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/LP3505LQ/V002
The Applicant / Operator is: Grundon Waste Management
The Installation is located at: Avonmouth HTI, Zinc Road, Avonmouth, Bristol, BS11 8AZ

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/LP3505LQ/V002. 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/LP3505LQ. We refer to the permit as "the **Permit**" in this document.

The Application was duly made on 22/12/2023.

The applicant is Grundon Waste Management Limited. We refer to Grundon Waste Management 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 Grundon Waste Management Limited "the **Operator**".

The proposed facility is located at Zinc Road, Avonmouth, Bristol, BS11 8AZ. 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 BAT C	Best Available Techniques (BAT) Reference Documents for Waste Incineration BAT conclusions
CEM	Continuous emissions monitor
CFD	Computerised fluid dynamics
CHP	Combined heat and power
CROW	Countryside and rights of way Act 2000
CV	Calorific value
CW	Clinical waste
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
ES	Environmental standard
EWC	European waste catalogue
FGC	Flue gas cleaning
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
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)
LADPH	Local Authority Director(s) of Public Health
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)
PPS	Public participation statement
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 issue the variation to the Applicant. This will allow it to operate the Installation, subject to the conditions in the varied 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 22/12/2023. 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 Bristol Post on 05/07/2024 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
- Local Authority – Planning
- Fire & Rescue
- Director of PH/UKHSA
- Health and Safety Executive
- Sewerage authorities
- Food Standards Agency
- National Grid
- Animal and Plant Health Agency

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.

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 20/02/2025, 03/04/2025 and 17/07/2025. A copy of each information notice and associated responses were placed on our public register.

In addition to our information notices, we received additional information during the determination from Grundon Waste Management:

- Updated EMS summary and initial H1 assessment for sewer discharges. Received on 18/12/2024.
- Clarification of annual tonnages for waste repackaging activities and waste storage capacities. Received on 03/02/2025.
- Information on the solid phase residence time in the primary chamber in relation to asbestos fibre destruction. Received on 26/08/2025
- Information on techniques in place at the scrubber effluent treatment system. Received 13/10/2025

We made a copy of this information available to the public in the same way as the responses to our information notices.

3 The legal framework

The Permit will be granted under Regulation 20 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 an activities listed in Part 1 of Schedule 1 to the EPR:

- Section 5.1 Part A(1)(a) – the incineration of hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity exceeding 10 tonnes per day
- Section 5.3 Part A(1)(a)(iv) – The disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes per day involving repackaging
- Section 5.6 Part A(1)(a) – the temporary storage of hazardous waste with a total capacity exceeding 50 tonnes

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, and the ash storage bunker, are therefore included in the listed incineration activity description.

The facility will incorporate a front-end materials resource facility (MRF). Most of the waste received at the MRF will be sent to the incineration activity, however, some wastes will be sent off-site for onward recovery or disposal. Therefore, it is appropriate for separate scheduled activities (the Section 5.3 and 5.6 activities detailed above).

An installation may also comprise "directly associated activities", which at this Installation includes the generation of electricity using a steam turbine and a back up electricity generator for emergencies in relation to the incineration activity. For the waste activities they include bin washing. These activities comprise one installation, because the incineration plant and the steam turbine are successive steps in an integrated activity.

The facility will also comprise of waste activities covering the repackaging and storage of non-hazardous waste.

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

The primary focus of this Decision Document is the Incineration Activity, as it serves as the facility's core function. However, it also outlines the assessment process for the additional permitted activities, specifically waste repackaging and storage, ensuring compliance with regulatory and operational standards

4.1.2 The Site

The Site is located on Zinc Road, Avonmouth, BS11 8AZ, and is located within the industrial area of Avonmouth, behind the ASDA Retail Distribution Centre, accessed off Kings Weston Lane in Avonmouth. Junction 18/18A of the M5 motorway is approx. 1 mile to the South.

The M4/M5 interchange is approx. 7 miles to the North. Avonmouth Docks are within 1 mile of the site and Bristol City Centre is 10 miles to the East via the A4 Portway.

All of the activities associated with the operation of the Facility will be undertaken within the existing installation boundary, and this application does not propose any changes to the installation boundary.

The Applicant submitted a revised plan which we consider is satisfactory, confirming 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 incineration activity as a High Temperature Waste Incinerator. Our view is that for the purposes of IED (in particular Chapter IV) and EPR, the installation is a waste incineration plant because:

Notwithstanding the fact that energy will be recovered from the process; the process is never the less ‘incineration’ because it is considered that its main purpose is the thermal treatment of waste.

The facility will comprise three Schedule 1 installation activities, as defined under the Environmental Permitting Regulations, along with directly associated activities. Additionally, it will include two non-Schedule 1 waste activities.

These activities will include

- Waste incineration plant – Processes incoming clinical, hazardous, and non-hazardous waste delivered to the facility by road.
- Flue gas treatment – Manages emissions generated from the combustion of waste fuels.
- Bottom ash production – Transfers material off-site for disposal in landfill.
- Air pollution control residue (APCr) management – Transfers APCr off-site to a suitably licensed hazardous waste facility for disposal.
- Hazardous and Non-Hazardous waste repackaging – Prepares hazardous waste for transfer off-site to a suitably licensed disposal/recovery facility.
- Hazardous and Non-Hazardous waste storage – stores wastes on site prior to repackaging or incineration

The Stationary Technical Unit (the Facility) includes waste reception and preparation; waste storage; water, fuel oil and air supply systems; a rotary kiln combustion system including steam boiler; facilities for the treatment of exhaust gases; on-site facilities for treatment or storage of residues and wastewater; stack; and devices and systems for controlling the combustion process and monitoring emissions.

The capacity of the Facility will be approximately 60 tonnes per day (2.5 tonnes per hour) of non-hazardous and hazardous wastes, with a net calorific value (NCV) of 26MJ/kg.:

The Facility will have an availability of approximately 8,000 hours per annum. Therefore, the Facility will have a nominal design capacity of approximately 20,000 tonnes per annum (tpa). However, allowing for the Facility operating on a low range NCV (<20 MJ/kg) the Facility could process up to 28,500 tpa. Therefore, the maximum capacity of the Facility is 28,500 tpa.

It is expected that the majority of waste received at the facility will be combusted on-site. Consequently, the operator anticipates that the volume of waste requiring repackaging under hazardous and non-hazardous waste treatment activities will be minimal. However, to ensure operational flexibility, the operator has applied to be permitted to for the following tonnages to be carry out under the repackaging activities

- Hazardous waste – 4,000 tonnes per annum
- Non-hazardous waste – 4,000 tonnes per annum

We have assessed the application based on these tonnages.

The key features of the Installation can be summarised in the table below.

Waste throughput, Tonnes/line	28,500 /annum	2.5 /hour

Waste processed	Commercial, Hazardous, Clinical waste	
Number of lines	1	
Furnace technology	Rotary Kiln	
Auxiliary Fuel	Fuel Oil	
Acid gas abatement	Combination of dry and wet. Wet for polishing	Lime
NOx abatement	SNCR	Urea
Reagent consumption	Auxiliary Fuel 60 te/annum Urea : 800 te/annum Ammonia: 140 te/annum Lime : 1,100 te/annum Activated carbon: 170 te/annum Process water: 43,800 metric tonnes /annum	
Flue gas recirculation	No	
Dioxin abatement	Powered activated carbon	
Stack	Grid Reference 352338, 179323	
	Height, 36.5 m	Diameter 1.2 m
Flue gas	Flow, 9.62 Nm^3/s	Velocity, 18.76 m/s
	Temperature °C	130
Electricity generated	1.5 MWe	MWh
Electricity exported	1.1 MWe	MWh
Steam conditions	Temperature, 215 °C	Pressure, 21 bar

4.1.4 Key Issues in the Determination

The key issues arising during determination of the Application were air quality and emissions to sewer and we therefore 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 proposed changes have not required any amendments to the installation boundary compared to the original application for the site.

The gasification plant which was previously permitted did not operate as it was intended and was eventually mothballed by Avonmouth Bio Power Limited in 2016. Grundon Waste Management Limited (Grundon) subsequently acquired the site from Avonmouth Bio Power Limited in February 2021.

Grundon has removed all of the gasification process equipment, including the waste feed and flue gas treatment systems. Grundon is currently installing a new waste incineration combustion technology, and associated waste and flue gas treatment systems to process a mix of non-hazardous,
clinical and hazardous wastes which require high temperature incineration.

4.2.2 Proposed site design: potentially polluting substances and prevention measures

There will be no process emissions to groundwater, surface water or land from the installation. The surface water emissions from the site will be uncontaminated surface and roof drainage. All waste will be stored inside the main waste reception area in leak proof containers and will be stored in secure areas with impermeable surfaces. Process waters will be emitted to sewer. Our assessment of these emissions is discussed separately, in sections 6.2.3 and 6.6.2 of this decision document.

The possibility of any substances being discharge accidentally to land or waters will be mitigated by a number of protective measures as follows;

- high standard of housekeeping will be maintained in all areas and suitable equipment will be provided and maintained to clean up spilled materials.
- Vehicles will be loaded and unloaded in designated areas provided with impermeable hard standing. These areas will have appropriate falls to the process water drainage system.
- Delivery and reception of waste will be controlled by a management system that will identify all risks associated with the reception of waste

and shall comply with all legislative requirements, including statutory documentation.

- Incoming waste will be: –
    - delivered in enclosed bins/vehicles;
    - unloaded under dedicated canopy on the northwest side of the HTI building; and
    - stored in enclosed, secure areas situated on areas of hardstanding with sealed drainage, with regular monitoring of storage areas undertaken to check for pests, litter, odour, leaks or spillages.
- Procedures and management systems for the delivery and reception of waste will be developed in line with guidance.

All chemicals will be stored in an appropriate manner incorporating the use of suitable secondary and other measures (for example, acid and alkali resistant coatings) to ensure appropriate containment and tertiary abatement measures.

All storage facilities for chemicals will be designed in accordance with recognised industry good practice to prevent pollution CIRIA Guidance titled '*Containment systems for the prevention of pollution*'

Deliveries of all chemicals will be unloaded and transferred to suitable storage facilities. Areas and facilities for the storage of chemicals and liquid hazardous materials will be situated within secondary containment, such as bunds. Secondary containment facilities will have capacity to contain whichever is the greater of 110% of the tank capacity or 25% of the total volume of materials being stored, in case of failure of the storage systems.

Tanker off-loading of chemicals will take place within areas where the drainage is contained with the appropriate capacity to contain a spill during delivery. This will include measures such as areas of hardstanding with falls to a gully and/or sump

A number of spill procedures will be in place for identified potential spillage events. This will include the provision of suitable equipment such as spill kits to deal with any incidents. Staff will receive training in the use of such kits. Under all circumstances, priority will be given to the potential environmental and health impacts of spillages. Where appropriate, engineering controls will be employed to reduce the potential for or minimise the impact of spillages, such as bunded areas for above-ground fuel storage.

Any spillage that has the potential to cause environmental harm or to leave the Facility will be reported to the site management and recorded in accordance with installations inspection, audit and reporting procedures. The relevant regulatory authorities (Environment Agency / Health and Safety Executive) will be informed as specified as required in accordance with the

Facility's documented management procedures should the spillage be significant.

In the event of a fire, contaminated water used for fighting fires will be contained through the use of an isolation valve to prevent discharge off-site. Additional storage will be available from site kerbing where appropriate.

We are satisfied that the measures described in the application are sufficient to prevent pollution of the ground and groundwater.

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.

New Earth Energy, the previous holder of the permit, submitted a site condition report and associated report with baseline data as part of the original application for the site (EPR/JP3535CE/A001). The current operator has submitted an updated site condition report which describes the historical use of the site as a gasification plant which is in the process of being replaced by a hazardous waste incinerator.

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, as referred to in 3.11.2 of the Application. 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 or EMAS. 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.

We have included a Pre-operational condition (PO11) in the permit which requires the operator to hold the relevant qualifications under the CIWM/WAMITAB scheme or other equivalent for the operation of hazardous waste transfer and storage activities. This condition will need to be discharged prior to commencement of commissioning.

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. This fire prevention plan has not been approved as it was not based on final design and therefore did not contain required elements such as retention of firewater calculations. As a result of final design information not being available at the time of determination, the operator will be required to provide an updated fire prevention plan which meets the objectives of our guidance prior to the facility being commissioned. The provision of this plan will be capture through PO10

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, received 22/12/2023	Grundon Waste Management Ltd Supporting Information – EP Variation
Response to request for further information dated 06/01/2025, received 03/02/2025	Maximum storage capacities and annual tonnages for the waste transfer and storage activities.
Response to Schedule 5 Notice dated 20/02/2025, received 23/06/2025	Measures detailed demonstrating compliance with healthcare waste appropriate measures and chemical waste appropriate measures.
Response to Schedule 5 Notice dated 03/04/2025, received 23/06/2025	Measures detailed demonstrating compliance with waste BAT Conclusions.
Response to Schedule 5 Notice dated 17/072025, received 01/08/2025	Measures detailed on odour management, site drainage arrangements, waste code handling and activated carbon and acid gas reagent dosing.
Response to request for further information dated 21/08/2025, received 26/08/2025	Details of solid phase residence temperature and time.
Response to request for further information dated 15/09/2025, received 13/10/2025	Information on techniques in place at the scrubber effluent treatment system.
Healthcare waste: appropriate measures for permitted facilities Version published 13 July 2020	For activity AR1, all of the following parts of the appropriate measures guidance shall apply: • Waste pre-acceptance, acceptance and waste tracking appropriate measures • Waste storage, segregation and handling appropriate measures – measure

	The following parts of the appropriate measures guidance are not applicable: • Waste storage, segregation and handling appropriate measures – measures 33, 34, 35, 36
Healthcare waste: appropriate measures for permitted facilities Version published 13 July 2020	For activities AR2, AR3 AR7, AR8 all parts of the appropriate measures guidance shall apply.
Chemical waste: appropriate measures for permitted facilities Version published 18 November 2020	For activity AR1, all of the following parts of the appropriate measures guidance shall apply: • Waste pre-acceptance, acceptance, and tracking • Waste storage, segregation, and handling
Chemical waste: appropriate measures for permitted facilities Version published 18 November 2020	For activities AR2, AR3 AR7, AR8 all parts of the appropriate measures guidance shall apply.
Non-hazardous and inert waste: appropriate measures for permitted facilities Version published 12 July 2021	For activities AR2, AR3 AR7, AR8 all parts of the appropriate measures guidance shall apply.

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
Fuel Oil	< 0.1% sulphur content	As required by Sulphur Content of Liquid Fuels Regulations.

Article 45(1) of the IED requires that the Permit 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 in Tables S2.2 (for the incineration activity) and S2.3 (for the waste repackaging activity). The applicant has withdrawn a number of waste codes initially proposed for the incineration activity as it they were not suitable for incineration. These were:

- 11 01 98* – Other wastes not otherwise specified (hazardous) from chemical surface treatment and coating of metals and other materials; non-ferrous hydro-metallurgy
- 16 01 22 – Components not otherwise specified (from end-of-life vehicles from different means of transport and wastes from dismantling of end-of-life vehicles and vehicle maintenance, except 13, 14, 16 06 and 16 08)
- 16 11 01* – Carbon-based linings and refractories from metallurgical processes (hazardous)
- 16 11 02 – Other linings and refractories from metallurgical processes
- 16 11 03* – Other linings and refractories from metallurgical processes containing hazardous substances (hazardous)
- 16 11 04 – Linings and refractories from non-metallurgical processes
- 16 11 05* – Linings and refractories from non-metallurgical processes containing hazardous substances (hazardous)
- 16 11 06 – Other linings and refractories from non-metallurgical processes
- 19 01 12 – Bottom ash and slag other than those mentioned in 19 01 11 (from incineration or pyrolysis of waste)
- 19 01 14 – Fly ash other than those mentioned in 19 01 13 (from incineration or pyrolysis of waste)
- 19 01 16 – Boiler dust other than those mentioned in 19 01 15 (from incineration or pyrolysis of waste)
- 19 01 18 – Pyrolysis waste other than those mentioned in 19 01 17 (from incineration or pyrolysis of waste)
- 19 01 19 – Sands from fluidised beds (from incineration or pyrolysis of waste)

- 19 04 04 – Vitrified waste other than those mentioned in 19 04 03 (from vitrification of waste)

The facility will be permitted to accept a broad range of waste types, reflecting its role as a specialist treatment option for materials that cannot be managed through landfill or conventional treatment routes, often due to contamination or their origin from highly specific and limited activities.

Many of these wastes will only be received as a last resort, where no other environmentally suitable option exists. The operator has provided justifications for the inclusion of the waste codes retained from the permit aplication, demonstrating the necessity for flexibility to address diverse and sometimes unpredictable waste streams.

Per- and polyfluoroalkyl substances (PFAS) contamination is a growing global concern due to their persistence and potential long-term impacts on ecosystems and human health.

The only source of waste which is currently known to contain PFAS in high concentrations is waste firefighting foams.

The Environment Agency has recently completed a systematic scoping review of PFAS Remediation. The report concludes that optimal operational conditions for the effective destruction of PFAS through incineration involve several critical parameters, including maintaining temperatures exceeding 1,100°C with residence times of at least 2 seconds. These conditions will be met by the facility, as required by condition by condition 2.3.12(b) in the permit

We are satisfied that, with robust waste pre-acceptance and acceptance procedures in place, and given the advanced technology to be employed at the facility, all wastes permitted can be safely and effectively processed in accordance with regulatory requirements.

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

(i) these wastes are likely to be within the design calorific value (CV) range for the plant;
(ii) these wastes are unlikely to contain components that cannot be safely processed at the Installation.

The incineration plant will take hazardous and non-hazardous commercial and clinical 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 Installation to 28,500 tonnes per annum. This is based on the installation operating 8,000 hours per year at a nominal capacity of 2.5 tonnes per hour. This rate per hour would give an annual throughput of 20,000 tonnes per annum. The 28,500 tonnes per annum figure is based on waste received which falls withing the low range of the calorific value of waste to be received at the facility.

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.

The Installation will also be designed, constructed and operated using BAT for the repackaging and handling of hazardous wastes and clinical wastes. Refer to section 6.5 of this decision document for how other relevant BAT conclusions and appropriate measures have been considered for these activities.

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 substantially refurbished 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 a number of measures that will be implemented at the Installation in order to increase its energy efficiency

- Minimise heat losses via the use of integral furnace boilers – heat will be recovered from the flue gases by means of steam boiler integral with the furnaces;

- Optimisation of the boiler design to improve heat transfer – the boilers will is designed to optimise the thermal cycle efficiency without prejudicing boiler tube life, having regard for the nature of the waste that is combusted;

- Cogeneration of heat and electricity – the Facility has been designed as a combined heat and power plant and could export heat to local users if suitable commercial agreements can be reached.

- Use of high efficiency motors, variable speed drives, cladding and insulation

- Good maintenance

- Implementation of an energy efficiency plan

(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 Installation will primarily generate electricity but will also provide heat in the form of steam for a flue gas re-heat system with the incineration plant. The electrical output of the plant will be 1.5 MWe.

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

The boiler efficiency was calculated by the Applicant as in excess of 90%. The BAT AEEL for boiler efficiency is 60 – 80 %. The value calculated by the Applicant is above this range.

In accordance with BAT 2 table S3.4 of the Permit requires the gross boiler 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 has stated that provision has been made to enable heat export from the facility but that no agreements are in place at this time. We have placed PO2 in the permit which requires the operator to carry out a comprehensive review of the options available for utilising the heat generated, including operating as CHP or supplying district heating, by the waste incineration process in order to ensure that it is recovered as far as practicable prior to the commencement of commissioning.

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.

(v) Choice of Steam Turbine

The facility has chosen a single-stage steam turbine for generating electricity which will generate saturated steam at 21 bar (a) and 215°C. The steam will be supplied to a single stage steam turbine generator set.

(vi) Choice of Cooling System

The facility will employ an air-cooled condenser system for cooling. The system significantly reduces water consumption compared to water-cooled systems and supports the efficient generation of electricity by maintaining optimal steam conditions and ensuring the continuous operation of the steam turbine.

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

Compliance with Article 14(5) of the Energy Efficiency Directive is not a relevant consideration because the installation's total net thermal input is 18.1 MW which is below the threshold specified in the directive.

(viii) Permit conditions concerning energy efficiency

Pre-operational condition PO2 requires 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 waste 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 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 efficient use of raw materials and water.

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 urea / 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 incinerator bottom ash (IBA) , air pollution control (APC) residues 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 and biological reactivity. Condition 3.1.3 and associated Table S3.5 specify limits for loss on ignition (LOI) of <5% 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 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 S3.5 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 drum-type magnetic separator and sent for recycling.

The facility will also transfer and repackage wastes not suitable for incineration. Wastes unsuitable for recovery or reuse will be disposed of, often in hazardous waste landfills. Wastes with potential for reuse will be sent to recovery facilities where they can be processed further. The facility will ensure

that all repackaged wastes are handled in compliance with environmental regulations and are directed to appropriate licensed facilities for their final treatment.
Due to the nature of the waste being processed at the Facility the bottom ash generated will be transferred to landfill for disposal.
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 Air Quality Assessment, Dioxin and Furan HRA Report and Abnormal Emissions Assessment of the Application. The assessments comprise of:

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

The applicant has presented the impacts of the proposed, varied, facility against the currently permitted facility. Since the original permit was issued, the construction of wind turbines has led to altered airflow, affecting emissions dispersion from nearby plants.

In table 3.4 of the Air Quality Assessment, the applicant compared:

- the 2012 as-permitted emissions, prior to the wind turbines being built
- the 2012 as-permitted emissions, after the wind turbines being built
- the proposed emissions, taking into consideration the wind turbines

The table showed that, when comparing the 2012 emissions to the proposed emissions, the proposed emissions would either result in an absolute reduction in PCs or a reduction when accounting for the impact of the newly constructed turbines. For clarity, in our assessment, we have presented the impacts of the proposed emissions in isolation

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 and potential odour impacts including those during plant shutdowns are considered in section 5.5.

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 Bristol Airport between 2018 and 2022. The meteorological data from the Bristol Airport measurement station was considered the most representative because it is the nearest accredited measurement station to the Avonmouth development site, located approximately 14.5 km away

The effect of the terrain surrounding the site upon plume dispersion was considered in the dispersion modelling.

The applicant consulted the model developers about the impact of wind turbines on pollutant dispersion modelling. The discussions revealed that the turbines were leading to elevated ground-level pollutant concentrations near the turbine base CERC acknowledged potential overestimations in the model and recommended adjustments. These recommendations were incorporated into the modelling process to address turbine-induced changes. We are satisfied that the modelling approach is appropriate.

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. We have audited the backgrounds used in the air quality assessment and are satisfied that the backgrounds used are appropriate.

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 review of the Applicant's assessment leads us to agree with the Applicant's conclusions. We have 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 their predicted ground level concentrations at the most impacted receptor.

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.

Non-metals

Pollutant	ES		Back-ground	Process Contribution (PC)		Predicted Environmental Concentration (PEC)	
	µg/m^3	Rererence period	µg/m^3	µg/m^3	% of EAL	µg/m^3	% of EAL
NO_2	40	Annual mean	12.33	1.35	**3.38**	13.7	34.2
	200	99.79th %ile of 1 hour means	24.66	20.48	**10.2**	45.1	22.6
PM_{10}	40	Annual mean	13.29	0.0565	0.14	13.3	33.4
	50	90.41st %ile of 24 hour means	26.58	0.22	0.44	26.8	53.6
$PM_{2.5}$	20	Annual mean	8.08	0.0563	0.28	8.14	40.7
SO_2	266	99.9th %ile of 15-min means	12.96	11.4	4.3	24.36	9.2
	350	99.73rd %ile of 1 hour means	12.96	10.09	2.88	23.05	6.6
	125	99.18th %ile of 24 hour means	6.48	3.06	2.4	9.54	7.6
HCl	750	1-hour mean	0.82	55.01	7.33	55.8	7.44
HF	16	Monthly mean	2.35	0.0113	0.07	2.361	14.76
	160	1 hour mean	5.11	9.17	5.73	14.28	8.9
CO	10000	Maximum daily running 8 hour mean	131	59	0.59	190	1.9
	30000	1 hour mean	131	84	0.28	215	0.7
TOC	2.25	Annual mean	See Note	See Note			
	2.25	24 Hour mean (Short Term)	See Note	See Note			

PAH	0.00025	Annual mean	0.0001	0.0000113	**4.52**	0.00011	44.5
NH_3	180	Annual mean	2.955	0.1126	0.06	3.07	1.70
	2500	1 hour mean	2.955	91.69	3.67	94.645	3.8
PCBs	0.2	Annual mean	0.0000434	6.75E-10	0.00	0.00004	0.02
	6	1 hour mean	0.0000868	5.5E-07	0.00	0.00009	0.00
Note - The consultant did not model against the 1,3 Butadiene ES for the Annual mean or 24 Hour mean							
PAH as benzo[a]pyrene							

Metals

Pollutant	**ES**		**Back-ground**	**Process Contribution**		**Predicted Environmental Concentration**	
	ng/m^3	**Reference period**	**ng/m^3**	**ng/m^3**	**% of EAL**	**ng/m^3**	**% of EAL**
Cd	5	Annual mean	0.13	0.225	**4.5**	0.36	7.1
	30	24 hour mean (short term)	0.26	8.073	**26.9**	8.33	27.8
Hg	600	1 hour mean	1.5	183	**30.5**	184.50	30.75
	60	24 hour mean (long term)	1.5	8.1	**13.5**	9.60	16.00
Sb	5000	Annual mean	Not provided	3.4	0.1		
	150000	1 hour mean	Not provided	2750	1.8		
Pb	250	Annual mean	3.6	3.4	**1.4**	7.00	2.80
Cu	50	24 hour mean (long term)	3.5	120	**240.0**	123.50	**247.00**
Mn	150	Annual mean	3	3.4	**2.3**	6.40	4.27
	1500000	1 hour mean	6	2750	0.2	2756.00	0.18

V	1000	24 hr average (short term)	0.86	120	**12.0**	120.86	12.09
As	6	Annual mean	0.76	3.4	**56.7**	4.16	69.3
Cr (II)(III)	2000	24 hour mean (long term)	960	120	6.0	1080.00	54.000
Cr (VI)	0.25	Annual mean	0.96	3.4	**1360.0**	4.36	**1744.0**
Ni	20	Annual mean	0.81	3.4	**17.0**	4.21	21.1
	700	1 hour mean	1.62	2750	**392.9**	2751.62	**393.1**

5.2.2 Assessment of non-metals

(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:

- PM10
- PM 2.5
- SO2
- HCl
- HF
- CO
- NH3
- PCBs

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.

- NO2
- TOC

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.

Regarding polyaromatic hydrocarbons (PAHs) as Benzo[a]pyrene (B[a]P, the consultant's assessment indicates that the predicted contribution is not insignificant. Their report references two background values, one from a local monitoring station and another from interactive mapping. We note that the higher monitored value exceeds the relevant objective. The consultant calculated the predicted environmental concentration using the lower background value, but using the higher value would result in an exceedance of the objective. However, our checks at residential and educational receptors show that contributions from the facility are very low and considered insignificant. Therefore, the overall risk of exceedance at human health receptors remains low.

(iii) Emissions requiring further assessment

Except for Cu, Cr(VI) and Ni, which are considered further below, all emissions either screen out as insignificant or where they do not screen out as insignificant are considered unlikely to give rise to significant pollution.

5.2.3 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 greater than 1% of the ES and therefore cannot be screened out as insignificant. However, from the table above, the emission is not expected to result in the ES being exceeded. The maximum short term PC is greater than 10% of the ES and therefore cannot be screened out as insignificant. However, it is not expected to result in the ES being exceeded.

(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.

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 $\mu g/m^3$, 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 $\mu g/m^3$ and a monthly ES of 16 $\mu g/m^3$ – the process contribution is <1% of the monthly ES and so the emission screens out as insignificant if the monthly ES is interpreted as representing a long term 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 $\mu g/m^3$, 15 – minute of 266 $\mu g/m^3$ and daily of 125 $\mu g/m^3$.

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.

Whilst SO_2 emissions cannot be screened out as insignificant, the Applicant's modelling shows that the installation is unlikely to result in a breach of the ES. The Applicant is required to prevent, minimise and control SO_2 emissions using BAT, this is considered further in Section 6. We are satisfied that SO_2 emissions will not result in significant pollution.

(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 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 based their assessment of short-term VOC impacts on the Environmental Standard (ES) for benzene. We have audited the Applicant's modelling outputs against the relevant short-term and long-term ESs for 1,3-butadiene. This approach was taken because 1,3-butadiene has the lowest ES among the organic compounds likely to be present in VOC emissions (excluding PAHs, PCBs, dioxins, and furans). For the 1,3-butadiene ESs, the maximum predicted short-term process contribution (PC) exceeds 10% and the maximum predicted long-term process contribution (PC) exceeds 1% of the respective ES and therefore cannot be screened out as insignificant. However, the predicted environmental concentrations (PECs) are not expected to exceed the applicable ES in either case.

The above tables show that for 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 above tables show that for PAH, the maximum long term PC is greater than 1% of the ES and therefore cannot be screened out as insignificant. However, from the table above, the emission is not expected to result in the ES being exceeded. However, it is not expected to result in the ES being exceeded.

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

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

From the tables above all the other 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.

The ammonia emission is based on a release concentration of 10 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.

Whilst all emissions cannot be screened out as insignificant, the Applicant's modelling shows that the installation is unlikely to result in a breach of the ES. The Applicant is required to prevent, minimise and control PAH and VOC emissions using BAT, this is considered further in Section 6. We are satisfied that PAH and VOC emissions will not result in significant pollution.

(V) Summary

For the above emissions to air, for those emissions that have not screened out as insignificant, 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. Therefore, 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:

- Sb
- Mn (short term)
- Cr (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:

- As
- Cd
- Hg
- Pb
- Mn (Long term)
- V
- Ni (Long term)

This left emissions of Cu, Cr (VI) and Ni (Short term) 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 metals Cu, Cr (VI) and Ni (Short term) 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.

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

- Cr (VI)

The following emissions of metals whilst not screened out as insignificant were assessed as being unlikely to give rise to significant pollution:

- Cu
- Ni (short term)

In the permit we have added Improvement Condition IC6 which requires the operator to carry out an assessment of the impact of emissions to air of Cu, Cr (VI) and Ni based on actual emissions once the facility is operational. This

condition ensures that we can, if required, vary the permit in the unlikely event that any environmental standards have the potential to be exceeded.

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

The air quality assessment has considered the presence of wind turbines in the vicinity of the facility. The modelling incorporated detailed data on local wind turbines, including their locations, heights, and operational characteristics, to assess their influence on the dispersion of emissions. The consultant used the ADMS model's wind turbine module to account for changes in airflow and turbulence caused by turbine operation. This approach ensures that potential impacts on pollutant dispersion are appropriately evaluated. We are satisfied that the methodology appropriately addresses the effects of wind turbines and provides a sound basis for decision-making.

(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.

5.3 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. The table below presents the modelled intake as a % of the 2 pg-TEQ/kg/d TDI.

Receptor	adult	child
Agricultural	0.44%	0.65%
Residential	0.001%	0.003%

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)

Our checks confirm that the dioxin, furan and dioxin-like PCB intakes are below 10% of the COT TDI and are not considered a significant risk to health. This also applies to any increased emissions of dioxins, furans and dioxin-like PCBs during worst-case abnormal operations. This is based on the UKHSA advise that:

- A total exposure including the PC from dioxins, furans and dioxin-like PCBs is without appreciable health risk if the total exposure is below the TDI.

- If total exposure results in an exceedance of the COT TDI, if the PC from the facility is less than 10% it would be unlikely to result in a significant risk.

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 µg/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 Applicant's assessment indicated that the Installation emissions screen out as insignificant or where the impact of emissions were not 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.

Our review confirms that emissions from the facility, including during abnormal operations, are not expected to pose a significant risk to public health. Predicted pollutant levels remain within environmental safety standards. The intake of dioxins, furans, and dioxin-like PCBs is well below health-based thresholds, even under worst-case conditions.

We carried out our own modelling and sensitivity checks. While there were some differences in numerical values, we found the applicant's conclusions to be robust and suitable for permit determination.

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 Food Standards Agency was also consulted during the permit determination process and did not provide a response to our consultation. Details of the responses provided by UKHSA to the consultation 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:

- Severn Estuary SAC, SPA and Ramsar (1029 metres)
- Avon Gorge Woodlands SPA (4478 metres)

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

- Severn Estuary SSSI (1029 metres)

The following local wildlife sites are located within 2 km of the Installation:

- Avonmouth Sewage Works and Hoar Gout 519 m
- Lawrence Weston Road Rhines 1,206 m
- Hallen Marsh Junction 1,226 m
- Lawrence Weston Bowl 1,463 m

- Gloucester Road Railway Sidings 1,479 m
- Salt Rhine and Moorhouse Rhine 1,487 m
- Barracks Lane Rhine Complex 1,553 m
- Long Cross Tip 1,707 m
- Fields along M5, Hallen 1,870 m

5.4.2 Habitats and SSSI Assessment

The Applicant's habitats assessment was reviewed by our technical specialists for air dispersion modelling and assessment who agreed with the assessment's conclusions, that there would be no likely significant effect on the interest feature(s) of the protected site(s).

Severn Estuary (SAC SPA and SSSI)

Pollutant	ES / EAL (µg/m³)	Process Contribution (PC) (µg/m³)	PC as % of ES
Direct Impacts[1]			
NO_x Annual	30	0.126	0.4%
NO_x Daily Mean	75	1.716	2.3%
SO_2	10	0.0317	0.3%
Ammonia	1	0.0106	0.4%
HF Weekly Mean	0.5	0.0143	1.5%
HF Daily Mean	5		0.3%
Deposition Impacts[1]			
N Deposition (kg N/ha/yr)	10	0.0678	0.7%
Acidification (Keq/ha/yr)	Note (2)	Note (2)	Note (2)

(1) Direct impact units are µg/m³ and deposition impact units are kg N/ha/yr or Keq/ha/yr.
(2) Acidification was not considered by the applicant but our audits found it to screen out as insignificant

Avon Gorge Woodland SPA

Pollutant	ES / EAL (µg/m³)	Process Contribution (PC) (µg/m³)	PC as % of ES
Direct Impacts[2]			
NO_x Annual	30	0.008	0.03%
NO_x Daily Mean	75	0.391	0.5%
SO_2	10	0.0021	0.02%
Ammonia	1	0.0007	0.07%
HF	0.5	0.0007	0.1%

Pollutant	ES / EAL (µg/m³)	Process Contribution (PC) (µg/m³)	PC as % of ES
Weekly Mean			
HF Daily Mean	5	0.0033	0.07%
Deposition Impacts[1]			
N Deposition (kg N/ha/yr)	10	0.0072	0.1%
Acidification (Keq/ha/yr)	4	0.0013	0.03%

(1) Direct impact units are µg/m³ and deposition impact units are kg N/ha/yr or Keq/ha/yr.

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.

Pollutant	ES / EAL (µg/m³)	Most affected LWS	Process Contribution (PC) (µg/m³)	PC as % of ES
Direct Impacts[1]				
NO_x Annual	30	Kings Weston Lane Rhine	0.60	2%
NO_x Daily Mean	75	St Andrews Road Rhine	4.71	6.3%
SO_2	10	Kings Weston Lane Rhine	0.15	0.7%
Ammonia	1	Kings Weston Lane Rhine	0.05	1.7%
HF Weekly Mean	0.5	St Andrews Road Rhine	0.017	3.3%
HF Daily Mean	5	St Andrews Road Rhine	0.039	0.8%
Deposition Impacts[1]				
N Deposition (kg N/ha/yr)	10-20	Kings Weston Lane Rhine	3.2% of 10; 1.6% of 20	0.07%
Acidification (Keq/ha/yr)	30	St Andrews Road Rhine	0.03	0.1%

(1) Direct impact units are µg/m³ and deposition impact units are kg N/ha/yr or Keq/ha/yr.

The tables above show that the PCs are below the critical levels or loads. We are satisfied that the Installation will not cause significant pollution at any of the other conservation sites. The Applicant is required to prevent, minimise and control emissions using BAT, this is considered further in Section 6.

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 100x normal
- Mercury emissions are 30 times those of normal operation
- NO_x emissions of 500 mg/m^3 (1.25x normal)
- Particulate emissions of 150 mg/m^3 (5 x normal)
- Metal emissions other than mercury are also 30 times those of normal operation
- SO_2 emissions of 450 mg/m^3 (2.25x normal)
- HCl emissions of 900 mg/m^3 (15x 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.

The result on the Applicant's short-term environmental impact is summarised in the table below.

Non-metals

Pollutant	ES		Back-ground	Process Contribution (PC)		Predicted Environmental Concentration (PEC)	
	µg/m^3		µg/m^3	µg/m^3	% of EAL	µg/m^3	% of EAL
NO_2	200	99.79th %ile of 1 hour means	24.66	59.75	**29.9**	84.41	42.2
PM_{10}	50	90.41st %ile of 24 hour means	26.58	1.28	2.6	27.86	55.7
SO_2	266	99.9th ile of 15-min means	12.96	170.8	**64.2**	183.76	69.1
	350	99.73rd %ile of 1 hour means	12.96	151.43	**43.3**	164.39	47.0
	125	99.18th %ile of 24 hour means	6.48	10.2	8.2	16.68	13.3
HCl	750	1 hour mean	0.82	325.8	**43.4**	326.62	43.5
HF	160	1 hour mean	5.11	7.2	4.5	12.31	7.7
PCBs	6	1 hour mean	0.0000868	0.00181	0.03	0.0018968	0.03

Metals

Pollutant	ES		Back-ground	Process Contribution (PC)		Predicted Environmental Concentration (PEC)	
	ng/m^3		ng/m^3	ng/m^3	% of EAL	ng/m^3	% of EAL
Hg	600	1 hour mean	1.5	216.77	**36.13**	218.27	36.378
Sb	150000	1 hour mean	-	124.87	0.08		
Cd	30	24 hour mean (short term)	0.26	8.04	**26.80**	8.30	27.667
Mn	1500000	1 hour mean	6	651.48	0.04	657.48	0.044
V	1000	24 hour mean (short term)	0.86	4.82	0.48	5.68	0.568
Ni	700	1 hour mean	1.62	575.48	**82.21**	577.10	82.443

From the table above the emissions of the following substances can still be considered insignificant, in that the PC is still <10% of the short-term ES.

- PM10
- HF
- PCBs
- Sb
- Mn
- V

Also, from the table above emissions of 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 predicted environmental concentration is less than 100% of short term ES.

- NO2
- SO2
- HCl

- Hg
- Cd
- Ni

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 that if dioxin emissions were at 10 ng/m^3 for the maximum period of abnormal operation, this would result in an increase of approximately 70% in the TDI reported in section 5.3.3. In these circumstances the worst-case TDI would be 1.35% of the COT TDI. At this level, emissions of dioxins will still not pose a risk to human health.

5.6 Other Emissions

There will be emissions to sewer of the treated effluent from the facility's wet scrubber. The BAT measures that will be in place at the facility are presented in section 6.2.3 and how these emissions have been assessed and how they will be controlled by the permit are presented in section 6.6.1 of this decision document

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 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 then 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 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.

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 hazardous and clinical waste is usually incinerated in rotary kilns but grate incinerators (including co-firing with other wastes) are sometimes applied to solid wastes, and fluidised bed incinerators to some pretreated materials. Static furnaces are also widely applied at on-site facilities in chemical plants.

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
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

Technique	Key waste characteristics and suitability	Throughput per line	Advantages	Disadvantages / Limitations of use	Bottom Ash Quality	Cost
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
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

Technique	Key waste characteristics and suitability	Throughput per line	Advantages	Disadvantages / Limitations of use	Bottom Ash Quality	Cost
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
- Stepped Hearth
- Rotary and oscillating kilns
- Fluidised Bed
- Pyrolysis / Gasification

The Operator then took Stepped Hearths and Rotary kilns forward for further assessment. The applicant justified this further assessment for the following reasons:

Stepped hearth:

- Proven technology commonly used for clinical waste incineration across the UK and Europe.
- Capable of achieving good waste burnout with controlled residence time and primary air control.
- Reliable and well-proven for hazardous waste incineration globally.
- However, their complex moving parts increase the risk of mechanical failure.

Rotary Kiln:

- Widely used for hazardous waste incineration and clinical waste treatment in the healthcare sector.
- Offers flexibility for processing variable waste types, including those with inconsistent moisture content and calorific value.
- Proven ability to handle liquid and sludge wastes, as proposed for the Facility.
- Allows close control of combustion air in the primary combustion chamber, essential for high-calorific-value wastes.
- Challenges such as slagging and particulate emissions can be mitigated through design improvements

The Applicant has proposed to use a furnace technology comprising a counter current rotary kiln with a separate secondary combustion chamber which is identified in the tables above as being considered BAT in the BREF for this type of waste feed.

The rotary kiln has been selected by the applicant over the stepped hearth due to its flexibility in processing various waste types, including hazardous, clinical, liquid, and sludge wastes. Its counter-current design enhances efficiency by preheating incoming waste with flue gas, ensuring complete

combustion through continuous waste movement and precise control of combustion air, which is essential for high-calorific-value wastes.

Rotary kilns are more reliable, with fewer moving parts, reducing mechanical failure risks, and produce higher-quality ash with lower residual carbon content, eliminating the need for quenching. They achieve high combustion efficiency, comply with emission limits, and address challenges like slagging and particulate emissions.

The Applicant proposes to use gasoil as support fuel for start-up, shut down and for the auxiliary burners. The choice of gas oil as a support fuel is consistent with the requirements of chapter IV of the IED.

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

6.2 BAT and emissions control

The prime function of flue gas treatment 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.	Require reheat to prevent visible plume	Where scrubbing required for

		Liquid effluent produced	and dew point problems.	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 with burst bag detection to minimise the risk of increased particulate emissions in the event of bag rupture.

Emissions of particulate matter cannot be screened out as insignificant. We have therefore considered whether other available techniques should be considered:

- Ceramic Filters – this technique can be used at higher flue gas temperatures than fabric filters, but filters are more likely to blind. This technique can be BAT for smaller plant or where high temperature gas cleaning is needed.
- Electrostatic Precipitators – this technique is not BAT by itself but can be used in combination with bag filters to reduce the energy consumption of the induced draft fan, which might be overall beneficial.

In this case, it is not considered that these alternate techniques offer any advantage in comparison with the Applicant's preferred option of fabric filters and so agrees that the Applicant's proposed technique is BAT for the installation.

The Applicant has proposed wet scrubbing, with the main objective of abating acid gases and metals, this scrubbing process will also further reduce particulate. This scrubbing process will take place after the fabric filtration.

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	NOx emissions	Relies on an	Port injection	All plant

non-catalytic reduction (SNCR)	80 -180 mg/m^3 Lower energy consumption than SCR Lower costs than SCR	optimum temperature around 900 °C, and sufficient retention time for reduction May lead to Ammonia slip	locations	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.

The operator also considered the use of Flue gas recirculation, but it was ruled out by the applicant on the basis that the cost vs benefit was not justified and that the facility could already meet all emission requirements.

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 urea as the reagent.

Emissions of NO_x cannot be screened out as insignificant. Therefore, the Applicant has carried out a cost / benefit study of the alternative techniques. The cost per tonne of NO_x abated over the projected life of the plant has been calculated and compared with the environmental impact as shown in the table below.

	Cost of NO_x removal £/tonne	PC (long term)	PEC (long term)
SCR	£4,825	2.25%	33.06%
SNCR	£2,460	3.37%	34.18%

Based on the figures above the Applicant considers that the additional cost of SCR over SNCR is not justified by the reduction in environmental impact. Thus, SCR is not BAT in this case, and SNCR is BAT for the Installation. The Applicant has justified the use of urea as the reagent on the basis of its lower climate change impacts and lesser health and safety handling risks when compared to ammonia. We agree with this assessment.

The operator has presented that due to the varied nature of the wastes to be received at the facility and the design of the boiler (it is much smaller than a municipal waste incineration plant), the financial costs associated with the installation and running of SCR and balance of environmental benefits, meeting an emission limit of 100mg/m^3 for daily NO_X is not representative of BAT and that a limit of 120mg/m^3 represents BAT. We agree with this assessment.

The amount of urea used for NO_x abatement will need to be optimised to maximise NO_x reduction and minimise NH_3 slip. Improvement condition IC12 requires the Operator to report to the Environment Agency on optimising the performance of the NO_x abatement system and to investigate ways that the daily NOx limit can be lowered below 120. The BAT AEL for ammonia has been set and the Operator is also required to monitor and report on N_2O emissions every quarter.

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	Reduces SOx at source		Start-up, supplementary firing.	Where auxiliary fuel required.

gasoil or natural gas)				
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 Low solid residues production Reagent delivery may be optimised by concentration and flow rate	Large effluent disposal and 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		Used for wide 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 solid residue production Reagent consumption controlled only by input rate		All plant

	Higher reliability Lowest visible plume potential			
Semi-dry (also described as semi-wet in the Bref)	Medium reaction rates Reagent delivery may be varied by concentration and input rate	Higher solid waste residues than wet but lower than dry system		All plant
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	Corrosive material	Wide range of uses	MWIs, CWIs

	rates Low leaching solid residue Temperature of reaction well suited to use with bag filters	May give greater residue volume if no in-plant recycle		
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 gasoil over alternatives like LPG, which pose explosion risks, and natural gas, which is costly and impractical due to infrastructure limitations. The facility already has a low sulphur fuel oil tank installed, making gas oil a practical and cost-effective choice and we agree with that assessment.
- Management of heterogeneous wastes – 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.

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

The applicant has proposed that a wet system is put in place in order to 'polish' the flue gases to meet the required BAT-AELs, the wet system is

described in further detail below. The applicant considered a dry or semi-dry system to be paired with the wet system and assessed

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 applicable for all plants and can improve overall performance of the acid gas abatement system as well as reducing reagent usage.

In this case, the Applicant proposes to put in place a dry system, in combination with a wet scrubber for ‘polishing’ to ensure compliance with BAT-AELs

For the dry element of the abatement, solid lime will be injected into the flue gases upstream of the fabric filter and is optimised and automated based on upstream monitoring of acid gas concentrations to match the acid load accurately.

In terms of the wet ‘polishing’ system, the Applicant proposes to use wet scrubbing in combination with the dry-system for further abatement of acid gases as a result of the potential high acid gas and metal components to be present in the exhaust gas. The wet scrubber doses sodium hydroxide into the scrubber to neutralise acid gases. It is understood that most of the acid gases, the volatiles and the particulates will have been abated prior to the flue gases passing through the wet scrubber.

In order for wet scrubbing to be BAT, the treatment and disposal of the wet scrubbing effluent needs to be in accordance with Article 46(3) of IED and BAT 34 of the waste incineration BAT conclusions. The wet scrubber effluent treatment system will utilise the following steps:

- Collection and Chemical Dosing. Effluent produced by the scrubber is collected in a feed tank. Before further treatment, chemicals are added to adjust the pH and help remove heavy metals and other contaminants.

- Flocculation. The effluent is mixed with treatment chemicals to encourage particles and contaminants to clump together. Additional chemicals are used to help remove oily substances. The mixture is then prepared for the next stage, where solids begin to settle out.

- Separation of Solids and Organics (TPS Unit). The effluent passes through a separation unit designed to remove most suspended solids and oils. Solids and separated oils are collected for safe disposal, while clarified water moves on to further treatment.

- Filtration. The clarified water is filtered to remove any remaining particles. The filtration system is periodically cleaned, and the process ensures the water meets required standards before final treatment.

- Final Polishing (Reverse Osmosis). A final treatment stage further purifies the water to meet strict discharge standards. Any concentrated residues are collected for appropriate disposal, and the treated water is safely discharged to the sewer system.

Further information on how treated effluents have been assessed and will be controlled at the facility are included in section 6.6.2 of this decision document.

We are satisfied that the treatment and disposal of the wet scrubbing effluent represents BAT.

A wet scrubber also requires the reheat of the exhaust to avoid a visible plume. To mitigate the risk of a visible plume, steam from the process will be used to reheat the flue gases to a temperature of 130°C after the wet scrubbing process. This ensures the flue gas temperature remains above the dew point, preventing condensation and plume formation.

We consider the use of a dry system in combination with a wet scrubber with the associated effluent management and visible plume mitigation to represent BAT for the facility.

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		Covered in section on furnace	All plants

	these species.		selection	

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.

- Use of catalytic filter bags. These can achieve low levels of emissions but mercury is not removed.

In this case the Applicant proposes separate feed 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 feed 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 Waste BAT and appropriate measures

The applicant has presented how the hazardous waste repackaging and storage activities (AR2, AR3, AR7 and AR8) will implement relevant requirements of the waste treatment BAT conclusions and the clinical waste and chemical waste appropriate measures.

It is also the case that the main incineration activity (AR1) will implement relevant requirements of the clinical waste and chemical waste appropriate measures.

Section 4.3.6 of this document details the appropriate measures guidance documents that will form part of the operating techniques for the facility.

6.6 Other Emissions to the Environment

6.6.1 Emissions to water

Only clean and uncontaminated water arising from the facility's roof and areas of hardstanding will be discharged, via oil interceptor, to the neighbouring drainage ditch.

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.

6.6.2 Emissions to sewer

Emissions to sewer will arise from boiler blow down and effluent from the facilities bin wash. Only bins containing healthcare waste will be washed at the facility. Bin washing will involve disinfection of the bins and the wash waters will be discharged to sewer under the facilities trade effluent consent.

As a separate discharge, effluent from the facility's wet scrubber which has passed through the facility's effluent treatment plant, will be discharged to sewer. The operator provided an assessment of the impacts of these effluents. We did not agree with the approach taken to the screening. However, following our own audit we did agree with the conclusion that impacts on the receiving water course (the River Severn SAC SPA Ramsar) to which the wastewater treatment works receiving the facility's effluent discharges will screen out as not significant.

In the permit we have added the BAT AEL limits in line with the top end of the limits as detailed by BAT 34 of the waste incineration BAT conclusions.

We have also added pre-operational conditions IC13a and IC13b to the permit in order to capture and assess a full emissions inventory from any pollutants being discharged to sewer and to take remedial action if any exceedances of environmental standards are determined.

Our view is that dual treatment, on-site ETP and at the receiving waste water treatment works, is BAT. 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.

6.6.3 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 describes the measures which will be in place to prevent fugitive emissions such as:

- Waste handling and storage are carried out in enclosed areas to prevent the release of litter and dust.
- Air is extracted through the combustion process, which will help to contain and treat any odorous air within the main building.
- Regular cleaning and good housekeeping practices are implemented to further reduce emissions.
- Solid or powdered materials are stored in silos equipped with bag filters to prevent dust release during refilling, while lime silos are filled pneumatically, with displaced air vented through fabric filters.

- Powdered Activated Carbon (PAC) is stored in designated areas or silos, and waste is delivered in enclosed vehicles or containers to minimise emissions during transportation and unloading.
- Air Pollution Control residues (APCr) are stored in bags within covered skips, and bottom ash is stored in covered skips outside the main building to prevent dispersal.
- The facility incorporates enclosed systems and appropriate ventilation to minimise fugitive emissions.

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

6.6.4 Odour

The applicant has proposed to put in place the following odour control measures:

- Incoming waste handling and storage are conducted in the waste reception hall, to minimise odour emissions.
- A roller shutter door will be used to close the entrance to the reception hall outside of the waste delivery periods
- Air extracted from the waste reception hall is used as combustion air within the incinerator, effectively treating odorous compounds.
- Waste is stored in secure, closed containers prior to loading onto the feeder and being transferred to the furnace, minimising the release of odour.
- Waste is run down prior to periods of planned maintenance.
- In the event of unplanned shutdown, waste deliveries to the site will be diverted to an adjacent waste transfer station

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.

6.6.5 Noise and vibration

The facility has been designed with measures to minimise noise impact. Key noise-generating equipment will be housed inside the main building and insulated if necessary. Air-cooled condensers have been optimised to reduce noise and tonal disturbances, strategically positioned to limit their effect on local residents. A sound attenuator will be installed on the flue gas ID fan to further control emissions.

Efforts to reduce noise will also extend to operations: night-time waste vehicle movements will be minimised, and regular maintenance will ensure machinery remains within acceptable noise levels. Mobile plant equipment will comply with the latest noise emission standards and will be operated according to manufacturer guidelines.

Routine noise monitoring will be conducted in areas with potentially high noise levels. If increases are detected, a noise management plan will be implemented to explore mitigation strategies and maintain a controlled acoustic environment.

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.

We audited the findings of the applicant’s noise survey and assessment

We agree that the noise impact from the Facility is equivalent to "low impact" based on BS 4142 assessments and consideration of context. We agree that noise impacts are acceptable and do not prevent a permit from being granted.

We identified gaps in the consultant's background sound level measurements, particularly for weekends at St Andrew’s Road and weekdays at St Anthony’s Park Traveller’s Site. We conducted our own conservative assessments to address these gaps.

We found discrepancies in the consultant's sound source levels for air-cooled condensers and adjusted them in our sensitivity modelling to reflect expected values.

The applicant proposed mitigation measures, including insulated building walls, closed roller shutter doors, and no nighttime deliveries. We consider these measures effective.

The consultant's consideration of context, including low absolute sound levels and limited operation of air-cooled condensers at night, supports the conclusion of low impact. We agree with this assessment.

Most elements of the Noise Impact Assessment (NIA) were assessed as low risk, except for background sound levels and source sound levels, which were graded as medium risk. We addressed these risks through our audit.

We concluded that the noise impacts are acceptable, and the permit application for the site can proceed and that an improvement condition to monitor actual noise emissions from the site is not needed.

6.7 Setting ELVs and other Permit conditions

6.7.1 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 impact on local receptors and habitats conservation sites for those emissions not screened out as insignificant and do not consider it necessary to impose further conditions, or set more stringent emission limits than those specified by the BAT AELs

(ii) National and European ESs

There are no additional National or Europeans EQSs that indicate that the BAT AELs are insufficient to protect the local environment.

(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. 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

Pre-operational condition (PO4) requires the Operator prior to the commencement of commissioning, to submit to the Environment Agency, and obtain the Environment Agency's written approval to it, a written commissioning plan, including timelines for completion, for approval by the Environment Agency. The commissioning plan shall include the expected emissions to the environment during the different stages of commissioning, the expected durations of commissioning activities and the actions to be taken to protect the environment and report to the Environment Agency in the event that actual emissions exceed expected emissions. Commissioning shall be carried out in accordance with the commissioning plan as approved.

6.8 Monitoring

6.8.1 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.

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

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.

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

The applicant is not proposing to provide back-up CEMS or surrogate measures. In the event that the installed CEMS for TOC, CO and TPM fail

this will necessitate plant shutdown, rather than abnormal operation in accordance with condition 2.3.13.

6.8.3 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 to be taken at the facility we require continuous monitoring of mercury.

Based on the waste types and control measures proposed in the Application we expect that emissions of dioxins will be stable 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 condition IC9 and we can require long term monitoring for dioxins if required.

6.9 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 Bristol City Council to grant planning permission on 08/12/2022.
- The report and 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 allows the mixing of hazardous waste in the furnace. We are satisfied that the provisions of Article 13 are still complied with and the adverse impact of the waste management on human health and the environment is not increased; and the mixing operation conforms to best available techniques.

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. This satisfies the requirements of the Public Participation Directive.

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*".

Paragraph 4.2 of this Guidance provides the objectives we are to pursue when discharging our main operational functions. As far as determining applications for water discharge permits is concerned, this states that we are:

> *'To protect, enhance and restore the environmental quality of inland and*
> *coastal surface water and groundwater, and in particular:*
> *to address both point source and diffuse pollution;*
> *to implement the EC Water Framework Directive; and*
> *to ensure that all relevant quality standards are met.'*

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

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…*". 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.

For waste 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 assessed the Application and concluded that the Installation will not damage the special features of any SSSI. We notified Natural England for information only. This was recorded on a CROW Appendix 4 form.

The Wildlife and Countryside Act (CRoW) 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.

7.2.8 **Marine and Coastal Access Act 2009**

Section 58 of this Act requires us to act in accordance with appropriate marine policy documents, unless relevant considerations indicate otherwise.

Section 125 of this Act requires that, so far as is consistent with their proper exercise, we exercise our functions in a manner that we consider best furthers the conservation objectives stated for Marine Conservation Zone(s) (MCZs) certain features of which are capable of being affected by our determination (to more than an insignificant degree) or else, where this is not possible, which least hinders the achievement of those objectives.

Section 126 of this Act requires that, before granting a Permit for an Installation capable of affecting certain features of a MCZ(s) (to more than an insignificant degree), we consult with Natural England and that we are satisfied that there is no significant risk of the operation of the Installation hindering the achievement of the conservation objectives stated for any relevant MCZ(s).

We have considered the Application and are satisfied that it would not affect, to more than an insignificant degree, the protected features of MCZs or the ecological or geomorphological process on which the conservation of such features are dependent

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.

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 have assessed the Application in accordance with our guidance and concluded that there will be no likely significant effects on any European Site.

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 surface water chemical status and good ecological potential.

In taking this decision we have applied the physico-chemical standards, environmental quality standards and biological element status boundary values for surface water bodies specified in Articles 8-10 of, and Schedule 3 to, the Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015

With respect to shellfish waters designated in accordance with Regulation 9, the RBMP contains measures to ensure water quality necessary or desirable to improve or protect those shellfish waters in order to support shellfish life and growth and to contribute to the high quality of shellfish products suitable for human consumption.

We consider that no additional or different conditions are appropriate for this Permit to achieve these shellfish water objectives.

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 **Bathing Water Regulations 2013**

We have considered our duty, under regulation 5 of these Regulations, to exercise our relevant functions to ensure compliance with the Bathing Water Directive, and in particular to take realistic and proportionate measures with a view to increasing the number of bathing waters classified as "good" or "excellent".

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

7.3.5 **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.

7.5 Other relevant legal requirements

7.5.1 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 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 and 3.1.2 and Tables S3.1, S3.1(a) in Schedule 3 of the Permit.
45(1)(d)	The permit shall include the requirements for pH, temperature and flow of waste water discharges.	Conditions 3.1.1, 3.1.2, 3.1.3 and Table S3.3 in Schedule 3 of the Permit.
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 3.6.54 and Tables S3.1, S3.1(a), S3.3 and S3.4 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 2.3.14 and 2.3.15.
45(2)(a)	The permit shall include a list of the quantities of the different categories of hazardous waste which may be treated.	Condition 2.3.4 and table S2.2

IED Article	Requirement	Delivered by
45(2)(b)	The permit shall include the minimum and maximum mass 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.	Condition 2.3.4, table S2.2 and information provided in the Application on waste acceptance.
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(a) 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.	Conditions 3.1.1 and 3.1.2 and Table S3.3
46(4)	Relates to conditions for water discharges from the cleaning of exhaust gases.	Conditions 3.1.1 and 3.1.2 and Table S3.3
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 2.3.14 and 2.3.15
47	In the event of breakdown, reduce or close down operations as soon	Condition 2.3.13

IED Article	Requirement	Delivered by
	as practicable. Limits on dust (150 mg/m3), CO and TOC not to be exceeded during this period.	
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, table S3.1, S3.1(a), and S3.4
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 PO6
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 S3.5
50(2)	Flue gas to be raised to a temperature of 1,100ºC for two seconds, as measured at representative point of the combustion chamber.	Condition 2.3.12, Pre-operational condition PO6 and Improvement condition IC4 and Table S3.4
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 2.3.11
50(4)(a)	Automatic shut-down to prevent waste feed if at start up until the	Condition 2.3.10

IED Article	Requirement	Delivered by
	specified temperature has been reached.	
50(4)(b)	Automatic shut-down to prevent waste feed if the combustion temperature is not maintained.	Condition 2.3.10
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 2.3.10 and 2.3.14
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.	Condition 2.3.1 and Table S1.2
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.	Not applicable -this only relates to waste co-incineration plant
52(1)	Take all necessary precautions concerning delivery and reception of Wastes, to prevent or minimise pollution.	Conditions 2.3.1, 2.3.3, 3.3, 3.4, 3.5 and 3.7
52(2)	Determine the mass of each category of wastes, if possible	Condition 2.3.4(a) and Table S2.2 in

IED Article	Requirement	Delivered by
	according to the EWC, prior to accepting the waste.	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).	Conditions 2.3.7 and 2.3.8
52(4)	Prior to accepting hazardous waste, the operator shall carry out the procedures set out in Article 52(4).	Information in the Application and Pre-operational condition PO5
52(5)	Granting of exemptions from Article 52(2), (3) and (4).	Not Applicable. Only applies to plants which are part of an installation covered by Chapter II and only incinerate or co-incinerate waste generated within that installation.>
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 S3.5
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 S3.5 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

BAT conclusion	Criteria	Delivered by
1	Implement environmental management system	Condition 1.1 and Pre-operational condition PO1
2	Determine boiler efficiency	Section 4.3.7 of this decision document. Permit table S3.4
3	Monitor key process parameters	Condition 3.6.1 and table S3.4
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	Condition 3.6.1 and table S3.3
7	Monitor unburnt substances in slags and bottom ashes	Conditions 3.1.4 and 3.6.1, and table S3.5
8	Analysis of hazardous waste	The Application explains the measures that will be used. Permit condition 2.3.1, table S1.2 and pre-operational condition PO5
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	N/A No treatment carried out on site
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, Permit conditions 3.8 and pre-operational condition PO9 and PO10
13	Storage and handling of clinical waste	Measures are described in the Application. Permit conditions 2.3.1, table S1.2

BAT conclusion	Criteria	Delivered by
14	Improve overall performance of plant including BAT-AELs for TOC or LOI	Techniques described in the Application. Permit condition 2.3.1, table S1.2, 3.1.4, 3.6.1 and table S3.4
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.
21	Measures to prevent or reduce diffuse emissions including odour	Measures described in the Application. Permit conditions 2.3.1, table S1.2, 3.4.1, 3.3.1, 3.3.2. Sections 4.2.2, 6.6.3 and 6.6.4 of this decision document.
22	Handling of gaseous and liquid wastes	Measures described in the Application
23	Management system to prevent or reduce dust emissions from treatment of slags and ashes	Not applicable
24	Techniques to prevent or reduce diffuse emissions to air from treatment of slags and ashes	Not applicable

BAT conclusion	Criteria	Delivered by
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 table S3.1
26	Techniques and BAT AEL for dust emissions from enclosed slags and ashes treatment	Not applicable
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
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 S1.22.3.1, 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, 6.6.1 and 6.6.2 of this decision document. Permit conditions 2.3.1, table S1.2, 3.1.1, 3.1.2 and table S3.2

BAT conclusion	Criteria	Delivered by
33	Techniques to reduce water usage and prevent or reduce waste water	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	Measures described in the Application.
35	Handle and treat bottom ashes separately from FGC residues	Permit condition 2.3.17
36	Techniques for treatment of slags and bottom ashes	No treatment carried out on site
37	Techniques to prevent or reduce noise emissions.	Measures are described in the Application. Section 6.6.5 of this decision document. Permit conditions 2.3.1, table S1.2, 3.5.1, 3.5.2

Also, refer to section 6.5 of this decision document for how other relevant BAT conclusions and appropriate measures have been considered for the various activities on site.

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. We are using these conditions to require the Operator to confirm that the details and measures proposed in the Application have been adopted or implemented prior to the operation of the Installation.

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– justifications, where applicable, for these are provided at the relevant section 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

A) 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 draft 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 05/07/2024 to 02/08/2024 and in the Bristol Post on 05/07/2024

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

- Local Authority - Environmental Health/Environmental Protection department
- Local Authority – Planning
- Fire and Rescue
- Director of Public Health / UKHSA
- Health and Safety Executive
- Food Standards Agency
- National Grid

1) Consultation Responses from Statutory and Non-Statutory Bodies

Response Received from UKHSA	
Brief summary of issues raised:	Summary of action taken / how this has been covered
The operator may want to consider reviewing the proposed stack height to potentially accommodate lower emission levels.	We are satisfied that the stack height has been calculated in accordance with IED article 46(1). Having assessed the Application as a whole we are satisfied that the measures proposed, of which stack height is one aspect, are BAT.
The EA may wish to review the 1st Stage Screening Assessment covering PECs for metals, given that some PECs for long-term or short-term effect emissions to air are missing. This excludes nickel and antimony.	We audited the Applicant's dispersion modelling. As part of the audit, we confirmed that either the Process Contributions (PCs) from the facility were insignificant or that the Predicted Environmental Concentrations (PECs) were below the relevant air quality standard. We have also added IC6 into the permit which will check that the assumptions made in the operator's

	modelling report are representative of actual emissions Based on the Applicant's modelling we are satisfied that there will not be a significant impact in air quality.
Based on the detailed modelling results for nickel, the EA should ensure that mitigation and preventative measures as per BAT are implemented at all times, to ensure that nickel emissions remain well below air quality standards during site operation and regulation to minimise potential impact on air quality and public health.	We are satisfied that mitigation and preventative measures as per BAT are implemented at all times. We have also added IC6 into the permit which will check that the assumptions made in the operator's modelling report with regard to Nickel are representative of actual emissions.
Reassessment on the location of the nearest sensitive receptors to ensure consistency. Nearest residential areas lists are missing within the documents attached to this application.	We are satisfied that there will not be a significant impact from emissions to air when based on the maximum concentrations or worst impacted receptors that represent the worst case predictions. Impacts at individual receptors will be lower than the maximum and we are satisfied there will not be an unacceptable impact at any receptor. Section 5.2 of this decision document has further details.
The EA may wish to ensure that the Odour Management Plan is submitted to accommodate for the additional wastes proposed to be accepted by the operator	The operator has proposed odour control measures which will be put in place at the facility. We agree that these measures will mitigate odour risk from the facility. See section 6.6.4 of this decision document. Condition 3.4.2 enables to Environment Agency to request an odour management plan from the operator if the activities are giving rise to odour pollution outside of the facility.

2) Consultation Responses from Members of the Public and Community Organisations

One response was received from a local business. Two responses were received from members of the public. Questions were raised which fall within the jurisdiction of the planning system.

Guidance on the interaction between planning and pollution control is given in the National Planning Policy Framework. It says that the planning and pollution control systems are separate but complementary. We are only able to take into account those issues, which fall within the scope of the Environmental Permitting Regulations.

a) Representations from Local MP, Councillors and Parish / Town / Councils

No representations were received from any of these individuals or groups.

b) Representations from Community and Other Organisations

Representations were received from Encirc Ltd.

Brief summary of issues raised:	Summary of action taken / how this has been covered
Comments about air emissions and air risk assessment	
Concerns about the impact this facility would bring not only to the operability of the business but of its workforce. Proximity of the facility to food manufacturers.	We are satisfied that there will not be a significant impact from emissions to air when based on the maximum concentrations or worst impacted receptors that represent the worst case predictions. Impacts at individual receptors will be lower than the maximum and we are satisfied there will not be an unacceptable impact at any receptor.
Request collaboration and consultation involvement to fully understand the impact assessments and what mitigation is planned	Our engagement has been carried out in line with our Public Participation Statement, ensuring transparent involvement of the public and stakeholders. See section 2 for further details. We are satisfied that the impact assessments are robust and that appropriate mitigation measures, consistent with Best Available Techniques (BAT), are in place to protect human health and the environment.

c) Representations from Individual Members of the Public

A total of two of responses were received from individual members of the public. Only those issues additional to those already considered are listed below:

Brief summary of issues raised:	Summary of action taken / how this has been covered
Comments about air emissions and air risk assessment	
Concern over how the air dispersion modelling was carried out including: • Background pollution levels are not representative	We audited the Applicant's dispersion modelling. As part of the audit, we checked that the background levels used by the Applicant were appropriate and we are satisfied that there were. Based on the Applicant's modelling we are satisfied that there will not be a significant impact in air quality. Further information in in section 5.2 of this decision document for further details.
Concerns over the cumulative impacts of the facility	Background pollution level were taken into account. Further cumulative assessment was not needed because the consultant's modelling showed that process contributions (PCs) for human health were insignificant or predicted environmental concentrations (PECs) were well below 100% of the relevant environmental standards. For ecological sites, all PCs for the Facility alone were insignificant. According to AQTAG17 guidance, if maximum PCs at European sites are insignificant, there is no potential for alone or in-combination effects, so a cumulative assessment is not required.
Concerns over lack of transparency and engagement in relation to the application.	Our engagement has been carried out in line with our Public Participation Statement, ensuring transparent involvement of the public and stakeholders. We are satisfied that we took appropriate steps to inform people about the Application and how they could comment on it. How we did this is described in section 2 of this decision document.
Concern over the impacts from: • Particulate matter	We have assessed the impacts from these pollutants and we are satisfied that there will not be any significant impacts. See section 5.2 including section 5.2.2 (consideration of key pollutants) of this decision document for further details.
The incineration of wastes 1) accelerates	Point 1); the global warming potential of the

climate change and 2) goes against the principles of a circular economy and the contractual arrangements of these facilities reduce recycling rates.	facility is addressed in section 6.3 of this decision document. Point 2); This is primarily outside the scope of this determination. Recycling initiatives are a matter for the local authority. The strategic use of incineration for the management of wastes is a matter for central government.