facility will be collected within a settlement lagoon and reused for dust and moisture content control.

Infrequently, during maintenance activities a boiler may be required to be emptied. If the process water system reaches capacity during this maintenance, the Operator may discharge only this boiler water to sewer (via emission point S1), in accordance with a trade effluent discharge consent.

Based upon the information in the Application we are satisfied that appropriate measures will be in place to prevent and /or minimise emissions to sewer.

6.5.3 Fugitive emissions

The IED specifies that plants must be able to demonstrate that the plant is designed in such a way as to prevent the unauthorised and accidental release of polluting substances into soil, surface water and groundwater. In addition,

storage requirements for waste and for contaminated water under Article 46(5) of the IED must be arranged.

The Applicant proposes to employ the following methods and techniques to prevent and minimise the release of fugitive emissions at the Installation:

- All wastes delivered to the Installation will be within enclosed/covered vehicles
- Waste intended for the Fuel Preparation Facility and the Energy Recovery Facility, and incoming IBA for the IBA Facility will be stored in enclosed buildings on impermeable surfaces, with fast acting roller shutter doors
- Within the Energy Recovery Facility, negative pressure will be maintained, with air being drawn through the process for combustion.
- All potentially polluting liquids are provided with secondary containment in line with CIRIA C736 guidance
- A high standard of housekeeping will be maintained in all areas, and spill kits available in suitable locations
- All silos are fitted with bag filter protection to prevent the uncontrolled release of dust during filling activities
- Tertiary containment is provided through the surface water drainage system; a penstock valve is in place before the emission point W1, ensuring the system can be isolated if required (for example in the event of a spill, or for firewater containment)

With regards to the IBA Facility, waste aggregates and IBAA are stored outside in the storage yard within a sealed drainage system. Pre-operational condition PO11 has been included to ensure the drainage system is built to CIRIA standards, and an appropriate maintenance / inspection regime is developed. Both waste aggregates and IBAA are kept dampened whilst outside, and within bays. A 5m boundary wall is in place to disrupt potential wind flow across the site; all stockpiles will be at least 0.5m below the height of the walls. Measures are all considered within the Dust Management Plan; we have set Pre-operational condition PO13 to ensure this is updated following the final design of the Installation, for the Environment Agency to approve prior to operation of the installation.

Based upon the information in the Application we are satisfied that appropriate measures will be in place to prevent and /or minimise fugitive emissions.

6.5.4 Odour

Based upon the information in the Application we are satisfied that the appropriate measures will be in place to prevent or where that is not practicable to minimise odour and to prevent pollution from odour.

Waste accepted at the installation will be delivered in covered vehicles or within containers and bulk storage of waste will only occur in the fuel preparation facility, and incineration waste bunker. Roller shutter doors on both facilities will be used to close the entrance when deliveries are not occurring. Waste

within the Fuel Preparation Facility is expected to be processed within 4-6 days; the short processing time limits reduce the odour potential of waste within the facility. Good housekeeping practices (including washdowns) will be employed to ensure residues do not build up.

In the energy recovery facility, combustion air will be drawn from above the waste storage bunker, creating negative pressure, to prevent odours and airborne particulates from leaving the building. Shut-down of both incineration lines should not occur simultaneously. However, in the unlikely event that both lines are shutdown due to an unplanned event, waste will be backloaded from the bunker and transferred off-site if odour is deemed a potential issue.

6.5.5 Noise and vibration

The site is located approximately 2.3km from the closest residential receptor; measures are in place to ensure noise from the site is minimised. Waste and materials will be delivered by road during daytime hours, with a speed limit on site, which minimises the impacts associated with deliveries. All stationary plant will be installed inside enclosed buildings, and regular maintenance undertaken on all plant (stationary and mobile) to ensure they are operating correctly.

Based upon the information in the Application we are satisfied that the appropriate measures will be in place to prevent or where that is not practicable to minimise noise and vibration and to prevent pollution from noise and vibration outside the site.

The Application contained a noise impact assessment which identified local noise-sensitive receptors, potential sources of noise at the proposed plant and noise attenuation measures. Measurements were taken of the prevailing ambient noise levels to produce a baseline noise survey and an assessment was carried out in accordance with BS 4142:2014 to compare the predicted plant rating noise levels with the established background levels.

Specific sound levels were shown to be more than 10 dB lower than residual sound levels at all ecological and human receptors, therefore existing ambient sound levels will not increase as a result of the installation.

6.6 Setting ELVs and other Permit conditions

6.6.1 Translating BAT into Permit conditions

Article 14(3) of the IED states that BAT-C shall be the reference for permit conditions. Article 15(3) further requires that under normal operating conditions; emissions do not exceed the emission levels associated with the BAT as laid down in the decisions on BAT-C.

BAT-C for waste incineration or co-incineration were published on 03/12/2019

The use of BAT AELs and IED Chapter IV emission limits for air dispersion modelling sets the worst case scenario. If this shows emissions are insignificant then we have accepted that the Applicant's proposals are BAT, and that there is no justification to reduce ELVs below the BAT AELs and Chapter IV limits.

Below we consider whether, for those emissions not screened out as insignificant, different conditions are required as a result of consideration of local or other factors, so that no significant pollution is caused (Article 11(c)) or to comply with environmental quality standards (EQS) (Article 18).

(i) Local factors

We have considered the location of the site when assessing BAT, including the proximity of human and ecological receptors. We are satisfied that the BAT measures described will ensure a high level of protection for the environment and human health.

(ii) National and European ESs

To control impacts levels of nitrogen deposition at the Teesmouth and Cleveland Coast SSSI, we added three additional limits into the permit that go beyond the usual requirements of BAT:

- Annual mass emission limit for NO_x of 328.45 tonnes per year
- Annual mass emission limit for NH_3 of 22.99 tonnes per year
- Average monthly NH_3 release concentration of 7 mg/m^3

The permit requires the Operator to monitor and report on both these monthly and annual limits. We are satisfied that by including these limits, there will not be a significant impact on the Teesmouth and Cleveland Coast SSSI from the operation of the installation.

The annual emission limits were was based on the modelling report submitted on 01/11/24 with the revised impacts on the SSSI:

Substance	ELV (mg/m^3)	Flor rate at reference conditions (m^3/s)	Annual emission based on continual operation (tonnes)	Operating time (%)	Annual emission (tonnes)
NOx	100	110.8	349.4	94	328.5
NH_3	7		24.46		23.0

For NOx the limit is based on 100 mg/m^3 and flow rate at reference conditions of both flues combined of 110.8 m^3/s. This equates to 349.4 tonnes per year. The modelling also assumes an operational availability of 94 %. 94 % of 349.4 is about 328.5 tonnes hence the annual limit in table S3.4. Our view is that this would give the operator more flexibility than trying to limit operating hours

of the plant, but achieve the same aim of making sure impacts remain at or below the insignificance level.

(iii) Global Warming

CO_2 is an inevitable product of the combustion of waste. The amount of CO_2 emitted will be essentially determined by the quantity and characteristics of waste being incinerated, which are already subject to conditions in the Permit. It is therefore inappropriate to set an ELV for CO_2, which could do no more than recognise what is going to be emitted. The gas is not therefore targeted as a key pollutant under Annex II of the IED, which lists the main polluting substances that are to be considered when setting ELVs in permits.

We have therefore considered setting equivalent parameters or technical measures for CO_2. However, provided energy is recovered efficiently (see section 4.3.7 above), there are no additional equivalent technical measures (beyond those relating to the quantity and characteristics of the waste) that can be imposed that do not run counter to the primary purpose of the plant, which is the destruction of waste / recovery of energy from waste. Controls in the form of restrictions on the volume and type of waste that can be accepted at the Installation and Permit conditions relating to energy efficiency effectively apply equivalent technical measures to limit CO_2 emissions.

(iv) Commissioning

We have set pre-operational condition PO4 for the Operator to submit a commissioning plan, which includes timeline for completion, expected emissions, durations of activities, reporting of exceedances and actions to be taken to protect the environment. This must be approved by the Environment Agency before commissioning can begin.

Improvement Condition IC3 requires the collection of data throughout the commissioning process to demonstrate that the plant performs in accordance with the Permit conditions, and against the design parameters assessed within the Application.

6.7 Monitoring

6.7.1 Monitoring during normal operations

We have decided that monitoring should be carried out for the parameters listed in Schedule 3 using the methods and to the frequencies specified in those tables. These monitoring requirements have been imposed in order to demonstrate compliance with ELVs and to enable correction of measured concentration of substances to the appropriate reference conditions; to gather information about the performance of the SNCR system; to establish data on the release of dioxin-like PCBs and PAHs from the incineration process and to

deliver the requirements of Chapter IV of the IED for monitoring of residues and temperature in the combustion chamber.

For emissions to air, the methods for continuous and periodic monitoring are in accordance with our guidance for monitoring of stack emissions to air.

Based on the information in the Application and the requirements set in the conditions of the Permit we are satisfied that the Operator's techniques, personnel and equipment will have either MCERTS certification or MCERTS accreditation as appropriate.

6.7.2 Monitoring under abnormal operations arising from the failure of the installed CEMs

The Operator has stated that they will provide back-up CEMS working in parallel to the operating CEMS. These will be switched into full operation immediately in the event that there is any failure in the regular monitoring equipment. The back-up CEMS measure the same parameters as the operating CEMS. In the unlikely event that the back-up CEMS also fail Condition 2.3.10 of the permit requires that the abnormal operating conditions apply.

6.7.3 Continuous emissions monitoring for dioxins and heavy metals

The BAT-C specify either manual extractive monitoring or long term monitoring for dioxins. For mercury either continuous or long term monitoring is specified, manual extractive monitoring is specified for other metals.

For dioxins long term monitoring does not apply if emissions are stable, and for mercury long term monitoring can be used instead of continuous if the mercury content of the waste is low and stable.

Based on the waste types and control measures proposed in the Application we expect that emissions of dioxins will be stable and that the mercury content of the waste will be low and stable. We have therefore set manual extractive monitoring in the Permit. However, the Permit requires the stable and low criteria to be demonstrated through Improvement conditions IC10 and IC11 and we can require long term monitoring for dioxins and continuous monitoring for mercury if required.

6.8 Reporting

We have specified the reporting requirements in Schedule 4 of the Permit either to meet the reporting requirements set out in the IED, or to ensure data is reported to enable timely review by us to ensure compliance with the Permit conditions and to monitor the efficiency of material use and energy recovery at the installation.

7 Other legal requirements

In this section we explain how we have addressed other relevant legal requirements, to the extent that we have not addressed them elsewhere in this document.

7.1 The EPR 2016 and related Directives

The EPR delivers the requirements of a number of European and national laws.

7.1.1 Schedules 1 and 7 to the EPR 2016 – **IED Directive**

We address the requirements of the IED in the body of this document above and the specific requirements of Chapter IV in Annex 1 of this document.

There is one requirement not addressed above, which is that contained in Article 5(3) IED. Article 5(3) requires that "In the case of a new installation or a substantial change where Article 4 of Directive 85/337/EC (now Directive 2011/92/EU) (the EIA Directive) applies, any relevant information obtained or conclusion arrived at pursuant to articles 5, 6 and 7 of that Directive shall be examined and used for the purposes of granting the permit."

- Article 5 of EIA Directive relates to the obligation on developers to supply the information set out in Annex IV of the Directive when making an application for development consent.
- Article 6(1) requires Member States to ensure that the authorities likely to be concerned by a development by reason of their specific environmental responsibilities are consulted on the Environmental Statement and the request for development consent.
- Article 6(2)-6(6) makes provision for public consultation on applications for development consent.
- Article 7 relates to projects with transboundary effects and consequential obligations to consult with affected Member States.

The grant or refusal of development consent is a matter for the relevant local planning authority. The Environment Agency's obligation is therefore to examine and use any relevant information obtained or conclusion arrived at by the local planning authorities pursuant to those EIA Directive articles.

In determining the Application, we have considered the following documents: -

- The Environmental Statement submitted with the planning application (which also formed part of the Environmental Permit Application).
- The decision of the Redcar and Cleveland Borough Council to grant planning permission on 27 January 2021.
- The decision notice of the local planning authority accompanying the grant of planning permission.
- The response of the Environment Agency to the local planning authority in its role as consultee to the planning process.

From consideration of all the documents above, the Environment Agency considers that no additional or different conditions are necessary.

The Environment Agency has also carried out its own consultation on the Environmental Permitting Application which includes the Environmental Statement submitted to the local planning authority. The results of our consultation are described elsewhere in this decision document.

7.1.2 Schedule 9 to the EPR 2016 – **Waste Framework Directive**

As the Installation involves the treatment of waste, it is carrying out a *waste operation* for the purposes of the EPR 2016, and the requirements of Schedule 9 therefore apply. This means that we must exercise our functions so as to ensure implementation of certain articles of the WFD.

We must exercise our relevant functions for the purposes of ensuring that the waste hierarchy referred to in Article 4 of the Waste Framework Directive is applied to the generation of waste and that any waste generated is treated in accordance with Article 4 of the Waste Framework Directive. (See also section 4.3.9)

The conditions of the permit ensure that waste generation from the facility is minimised. Where the production of waste cannot be prevented it will be recovered wherever possible or otherwise disposed of in a manner that minimises its impact on the environment. This is in accordance with Article 4.

We must also exercise our relevant functions for the purposes of implementing Article 13 of the Waste Framework Directive; ensuring that the requirements in the second paragraph of Article 23(1) of the Waste Framework Directive are met; and ensuring compliance with Articles 18(2)(b), 18(2)(c), 23(3), 23(4) and 35(1) of the Waste Framework Directive.

Article 13 relates to the protection of human health and the environment. These objectives are addressed elsewhere in this document.

Article 23(1) requires the permit to specify:

(a) the types and quantities of waste that may be treated;
(b) for each type of operation permitted, the technical and any other requirements relevant to the site concerned;
(c) the safety and precautionary measures to be taken;
(d) the method to be used for each type of operation;
(e) such monitoring and control operations as may be necessary;
(f) such closure and after-care provisions as may be necessary.

These are all covered by permit conditions.

The permit does not allow the mixing of hazardous waste so Article 18(2) is not relevant.

We consider that the intended method of waste treatment is acceptable from the point of view of environmental protection so Article 23(3) does not apply.

Energy efficiency is dealt with elsewhere in this document but we consider the conditions of the permit ensure that the recovery of energy take place with a high level of energy efficiency in accordance with Article 23(4).

Article 35(1) relates to record keeping and its requirements are delivered through permit conditions.

7.1.3 Schedule 22 to the EPR 2016 – **Water Framework and Groundwater Directives**

To the extent that it might lead to a discharge of pollutants to groundwater (a "groundwater activity" under the EPR 2016), the Permit is subject to the requirements of Schedule 22, which delivers the requirements of EU Directives relating to pollution of groundwater. The Permit will require the taking of all necessary measures to prevent the input of any hazardous substances to groundwater, and to limit the input of non-hazardous pollutants into groundwater so as to ensure such pollutants do not cause pollution, and satisfies the requirements of Schedule 22.

No releases to groundwater from the Installation are permitted. The Permit also requires material storage areas to be designed and maintained to a high standard to prevent accidental releases.

7.1.4 Directive 2003/35/EC – **The Public Participation Directive**

Regulation 60 of the EPR 2016 requires the Environment Agency to prepare and publish a statement of its policies for complying with its public participation duties. We have published our public participation statement.

This Application has been consulted upon in line with this statement, as well as with our guidance RGS6 on Sites of High Public Interest, which addresses specifically extended consultation arrangements for determinations where public interest is particularly high. This satisfies the requirements of the Public Participation Directive.

Our decision in this case has been reached following a programme of extended public consultation, on the original application. The way in which this has been done is set out in Section 2.2. A summary of the responses received to our consultations and our consideration of them is set out in Annex 4.

7.2 National primary legislation

7.2.1 **Environment Act 1995**

(i) Section 4 (Pursuit of Sustainable Development)

We are required to contribute towards achieving sustainable development, as considered appropriate by Ministers and set out in guidance issued to us. The Secretary of State for Environment, Food and Rural Affairs has issued *The Environment Agency's Objectives and Contribution to Sustainable Development: Statutory Guidance (December 2002)*. This document:

> "*provides guidance to the Agency on such matters as the formulation of approaches that the Agency should take to its work, decisions about priorities for the Agency and the allocation of resources. It is not directly applicable to individual regulatory decisions of the Agency*".

In respect of regulation of industrial pollution through the EPR, the Guidance refers in particular to the objective of setting permit conditions "*in a consistent and proportionate fashion based on Best Available Techniques and taking into account all relevant matters…*".

For waste operations the guidance refers to ensuring waste is recovered or disposed of in ways which protect the environment and human health.

The Environment Agency considers that it has pursued the objectives set out in the Government's guidance, where relevant, and that there are no additional conditions that should be included in this Permit to take account of the Section 4 duty.

(ii) Section 5 (Preventing or Minimising Effects of Pollution of the Environment)

We are satisfied that our pollution control powers have been exercised for the purpose of preventing or minimising, remedying or mitigating the effects of pollution.

(iii) Section 6(1) (Conservation Duties with Regard to Water)

We have a duty to the extent we consider it desirable generally to promote the conservation and enhancement of the natural beauty and amenity of inland and coastal waters and the land associated with such waters, and the conservation of flora and fauna which are dependent on an aquatic environment.

We consider that no additional or different conditions are appropriate for this Permit.

(iv) Section 6(6) (Fisheries)

We have a duty to maintain, improve and develop fisheries of salmon, trout, eels, lampreys, smelt and freshwater fish.

We consider that no additional or different conditions are appropriate for this Permit.

(v) Section 7 (General Environmental Duties)

This places a duty on us, when considering any proposal relating to our functions, to have regard amongst other things to any effect which the proposals would have on sites of archaeological, architectural, or historic interest; the economic and social well-being of local communities in rural areas; and to take into account any effect which the proposals would have on the beauty or amenity of any rural or urban area or on any such flora, fauna, features, buildings, sites or objects.

We considered whether we should impose any additional or different requirements in terms of our duty to have regard to the various conservation objectives set out in Section 7, but concluded that we should not.

(vi) Section 39 (Costs and Benefits)

We have a duty to take into account the likely costs and benefits of our decisions on the applications ('costs' being defined as including costs to the environment as well as any person). This duty, however, does not affect our obligation to discharge any duties imposed upon us in other legislative provisions.

In so far as relevant we consider that the costs that the permit may impose on the applicant are reasonable and proportionate in terms of the benefits it provides.

(viii) Section 81 (National Air Quality Strategy)

We have had regard to the National Air Quality Strategy and consider that our decision complies with the Strategy, and that no additional or different conditions are appropriate for this Permit.

We have also had regard to the clean air strategy 2019 and consider that our decision complies with the Strategy, and that no additional or different conditions are appropriate for this Permit.

We have had regard to the National Air Pollution Control Programme (set under the National Emissions Ceiling Regulations 2018) and consider that our decision complies with the Strategy, and that no additional or different conditions are appropriate for this Permit.

7.2.2 **Section 108 Deregulation Act 2015 – Growth duty**

We considered our duty to have regard to the desirability of promoting economic growth set out in section 108(1) of the Deregulation Act 2015 and the guidance issued under section 110 of that Act in deciding whether to grant this permit.

Paragraph 1.3 of the statutory guidance issued by the Department of Business, Energy and Industrial Strategy in March 2017 says:

“The primary role of regulators, in delivering regulation, is to achieve the regulatory outcomes for which they are responsible. For a number of regulators, these regulatory outcomes include an explicit reference to development or growth. The growth duty establishes economic growth as a factor that all specified regulators should have regard to, alongside the delivery of the protections set out in the relevant legislation.”

We have addressed the legislative requirements and environmental standards to be set for this operation in the body of the decision document above. The guidance is clear at paragraph 1.5 that the growth duty does not legitimise non-compliance and its purpose is not to achieve or pursue economic growth at the expense of necessary protections.

We consider the requirements and standards we have set in this permit are reasonable and necessary to avoid a risk of an unacceptable level of pollution. This promotes growth amongst legitimate operators because the standards applied to the operator are consistent across businesses in this sector and have been set to achieve the required legislative standards. It also ensures that any pollution that may arise from the regulated facility does not adversely affect local businesses.

7.2.3 **Legislative and Regulatory Reform Act 2006**

In accordance with section 21 of this Act, when making this decision we have had regard to the need to be transparent, accountable, proportionate and consistent, and the need to target action where it is needed.

In accordance with section 22 of the Act we have had regard to the Regulators’ Code; in particular the need to base our decision on environmental risk, and to support the applicant to comply and grow, so that burdens have only been imposed where they are necessary and proportionate.

7.2.4 **Human Rights Act 1998**

We have considered potential interference with rights addressed by the European Convention on Human Rights in reaching our decision and consider that our decision is compatible with our duties under the Human Rights Act 1998. In particular, we have considered the right to life (Article 2), the right to a fair trial (Article 6), the right to respect for private and family life (Article 8) and the right to protection of property (Article 1, First Protocol). We do not believe that Convention rights are engaged in relation to this determination.

7.2.5 **Countryside and Rights of Way Act 2000 (CROW 2000)**

Section 85 of this Act imposes a duty on Environment Agency to have regard to the purpose of conserving and enhancing the natural beauty of the area of outstanding natural beauty (AONB). There is no AONB which could be affected by the Installation.

7.2.6 **Wildlife and Countryside Act 1981**

Under section 28G of the Wildlife and Countryside Act 1981 the Environment Agency has a duty to take reasonable steps to further the conservation and enhancement of the flora, fauna or geological or physiographical features by reason of which a site is of special scientific interest. Under section 28I the Environment Agency has a duty to consult Natural England in relation to any permit that is likely to damage SSSIs.

We completed a Wildlife and Countryside Act (CRoW) Appendix 4 form and consulted with Natural England. The outcome of our assessment is summarised in greater detail in section 5.4 of this document. A copy of the full Appendix 4 Assessment can be found on the public register.

7.2.7 **Natural Environment and Rural Communities Act 2006**

Section 40 of the Natural Environment and Rural Communities Act 2006 has been amended with effect from 1 January 2023 to require consideration as to what action we can properly take, consistently with the proper exercise of our functions, to further the general biodiversity objective, which is to further the conservation and enhancement of biodiversity and having considered, determined such policies and specific objectives as we consider appropriate for taking action to further the general biodiversity objective, and take such action as we consider appropriate, in the light of those policies and objectives, to further that objective.

Section 40(2A) states that in complying with the duty in section 40(1) and (1A) we must have particular regard to any relevant local nature recovery strategy and species protection strategy or protected sites strategy.

We have, also, considered the general biodiversity objective when carrying out our permit application determination and, consider that no different or additional conditions are required in the permit.

7.2.9 **Countryside Act 1968**

Section 11 imposes a duty on the Environment Agency to exercise its functions relating to any land, having regard to the desirability of conserving the natural beauty and amenity of the countryside including wildlife. We have done so and consider that no different or additional conditions in the Permit are required.

7.2.10 **National Parks and Access to the Countryside Act 1949**

Section 11A and section 5(1) imposes a duty on the Environment Agency when exercising its functions in relation to land in a National Park, to have regard to the purposes of conserving and enhancing the natural beauty, wildlife and cultural heritage of the areas, and of promoting opportunities for the understanding and enjoyment of National Parks by the public.

We have done so and consider that no different or additional conditions in the Permit are required. There is no National Park which could be affected by the Installation.

7.2.12 **Environment Act 2021**

Section 110(10) requires that we must have regard to a protected sites strategy, which Natural England has prepared and published in relation to improving the conservation and management of a protected site, and managing the impact of plans, projects or other activities (wherever undertaken) on the conservation and management of the protected site, where relevant to exercise of our duties under Conservation of Habitats and Species Regulations 2017, sections 28G to 28I Wildlife and Countryside Act 1981 or Marine and Coastal Access Act 2009.

We have had regard to this in our assessments.

7.3 National secondary legislation

7.3.1 **Conservation of Habitats and Species Regulations 2017**

We assessed the Application in accordance with our guidance and concluded that for the purposes of the Habitats Regulations there will be likely significant effects on any European site and undertook an Appropriate Assessment (Habitats Regulations Assessment Stage 2) of those effects.

We consulted Natural England on the appropriate assessment, and they agreed with our conclusion, that the operation of the Installation would not have adverse effects on the interest features of European sites.

The Habitats Regulations Assessment is summarised in greater detail in section 5.4 of this document. A copy of the Habitats Regulations Assessment can be found on the public register.

We have also considered our general duties under Regulation 9(3) to have regard to the requirements of the Habitats Directive in the exercise of our powers and under Regulation 10 in relation to wild bird habitat to take such steps in the exercise of their functions as they consider appropriate so far as lies within our powers to secure preservation, maintenance and re-establishment of a sufficient diversity and area of habitat for wild birds.

We considered whether we should impose any additional or different requirements in the permit in terms of these duties but concluded that we should not.

7.3.2 **Water Environment (Water Framework Directive) Regulations 2017**

Consideration has been given to whether any additional requirements should be imposed in terms of the Environment Agency's duty under regulation 3 to secure compliance with the requirements of the Water Framework Directive, Groundwater Directive and the EQS Directive through, amongst other things, environmental permits, and its obligation in regulation 33 to have regard to the river basin management plan (RBMP) approved under regulation 31 and any supplementary plans prepared under regulation 32. However, it is felt that existing conditions are sufficient in this regard and no other appropriate requirements have been identified.

We are satisfied that granting this application with the conditions proposed would not cause the current status of the water body to deteriorate, and that it will not compromise the ability of this water body to achieve good status.

7.3.3 **The Persistent Organic Pollutants Regulations 2007**

We have explained our approach to these Regulations, which give effect to the Stockholm Convention on POPs and the EU's POPs Regulation, above.

7.3.4 **Marine Strategy Regulations 2010**

In relation to Regulation 9 of the Marine Strategy Regulations 2010 we have had regard to the marine strategy (in so far as it has been developed and published to date) and consider that there is nothing in it which would lead us to any different conclusions from those we have already reached through our other marine assessments.

7.4 Other relevant legal requirements

7.4.1 Duty to Involve

Section 23 of the Local Democracy, Economic Development and Construction Act 2009 require us where we consider it appropriate to take such steps as we consider appropriate to secure the involvement of interested persons in the exercise of our functions by providing them with information, consulting them or involving them in any other way. Section 24 requires us to have regard to any Secretary of State guidance as to how we should do that.

The way in which the Environment Agency has consulted with the public and other interested parties is set out in section 2.2 of this document. The way in which we have taken account of the representations we have received is set out in Annex 4. Our public consultation duties are also set out in the EP

Regulations, and our statutory Public Participation Statement, which implement the requirements of the Public Participation Directive. In addition to meeting our consultation responsibilities, we have also taken account of our guidance in Environment Agency Guidance Note RGS6.

Annexes

Annex 1A: Application of chapter IV of the Industrial Emissions Directive

IED Article	Requirement	Delivered by
45(1)(a)	The permit shall include a list of all types of waste which may be treated using at least the types of waste set out in the European Waste List established by Decision 2000/532/EC, if possible, and containing information on the quantity of each type of waste, where appropriate.	Condition 2.3.4(a) and Table S2.2 in Schedule 2 of the Permit.
45(1)(b)	The permit shall include the total waste incinerating or co-incinerating capacity of the plant.	Condition 2.3.4(a) and Table S2.2 in Schedule 2 of the Permit.
45(1)(c)	The permit shall include the limit values for emissions into air and water.	Conditions 3.1.1, 3.1.2 and 3.1.3 and Tables S3.1, S3.1(a), S3.4 in Schedule 3 of the Permit.
45(1)(d)	The permit shall include the requirements for pH, temperature and flow of waste water discharges.	Not Applicable
45(1)(e)	The permit shall include the sampling and measurement procedures and frequencies to be used to comply with the conditions set for emissions monitoring.	Conditions 3.6.1 to 3.6.4 and Tables S3.1 and S3.1(a) in Schedule 3 of the Permit.
45(1)(f)	The permit shall include the maximum permissible period of unavoidable stoppages, disturbances or failures of the purification devices or the measurement devices, during which the emissions into the air and the discharges of waste water may exceed the prescribed emission limit values.	Conditions 2.3.12 and 2.3.13.
45(2)(a)	The permit shall include a list of the quantities of the different categories of hazardous waste which may be treated.	Not Applicable
45(2)(b)	The permit shall include the minimum and maximum mass	Not Applicable

IED Article	Requirement	Delivered by
	flows of those hazardous waste, their lowest and maximum calorific values and the maximum contents of polychlorinated biphenyls, pentachlorophenol, chlorine, fluorine, sulphur, heavy metals and other polluting substances.	
46(1)	Waste gases 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.	Condition 2.3.1 and Table S1.2 of Schedule 1 of the Permit.
46(2)	Emission into air shall not exceed the emission limit values set out in part 3 of Annex VI.	Conditions 3.1.1 and 3.1.2 and Tables S3.1, S3.1a.
46(3)	Relates to conditions for water discharges from the cleaning of exhaust gases.	There are no such discharges as condition 3.1.1 prohibits this.
46(4)	Relates to conditions for water discharges from the cleaning of exhaust gases.	There are no such discharges as condition 3.1.1 prohibits this.
46(5)	Prevention of unauthorised and accidental release of any polluting substances into soil, surface water or groundwater. Adequate storage capacity for contaminated rainwater run-off from the site or for contaminated water from spillage or fire-fighting.	The application explains the measures to be in place for achieving the directive requirements. The permit requires that these measures are used. Various permit conditions address this and when taken as a whole they ensure compliance with this requirement.
46(6)	Limits the maximum period of operation when an ELV is exceeded to 4 hours uninterrupted duration in any one instance, and with a maximum cumulative limit of 60 hours per year. Limits on dust (150 mg/m3), CO and TOC not to be exceeded during this period.	Conditions 2.3.12 and 2.3.13

IED Article	Requirement	Delivered by
47	In the event of breakdown, reduce or close down operations as soon as practicable. Limits on dust (150 mg/m3), CO and TOC not to be exceeded during this period.	Condition 2.3.11
48(1)	Monitoring of emissions is carried out in accordance with Parts 6 and 7 of Annex VI.	Conditions 3.6.1 to 3.6.4, 3.2.1, 3.2.2, tables S3.1, S3.1(a). Reference conditions are defined in Schedule 6 of the Permit.
48(2)	Installation and functioning of the automated measurement systems shall be subject to control and to annual surveillance tests as set out in point 1 of Part 6 of Annex VI.	Conditions 3.6.1, 3.6.3, tables S3.1, S3.1(a), and S3.6
48(3)	The competent authority shall determine the location of sampling or measurement points to be used for monitoring of emissions.	Conditions 3.6.1. Pre-operational condition PO8
48(4)	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.	Conditions 4.1.1 and 4.1.2, and Tables S4.1 and S4.4
49	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.	Conditions 3.1.1, 3.1.2, 3.2.1, 3.2.2 and tables S3.1, S3.1(a)
50(1)	Slag and bottom ash to have Total Organic Carbon (TOC) < 3% or loss on ignition (LOI) < 5%.	Conditions 3.6.1 and Table S3.7
50(2)	Flue gas to be raised to a temperature of 850ºC for two seconds, as measured at representative point of the combustion chamber.	Condition 2.3.9, Pre-operational condition PO6 and Improvement condition IC4 and Table S3.6
50(3)	At least one auxiliary burner which must not be fed with fuels which can cause higher emissions than those resulting from the burning of gas oil liquefied gas or natural gas.	Condition 2.3.14

IED Article	Requirement	Delivered by
50(4)(a)	Automatic shut-down to prevent waste feed if at start up until the specified temperature has been reached.	Condition 2.3.9
50(4)(b)	Automatic shut-down to prevent waste feed if the combustion temperature is not maintained.	Condition 2.3.9
50(4)(c)	Automatic shut-down to prevent waste feed if the CEMs show that ELVs are exceeded due to disturbances or failure of waste cleaning devices.	Condition 2.3.9 and 2.3.12
50(5)	Any heat generated from the process shall be recovered as far as practicable.	(a) The plant will generate electricity (b) Operator to review the available heat recovery options prior to commissioning (Condition PO2) and then every 4 years (Conditions 1.2.1 to 1.2.3)
50(6)	Relates to the feeding of infectious clinical waste into the furnace.	Not Applicable – no infectious clinical waste will be burnt
50(7)	Management of the Installation to be in the hands of a natural person who is competent to manage it.	Conditions 1.1.1 to 1.1.3 and 2.3.1 of the Permit.
51(1)	Different conditions than those laid down in Article 50(1), (2) and (3) and, as regards the temperature Article 50(4) may be authorised, provided the other requirements of this chapter are me.	No such conditions Have been allowed
51(2)	Changes in operating conditions do not cause more residues or residues with a higher content of organic polluting substances compared to those residues which could be expected under the conditions laid down in Articles 50(1), (2) and (3).	No such conditions Have been allowed
51(3)	Changes in operating conditions shall include emission limit values for CO and TOC set out in Part 3 of Annex VI.	No such conditions Have been allowed

IED Article	Requirement	Delivered by
52(1)	Take all necessary precautions concerning delivery and reception of Wastes, to prevent or minimise pollution.	Conditions 2.3.1, 2.3.3, 2.3.3, 2.3.4, 2.3.5 and 2.3.7
52(2)	Determine the mass of each category of wastes, if possible according to the EWC, prior to accepting the waste.	Condition 2.3.4(a) and Table S2.2 in Schedule 3 of the Permit.
52(3)	Prior to accepting hazardous waste, the operator shall collect available information about the waste for the purpose of compliance with the permit requirements specified in Article 45(2).	Not applicable
52(4)	Prior to accepting hazardous waste, the operator shall carry out the procedures set out in Article 52(4).	Not applicable
52(5)	Granting of exemptions from Article 52(2), (3) and (4).	Not applicable
53(1)	Residues to be minimised in their amount and harmfulness, and recycled where appropriate.	Conditions 1.4.1, 1.4.2 and 3.6.1 with Table S3.10
53(2)	Prevent dispersal of dry residues and dust during transport and storage.	conditions 1.4.1 2.3.1, 2.3.2 and 3.3.1.
53(3)	Test residues for their physical and chemical characteristics and polluting potential including heavy metal content (soluble fraction).	Condition 3.6.1 and Table S3.7 and pre-operational condition PO3.
55(1)	Application, decision and permit to be publicly available.	All documents are accessible from the Environment Agency Public Register.
55(2)	An annual report on plant operation and monitoring for all plants burning more than 2 tonne/hour waste.	Condition 4.2.2 and 4.2.3.

Annex 1B: Compliance with Bat Conclusions

Waste Incineration BAT Conclusions:

BAT conclusion	Criteria	Delivered by
1	Implement environmental management system	Condition 1.1 and Pre-operational condition PO1
2	Determine gross electrical efficiency	Section 4.3.7 of this decision document. Permit table S3.6
3	Monitor key process parameters	Condition 3.6.1 and table S3.6
4	Monitoring emissions to air	Condition 3.6.1 and table S3.1
5	Monitoring emissions to air during OTNOC	Condition 1.1.1 and pre-operational condition PO1
6	Monitoring emissions to water from flue gas treatment and/or bottom ash treatment	There are no such emissions from the installation
7	Monitor unburnt substances in slags and bottom ashes	Conditions 3.1.4 and 3.6.1, and table S3.7
8	Analysis of hazardous waste	Not applicable
9	Waste stream management techniques	The Application explains the measures that will be used. Permit condition 2.3.1, table S1.2 and pre-operational condition PO5.
10	Quality management system for bottom ash treatment plant	This will form part of the EMS as required by condition 1.1 and pre-operational condition PO1

BAT conclusion	Criteria	Delivered by
11	Monitor waste deliveries as part of waste acceptance procedures	The Application explains the measures that will be used. Permit condition 2.3.1, table S1.2 and pre-operational condition PO5.
12	Reception, handling and storage of waste	Measures are described in the Application and FPP. Permit conditions 2.3.1, table S1.2 and 3.8.1
13	Storage and handling of clinical waste	Not applicable
14	Improve overall performance of plant including BAT-AELs for TOC or LOI	Techniques described in the Application. Permit conditions 2.3.1, 3.1.4, 3.6.1 and tables S1.2 and S3.7
15	Procedures to adjust plant settings to control performance	Measures described in the Application condition 2.3.1 and table S1.2
16	Procedures to minimise start-up and shut down	Measures described in the Application
17	Appropriate design, operation and maintenance of FGC system	FGC measures described in Application. Operation and maintenance procedures will form part of the EMS
18	OTNOC management plan	Pre-operational condition PO1
19	Use of heat recovery boiler	Described in the Application. Permit condition 2.3.1, table S1.2
20	Measures to increase energy efficiency and BAT AEEL	Measures described in the Application. Permit condition 2.3.1, table S1.2 Section 4.3.7 of this decision document.

BAT conclusion	Criteria	Delivered by
21	Measures to prevent or reduce diffuse emissions including odour	Measures described in the Application. Permit conditions 2.3.1, table S1.2, 3.3.1, 3.3.2, 3.4.1. Sections 4.2.2, 6.5.3 and 6.5.4 of this decision document.
22	Handling of gaseous and liquid wastes	Not applicable
23	Management system to prevent or reduce dust emissions from treatment of slags and ashes	The Application included a dust management plan that forms part of the Permit; PO13 requires this to be re-submitted after final design.
24	Techniques to prevent or reduce diffuse emissions to air from treatment of slags and ashes	Measures described in the dust management plan; PO13 requires this to be re-submitted after final design.
25	Minimisation of dust and metal emissions and compliance with BAT AEL	Section 5.2 of this decision document. Permit conditions 2.3.1, table S1.2, 3.4.1, 3.3.1, 3.3.2. 3.1.1 and 3.1.2 and tables S3.1 and S3.5
26	Techniques and BAT AEL for dust emissions from enclosed slags and ashes treatment	There are no channelled emissions to air from the enclosed IBA treatment.
27	Techniques to reduce emissions of HCl, HF and SO_2	Measures described in the Application. Permit condition 2.3.1 and table S1.2 Section 5.2 of this decision document.
28	Techniques to reduce peak emissions of HCl, HF and SO_2, optimise reagent use and BAT AELs	Measures described in the Application. Permit conditions 2.3.1, table S1.2, 3.1.1 and 3.1.2 and table S3.1

BAT conclusion	Criteria	Delivered by
29	Techniques to reduce emissions of NO_2, N_2O, CO and NH_3 and BAT AELs	Measures described in the Application. Section 5.2 of this decision document. Permit conditions 2.3.1, table S1.2, 3.1.1 and 3.1.2 and table S3.1
30	Reduce emissions or organic compounds including dioxins/furans and PCBs. BAT AELs	Measures described in the Application. Section 5.2 of this decision document. Permit conditions 2.3.1, table S1.2, 3.1.1 and 3.1.2 and table S3.1
31	Reduce emissions of mercury. BAT AEL	Measures described in the Application. Section 5.2 of this decision document. Permit conditions 2.3.1, table S1.2, 3.1.1 and 3.1.2 and table S3.1
32	Segregate waste water streams to prevent contamination	Measures described in the Application. Sections 4.2.2, 6.5.1 and 6.5.3 of this decision document. Permit conditions 2.3.1, table S1.2, 3.1.1, 3.1.2 and tables S3.2, S3.3
33	Techniques to reduce water usage and prevent or reduce wastewater	Measures described in the Application. Sections 4.2.2 and 4.3.8 of this decision document. Permit conditions 1.3.1, 2.3.1, table S1.2
34	Reduce emissions to water from FGC and/or from treatment or storage of bottom ashes. BAT AELs	Not applicable
35	Handle and treat bottom ashes separately from FGC residues	Permit condition 2.3.15
36	Techniques for treatment of slags and bottom ashes	Measures are described in the Application. Permit conditions 2.3.1, table S1.2
37	Techniques to prevent or reduce noise emissions.	Measures are described in the Application. Section 6.5.5 of this decision document. Permit conditions 2.3.1, table S1.2, 3.5.1, 3.5.2

Waste Treatment BAT Conclusions:

BAT conclusion	Criteria	Delivered by
1	Implement environmental management system	Condition 1.1 and Pre-operational condition PO1
2	Waste management procedures	Condition 1.1 and Pre-operational condition PO1
3	Inventory of wastewater and waste gas streams	There are no emissions to air or water from the Fuel Preparation Facility
4	Environmental risk from storage of waste	The Application explains the measures that will be used. Permit conditions 1.1.1, 2.3.1, table S1.2.
5	Set up waste handling and transfer procedures	Measures are described in the application. Permit condition 2.3.1, table S1.2
6	Monitoring parameters for emissions to water	There are no such emissions to water from the Fuel Preparation Facility. Condition 3.1.1, tables S3.2 and S3.3
7	Monitoring frequencies for emissions to water	There are no such emissions to water from the Fuel Preparation Facility. Condition 3.1.1, tables S3.2 and S3.3
8	Monitoring frequencies for emissions to air	There are no such emissions to air from the Fuel Preparation Facility. Condition 3.1.1, table S3.1
9	Monitoring emissions from regeneration of spent solvents	Not applicable; no solvents are used at the Fuel Preparation Facility
10	Odour emission monitoring	Installation to operate in accordance with Odour Management Plan. Permit condition 3.4.1, 2.3.1, table S1.2
11	Monitor consumption of water energy and raw materials	Permit conditions 1.3.1, 4.2.2, Table S4.3
12	Implement an Odour Management Plan	Installation to operate in accordance with Odour Management Plan. Permit condition 3.4.1, 2.3.1, table S1.2
13	Implement techniques to reduce odour emissions	Measures are described in the application. Permit condition 3.4.1, 2.3.1, table S1.2

BAT conclusion	Criteria	Delivered by
14	Reducing diffuse emissions to air	Measures are described in the application. Permit condition 2.3.1, table S1.2
15	Limiting the use of flaring	Not applicable – the Fuel Preparation Facility does not operate a flare
16	Reducing emissions from flaring	Not applicable – the Fuel Preparation Facility does not operate a flare
17	Implementing a noise management plan	Not required at this time. Condition 3.5.2 requires a Noise Management Plan to be implemented if the Environment Agency notify the Operator that this is required.
18	Noise reduction techniques	Measures are described in the application. Permit conditions 3.5.1, 3.5.2, 2.3.1, table S1.2
19	Optimise water consumption	Measures are described in the application. Permit condition 2.3.1, table S1.2
20	Treatment of wastewater	All wastewaters are reused – there are no process emissions to water/sewer from the Fuel Preparation Facility. Condition 3.1.1, tables S3.2, S3.3
21	Techniques within Accident Management Plan	Condition 1.1 and Pre-operational condition PO1
22	Substitute materials with waste	Not applicable for activities
23	Techniques for using energy efficiently	Measures described in the Application. Permit conditions 1.2.1, 2.3.1, table S1.2
24	Reuse of packaging	Condition 1.1, 1.4.1 and Pre-operational condition PO1
25	Techniques to reduce dust, metals, dioxins and furans	There are no such emissions to air from the Fuel Preparation Facility. Condition 3.1.1, table S3.1
26	Prevention of emissions due to accidents	Measures described in the Application. Permit condition 2.3.1, table S1.2, Pre-operational condition PO5

BAT conclusion	Criteria	Delivered by
27	Prevention of deflagrations	Not applicable – the Fuel Preparation Facility does not shred metal or WEEE waste
28	Shredder feed stable	Confirmed within application. Permit condition 2.3.1, table S1.2
29	Techniques to reduce organic emissions to air	There are no such emissions to air from the Fuel Preparation Facility. Condition 3.1.1, table S3.1; metal and WEEE waste are not shredded
30	Prevent emissions due to explosions	Not applicable – the Fuel Preparation Facility does not treat WEEE waste
31	Techniques to reduce organic emissions to air	There are no such emissions to air from the Fuel Preparation Facility. Condition 3.1.1, table S3.1
32	BAT conclusions for the mechanical treatment of WEEE containing mercury	Not applicable
33 - 35	BAT Conclusions for biological treatment of waste	Not applicable
36 – 37	BAT conclusions for the aerobic treatment of waste	Not applicable
38	BAT conclusion for the anaerobic treatment of waste	Not applicable
39	BAT conclusions for the mechanical biological treatment (MBT) of waste	Not applicable
40 - 41	BAT conclusions for the physico-chemical treatment of solid and/or pasty waste	Not applicable
42 – 44	BAT conclusions for the re-refining of waste oil	Not applicable
45	BAT conclusions for the physico-chemical treatment of waste with calorific value	Not applicable

BAT conclusion	Criteria	Delivered by
46 - 47	BAT conclusions for the regeneration of spent solvents	Not applicable
48 - 49	BAT conclusions for the thermal treatment of spent activated carbon, waste catalysts and excavated contaminated soil	Not applicable
50	BAT conclusions for the water washing of excavated contaminated soil	Not applicable
51	BAT conclusions for the decontamination of equipment containing PCBs	Not applicable
52 - 53	BAT conclusions for the treatment of water-based liquid waste	Not applicable

Annex 2: Pre-Operational Conditions

Based on the information on the Application, we consider that we do need to impose pre-operational conditions. These conditions are set out in the permit and referred to, where applicable, in the text of the decision document.

Annex 3: Improvement Conditions

Based in the information in the Application we consider that we need to set improvement conditions. These conditions are set out in the permit and referred to, where applicable, in the text of the decision document. We are using these conditions to require the Operator to provide the Environment Agency with details that need to be established or confirmed during and/or after commissioning.

Annex 4: Consultation Reponses

Advertising and Consultation on the Application

The Application has been advertised and consulted upon in accordance with the Environment Agency's Public Participation Statement. The way in which this has been carried out along with the results of our consultation and how we have taken consultation responses into account in reaching our decision is summarised in this Annex. Copies of consultation responses have been placed on the Environment Agency public register.

The Application was advertised on the Environment Agency website from 30 November 2023 to 2 January 2024 and in the Teesside Evening Gazette on 30 November 2023. The Application was made available to view on our Public Register.

The following statutory and non-statutory bodies were consulted: -

- Local Authority Environmental Protection Department – Redcar and Cleveland Borough Council
- Local Authority Planning Department – Redcar and Cleveland Borough Council
- Food Standards Agency
- Health and Safety Executive
- Director of Public Health and UK Health Security Agency (Previously Public Health England)
- Fire & Rescue Service – Tyne and Wear
- Northumbrian Water
- National Grid

All consultation responses received:

Response Received from UKHSA	
Brief summary of issues raised:	**Summary of action taken / how this has been covered**
UKHSA understands that the regulator will satisfy itself that the applicant has provided an atmospheric dispersion modelling assessment that is reflective of the proposed installations worst-case emissions scenarios for all pollutants. The permit holder should take all appropriate measures to prevent or control pollution, in accordance with the relevant sector guidance and industry best practice.	We have audited the Applicant's modelling data and files, and we are satisfied that they are appropriate and are a worst case. The Applicant has shown in their application that they will follow the relevant Best Available Techniques (BAT) for the sector. These operating techniques are incorporated into Table S1.2 of the permit.

Response Received from Health and Safety Executive	
Brief summary of issues raised:	**Summary of action taken / how this has been covered**
HSE confirmed they have no comments to make regarding the permit application.	No action required

Response Received from Redcar & Cleveland Borough Council (Planning Department)	
Brief summary of issues raised:	**Summary of action taken / how this has been covered**
The Local Planning Authority confirmed they have no comments to make regarding the permit application.	No action required