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/GP3031JB
The Applicant / Operator is:	Vital Energi (Drakelow) Limited
The Installation is located at:	Drakelow Energy Generation Facility, Walton Road, Burton upon Trent, Staffordshire

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/GP3031JB/A001. We refer to the application as "the **Application**" in this document in order to be consistent.

The number we have given to the permit is EPR/GP3031JB. We refer to the proposed permit as "the **Permit**" in this document.

The Application was duly made on 19 July 2018.

The Applicant is Vital Energi (Drakelow) Limited. We refer to Vital Energi (Drakelow) 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 Vital Energi (Drakelow) Limited "the **Operator**".

Vital Energi (Drakelow) Limited's proposed facility is located at Drakelow Energy Generation Facility, Walton Road, Burton upon Trent, Staffordshire. We refer to this as "the Installation" in this document.

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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 Stratergy
BAT	Best Available Technique(s)
BAT-AEL	BAT Associated Emission Level
BREF	Best Available Techniques (BAT) Reference Documents for Waste Incineration
BAT C	BAT conclusions
CCW	Countryside Council for Wales
CEM	Continuous emissions monitor
CFD	Computerised fluid dynamics
CHP	Combined heat and power
COMEAP	Committee on the Medical Effects of Air Pollutants
CROW	Countryside and rights of way Act 2000
CV	Calorific value
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
ES	Environmental standard
EWC	European waste catalogue
FGC	Flue gas cleaning
FSA	Food Standards Agency
GWP	Global Warming Potential

HHRAP	Human Health Risk Assessment Protocol
HPA	Health Protection Agency (now PHE – Public Health England)
HRA	Human Rights Act 1998
HW	Hazardous waste
HWI	Hazardous waste incinerator
IBA	Incinerator Bottom Ash
IED	Industrial Emissions Directive (2010/75/EU)
IPPCD	Integrated Pollution Prevention and Control Directive (2008/1/EC) – now superseded by IED
I-TEF	Toxic Equivalent Factors set out in Annex VI Part 2 of IED
I-TEQ	Toxic Equivalent Quotient calculated using I-TEF
LCPD	Large Combustion Plant Directive (2001/80/EC) – now superseded by IED
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
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
RGS	Regulatory Guidance Series

SAC	Special Area of Conservation
SED	Solvent Emissions Directive (1999/13/EC) – now superseded by IED
SCR	Selective catalytic reduction
SGN	Sector guidance note
SHPI(s)	Site(s) of High Public Interest
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

1 Our decision

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

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

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

The Permit contains many conditions taken from our standard Environmental Permit template including the relevant Annexes. We developed these conditions in consultation with industry, having regard to the legal requirements of the Environmental Permitting Regulations 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 the details are sufficient and satisfactory to make the standard condition 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.

2 How we reached our decision

2.1 Receipt of Application

The Application was duly made on 19 July 2018. 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 below.

2.2 Consultation on the Application

We carried out consultation on the Application in accordance with the EPR, our statutory PPS and our own internal guidance RGS Note 6 for Determinations involving Sites of High Public Interest. 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, our consultation already satisfies the Act's requirements.

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 made a copy of the Application and all other documents relevant to our determination (see below) 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 (Planning, and Environmental Health)
- Public Health England
- Department of Public Health
- Food Standards Agency
- Health & Safety Executive
- Fire & Rescue Service
- National Grid

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

The Applicant then made a formal amendment to their Application to take account of changes to the proposed technology, and the layout of the site. Upon receipt of the amended parts of the Application we re-advertised on our website, re-consulted with the aforementioned organisations, and placed the amended documents on our Public Register.

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 24 October 2018 and 10 September 2019 respectively. A copy of each information notice was placed on our public register.

In addition to our information notices, we received further information during the determination from the Operator with respect to electrical efficiency, air emissions abatement plant, BAT Conclusions assessment, and emission points, this information being in response to our email dated 13 January 2020, and received on 27 January 2020; and with respect to the dust abatement performance of ceramic filters, this information being in response to our email dated 30 January 2020, and received on 13 February 2020.

3 The legal framework

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

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

We address some of the major legal requirements directly where relevant in the body of this document. Other requirements are covered in a section 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 activity listed in Part 1 of Schedule 1 to the EPR:

- Section 5.1 Part A(1)(b) – incineration of non-hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity of 3 tonnes or more per hour.

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” for EPR purposes (see below), such as air pollution control plant,

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

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. These activities comprise one installation, because the incineration plant and the steam turbine are successive steps in an integrated activity.

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

4.1.2 The Site

The proposed Installation is located on the site of the former Drakelow C Power Station, which was demolished in 2006, at Walton Road, Burton-upon-Trent, DE15 9TZ. The National Grid Reference of the site is SK 23250 19810.

The site is located in a generally rural setting just to the southwest of Burton-upon-Trent. To the north and west of the site lies the River Trent, a mainline railway line and the A38 trunk road, while agricultural land predominates the surrounding landscape otherwise. The nearest residential dwellings are isolated properties and include Barn Farm 675m to the south and an isolated property 610m to the south-southwest. The nearest high-density residential development is located to the north at a distance of approximately 850m, comprising the southern part of Burton-upon-Trent. The development of the Drakelow Masterplan will introduce new residential properties within 400m north east of the site.

The site is directly underlain by superficial deposits of River Terrace Deposits, comprising sand and gravel (Secondary A aquifer), and bedrock of the Merica Mudstone Group (Secondary B aquifer) estimated to be approximately 100m thick. It is not within a groundwater source protection zone. It is not within a designated flood zone for planning. There are no surface water features on-site, with the exception of standing water sited upon the cooling tower base. The closest surface water feature is a large area of standing water located to the south-west of the site. Otherwise the nearest surface watercourse is the River Trent about 430m away.

The site is located within 10 km of the following *European* designated site: River Mease Special Area of Conservation (SAC). The site is also located within 2km of the following non-statutory conservation sites, comprising

- Local Wildlife Sites - Drakelow Nature Reserve; A38 Dual Carriageway; Branston Gravel Pits; Riverside Hotel Grounds; Branston; The Rookery; Trent Valley Washlands; and Beans Covert;
- Local Nature Reserve - Branston Water Park
- Ancient Woodland - Grove Wood.

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

Further information on the site is addressed below at 4.3.

4.1.3 What the Installation does

The Applicant has described the facility as an Energy Generation Facility. 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 proposed plant will utilise advanced thermal treatment technology, namely gasification, as a means of processing pre-prepared refuse derived fuel (RDF) feedstocks to produce a combustible synthesis gas (syngas) which will be used to raise steam, and generate energy. The Installation has been designed to process approximately 169,000 tonnes of RDF per annum. The principle components of the process comprise are as follows:

- Waste Acceptance and Reception:

  RDF will be delivered directly to the Tipping Hall. HGV's will unload in the internal tipping area and a visual inspection will take place. The delivered RDF feedstocks will then be transferred either directly to the Mechanical Polishing Plant or to one of two Temporary Fuel Storage Areas. The RDF will be stored within the temporary areas for no longer than 1 day before being transferred to the Mechanical Polishing Plant.

- Mechanical Polishing Plant:

  Bucket loaders will transfer the RDF from the temporary fuel storage areas to the fuel transfer system for automatic feeding into the Mechanical Polishing Plant. The Mechanical Polishing Plant (MPP) consists of two parallel processing lines, both lines consisting of a shredder, a Ferrous Metal Separator and a Non-Ferrous Metal Separator. From the polishing plant the prepared RDF will then be stored within the Fuel Storage Bunker until required by the gasification plant. The RDF will be automatically placed within the bunker by automatic overhead cranes including placing the RDF onto each of the walking floors feeding each gasification system.

- Gasification:

  The site will have three gasification / combustion lines each with an independent fuel feed system. The fuel feed system will deliver the RDF into the gasification system where the waste will be gasified to

produce a syngas. The syngas is then combusted for the purposes of raising superheated steam through a steam boiler plant.

- Electricity Generation:

  The superheated steam then passes to a Steam Turbine and Generator, which will on average export circa 15MWe (net) of renewable electricity into the Local Distribution Network.

- Steam water cycle, including Air-Cooled Condenser, De-aerator and Water Treatment Plant:

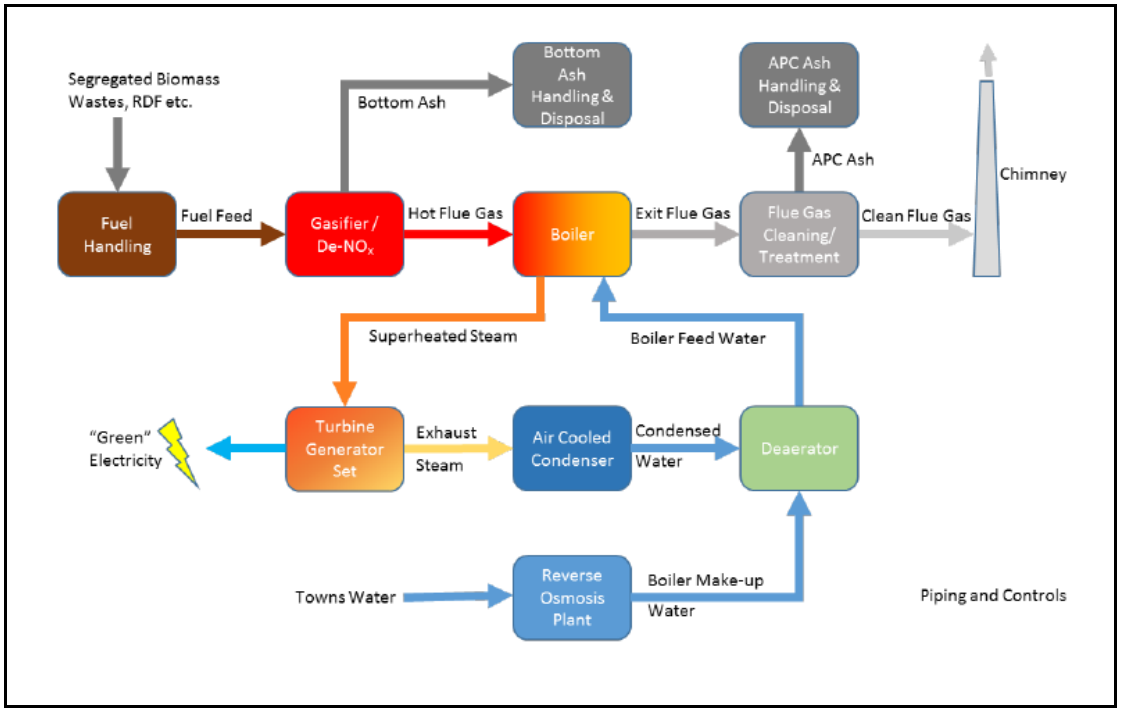
  The exhaust steam from the turbine will flow towards the air cooled condenser. The condensate is collected and pumped to the deaerator which removes oxygen and other dissolved gases from the liquid. The condensate is then passed to the economiser which heats the water before it is fed to the boiler.

  The water treatment plant utilise reverse osmosis (RO) technology to supply purified make up water for boiler. The systems will be supplied with water from the main raw water storage tanks and will deliver water to the treated storage tank for onward usage with the power plant.

- Flue-Gas Cleaning:

  Flue gas from the combustion chambers is passed to the flue gas cleaning system. Cleaning and pollution control consists of Selective Non-Catalytic Reduction (SNCR) through urea injection within the combustion chambers, Selective Catalytic Reduction (SCR) through a ceramic catalytic filter with urea injection, both for the reduction of oxides of nitrogen, hydrated lime injection for acid gas neutralisation and activated carbon powder injection for absorption and removal of heavy metals, dioxins, VOC and other harmful substances.

A simplified process layout is provided in the Figure below.



The facility will consist of the following:

- RDF reception and Tipping hall
- Mechanical polishing plant
- Fuel handling system
- 3 x Grate gasification systems
- 3 x Combustion systems
- 3 x Steam boilers
- 3 x Economisers
- Flue gas cleaning system
- Ash handling and storage systems
- A 55m high exhaust stack for cleaned flue gases
- Steam turbine and generator set with air cooled condenser
- Steam water cycle with de-aerator and water treatment plant.

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

Waste throughput, Tonnes/annum (total)	169,000 t/a	
Waste throughput per line, Tonnes/line	56,333 t/annum	
Waste processed	RDF	
Number of lines	3	
Furnace technology	Gasification	
Auxiliary Fuel	Liquefied Natural Gas / Liquefied Petroleum Gas	
Acid gas abatement	Dry	Hydrated lime
NOx abatement	SNCR (in the main	Urea

	combustion chamber) plus SCR downstream for residual NOx abatement	
Reagent consumption	Urea: 560,000 litres/annum Hydrated lime: 2,500 te/annum Activated carbon: 50 te/annum	
Flue gas recirculation	Yes	
Dioxin abatement	Activated carbon	
Stack	Grid Reference, SK 23238 19863	
	Height, 55 m	Diameter, 1.91 m
Flue gas	Flow, 61.2 Nm^3/s (actual), 50.6 Nm^3/s (normalised)	Velocity, 21.5 m/s
	Temperature °C	150
Electricity generated	18 MWe (gross output)	MWh
Electricity exported	15 MWe (net, on average)	MWh
Steam conditions	Temperature, 405°C	Pressure, 46.5 bar
Steam exported	N/A - CHP-R only	
Waste heat use	Waste heat will be used for internal uses where possible i.e. preheating combustion air	

4.1.4 Key Issues in the Determination

The key issues arising during this determination were the assessment of (a) emissions to air, (b) noise and vibration, and (c) Best Available Techniques, and we therefore describe how we determined these issues in most detail in this document.

4.2 The site and its protection

4.2.1 Site setting, layout and history

The installation is located on the site of the former Drakelow C power station, which operated from 1964 until its decommissioning in 2003, with demolition in 2006. Prior to this Drakelow A and B stations were used to generate electricity, with A station operating from 1955 until 1984, and B station from 1960 until 1993. All of the power stations were coal fired.

4.2.2 Proposed site design: potentially polluting substances and prevention measures

There will be no point source releases to groundwater from the installation. Fugitive releases to groundwater will be prevented via a range of pollution control and containment measures, as summarised below:

All on-site activities will take place within the main processing building. There will be no external storage or processing external to the main building. The building provides both secondary and tertiary containment. Any spillages,

leaks or incidents arising within the building (including firewater) will be effectively contained and captured within the footprint of the main building.

The site will be constructed with impermeable hardstanding with all surface joints sealed. There will be no open ground in the process area. The surfacing will be designed to ensure that it is of the appropriate strength, reinforcement and thickness to withstand the heavy traffic which will pass over it during operations. The detailed inspection of the site surfacing and containment will be subject to a detailed inspection regime in accordance with construction engineer's recommendations. Additionally routine inspections will be undertaken on a daily basis by site personnel as part of the daily site checks.

Above ground bulk storage tanks containing liquids will be appropriately constructed to ensure they are impermeable with deliveries supervised to minimise the risk of contamination of surface water. All tanks and facilities containing potentially polluting substances will be installed with secondary containment and be designed to comply with relevant standards. All non-bulk storage (IBC's etc.) shall be stored within the fully contained processing building so that in the event of a release it is not possible for the materials to enter the surface water drainage system.

Uncontaminated clean surface water runoff captured from roof drainage and external roadways / car parking areas will be discharged to the existing surface water drainage system. Any process effluent arising will be collected in an effluent collection tank and tankered off site for disposal. Boiler blowdown will be collected in the boiler blowdown tank with temperature and pH will be monitored and corrected via prior to discharge to surface water. All domestic effluent arising will be collected in the effluent collecting tank and tankered off site for disposal. The Applicant has submitted a detailed drainage plan for the site showing the location of foul, process and surface water drains, monitoring points and emissions points, which we consider to be satisfactory.

The Installation will require the use of a number of potentially polluting raw materials, chemicals and fuels including liquefied petroleum gas and/or, liquefied natural gas, lubrication oils, hydraulic and turbine oils, urea, hydrated lime, activated carbon and water treatment chemicals. All such substances will be stored within suitably constructed tanks or silos, with appropriate bunding (where necessary).

In the event of a fire, deluge water will be contained within the main processing building for subsequent pumping out and tankering away to a suitable water treatment facility.

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

The Applicant has submitted a site condition report which includes a report on the baseline conditions as required by Article 22. We have reviewed that

report and consider that it adequately describes the condition of the soil and groundwater prior to the start of operations.

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

The application did not include a site closure plan. Pre-operational condition PO1 requires the Operator to have an Environmental Management System in place before the Installation is operational, and this will have to include a site closure plan that sets out the appropriate measures that will be in place for the closure and decommissioning of the Installation

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.

The name of the Applicant has changed twice since the submission of the permit application. The application was submitted by Future Earth Energy Limited, but the company name was subsequently changed firstly to Future Earth Energy (Drakelow) Limited, and then to Vital Energi (Drakelow) Limited. The company registration number has remain unchanged throughout although the registered office address has changed as have the company directors. We requested revised application forms (Form A and Form F1) to be submitted in each case and are satisfied that the application 'declaration' has been signed by a *relevant person* from Vital Energi (Drakelow) Limited.

4.3.2 Management

The Applicant has stated in the Application that they will implement an Environmental Management System (EMS) designed to meet the requirements of ISO 14001:2015, and that the EMS will be fully developed, implemented and in operation at the time of plant commissioning. 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 certification of its EMS.

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

4.3.3 Site security

A secure fence will be installed around the perimeter of the site. The site manager will inspect the site security at the start of each working day and any defects or damage shall be made secure by temporary repair by the end of the working day and a permanent repair effected within seven working days and noted in the site diary. The site entrance will be equipped with lockable gates and an intruder alarm, and will be secured outside operating hours. The site will be equipped with digital Closed Circuit Television (CCTV). The CCTV system will operate on a 24/7 basis and be monitored by the Site Manager. Offices within the facility will be adequately secured out of operating hours.

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 submitted an Accident Management Plan. Having considered the Plan and 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 (FPP) which we considered acceptable and which has been approved. We have referenced the approved FPP in Table S1.2 of the permit as an ‘Operating technique.’

We have a regulatory duty to protect the environment and people. A fire that occurs on a site storing combustible waste materials can have a severe impact on the environment and on local communities. Waste fires can produce smoke that contains a variety of harmful emissions including asphyxiants and irritants. The longer the exposure to smoke the more likely there may be significant pollution or harm to human health. Therefore our approach is first to minimise the risk of a fire occurring and then to recognise that if a fire does occur it should be extinguished as quickly as possible whilst at the same time preventing it from spreading.

The measures set out in the Fire prevention plans: environmental permits guidance (May 2018) (the guidance) have therefore been designed to meet the following three objectives:

- minimise the likelihood of a fire happening;
- aim for a fire to be extinguished within 4 hours; and
- minimise the spread of fire within the site and to neighbouring sites.

We consider that if an operator submits a fire prevention plan (FPP) that includes the measures set out in the guidance we are likely to approve that FPP. If an operator is unable to meet the measures in the guidance but can propose alternative measures that nevertheless meet the aims of the guidance we can still approve that FPP. It is for the operator to demonstrate these measures, so that we can be satisfied that the alternative measures meet the objectives of the guidance.

The operator has identified the potential risk of fire from the installation due to the treatment and storage of combustible non-hazardous waste on site, in this case refuse derived fuel (RDF). The FPP sets out the measures put in place to prevent a fire and the actions that will be taken in the event of a fire occurring.

The FPP did not include all of the measures set out in our guidance. However the FPP did include alternative measures and so the operator was required to demonstrate that the alternative measures could meet the objectives in accordance with our guidance.

We have assessed the FPP and set out below where measures in line with the guidance are in place and where we have agreed alternative measures.

Appropriate measures are in place for the following FPP assessment areas: non-waste materials, using the FPP, site plans, manage common causes of fire, prevent self-combustion, prevent fire spreading, detecting fires, suppressing fires, fire-fighting techniques, containment, and contingency planning. We consider these to be in line with the guidance.

Alternative measures that we have assessed and are satisfied that they meet the objectives of the guidance are as follows:

- Manage waste piles (maximum pile sizes)

  The Applicant states that upon receipt the RDF will be offloaded into the Fuel Offload Area. After visual inspection it will immediately be transferred either to the Material Polishing Plant where it will be processed prior to transfer to the Fuel Bunker, or into one of the two Temporary Fuel Storage Areas. Each Temporary Fuel Storage Area is 20m long, 5m wide and the waste will be stored at a height of 4.5m (giving a maximum capacity of 450m^3), against a 6m high concrete push wall. So while the storage areas meet the required horizontal

dimensions, and the overall storage capacity within our guidance, they exceed the maximum permissible height of 4m, by 0.5m. The Applicant contends that although the 4.5m exceeds the 4m maximum pile height stated within the guidance, waste will be stored within these areas for a maximum of 1 day.

The Applicant also discusses the Fuel Bunker insofar as they acknowledge that with it being purpose built it does not meet all the requirements stated within our guidance. The maximum volume stored within the bunker 7,517m3. The maximum length of the bunker is 46m, maximum width is 23m and waste will be stored at a height of 9m. So while these dimensions do not meet our requirements they contend that the guidance is not intended to be applied to purpose built fuel bunkers for energy from waste plants and therefore the pile size stipulations cannot be applied to this aspect of the facility. They also state that the RDF will only be stored within the bunker for a maximum of 3 days. The 3 day storage capacity within the bunker together with the 1 day storage capacity within the Temporary Fuel Storage Areas, allows a 4 day supply on site for scenarios such as a long weekend, resulting in the continuous operation of the gasification system without major load reduction.

Therefore although the waste piles do not comply with our guidance, we are satisfied that the plant design and proposed storage durations (which are significantly shorter than 3 months) together with the good stock rotation being proposed, are acceptable.

- Quarantine area

The Applicant states that due to the design of the fuel storage bunker and the automatic detection and suppression equipment provided throughout the bunker, a quarantine area sized in accordance with our guidance requirements (i.e. it should have a capacity of at least 50% of the largest single waste pile) is not considered appropriate. They contend that all incidents will be dealt with within the bunker, resulting in there being no need for an external quarantine area on site. They say that in the event that a thermal imaging camera identifies a hot spot within the RDF pile, the crane would be used to mix and spread out the RDF to ensure that the hot spot is dissipated. Any fire would be immediately detected which in turn would trigger the automatic fire suppression system resulting in the fire being extinguished. As such they state that any burning RDF would never need to be removed from the bunker and extinguished in a quarantine area.

In the event of a fire, the whole plant would be shut down and the fire suppression system operated. During such an emergency, no further deliveries will be accepted on site until the incident was fully under control, extinguished and all affected fuel material removed.

The Applicant adds that in the unlikely event of a hot spot being identified within the Temporary Fuel Storage Areas (due to the 1 day maximum storage time) and waste needs to be spread out and cooled, the floor area within the Tipping Hall where HGV's unload the waste could be used.

Although the above proposals do not comply with our guidance, having considered the operation of the fuel bunker, the site plan, the relative sizes of the temporary fuel storage areas and the floor area within the fuel reception area, together with the very short storage durations involved, we are satisfied that the Applicant's proposals are acceptable.

- Water supplies

  The Applicant states that on-site firefighting water supplies in accordance with our guidance are not appropriate for the Fuel Storage Bunker. They state that in the unlikely event of a fire within the bunker, all incidents will be dealt with within the bunker by the sprinkler and cannon suppression systems. We are satisfied with the proposed arrangements for dealing with a fire within the waste bunker.

  Excluding the Fuel Storage Bunker, the largest pile size on site is 450m^3. Therefore in accordance with our guidance and a worst case scenario event of the largest waste pile catching fire, the site requires 3,000 litres a minute for a minimum of 3 hours, or 540,000 litres of fire water to meet the guidance. The Applicant confirms that this volume will be provided by the firewater stored in two 710,000 litre tanks located in the external plant compound. These storage tanks also accommodate the additional storage for process water for the main plant, but the process water draw-off outlets from the tanks are located above the level of firewater fighting water and cannot affect the volume of firefighting water available. Each tank will contain 175,000 litres of process water and 535,000 litres of firewater, which demonstrates that there is sufficient water supply to extinguish a fire within the 3 hour timescale.

In conclusion we are satisfied overall that the Applicant's FPP meets the objectives of our guidance.

Some details remain outstanding however, as the installation is still subject to final detailed design. The Applicant has requested that the final design of the containment and bunding arrangements on-site be addressed via a pre-operational condition on the permit. They state that their response to such a pre-operational condition will include calculations and details to substantiate the final bund height as well as the final site drainage plan for the facility. We have agreed to this request because we are satisfied with the design principles proposed in the FPP for the containment of firewater, as follows:

- In the event of a fire within the Fuel Store Bunker, all incidents will be dealt with within the bunker by the automatic suppression equipment.
- All water will be contained within the Fuel Store Bunker and Tipping Hall and will be tankered off-site for disposal.
- In the event of a fire within the temporary storage areas, all fire water will be retained within the Tipping Hall. The entire area will bunded around the perimeter internal to the building to the necessary height required to contain the required firefighting water volume plus an additional 10%.
- Wherever RDF is proposed to be stored in either the bunker or temporary storage areas, then only half of the volume of the storage area will be considered to be available for fire water retention. This allows for a conservative margin in addition to the fuel density of 225kg/m3 for compression of fuel at the base of any pile.
- The final level of this bund height is still to be finalised as part of detailed design however as a whole is currently envisioned to be approximately 600mm.
- Thresholds of personnel doors into this area will be set at a height aligned with the top of the bund level and stairs will be provided internally and externally for access and egress.
- Fire water retention barriers of at least the same height of the bund will be utilised internally across all large roller shutter vehicle doors.

Pre-operational condition PO8 in the permit addresses the above requirement.

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	Justification
Application EPR/GP3031JB/A001	Parts B2 and B3 of the Application Form and relevant supporting information	Together these sections describe key operating techniques and how the Installation will be operated to ensure that best available techniques are applied.
Additional information received EPR/GP3031JB/A001	Site layout plans showing new waste reception and storage facilities	
Response to Schedule 5 Notice dated 10/09/19	Response to Q1 (Boiler Blowdown), Q2 (Diesel generator), Q6 (Annual operating hours), Q8 (Fire	

Description	Parts Included	Justification
	Prevention Plan and Q9 (BAT assessment) Updated Application Support Document (Issue 4, dated October 2019) Updated Working Plan (Rev. 0, dated October 2019) Fire Prevention Plan (issue 4, dated October 2019)	
Additional information received EPR/GP3031JB/A001	Updated Emission points plan	

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

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 Table S2.2. The only waste type in the Application was EWC 19 12 10, namely, combustible waste (refuse derived fuel), and this has been included in Table S2.2. The Application also states that notwithstanding the above permitted EWC type, RDF shall not be accepted at the site which has any of the following characteristics:

• hazardous wastes;
• consisting solely or mainly of dusts, powders, loose fibres or liquids;
• defined as Infectious;
• drummed waste; or
• malodourous wastes.

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

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

We have limited the capacity of the Installation to 169,000 tonnes per annum. This is based on the installation operating 7,884 hours per year at a nominal capacity of 21.4 tonnes per hour.

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

4.3.7 Energy efficiency

(i) Consideration of energy efficiency

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

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

2. The extent to which the Installation meets the requirements of Article 50(5) of the IED, which requires *"the heat generated* during the incineration and co-incineration process is *recovered as far as practicable through the generation of heat, steam or power*". This issue is covered in this section.

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

4. The extent to which the Installation meets the requirement of Article 14(5) of the Energy Efficiency Directive which requires new thermal electricity generation installations with a total thermal input exceeding 20 MW to carry out a cost-benefit assessment to "*assess the cost and benefits of providing for the operation of the installation as a high-efficiency cogeneration installation*".

Cogeneration means the simultaneous generation in one process of thermal energy and electrical or mechanical energy and is also known as combined heat and power (CHP).

High-efficiency co-generation is cogeneration which achieves at least 10% savings in primary energy usage compared to the separate generation of heat and power – see Annex II of the Energy Efficiency Directive for detail on how to calculate this.

(ii) Use of energy within the Installation

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

The Application details a number of measures that will be implemented at the Installation in order to increase its energy efficiency. The plant and ancillaries have been designed to operate with a high level of energy efficiency. The key measures that have been included within the design of the plant are stated as follows:

- all plant and equipment will be individually monitored and controlled using a SCADA monitoring system and PLC controls, optimised for efficiency of operation;
- all heat generated by the gasification plant will be recovered and used for the generation of electricity;
- all aspects of the gasification plant are controlled in real time to ensure maximum thermal efficiency and operational control;
- all plant energy data will be monitored and recorded and targeted to ensure optimal plant performance; and

Further basic design measures have also been outlined, as follows:

- wherever possible the plant utilises the waste heat to generate steam, which is used to generate electricity;
- all parasitic loads of the plant will be provided by the generated electricity, and hence lower the net energy imports required to power and operate the plant;
- all pipelines and thermal processes are lagged and insulated to ensure that heat loss is minimised and prevented;
- the steam turbine specified for the plant has a high electrical and thermal efficiency;
- all ancillary plant (fans and motors) have been specified with high efficiency electrical motors and variable speed drives;
- waste heat will be used for internal uses where possible i.e. preheating combustion air, etc;
- the plant will be maintained at steady capacity to avoid downtime; and
- the plant has been designed to ensure that all residues are reused or recycled.

The Applicant proposes to establish Key Performance Indicators (KPIs) when site electricity generation figures are available. The composition of the waste materials in the process will not vary greatly over the life of the plant. Should any site equipment or technology be replaced, efforts will be made to replace the unit with one which is more energy efficient, if available. The KPIs will be based on monitoring data on how much energy is used to run the site and whether this can be reduced. Within six months of operating the Applicant proposes to produce a report detailing the energy uses at the site and where energy use improvements, if any, can be made. As part of the company's EMS, targets will be set regarding the increased thermal efficiency of the plant and the potential export of heat to neighbouring facilities.

The Application states that the specific energy consumption, a measure of total energy consumed per unit of waste processed, will be 143.3 kWh/tonne. The installation capacity is 169,000 tonnes/annum.

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

The LCV in this case is expected to be 12.09 MJ/kg. The specific energy consumption in the Application is in line with that set out above.

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

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

Our 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, the Environment Agency considers that BAT is to build the plant to be CHP Ready (CHP-R) to a degree which is dictated by the likely future opportunities which are technically viable and which may, in time, also become economically viable.

The BREF says that 0.4 – 0.8 MWh of electricity can be generated per tonne of waste. Our technical guidance note, SGN EPR S5.01, states that where electricity only is generated, 5-9 MW of electricity should be recoverable per

100,000 tonnes/annum of waste (which equates to 0.4 – 0.72 MWh/tonne of waste.

The Installation will generate electricity only and has been specified to maximise electrical output with little or no use of waste heat. The heat and mass balance diagram in the Application (*entitled Process Flow for BPL Drakelow 18.0MWe (Gross) RDF-to-Energy Power Plant, Rev 1.0P*) shows 18 MW of electricity produced for an annual burn of approximately 157,215 tonnes of waste (at the design point of the plant), which represents 11.4 MW per 100,000 tonnes/yr of waste burned (0.9 MWh/tonne of waste). Based on the above figures the Installation will exceed the upper limit of the indicative BAT range stated in the BREF.

The Applicant provided a calculation of the gross electrical efficiency and compared it to the BAT Associated Energy Efficiency Level (AEEL) specified in BAT conclusions BAT 20. The gross electrical efficiency was calculated as 25%. The BAT AEEL for gross electrical efficiency is 25-35%. The value calculated by the Applicant is at the lower end of the BAT AEEL range. The Applicant has stated that their boiler design has looked to maintain the highest level of efficiency for this type of waste processing by using 45 bar pressure, 400°C steam for the operation of the turbine. They say that the 25% efficiency quoted by the plant designers is a minimum guaranteed performance, based on the design envelope of the incoming waste, boiler design and turbine efficiency. The efficiency has been based on the minimum acceptable BAT guidelines, warranted operational hours, worst case feedstock specification and 'generation only' mode. They confirm that the performance of the plant will be assessed and confirmed during the commissioning programme and reliability testing.

In accordance with BAT 2 table S3.3 of the Permit requires the gross electrical efficiency to be measured by carrying out a performance test at full load.

The SGN 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 Application states that at present there are no immediate high value heat neighbours which provide an economically viable heat export opportunity, and that this situation will be reviewed on a periodic basis and the feasibility re-appraised. The plant has been configured to maximise power generation only and has not been configured for CHP mode operation at this time. The turbine has the capacity to be modified to operate in a CHP mode and steam could be diverted to heat exchangers if required (i.e. the plant will be CHP-ready), however the likely operating mode will be power generation only.

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. In our role as a statutory consultee on the planning application, we ensured that the issue of energy utilisation was brought to the planning authority's attention.

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

(iv) R1 Calculation

The R1 calculation does not form part of the matters relevant to our determination. It is however a general indicator that the installation is achieving a high level of energy recovery.

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

Note that the availability or non-availability of financial incentives for renewable energy such as the ROC and RHI schemes is not a consideration in determining this application.

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

The applicant has considered the potential for operating the installation as a high-efficiency cogeneration installation and has concluded that this will not be possible because at present there are no immediate high value heat neighbours which provide an economically viable heat export opportunity.

(vi) 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 4. The following parameters are required to be reported: total electrical energy generated; electrical energy exported; total energy usage and energy exported as heat (if any). Together with the total MSW burned per year, this will enable the Environment Agency 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 the Environment Agency accepts 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 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 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 and SCR systems 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 4.2.2. 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 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 bottom ash, and air pollution control residues.

The first objective is to avoid producing waste at all. Waste production will be avoided by achieving a high degree of burnout of the ash in the furnace, which results in a material that is both reduced in volume and in chemical reactivity. Condition 3.1.4 and associated Table S3.4 specify limits for total organic carbon (TOC) of <3% in bottom ash. Compliance with this limit will demonstrate that good combustion control and waste burnout is being achieved in the furnaces and waste generation is being avoided where practicable.

Incinerator bottom ash (IBA) will normally be classified as non-hazardous waste. However, IBA is classified on the European List of Wastes as a "mirror entry", which means IBA is a hazardous waste if it possesses a hazardous property relating to the content of dangerous substances. Monitoring of incinerator ash 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.

Air pollution control (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 ash sampling protocols. Table S3.4 requires the Operator to carry out an ongoing programme of monitoring.

Having considered the information submitted in the Application, we are satisfied that the waste hierarchy referred to in Article 4 of the WFD will be applied to the generation of waste and that any waste generated will be treated in accordance with this 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 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). ES are described in our web guide ‘Air emissions risk assessment for your environmental permit’.

Our web guide sets out the relevant ES as:

- Ambient Air Directive Limit Values
- Ambient Air Directive and 4th Daughter Directive Target Values
- UK Air Quality Strategy Objectives
- Environmental Assessment Levels.

Where an Ambient Air Directive (AAD) Limit Value exists, the relevant standard is the AAD Limit Value. Where an AAD Limit Value does not exist, AAD 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 AAD limit values, AAD target and AQS objectives. In a very small number of cases, e.g. for emissions of lead, the AQS objective is more stringent that the AAD value. In such cases, we use the AQS objective for our assessment.

AAD target values, AQS objectives and EALs do not have the same legal status as AAD 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.

For assessment of impacts on ecological receptors, the relevant standards are referred to as Critical levels and Critical loads. Critical levels are defined as gaseous concentrations of pollutants in the atmosphere above which direct adverse effects on receptors, such as human beings, plants, ecosystems or materials, may occur according to present knowledge. The Critical load relates to the quantity of a pollutant deposited from air to the ground. It is defined as a quantitative estimate of exposure to one or more pollutants below which significant harmful effects on sensitive elements of the environment do not occur according to present knowledge.

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

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

The **long term** 1% process contribution 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 health and the environment.

The **short term** 10% process contribution 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 health and the environment.

Where an emission is screened out in this way, we would normally consider that 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 of 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 report entitled, "Environmental Permit Application: Air Quality Assessment of the Drakelow Renewable Energy Centre", Report reference C78-P09-R04, dated March 2019. The assessment comprises:

- Dispersion modelling of emissions to air from the operation of the incinerator.
- A study of the impact of emissions on nearby sensitive habitat / conservation sites.

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

The Applicant has assessed the Installation's potential emissions to air against the relevant air quality standards, and the potential impact upon local conservation and habitat sites and human health. These assessments predict the potential effects on local air quality from the Installation's stack emissions using the ADMS 5.2 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 East Midlands Airport, located 20km east north-east of the installation. The impact of the terrain surrounding the site upon plume dispersion was considered in the dispersion modelling.

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

- First, they assumed that the ELVs in the Permit would be the maximum permitted by Article 15(3), Article 46(2) and Annex VI of the IED. These substances are:

    - Oxides of nitrogen (NO_x), expressed as NO_2
    - Total dust
    - Carbon monoxide (CO)
    - Sulphur dioxide (SO_2)
    - Hydrogen chloride (HCl)
    - Hydrogen fluoride (HF)
    - Metals (Cadmium, Thallium, Mercury, Antimony, Arsenic, Lead, Chromium, Cobalt, Copper, Manganese, Nickel and Vanadium)
    - Polychlorinated dibenzo-para-dioxins and polychlorinated dibenzo furans (referred to as dioxins and furans)
    - Gaseous and vaporous organic substances, expressed as Total Organic Carbon (TOC)
    - Ammonia (NH_3)

- Second, they assumed that the Installation operates continuously at the relevant long-term or short-term ELVs, i.e. the maximum permitted emission rate

- Third, the model also considered emissions of pollutants not covered by Annex VI of IED, specifically, polycyclic aromatic hydrocarbons (PAH) and Polychlorinated biphenyls (PCBs).

We are in agreement with this approach. The assumptions underpinning the model have been checked and are reasonably precautionary.

The Applicant has used background pollutant concentrations from a variety of data sources: local authority monitoring, Defra modelled background maps; rural heavy metals and polycyclic aromatics networks, acid gas and aerosol network and toxic organic micro pollutants network. The selected background data indicates that there is likely to be headroom for most pollutants. We have selected appropriate background concentrations for our check modelling and sensitivity analysis, based on the data available.

As well as calculating the peak ground level concentration, the Applicant has modelled the concentration of key pollutants at a number of specified locations within the surrounding area.

The way in which the Applicant used dispersion models, its selection of input data, use of background data and the assumptions it made have been reviewed by the Environment Agency's 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 health impacts and impact on habitats and conservation sites.

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. We have conservatively assumed that the maximum concentrations occur at the location of receptors.

For NO_2 the Applicant's modelling also predicted annual pollutant concentrations at discrete receptors. The table below therefore shows the peak predicted ground level concentration for NO_2 across the modelled grid, and at the most impacted discrete receptor.

Whilst we have used the Applicant's modelling predictions in the tables below, we have made our own simple verification calculation of the percentage process contribution and predicted environmental concentration. 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.

Assessment results for non-metals

Pollutant	**Environmental Standard (ES)**		**Back-ground conc.**	**Process Contribution (PC)** Note (e)		**Predicted Environmental Concentration (PEC)** Note (f)	
	µg/m³ Notes 1-10		**µg/m³**	**µg/m³**	**% of EAL**	**µg/m³**	**% of EAL**
NO_2	40	1	13	1.9 Note (a)	4.75	14.9	37.3
				1.51 Note (b)	3.78	14.5	36.3
	200	2	-	11.1	**5.6**	-	-
PM_{10}	40	1	-	0.14	**0.35**	-	-
	50	3	-	0.43	**0.86**	-	-
$PM_{2.5}$	25	1	-	0.14	**0.56**	-	-
SO_2	266	4	-	8.8	**3.3**	-	-
	350	5	-	7.8	**2.23**	-	-
	125	6	-	4.8	**3.8**	-	-
HCl	750	7	-	3.5	**0.4666667**	-	-
HF	16	8	-	0.01	**0.06**	-	-

Pollutant	Environmental Standard (ES)		Back-ground conc.	Process Contribution (PC) Note (e)		Predicted Environmental Concentration (PEC) Note (f)	
	µg/m³ Notes 1-10		µg/m³	µg/m³	% of EAL	µg/m³	% of EAL
	160	7	-	0.35	**0.21875**	-	-
CO	10000	9	-	7.5	**0.08**	-	-
	30000	10	-	17.4	**0.06**	-	-
TOC Note (c)	5	1	0.29	0.14	2.80	0.430	8.60
PAH Note (d)	0.001	1	0.0004	0.000014	1.40	0.000414	41.4
NH_3	180	1	-	0.14	**0.08**	-	-
	2500	10	-	3.5	**0.14**	-	-
PCBs	0.2	1	-	0.000069	**0.03**	-	-
	6	10	-	0.0017	**0.03**	-	-
Dioxins			1.5E-09	1.40E-09		2.90E-09	

Notes

(a) Maximum result across the modelled grid

(b) Result for most impacted residential receptor (receptor ref. R30)

(c) TOC as benzene

(d) PAH as benzo[a]pyrene

(e) Insignificant PC's highlighted in bold font

(f) PEC only shown if PC does not screen out as insignificant

1 Annual Mean

2 99.79th %ile of 1-hour means

3 90.41st %ile of 24-hour means

4 99.9th ile of 15-min means

5 99.73rd %ile of 1-hour means

6 99.18th %ile of 24-hour means

7 1-hour average

8 Monthly average

9 Maximum daily running 8-hour mean

10 1-hour maximum

Assessment results for metals

Pollutant	Environmental Standard (ES)		Back-ground conc.	Process Contribution (PC) Note (a)		Predicted Environmental Concentration (PEC)	
	µg/m³ Notes 1-3		µg/m³	µg/m³	% of EAL	µg/m³	% of EAL
Cd	0.005	1	0.00013	0.00069	13.8	0.00082	16.4
Tl	1	1	-	0.00069	**0.1**	-	-
Hg	0.25	1	-	0.00069	**0.28**	-	-
	7.5	2	-	0.0174	**0.23**	-	-
Sb	5	1	-	0.0069	**0.14**	-	-
	150	2	-	0.173	**0.12**	-	-
Pb	0.25	1	0.0063	0.0069	2.76	0.01320	5.28
Co	0.2	1	0.052	0.0069	3.45	0.05890	29.5
Cu	10	1	-	0.0069	**0.07**	-	-
	200	2	-	0.173	**0.09**	-	-
Mn	0.15	1	0.0024	0.0069	4.60	0.0093	6.20
	1500	2	-	0.173	**0.01**	-	-
V	5	1	-	0.0069	**0.14**	-	-
	1	3	-	0.056	**5.60**	-	-
As	0.003	1	0.0007	0.0069	230.00	0.00760	253.3
Cr (II)(III)	5	1	-	0.0069	**0.14**	-	-
	150	2	-	0.173	**0.12**	-	-
Cr (VI)	0.0002	1	0.00010	0.0014	700.00	0.00150	750.0
Ni	0.02	1	0.0008	0.0069	34.50	0.00770	38.5

Notes

(a) Insignificant PC's highlighted in bold font
(b) PEC only shown if PC does not screen out as insignificant

1 Annual mean
2 1-hr maximum
3 24-Hr maximum

(i) Screening out emissions which are insignificant

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

- PM_{10}, $PM_{2.5}$, SO_2, HCl, HF, CO, NH_3, PCB's, Tl, Hg, Sb, Cu, V and Cr(II)(III).

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

(ii) Emissions unlikely to give rise to significant pollution

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

- NO_2, TOC, PAH, Cd, Pb, Co, Mn and Ni.

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

(iii) Emissions requiring further assessment

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

- As and Cr(VI)

These substances were subject to further assessment in accordance with the Environment Agency guidance entitled "Guidance to Applicants on Impact Assessment for Group 3 Metals Stack Releases – V.4 June 2016". This is reported in section 5.2.3 below.

In any case, with respect to these pollutants, we have carefully scrutinised the Applicant's proposals to ensure that they are applying the Best Available Techniques to prevent and minimise emissions of these substances. This is reported in section 6 of this document.

5.2.2 Consideration of key pollutants

(i) Nitrogen dioxide (NO_2)

The impact on air quality from NO_2 emissions has been assessed against the ES of 40 $\mu g/m^3$ as a long term annual average and a short term hourly average of 200 $\mu g/m^3$. 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 peak long term PC is greater than 1% of the ES and therefore cannot be screened out as insignificant. Even so, from the

table above, the emission is not expected to result in the ES being exceeded. The peak short term PC is less than 10% of the ES and so can be screened out as insignificant.

(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 25 $\mu g/m^3$ as a long-term annual average to be achieved by 2010 as a Target Value and by 2015 as a Limit Value has been used.

The Applicant's predicted impact of the Installation against these ESs 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 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 assessment shows that the predicted process contribution for emissions of PM_{10} is below 1% of the long term ES and below 10% of the short term ES and so can be screened out as insignificant. Therefore we consider the Applicant's proposals for preventing and minimising the emissions of particulates to be BAT for the Installation.

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

There is currently no emission limit prescribed nor any continuous emissions monitor for particulate matter specifically in the PM_{10} or $PM_{2.5}$ fraction. Whilst the Environment Agency is 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 the Environment Agency is 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, SO_2, HCl and 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. There is no long term ES for HCl. HF has 2 assessment criteria – a 1-hr ES and a monthly EAL – the process contribution is <1% of the monthly EAL 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.

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

(iv) Emissions to Air of CO, VOCs, PAHs, PCBs, Dioxins and NH_3

The above tables show that for CO emissions, the peak long term PC is less than 1% of the ES and the peak 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 above tables show that for TOC emissions, the peak long term PC is greater than 1% of the ES and therefore cannot be screened out as insignificant. Even so, from the table above, the emission is not expected to result in the ES being exceeded. The Applicant has used the ES for benzene for their assessment of the impact of TOC.

The above tables show that for PCB emissions, the peak long term PC is less than 1% of the ES and the peak 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 emissions, the peak long term PC is greater than 1% of the ES and therefore cannot be screened out as insignificant. Even so, from the table above, the emission is not expected to result in the ES being exceeded. The Applicant has also used the ES for benzo[a]pyrene (BaP) for their assessment of the impact of PAH. We agree that the use of the BaP ES is sufficiently precautionary.

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

The above tables show that for NH_3 (ammonia) emissions, the peak long term PC is less than 1% of the ES and the peak 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 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 EAL. The Applicant is required to prevent, minimise and control NO_2, TOC and PAH emissions using BAT, this is considered further in Section 6. We are satisfied that NO_2, TOC and PAH emissions will not result in significant pollution.

(v) Summary

For the above emissions to air, for those emissions that do not screen out, 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:

- Tl, Hg, Sb, Cu, V and 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:

- Cd, Pb, Co, Mn and Ni.

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

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

For metals As and Cr(VI) the Applicant Used representative emissions data from other municipal waste incinerators using our guidance note Please refer to "Guidance to Applicants on Impact Assessment for Group 3 Metals Stack Releases – version 4". Measurement of Chromium (VI) at the levels anticipated at the stack emission points is expected to be difficult, with the likely levels being below the level of detection by the most advanced methods. Data for Cr (VI) was based on total Cr emissions measurements and the proportion of total Cr to Cr (VI) in APC residues.

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:

- As

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

5.2.4 Consideration of Local Factors

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

No Air Quality Management Areas (AQMAs) have been declared within an area likely to be affected by emissions from the incinerator.

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. These regulations include the requirements of relevant EU Directives, notably, the industrial emissions directive (IED), the waste framework directive (WFD), and ambient air directive (AAD).

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. 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 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, global warming potential and 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

We take account of the views of national and international expert bodies. The gathering of evidence is a continuing process. Although gathering evidence is not our role we keep the available evidence under review. The following is a summary of some of the publications which we have considered (in no particular order).

An independent review of evidence on the health effects of municipal waste incinerators was published by **DEFRA** in 2004. It concluded that there was no convincing link between the emissions from MSW incinerators and adverse effects on public health in terms of cancer, respiratory disease or birth defects. On air quality effects, the report concluded “Waste incinerators contribute to local air pollution. This contribution, however, is usually a small proportion of existing background levels which is not detectable through environmental monitoring (for example, by comparing upwind and downwind

levels of airborne pollutants or substances deposited to land). In some cases, waste incinerator facilities may make a more detectable contribution to air pollution. Because current MSW incinerators are located predominantly in urban areas, effects on air quality are likely to be so small as to be undetectable in practice."

HPA (now PHE) in 2009 stated that "The Health Protection Agency has reviewed research undertaken to examine the suggested links between emissions from municipal waste incinerators and effects on health. While it is not possible to rule out adverse health effects from modern, well regulated municipal waste incinerators with complete certainty, any potential damage to the health of those living close-by is likely to be very small, if detectable".

In 2012 the UK Small Area Health Statistics Unit (SAHSU) at Imperial College was commissioned by Public Heath England (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 PM10 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.

PHE 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, PHE have further stated that 'PHE's position remains that modern, well run and regulated municipal waste incinerators are not a significant risk to public health, and as such our advice to you [i.e. the Environment Agency] on incinerators is unchanged.'

The **Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (CoC) issued** a statement in 2000 which said that "any potential risk of cancer due to residency (for periods in excess of 10 years) near to municipal solid waste incinerators was exceedingly low and probably not measurable by the most modern epidemiological techniques." In 2009, CoC considered six further relevant epidemiological papers that had been published since the 2000 statement, and concluded that "there is no need to change the advice given in the previous statement in 2000 but that the situation should be kept under review".

Republic of Ireland Health Research Board report stated that "It is hard to separate the influences of other sources of pollutants, and other causes of cancer and, as a result, the evidence for a link between cancer and proximity to an incinerator is not conclusive".

The **Food Safety Authority of Ireland (FSAI) (2003)** investigated possible implications on health associated with food contamination from waste incineration and concluded: "In relation to the possible impact of introduction of waste incineration in Ireland, as part of a national waste management strategy, on this currently largely satisfactory situation, the FSAI considers that such incineration facilities, if properly managed, will not contribute to dioxin levels in the food supply to any significant extent. The risks to health and sustainable development presented by the continued dependency on landfill as a method of waste disposal far outweigh any possible effects on food safety and quality."

Health Protection Scotland (2009) considered scientific studies on health effects associated with the incineration of waste particularly those published after the Defra review discussed earlier. The main conclusions of this report were: "(a) For waste incineration as a whole topic, the body of evidence for an association with (non-occupational) adverse health effects is both inconsistent and inconclusive. However, more recent work suggests, more strongly, that there may have been an association between emissions (particularly dioxins) in the past from industrial, clinical and municipal waste incinerators and some forms of cancer, before more stringent regulatory requirements were implemented. (b) For individual waste streams, the evidence for an association with (non-occupational) adverse health effects is inconclusive. (c) The magnitude of any past health effects on residential populations living near incinerators that did occur is likely to have been small. (d) Levels of airborne emissions from individual incinerators should be lower now than in the past, due to stricter legislative controls and improved technology. Hence, any risk to the health of a local population living near an incinerator, associated with its emissions, should also now be lower."

The **US National Research Council Committee on Health Effects of Waste Incineration (NRC) (NRC 2000)** reviewed evidence as part of a wide ranging report. The Committee view of the published evidence was summarised in a key conclusion: "Few epidemiological studies have attempted to assess whether adverse health effects have actually occurred

near individual incinerators, and most of them have been unable to detect any effects. The studies of which the committee is aware that did report finding health effects had shortcomings and failed to provide convincing evidence. That result is not surprising given the small populations typically available for study and the fact that such effects, if any, might occur only infrequently or take many years to appear. Also, factors such as emissions from other pollution sources and variations in human activity patterns often decrease the likelihood of determining a relationship between small contributions of pollutants from incinerators and observed health effects. Lack of evidence of such relationships might mean that adverse health effects did not occur, but it could mean that such relationships might not be detectable using available methods and sources."

The **British Society for Ecological Medicine (BSEM) published a report in 2005** on the health effects associated with incineration and concluded that "Large studies have shown higher rates of adult and childhood cancer and also birth defects around municipal waste incinerators: the results are consistent with the associations being causal. A number of smaller epidemiological studies support this interpretation and suggest that the range of illnesses produced by incinerators may be much wider. Incinerator emissions are a major source of fine particulates, of toxic metals and of more than 200 organic chemicals, including known carcinogens, mutagens, and hormone disrupters. Emissions also contain other unidentified compounds whose potential for harm is as yet unknown, as was once the case with dioxins. Abatement equipment in modern incinerators merely transfers the toxic load, notably that of dioxins and heavy metals, from airborne emissions to the fly ash. This fly ash is light, readily windborne and mostly of low particle size. It represents a considerable and poorly understood health hazard."

The BSEM report was reviewed by the HPA and they concluded that "Having considered the BSEM report the HPA maintains its position that contemporary and effectively managed and regulated waste incineration processes contribute little to the concentrations of monitored pollutants in ambient air and that the emissions from such plants have little effect on health." The BSEM report was also commented on by the consultants who produced the Defra 2004 report referred to above. They said that "It fails to consider the significance of incineration as a source of the substances of concern. It does not consider the possible significance of the dose of pollutants that could result from incinerators. It does not fairly consider the adverse effects that could be associated with alternatives to incineration. It relies on inaccurate and outdated material. In view of these shortcomings, the report's conclusions with regard to the health effects of incineration are not reliable."

A **Greenpeace** review on incineration and human health concluded that a broad range of health effects have been associated with living near to incinerators as well as with working at these installations. Such effects include cancer (among both children and adults), adverse impacts on the respiratory system, heart disease, immune system effects, increased allergies and congenital abnormalities. Some studies, particularly those on cancer, relate to

old rather than modern incinerators. However, modern incinerators operating in the last few years have also been associated with adverse health effects."

The Health Protection Scotland report referred to above says that "the authors of the Greenpeace review do not explain the basis for their conclusion that there is an association between incineration and adverse effects in terms of criteria used to assess the strength of evidence. The weighting factors used to derive the assessment are not detailed. The objectivity of the conclusion cannot therefore be easily tested."

From this published body of scientific opinion, we take the view stated by the HPA that "While it is not possible to rule out adverse health effects from modern, well regulated municipal waste incinerators with complete certainty, any potential damage to the health of those living close-by is likely to be very small, if detectable". We therefore 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 in order 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 mathematic 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 in order to allow for different body size, such as for children of different ages. In the UK, the COT has set a TDI for dioxins, furans and dioxin like PCB's of 2 picograms I-TEQ/Kg-body weight/day (N.B. 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 PCB's, 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.

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". COMEAP has issued a statement expressing some reservations about the applicability of applying its methodology to small affected areas. Those concerns generally relate to the fact that the exposure-response coefficients used in the COMEAP report derive from studies of whole urban populations where the air pollution climate may differ from that around a new industrial installation. COMEAP identified a number of factors and assumptions that would contribute to the uncertainty of the estimates. These were summarised in the Defra review as below:

- Assumption that the spatial distribution of the air pollutants considered is the same in the area under study as in those areas, usually cities or large towns, in which the studies which generated the coefficients were undertaken.
- Assumption that the temporal pattern of pollutant concentrations in the area under study is similar to that in the areas in which the studies which generated the coefficients were undertaken (i.e. urban areas).
- It should be recognised that a difference in the pattern of socio-economic conditions between the areas to be studied and the reference areas could lead to inaccuracy in the predicted level of effects.
- In the same way, a difference in the pattern of personal exposures between the areas to be studied and the reference areas will affect the accuracy of the predictions of effects.

The use of the COMEAP methodology is not generally recommended for modelling the human health impacts of individual installations. However it may have limited applicability where emissions of NO_x, SO_2 and particulates cannot be screened out as insignificant in the Environmental Impact assessment, there are high ambient background levels of these pollutants and we are advised that its use was appropriate by our public health consultees.

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 model 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 a period of time.

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 I-TEQ / Kg bodyweight/ day.

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

Receptor type	Receptor Name	Adult	% of TDI	Child	% of TDI
Farmer	Farmer North	0.063	3.15	0.093	4.65
Resident	Resident Drakelow West	0.0031	1.55	0.010	0.5

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

Based on a paper by the European Food Safety Authority (EFSA) the COT have recently revised their advice on dioxin/dioxin like PCBs. This has resulted in a change from a tolerable daily intake (TDI) of 2pg I-TEQ/Kg-body weight to a tolerable **weekly** intake (TWI) of 2pg I-TEQ/Kg-body weight. We have checked the Applicant's assessment taking the revised tolerable intake into account and we are satisfied that the conclusions of the assessment are not affected and that impacts will not be significant.

The FSA has reported that dietary studies have shown that estimated total dietary intakes of dioxins and dioxin-like PCBs from all sources by all age groups fell by around 50% between 1997 and 2001, and are expected to continue to fall. A report in 2012 showed that Dioxin and PCB levels in food have fallen slightly since 2001. In 2001, the average daily intake by adults in the UK from diet was 0.9 pg WHO-TEQ/kg bodyweight. The additional daily

intake predicted by the modelling as shown in the table above is substantially below this figure.

In 2010, FSA studied the levels of chlorinated, brominated and mixed (chlorinated-brominated) dioxins and dioxin-like PCBs in fish, shellfish, meat and eggs consumed in 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 HPA 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 HPA (now PHE) 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. PHE note that the coefficients that allow the use of number concentrations in impact calculations have not yet been defined because the national experts have not judged that the evidence is sufficient to do so. This is an area being kept under review by COMEAP.

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

PHE 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. PHE 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

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). We have applied the relevant requirements of the national and European legislation in imposing the permit

conditions. We are satisfied that compliance with these conditions will ensure protection of the environment and human health.

Taking into account all of the expert opinion available, we agree with the conclusion reached by PHE that "While it is not possible to rule out adverse health effects from modern, well regulated municipal waste incinerators with complete certainty, any potential damage to the health of those living close-by is likely to be very small, if detectable."

In carrying out air dispersion modelling as part of the Environmental Impact assessment and comparing the predicted environmental concentrations with European and national air quality standards, the Applicant has effectively made a health risk assessment for many pollutants. These air quality standards have been developed primarily in order to protect human health.

The Applicant's assessment of the impact from PM_{10}, $PM_{2.5}$, SO_2, HCl, HF, CO, NH_3, PCB's, Tl, Hg, Sb, Cu, V, Cr(II)(III) and Cr(VI) have all indicated that the Installation emissions screen out as insignificant; where the impact of emissions of NO_2, TOC, PAH, Cd, Pb, Co, Mn, Ni and As have not been screened out as insignificant, the assessment, or our audit of the assessment, still shows that the predicted environmental concentrations are well within air quality standards or environmental action levels.

The Environment Agency has reviewed the methodology employed by the Applicant to carry out the health impact assessment. For both normal and abnormal operation, our predictions from screening check calculations confirm that the Installation will not cause significant impacts or exceedances of the environmental standards for air at human receptors. With regard to dioxins, furans and dioxin-like PCB intakes, our checks indicate process contributions that are less than those predicted by the Applicant for the most impacted receptors, which are not likely to be significant and do not require further investigation.

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 carcinogenic or non-carcinogenic risk to human health.

Public Health England and the Local Authority Director of Public Health were consulted on the Application and 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 it concluded that it is unlikely that there will be any unacceptable effects on the human food chain as a result of the operations at the Installation. Details of the responses provided to the consultation on this Application can be found in Annex 4.

The Environment Agency is therefore satisfied that the Applicant's conclusions presented above are soundly based and we conclude that the potential emissions of pollutants including dioxins, furans and metals from the proposed facility are unlikely to have an impact upon human health.

5.4 Impact on Habitats sites, SSSIs, and non-statutory conservation sites

5.4.1 Sites Considered

The following Habitats (i.e. Special Areas of Conservation, Special Protection Areas and Ramsar) sites are located within 10Km of the Installation:

- River Mease Special Area of Conservation (SAC)

There are no Sites of Special Scientific Interest within 2Km of the proposed Installation.

The following non-statutory local wildlife and conservation sites are located within 2Km of the Installation:

- Drakelow Nature Reserve Local Wildlife Site (LWS)
- A38 Dual Carriageway LWS
- Branston Gravel Pits LWS
- Riverside Hotel Grounds, Branston LWS
- The Rookery LWS
- Trent Valley Washlands LWS
- Beans Covert LWS
- Branston Water Park Local Nature Reserve (LNR)
- Grove Wood Ancient Woodland (AW)

5.4.2 Habitats Assessment

The Applicant's Habitats assessment was reviewed by the Environment Agency's technical specialists for air quality modelling, 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). The results from the Applicant's ecological assessment for the River Mease SAC are shown in the table below.

Pollutant	**Environmental Standard (ES)**	**Back-ground conc.**	**Process Contribution (PC)**	**PC as % of ES** Note (a)
Direct Impacts Note (b)				
NO_x Annual	30	16.8	0.072	**0.2**

Pollutant	Environmental Standard (ES)	Back-ground conc.	Process Contribution (PC)	PC as % of ES Note (a)
NO_x Daily Mean	75	19.8	1.2	**1.6**
SO_2 Annual	20	0.44	0.018	**0.1**
Ammonia Annual	3	2.38	0.004	**0.1**
HF Weekly Mean	0.5	0.3	0.002	**0.4**
HF Daily Mean	5	0.5	0.006	**0.1**
Deposition Impacts Note (b)				
N Deposition (kg N/ha/yr)	No Critical load available	10.71	0.029	**0.3** Note (c)
Acidification, N deposition (Keq/ha/yr)	No Critical load available	0.76	0.0025	1.3 Note (c)
Acidification, S deposition (Keq/ha/yr)	No Critical load available	0.24	0.0025	

Notes

(a) Insignificant PC's highlighted in bold font

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

(c) No Critical Loads available for River Mease SAC. The PC's shown are % of background

From the table above the direct impacts due to emissions of NO_x, SO_2, ammonia and HF can be screened out as insignificant and their impact considered not discernable, in that the PC is less than 1% of the long term Critical level and less than 10% of the short term Critical level.

With regard to deposition impacts the Applicant has noted that there are no Critical loads available within APIS (Air Pollution Information System) for the River Mease SAC and as such they have compared the calculated PC against the respective background concentration. In doing so they have concluded that because the PC for nutrient nitrogen deposition is 0.3% of the background, and for acidification the PC is 1.3% of the background, then deposition impacts from the installation would not have a significant impact on the European site.

We have confirmed that there are no Critical loads available for the River Mease SAC, nor are there any comparable habitats with established critical load estimates; and that no Critical loads have been assigned to the EUNIS (European nature information system) classes for meso/eutrophic systems. We recognise that the designated features of the SAC are sensitive to

nitrogen deposition and acidification and that the modelled PC's are very low with respect to established background concentrations. Nevertheless we have undertaken our own checks by screening against conservative nutrient nitrogen and acid Critical loads, and confirmed that PC's at the River Mease SAC are likely to be insignificant with respect to nutrient nitrogen and acid deposition. We are therefore satisfied that no further assessment is required.

5.4.3 Assessment of other conservation sites

Conservation sites are protected in law by legislation. The Habitats Directive provides the highest level of protection for SACs and SPAs, domestic legislation provides a lower but important level of protection for SSSIs. Finally the Environment Act provides more generalised protection for flora and fauna rather than for specifically named conservation designations. It is under the Environment Act that we assess other sites (such as local wildlife sites) 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 process contribution (PC) and the background levels in making an assessment of impact. In assessing these other sites under the Environment Act we look at the impact from the Installation alone in order 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 other nature conservation 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.

The Applicant has presented impact data for the nine non-statutory conservation sites identified within 2km of the installation. Consideration of the results show that for virtually all pollutants the greatest impacts would be at the Local Wildlife Site known as 'The Rookery', (receptor ref. H8). The only exception is for the pollutants HF (weekly and daily means) and NO_x (daily mean) where the most impacted receptor will be Drakelow Nature Reserve LWS, (receptor ref. H3). The Applicant has stated that in APIS Critical loads are only published for European sites and SSSI's and as such their

assessment only considered direct impacts with respect to published Critical levels. The results from the Applicant's ecological assessment for the worst impacted receptor for each pollutant are shown in the table below.

Pollutant	**Environmental Standard (ES) - Critical level**	**Back-ground conc.**	**Process Contribution (PC)**	**PC as % of ES** Note (a)
Direct impacts Note (b)				
NO_x Annual	30	16.8	2.0	**6.7**
NO_x Daily Mean	75	19.8	22.1	**29.5**
SO_2 Annual	10	0.44	0.5	**5.0**
Ammonia Annual	1	2.38	0.102	**10.2**
HF Weekly Mean	0.5	0.3	0.061	**12.3**
HF Daily Mean	5	0.5	0.11	**2.2**

Notes

(a) Insignificant PC's highlighted in bold font

(b) Direct impact units are µg/m³

The table above shows that all PCs are less than the relevant Critical level.

The Applicant's contention that Critical loads are only available for European sites and SSSI's is incorrect however. We have therefore undertaken our own checks by screening against conservative nutrient nitrogen and acid Critical loads, and confirmed that the resulting PC's are well below the Critical load, i.e. <100% of the 'no significant pollution' criteria.

We are therefore satisfied that the Installation will not cause significant pollution at these non-statutory 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 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 emission limit value (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 at all times. 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 hour 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 Applicant has assumed a worse case of complete abatement failure occurring, with the following resultant emissions:

- NO_x emissions of 535 mg/m^3 (1.25 x normal)
- SO_2 emissions of 250 mg/m^3 (1.25 x normal)
- PM_{10} emissions of 150 mg/m^3 (5 x normal)
- HCl emissions of 75 mg/m^3 (1.25 x normal)
- HF emissions of 5 mg/m^3 (1.25 x normal)

Abnormal operating 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.

Pollutant	Environmental Standard (ES) – short term		Back-ground conc.	Process Contribution (PC) Note (a)		Predicted Environmental Concentration (PEC) Note (b)	
	µg/m³	averaging period	µg/m³	µg/m³	% of ES	µg/m³	% of ES
NO_2	200	99.79th %ile of 1-hour means	26	65.0	32.5	91.0	45.5
PM_{10}	50	90.41st %ile of 24-hour means	-	3.7	**7.5**	-	-
SO_2	266	99.9th ile of 15-min means	13.4	116.2	43.7	129.6	48.7
	350	99.73rd %ile of 1-hour means	10	86.7	24.8	96.7	27.6
	125	99.18th %ile of 24-hour means	-	9.3	**7.4**	-	-
HCl	750	1-hr average	-	26.0	**3.5**	-	-
HF	160	1-hr average	-	1.7	**1.1**	-	-

Notes

(a) Insignificant PC's highlighted in bold font

(b) PEC only shown if PC does not screen out as insignificant

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.

- PM_{10}, SO_2 (24-hr mean), HCl, and HF.

Also from the table above emissions of the following substances (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.

- NO_2, SO_2 (15-min mean, and 1-hr mean)

From these results the Applicant has concluded that having taken into account the worst-case assumptions and the low frequency of abnormal operating conditions, abnormal emissions will not have a significant impact on local air quality.

We have conducted our own checks on abnormal emissions against all the relevant short-term environmental standards, including conducting sensitivity analysis to the maximum permissible dust concentration during abatement failure for all particle and particle-bound pollutants. Our checks using plausible abnormal emissions concentrations confirm that the installation is unlikely to lead to any short term breaches of the environmental standards. 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, i.e. conservatively assumed to be 60 hours of unabated emission at 100 times the IED ELV of 0.1 ng/m^3, we remain satisfied that emissions of dioxins will still not pose a risk to human health.

5.6 Impact of emissions during OTNOC

IED article 14 (3) states that BAT conclusions shall be the reference for setting the permit conditions. Article 14 (3) states that the competent authority shall set emission limit values that, under normal operating conditions, do not exceed the emission levels associated with the best available techniques as laid down in the decisions on BAT conclusions. These limits are set in Table S3.1. In addition, the IED also sets maximum limits for certain emissions that should not be exceeded and would still apply outside normal operating conditions. These limits are set in Table S3.1(b) and are normally higher that the BAT AELs.

The IED and BAT conclusions therefore make provision for plants to have short term fluctuations where BAT AELs could be exceeded but the IED limits are not other than under abnormal operation. These periods are called 'Other than normal operation.' (OTNOC). Although the BAT AELs can be exceeded during OTNOC setting BAT AELs as emission limits is controlling emissions because plants will need to ensure that the plant is capable of meeting the BAT AELs during normal operation which will apply for most of the time the plant is operational.

Although BAT AELs do not apply during periods of OTNOC the IED annex VI emission limits do still apply.

Periods of OTNOC will be of short duration and limited in nature. The Applicant used the IED annex VI half hour average limits to assess short term impacts, therefore no further specific assessment of the impacts during OTNOC was required.

Pre-operational condition PO1 requires the Operator to have an EMS and that the EMS will include an OTNOC management plan in line with BAT conclusions 1 and 18. The Operator will be required to identify potential OTNOC scenarios and any required monitoring in their management plan and will require our approval of scenarios before they can be classed as OTNOC. We may impose further monitoring and limits, through tale S3.1(b) of the Permit, once we have approved the OTNOC scenarios.

5.7 Other Emissions

5.7.1 Noise

The application contained a noise impact assessment (NIA) which identified local noise-sensitive receptors (NSR), potential sources of noise at the proposed installation and noise attenuation measures.

While much of the plant will be located internally, the following externally located plant were identified as requiring consideration within the assessment:

- Air Cooled Condenser (ACC) fans (x4), for cooling steam from the turbine; and
- Water cooling fans (x4).

BS4142:2014 assessment

The Applicant also considered the potential for noise impact due to HGV movements around the site associated with the delivery of RDF.

The Applicant's assessment of the potential noise impact during operation of the installation was based on the modelling software package CadnaA, which is a commonly used computer model for regulatory noise modelling. The assessment considered operations during both the daytime and the night-time period.

The potential impact due to the operation of the installation has been determined in accordance with the methodology in British Standard BS4142:2014, 'Methods for rating and assessing industrial and commercial sound.' The significance of industrial/commercial sound depends on the difference between the rating level (which is the predicted sound output of the industrial/commercial premises, corrected to account for tonality, impulsivity, intermittency or other applicable sound characteristics) and the background sound level. Typically, the greater the difference, the greater the magnitude of the impact.

A difference of around +10dB or more is likely to be an indication of a significant adverse impact, while a difference of around +5dB is likely to be an indication of an adverse impact. The lower the rating is, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. If the rating level does not exceed the background sound level, this is an indication of a low impact. BS4142:2014 requires that the assessment of potential impact takes into account the 'context' in which the sound occurs. This entails having a sufficient understanding of the situation to be rated and assessed, and placing the sound being assessed in context when making conclusions.

Modelling predictions were made at 6 noise sensitive receptors. The closest existing receptor is located approximately 760m from the proposed installation, NSR ref. NAL06. The other receptors were located on land earmarked for the Drakelow Park residential development approximately 430m from the proposed installation, NSR refs. NAL01-05. We considered these locations to be representative of the nearest NSRs.

The Applicant undertook environmental sound surveys at four locations close to the NSRs for 5 days in September 2018 in order to establish background sound levels. A meteorological mast was also installed on the development site to measure rainfall, wind speed, wind direction and temperature. All measured sound level data during periods of wind speed above 5 m/s and during any precipitation event was removed to reduce the potential for increased sound levels attributable to adverse weather effects. In general we considered that the survey was appropriate and in accordance with the BS4142 methodology.

The way in which the Applicant has used the noise model, the selection of input data, use of background data and the assumptions made have been reviewed by the Environment Agency's modelling specialists to establish the robustness of the Applicant's noise impact assessment. Our view is that the methodology used by the Applicant is acceptable.

The results of the Applicant's daytime assessment are shown in the table below.

NSR ref.	**Receptor name**	**Measured background noise level (dB)**	**Modelled rating level (dB)**	**Rating minus background (dB)**
NAL01	Drakelow Park 01	37	32	-5
NAL02	Drakelow Park 02	37	34	-3
NAL03	Drakelow Park 03	37	33	-4
NAL04	Drakelow Park 04	37	33	-4
NAL05	Drakelow Park 05	38	31	-7
NAL06	Closest existing NSR	40	35	-5

The results show that during the daytime the background level would not be exceeded at any of the noise sensitive receptors, with the predicted sound level at receptors ranging from 3-7db less than the background level. These predictions would indicate a low impact in accordance with BS4142.

With regard to the Applicant's night-time assessment there appeared to be an error in the report with the figures shown in the 'Rating minus background' column in table 5-5. We have made the necessary amendments and show the correct values in the right hand column in the results table below. We are satisfied that this was a simple calculation / drafting error in the Applicant's

noise report as the values shown for the measured background levels and modelled rating levels at each receptor as shown below were correct.

NSR ref.	Receptor name	Measured background noise level (dB)	Modelled rating level (dB)	Rating minus background (dB)
NAL01	Drakelow Park 01	36	37	+1
NAL02	Drakelow Park 02	36	39	+3
NAL03	Drakelow Park 03	36	37	+1
NAL04	Drakelow Park 04	36	37	+1
NAL05	Drakelow Park 05	36	35	-1
NAL06	Closest existing NSR	36	36	0

The results show that during the night-time the background level would be exceeded at four of the noise sensitive receptors associated with the Drakelow Park residential development, i.e. NSR's NAL01-04 respectively. The greatest exceedence is at NAL02 where the background is exceeded by 3dB. This indicates the potential for an impact which is approaching 'adverse' in accordance with BS4142. The results for the other three receptors indicate a lesser potential impact, at 1dB above background. The results for the remaining receptors, NAL05&06 are indicative of a low impact.

The BS 4142 methodology sets out different penalties to be applied for tonality, impulsivity, intermittent, or other distinctive sound characteristics. The Applicant considered these in their assessment but did not deem any penalties necessary therefore the Rating levels in the tables above do not include any such corrections. However, we considered that a tonal penalty of +3db is likely to be required in because of the external location of the Air Cooled Condenser (ACC) fans and water cooling fans. While inclusion of the tonal penalty does not change the conclusions for the daytime assessment, i.e. the impact remains low at all receptors, for the night-time assessment all receptors may now be adversely impacted while for receptor NAL02, the result is indicative of a significant adverse impact, at +6dB.

In taking into account the 'context' of the assessment the Applicant stated that the proposed installation would operate continually with an unvarying sound level output. In addition, they contend that the noise propagation model does not account for the barrier attenuation that is likely to be gained from the construction of buildings in Drakelow Park which are likely to block the line of

sight between the houses and the Proposed Development. Therefore they concluded that having consider the overall context, noise was unlikely to have an adverse impact.

Having reviewed the Applicant's assessment and carried out our own checks and sensitivity analysis we consider that worst case Rating levels at noise sensitive receptors may be slightly higher than presented by the Applicant. However we are satisfied that in taking into account the context, i.e. that other consented or permitted sites will contribute to an overall increase in the background sound level; and that further development of the Drakelow Park area will attenuate some of the noise levels from the installation, the resultant noise impacts are unlikely to be adverse. Therefore while we do not agree with the absolute numerical predictions presented by the Applicant we are in agreement with their conclusions.

Application of BAT

The Waste Incineration BAT Conclusions require that in order to prevent or, where that is not practicable, to reduce noise emissions, BAT is to use one or a combination of the techniques below:

- Appropriate location of equipment and buildings
- Operational measures
- Low-noise equipment
- Noise Attenuation
- Noise-control equipment / infrastructure.

The Applicant has stated that all of the techniques will be used one way or another (subject to final design), the key measures being indicated below:

- all plant and/or processing activities located indoors where possible
- main processing building is acoustically treated and sealed to prevent noise breakout
- roller shutter doors on Tipping Hall will be closed except for allowing entry and exit of delivery vehicles
- no HGV movements for the delivery of RDF during the night
- all internal noise generating equipment will be fitted with acoustic enclosures
- external air cooled condenser fans will be acoustically treated (large, slow moving with appropriate lagging)
- tonal exhaust noise from the main stack minimised through fitting of silencer within the stack
- the use of an appropriate preventative maintenance program to ensure no deterioration of plant or equipment that would give rise to an increase in noise.

We consider that the above measures represent BAT and broadly follow the noise hierarchy outlined in our H3, Part 2 guidance on 'Noise Assessment and Control'.

Conclusion

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.

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 the Best Available Techniques 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. They are: NO_2, TOC, PAH, Cd, Pb, Co, Mn, Ni and As.

- 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 Global Warming Potential 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 emission limit values. 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 Conclusions shall be the reference for setting the permit conditions, so it may be possible and desirable to achieve emissions below the limits referenced in Chapter IV. The BAT conclusions were published on 03/12/19.

Even if the Chapter IV limits are appropriate, operational controls complement the emission limits 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 who sought to operate its installation continually at the maximum permitted level would almost inevitably breach those limits regularly, simply by virtue of normal fluctuations in plant performance, resulting in enforcement action

(including potentially prosecution) being taken. Assessments based on, say, Chapter IV limits are therefore "worst-case" scenarios.

Should the Installation, once in operation, emit at rates significantly below the limits included in the Permit, we will consider tightening ELVs appropriately. We are, however, satisfied that emissions at the permitted limits would ensure a high level of protection for human health and the environment in any event.

6.1.1 Consideration of Furnace Type

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

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

Section 4.3 of the BREF provides a comparison of combustion and thermal treatment technologies, used in Europe and factors affecting their applicability and operational suitability for various waste types. There is also some information on the comparative costs. The table below has been extracted from the BREF tables. This table is also in line with the Guidance Note "The Incineration of Waste (EPR 5.01)). However, it should not be taken as an exhaustive list nor that all technologies listed have found equal application across Europe.

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

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

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

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

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

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

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

The Applicant assessed the suitability of above furnace types by considering them against the following criteria: emissions, waste, residue generation, odour, raw materials, noise and accidents. They state that although all of the technologies reviewed are capable of treating RDF, the majority have been rejected on ground of environmental impact, operational cost or efficiency, whereby Advanced Thermal Treatment (ATT), which includes gasification and pyrolysis technology, has a number of potential advantages over traditional incineration processes, principally,

- it is viable at smaller unit sizes, enabling the development of facilities ancillary to existing waste management operations; and
- there is much less visual impact, as ATT processes tend to be smaller and therefore require shorter exhaust stacks (55m compared to 60-100m for conventional incinerators).

The Applicant has proposed to use a furnace technology comprising of an updraft gasification system, where the air intake is at the bottom and the gas leaves at the top, with the combustion reactions taking place near the grate at the bottom, followed by reduction reactions higher up in the gasifier. The Applicant made a comparison of several types of gasifier, including updraft, downdraft, crossdraft, fluidised bed and circulating fluidised bed gasifiers, assessing them on the criteria of efficiency, reliability, feedstock preparation, particle size, tar, oil and particulates, and flexibility. They concluded that the major advantages of the updraft gasifier are its simplicity, high charcoal burn-out and internal heat exchange leading to low gas exit temperatures and high equipment efficiency, also stating that they are generally accepted as being the most robust and least sensitive to variations in feedstock homogeneity. We are satisfied that the technology proposed in the application (updraft step grate gasification system) can be considered BAT for this type of waste feed.

The Applicant proposes to use Liquefied Petroleum Gas / Liquefied Natural Gas as support fuel for start-up, shut down and for the auxiliary burners. The choice of support fuel is based on minimising the impact from NO_x emissions to air and we are satisfied with the Applicant's decision.

Boiler Design

In accordance with BAT 30 of the BAT C and our Technical Guidance Note, 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 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 on bottom ash.

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 flue-gas treatment (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 Technical Guidance Note points to a range of technologies being BAT subject to circumstances of the Installation.

6.2.1 Particulate Matter

Particulate matter				
Technique	**Advantages**	**Disadvantages**	**Optimisation**	**Defined as BAT in BREF or TGN for:**
Bag / Fabric filters (BF)	Reliable abatement of particulate matter to below 5mg/m^3	Max temp 250°C Higher energy use than ESP Sensitive to condensation and corrosion	Multiple compartments Bag burst detectors	Most plants
Wet scrubbing	May reduce acid gases simultaneously.	Not normally BAT. Liquid effluent	Require reheat to prevent visible plume and dew point	Where scrubbing required for other

		produced	problems.	pollutants
Ceramic filters	High temperature applications Smaller plant.	May “blind” more than fabric filters		Small plant. High temperature gas cleaning required.
Electrostatic precipitators	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 ceramic filters for the abatement of particulate matter. The ceramic filters also incorporate SCR (Selective Catalytic Reduction) technology for the abatement of residual NOx (see section 6.22).

Our understanding is that ceramic filters are not widely used on incinerators, nor are they listed as a technique under BAT 25 of the Waste Incineration BAT Conclusions. Therefore we requested details from the Applicant on why ceramic filters have been proposed; and for them to demonstrate that this alternative technique provides an equivalent level of environmental protection to a conventional bag filter, such that they can be considered BAT for the installation.

We also requested the Applicant to provide an indication of the expected performance of the ceramic filters, in particular their ability to abate so-called ‘nano-particles’, <0.1µm in diameter ($PM_{0.1}$). This is because of 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. Their small size also means there will be a larger number of small particles for a given mass concentration.

In response the Applicant stated that the ceramic filter has a higher removal efficiency than fabric filters and can routinely handle sub-micron particles down to $PM_{2.5.}$ The manufacturer was reported to have provided a dust load warranty of less than 5 mg/Nm^3, with the system typically achieving operational values of 1-2 mg/Nm^3. In terms of their performance for abating nano-particles the Applicant provided evidence in the form of the results of filtration efficiency experiments undertaken by the manufacturer in accordance with the BS-3928 Sodium Flame Test method. This showed that the average efficiency of a ceramic filter operating at the filtration velocity for the proposed Drakelow plant was circa 99.99% across the tested particle range of 0.02-2µm. They then compared this against published data for bag filter efficiency, concluding that their proposed ceramic filter performs at least equal to, if not better than bag filters, especially in the nano/ultrafine particle range.

Having reviewed the evidence provided by the Applicant we are satisfied that the proposed ceramic filters can be considered BAT for the abatement of particulate matter at the installation.

6.2.2 Oxides of Nitrogen

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

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

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

The Applicant proposes to implement the following primary measures:

- Low NO_x burners – this technique reduces NO_x at source and is defined as BAT where auxiliary burners are required.
- Starved air systems – this technique also simultaneously reduces CO and is defined as BAT for pyrolysis and gasification systems.
- Optimise primary and secondary air injection – this technique is BAT for all plant.
- Flue gas recirculation – this technique reduces the consumption of reagents for secondary NO_x control and can increase overall energy recovery, although in some applications there can be corrosion problems.

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 for reducing NOx with urea as the reagent, which is injected into the combustion chamber.

Additional NOx reduction will be achieved in the flue gas treatment system downstream of the boiler. Here the Applicant proposes to employ SCR through the use of a ceramic catalytic filter. A catalyst layer within the filter will perform the SCR function when urea is added to the flue gas flow. While the main purpose of the ceramic filter is the reduction of emissions of particulate matter, and acid gases due to the injection of hydrated lime and powdered activated carbon, the injection of urea into the system at this point will further reduce residual NOx.

While emissions of NO_x cannot be screened out as insignificant the Environment Agency considers that the above combination of techniques is BAT for the installation.

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 IC5 requires the Operator to report to the Environment Agency on optimising the performance of the NO_x abatement system. The BAT AEL for ammonia has been set and the Operator is also required to continuously monitor N_2O (as proposed in their application) and report quarterly to the Environment Agency.

6.2.3 Acid Gases, SO_x, HCl and HF

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

Acid gases and halogens : Secondary Measures (BAT is to apply Primary Measures first)				
Technique	**Advantages**	**Disadvantages**	**Optimisation**	**Defined as BAT in BREF or TGN for:**
Wet	High reaction rates 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 reliability Lowest visible plume	Higher solid residue production Reagent consumption controlled only by input rate		All plant

	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 rates Low leaching solid residue Temperature	Corrosive material May give greater residue volume if no in-plant	Wide range of uses	MWIs, CWIs

	of reaction well suited to use with bag filters	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 in the form of Liquefied Petroleum Gas / Liquefied Natural Gas
- Management of heterogeneous wastes through the use of waste feed (RDF) produced to a particular specification – this will disperse problem wastes such as PVC by ensuring a more homogeneous waste feed.

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

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.

Reagent dosage will be automated based on continuous monitoring of the flue gas, thereby optimising usage and minimising the potential for waste and emissions.

In this case, the Applicant proposes to use a dry method based on the use of lime as the reagent. The Environment Agency is satisfied that this is BAT.

6.2.4 Carbon monoxide and volatile organic compounds (VOCs)

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

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

6.2.5 Dioxins and furans (and Other POPs)

Dioxins and furans				
Technique	**Advantages**	**Disadvantages**	**Optimisation**	**Defined as BAT in BREF or TGN for:**
Optimise combustion control	All measures will increase oxidation of these species.		Covered in section on furnace selection	All plants
Avoid *de novo* synthesis			Covered in boiler design	All plant
Effective Particulate matter removal			Covered in section on particulate matter	All plant
Activated Carbon injection	Can be combined with acid gas absorber or fed separately. Metallic	Combined feed rate usually controlled by acid gas content.		All plant. Separate feed normally BAT unless feed is constant and

	mercury is also absorbed.			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 a ceramic catalytic filter system (as reported in sections 6.2.1 and 6.2.2.)

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	Combined feed rate usually controlled by acid gas content.		All plant. Separate feed normally BAT unless feed is constant and acid gas control also

	with bromine or sulphur to enhance reactivity, for use during peak emissions.			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. We are satisfied that 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 Permit. 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 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 are released as a result of waste combustion. This will 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 decision 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. Ammonia has no direct GWP effect.

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

The Environment Agency agrees 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. The Environment Agency is 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 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 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 I-TEQ (International Toxic Equivalence) 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 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 COT. The release of dioxin-like PCBs and PAHs is expected to be low where measures have been taken to control dioxin releases. The Permit also

requires monitoring of a range of PAHs and dioxin-like PCBs at the same frequency as dioxins are monitored. We have included a requirement to monitor and report against these WHO-TEQ values for dioxins and dioxin-like PCBs and the range of PAHs as listed in the Permit. We are confident that the measures taken to control the release of dioxins will also control the releases of dioxin-like PCBs and PAHs. Section 5.2.1 of this document details the assessment of emissions to air, which includes dioxins and concludes that there will be no adverse effect on human health from either normal or abnormal operation.

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

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

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

We have assessed the control techniques proposed for dioxins by the Applicant and have concluded that they are appropriate for dioxin control. We are confident that these controls are in line with the UN-ECE BAT guidance and will minimise the release of HCB, PCB and PeCB.

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

6.5 Other Emissions to the Environment

6.5.1 Emissions to water

The only emission to surface water will consist of (a) boiler blowdown and process condensate from the steam system, and (b) uncontaminated surface

water run-off; both of which will be discharged via emission point W1 into an existing surface water drain which flows into the River Trent approximately 500 metres north of the installation.

Boiler blowdown and process condensate (e.g. steam trap discharge and soot blower pipework condensate purge).will be collected in the boiler blowdown tank where temperature and pH will be monitored / corrected via additional cooling water / neutralising agent prior to discharge. No hazardous pollutants will be present within the boiler blowdown, which will consist primarily of demineralised water with slightly elevated pH compared to normal water and trace dosing chemistry.

Boiler blowdown will initially occur once per 12 hour shift, but may increase or decrease on this based on the amount of water quality testing to achieve the required boiler water quality. Draining of the boiler blowdown tank will be dependent on the frequency of boiler blowdown and on the volumes of other condensate added to the blowdown tank. The water in the boiler blowdown tank is drained into one of two $30m^3$ clean water tanks where cold water is added if required to reduce the discharge water temperature. It is proposed to fill one clean water tank per shift then change over tanks. The pH and temperature of the full tank will be checked prior to discharge to W1 and will be corrected with neutralizing agent and cold water as required. The discharge will be made as a batch release via emission point W1.

We have included an emission limit value (ELV) for pH on emission point W1, expressed as a range, i.e. 6-9 pH units, indicating that the discharge should be made an approximately pH neutral. We have not included an ELV for temperature, however condition 3.1.3 of the permit requires that the discharge is made at a temperature that does not exceed the ambient temperature of the receiving water, i.e. the background temperature.

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

6.5.2 Emissions to sewer

There are no discharges to public sewer from the installation. Any wastewater arising from process plant and all domestic effluent arising from staff welfare facilities will be collected in the effluent tank and taken off-site for disposal.

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

6.5.3 Fugitive emissions

The IED specifies that plants must be able to demonstrate that the plant is designed in such a way as to prevent the unauthorised and accidental release of polluting substances into soil, surface water and groundwater. In addition storage requirements for waste and for contaminated water of Article 46(5) must be arranged.

The Applicant has provided a BAT assessment for fugitive emissions. The techniques that they propose to control fugitive emissions, as set out in their application, are as follows:

- No waste will be accepted on site unless the site has adequate waste storage capacity. This will be achieved by (a) the maximum waste storage capacity being clearly established on site; and (b) regular monitoring of the waste stored on site against the maximum allowed storage capacity.

- Waste reception, waste handling and the storage of waste will take place internally within the relevant internal storage areas on impermeable surfaces with sealed drainage.

- In the event of a shutdown where no incineration capacity is available, no more waste deliveries will be accepted on site. If any waste stored on site exceeds the maximum storage times on site, the waste will be removed off site in covered vehicles.

- There will be no open skips or vessels at the facility, nor any outdoor or uncovered stockpiles.

- No raw materials will be stored outside and any small volumes of materials for maintenance, etc. shall be stored in sealed containers.

- Feed systems will be simple and enclosed.

- An air extraction system will be in place resulting in odorous air within the building being thermally destroyed by the combustion system.

- Mobile and stationary vacuum cleaning will be used if necessary

- All waste storage will be enclosed and transferred using an automated handling system.

- The waste charging system will be fully enclosed

- There will be no treatment of slags and bottom ashes on-site. Bottom ash from the gasification system will be handled by a submerged drag chain conveyor with the water in this conveyor creating a seal to the furnace stopping the ingress of air, also stopping the ash from the furnace being of a dusty consistency.

- Bottom ash from the superheater, boiler and economiser will be collected in a sealed bin type system and transferred to a collection and handling point.

- Segregation of uncontaminated site run-off and process wastewater and domestic sewage

- Site staff will be fully trained and regularly audited through the EMS to ensure that housekeeping measures are appropriate to the nature and scale of the activities and that there is minimum possibility of uncontrolled emissions

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

6.5.4 Odour

The Applicant states that due to the design of the building structure and the fully enclosed RDF handling activities, there is very little potential for offsite odour emissions / impacts.

Entry to the tipping hall and processing building will be via electrically controlled fast acting roller shutter doors through which delivery vehicles will reverse in. RDF will only be offloaded from the HGVs within the Tipping Hall and only when the roller shutter doors are closed. To avoid the escape any odour emissions from the Tipping Hall, the building will be kept at slight negative pressure and an air extraction system will be in place to draw odorous air within the building through the processing plant where odorous compounds will be thermally destroyed in the combustion chambers.

In the event of a shutdown where no incineration capacity is available, no more waste deliveries will be accepted on site and if any waste already in storage on-site exceeds the maximum proposed storage time of 4 days, the waste will be removed from the site.

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 Setting ELVs and other Permit conditions

6.6.1 Translating BAT into Permit conditions

Article 14(3) of IED states that BAT conclusions 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 best available techniques as laid down in the decisions on BAT conclusions.

BAT conclusions for waste incineration or co-incineration were published on 03/12/19.

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 emission 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 (Article 18).

(i) Local factors

We have considered the impact on local receptors and habitat 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 IED.

(ii) National and European ESs

There are no additional National or European EQSs that indicate that IED limits 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 emission limit value 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 IED, which lists the main polluting substances that are to be considered when setting emission limit values (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 thermal treatment 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

Before the plant can become fully operational it will be necessary for it to be commissioned. Before commissioning can commence the Operator is required by pre-operational condition PO4 to submit a commissioning plan to the Agency for approval. Commissioning can only begin and be carried out in accordance with the approved proposals in the plan.

The Applicant has confirmed that a full commissioning and acceptance programme will be carried out in conjunction with the technology supplier as part of the plant installation and handover. They state that while the exact nature of the commissioning programme is unknown (at the time of permit application), it will be structured around the needs of the permit and agreed with the Environment Agency as part of the pre-operation condition.

The Operator will also be required to submit a written report to the Environment Agency on the commissioning of the installation within 4 months of completion of commissioning, in accordance with Improvement Condition IC3. In the report they will be required to summarise the environmental performance of the plant as installed against the design parameters set out in their permit application. The report will also include a review of the performance of the facility against the conditions of this permit and details of procedures developed during commissioning for achieving and demonstrating compliance with permit conditions and confirm that the Environmental Management System (EMS) has been updated accordingly.

6.7 Monitoring

6.7.1 Monitoring during normal operations

We have decided that monitoring should be carried out for the parameters listed in Schedule 3 using the methods and to the frequencies specified in those tables. These monitoring requirements have been imposed in order to demonstrate compliance with emission limit values 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 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 the Environment Agency's Guidance M2 for monitoring of stack emissions to air.

For emissions to water, the methods for periodic monitoring are in accordance with the Environment Agency's Guidance M18 for monitoring of discharges to water and 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.

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

The Applicant has stated that the plant will be operated with a single CEMS unit per incineration line which will be linked into the controls system. They

state that in the unlikely event of CEMS failure, a full replacement CEMS will be available on site as soon as possible (12 hour service / call out contract) and the affected incineration line will be taken offline until the replacement CEMS can be installed. This is consistent with the fact that the Applicant has not proposed any mechanism or alternative techniques for demonstrating how the back up limits for particulates, CO and TOC would not be exceeded in the period between primary CEM failure and the replacement CEMS being installed and operational, therefore the affected incineration line will need to be shutdown – abnormal operation will not apply.

6.7.3 Continuous emissions monitoring for dioxins and heavy metals

The BAT conclusions 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.

The Applicant has stated that the waste accepted on site will have a low mercury content, therefore periodic monitoring is considered suitable, and that they will undertake periodic testing of the fuel to provide confirmation of substance levels which are not continuously monitored.

Based on the waste types and control measures proposed in the Application we expect that emissions of dioxins will be stable and that the mercury content of the waste will be low and stable. We have therefore set manual extractive monitoring in the Permit. However the Permit requires the stable and low criteria to be demonstrated through Improvement condition IC9 and IC10 and we can require long term monitoring for dioxins and continuous monitoring for mercury if required.

6.7.4 Monitoring during periods of 'other than normal operation' (OTNOC)

BAT AELs (daily averages) do not apply during period of OTNOC. However IED chapter IV limits will apply during these periods. Permit table S3.1(b) contains appropriate limits and monitoring requirements during OTNOC. Pre-operational condition PO1 will ensure OTNOC scenarios are defined.

6.8 Reporting

We have specified the reporting requirements in Schedule 4 of the Permit either to meet the reporting requirements set out in the IED, or to ensure data is reported to enable timely review by the Environment Agency to ensure compliance with 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 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:

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

These are all covered by permit conditions.

The permit does not allow the acceptance of, nor mixing of, hazardous waste so Article 18(2) is not relevant.

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

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

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

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

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

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

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

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

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

7.2 National primary legislation

7.2.1 **Environment Act 1995**

(i) Section 4 (Pursuit of Sustainable Development)

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

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

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 (Pursuit of Conservation Objectives)

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 area.

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.

(vii) 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.

(viii) National Emissions Ceiling Regulations 2018

We have had regard to the National Air Pollution Control Programme 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 have 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 guidance 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 also 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.

7.2.3 **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.

7.2.4 **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.

7.2.5 **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 as no SSSIs were located within the 2km screening distance of the installation no assessment was necessary.

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

Section 40 of this Act requires us to have regard, so far as is consistent with the proper exercise of our functions, to the purpose of conserving biodiversity. We have done so and consider that no different or additional conditions in the Permit are required.

7.2.8 **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.

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

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

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

7.3 National secondary legislation

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

We have assessed the Application in accordance with guidance agreed jointly with Natural England and concluded that there will be no likely significant effect on any European Site.

We have sent a copy of our conclusions to Natural England (for information only) by means of an HRA1 assessment.

The habitat assessment is summarised in greater detail in section 5.4 of this document. A copy of the full HRA1 can be found on the public register.

7.3.2 **Water Environment (Water Framework Directive) Regulations 2017 2003**

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 (inter alia) 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

7.3.3 **The Persistent Organic Pollutants Regulations 2019**

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

7.5 Other relevant legal requirements

7.5.1 Duty to Involve

S23 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. S24 requires us to have regard to any Secretary of State guidance as to how we should do that.

The way in which the Environment Agency has consulted with the public and other interested parties is set out in Section 2.2 of this document. The way in which we have taken account of the representations we have received is set out in Annex 4. Our public consultation duties are also set out in the EP Regulations, and our statutory Public Participation Statement, which implement the requirements of the Public Participation Directive. In addition to meeting our consultation responsibilities, we have also taken account of our guidance in Environment Agency Guidance Note RGS6 and the Environment Agency's Building Trust with Communities toolkit.

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) and S3.1(b) in Schedule 3 of the Permit.
45(1)(d)	The permit shall include the requirements for pH, temperature and flow of waste water discharges.	Not Applicable as there is no discharge from a wet flue gas abatement system
45(1)(e)	The permit shall include the sampling and measurement procedures and frequencies to be used to comply with the conditions set for emissions monitoring.	Conditions 3.6.1 to 3.6.4 and Tables S3.1, S3.1(a), and S3.1(b), 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 2.3.11 and 2.3.12.
46(1)	Waste gases shall be discharged in a controlled way by means of a stack the height of which is calculated in such a way as to safeguard human health and the environment.	Condition 2.3.1 and Table S1.2 of Schedule 1 of the Permit.
46(2)	Emission into air shall not exceed the emission limit values set out in	Conditions 3.1.1 and 3.1.2 and Tables

IED Article	Requirement	Delivered by
	part 3 of Annex VI.	S3.1, S3.1(a) and S3.1(b)
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.	Condition 2.3.11
47	In the event of breakdown, reduce or close down operations as soon as practicable. Limits on dust (150 mg/m3), CO and TOC not to be exceeded during this period.	Condition 2.3.11
48(1)	Monitoring of emissions is carried out in accordance with Parts 6 and 7 of Annex VI.	Conditions 3.6.1 to 3.6.4. 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.	Condition 3.6.3, and tables S3.1, S3.1(a) and S3.1(b)
48(3)	The competent authority shall determine the location of sampling or measurement points to be used for monitoring of emissions.	Conditions 3.6.3 and 3.6.4
48(4)	All monitoring results shall be recorded, processed and presented	Conditions 4.1.1 and 4.1.2, and Tables

IED Article	Requirement	Delivered by
	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.	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 and 3.1.2
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 S3.4
50(2)	Flue gas to be raised to a temperature of 850ºC for two seconds, as measured at representative point of the combustion chamber.	Condition 2.3.7, Pre-operational condition PO5 and Improvement condition IC4 and Table S3.3
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 2.3.8
50(4)(a)	Automatic shut to prevent waste feed if at start up until the specified temperature has been reached.	Condition 2.3.7
50(4)(b)	Automatic shut to prevent waste feed if the combustion temperature is not maintained.	Condition 2.3.7
50(4)(c)	Automatic shut to prevent waste feed if the CEMs show that ELVs are exceeded due to disturbances or failure of waste cleaning devices.	Condition 2.3.7
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 2 years (Conditions 1.2.1 to 1.2.3)
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.

IED Article	Requirement	Delivered by
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
52(1)	Take all necessary precautions concerning delivery and reception of Wastes, to prevent or minimise pollution.	Conditions 2.3.1, 2.3.4, 3.2, 3.3, 3.4 and 3.6.
52(2)	Determine the mass of each category of wastes, if possible according to the EWC, prior to accepting the waste.	Condition 2.3.4(a) and Table S2.2 in Schedule 2 of the Permit.
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 S3.4
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 S3.4 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 gross electrical efficiency	Section 4.3.7 of this decision document. Permit table S3.3
3	Monitor key process parameters	Condition 3.6.1 and table S3.3
4	Monitoring emissions to air	Condition 3.6.1 and table S3.1
5	Monitoring emissions to air during OTNOC	Condition 3.6.1 and table S3.1(b)
6	Monitoring emissions to water from flue gas treatment and/or bottom ash treatment	There are no such emissions from the installation
7	Monitor unburnt substances in slags and bottom ashes	Conditions 3.1.4 and 3.6.1, and table S3.4
8	Analysis of hazardous waste	Not applicable
9	Waste stream management techniques	The Application explains the measures that will be used. Permit condition 2.3.1, table S1.2
10	Quality management system for bottom ash treatment plant	Not applicable
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
12	Reception, handling and storage of waste	Measures are described in the Application and FPP. Permit conditions 2.3.1, table S1.2 and 3.8.1
13	Storage and handling of clinical waste	Not applicable
14	Improve overall performance of plant including BAT-AELs for TOC or LOI	Techniques described in the Application. Permit condition 2.3.1, table S1.2, 3.1.4, 3.6.1 and table S3.4

BAT conclusion	Criteria	Delivered by
15	Procedures to adjust plant settings to control performance	Measures described in the Application. Permit condition 2.3.1, 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, 3.3.1, 3.3.2 and 3.4.1, and table S1.2. Sections 6.5.3 and 6.5.4 of this decision document.
22	Handling of gaseous and liquid wastes	Not applicable
23	Management system to prevent or reduce dust emissions from treatment of slags and ashes	Not applicable
24	Techniques to prevent or reduce diffuse emissions to air from treatment of slags and ashes	Not applicable
25	Minimisation of dust and metal emissions and compliance with BAT AEL	Section 5.2 of this decision document. Permit conditions 2.3.1, 3.1.1, 3.1.2, 3.3.1, 3.3.2 and 3.4.1, and tables S1.2 and S3.1
26	Techniques and BAT AEL for dust emissions from enclosed slags and ashes treatment	Not applicable

BAT conclusion	Criteria	Delivered by
27	Techniques to reduce emissions of HCl, HF and SO_2	Measures described in the Application. Permit condition 2.3.1, 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, 3.1.1 and 3.1.2, and tables S1.2 and 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, 3.1.1 and 3.1.2, and tables S1.2 and 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, 3.1.1 and 3.1.2, and tables S1.2 and 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, 3.1.1 and 3.1.2, and tables S1.2 and S3.1
32	Segregate waste water streams to prevent contamination	Measures described in the Application Sections 4.2.2, 6.5.1 and 6.5.3 of this decision document. Permit conditions 2.3.1, 3.1.1 and 3.1.2, and tables S1.2 and S3.1
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 2.3.1, 3.1.1 and 3.1.2, and tables S1.2 and S3.1

BAT conclusion	Criteria	Delivered by
34	Reduce emissions to water from FGC and/or from treatment or storage of bottom ashes. BAT AELs	Not applicable
35	Handle and treat bottom ashes separately from FGC residues	Permit condition 2.3.13
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 5.7.1 of this decision document. Permit conditions 2.3.1, 3.5.1, 3.5.2, and table S1.2

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 below 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.

Table S1.4 Pre-operational measures	
Reference	**Pre-operational measures**
PO1	Prior to the commencement of commissioning, the Operator shall send: • a summary of the site Environment Management System (EMS);and • a copy of the full OTNOC management plan which shall be prepared in accordance with BAT 18 of the BAT conclusions to the Environment Agency and obtain the Environment Agency's written approval to the EMS summary and the full OTNOC management plan. The Operator shall make available for inspection all documents and procedures which form part of the EMS. The EMS shall be developed in line with the requirements set out in Environment Agency web guide on developing a management system for environmental permits (found on www.gov.uk) and BAT 1 of the incineration BAT conclusions. The EMS shall include the approved OTNOC management plan. The documents and procedures set out in the EMS shall form the written management system referenced in condition 1.1.1 (a) of the permit.
PO2	Prior to the commencement of commissioning, the Operator shall send a report to the Environment Agency, and obtain the Environment Agency's written approval to it, which will contain 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. The review shall detail any identified proposals for improving the recovery and utilisation of heat and shall provide a timetable for their implementation.
PO3	Prior to the commencement of commissioning, the Operator shall submit to the Environment Agency, and obtain the Environment Agency's written approval to it, a protocol for the sampling and testing of incinerator bottom ash for the purposes of assessing its hazard status. Sampling and testing shall be carried out in accordance with the protocol as approved.
PO4	Prior to the commencement of commissioning, the Operator shall 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

Table S1.4 Pre-operational measures	
Reference	**Pre-operational measures**
	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.
PO5	No later than one month after the final design of the furnace and combustion chamber, the operator shall submit a written report to the Environment Agency, and obtain the Environment Agency's written approval to it, of the details of the computational fluid dynamic (CFD) modelling. The report shall explain how the furnace has been designed to comply with the residence time and temperature requirements as defined by Chapter IV and Annex VI of the IED whilst operating under normal load and the most unfavourable operating conditions (including minimum turn down and overload conditions), and that the design includes sufficient monitoring ports to support subsequent validation of these requirements during commissioning.
PO6	At least three months before (or other date agreed in writing with the Environment Agency) the commencement of commissioning, the Operator shall submit a written report to the Environment Agency, and obtain the Environment Agency's written approval to it, specifying arrangements for continuous and periodic monitoring of emissions to air to comply with Environment Agency guidance notes M1, M2 and M20. The report shall include the following: • Plant and equipment details, including accreditation to MCERTS • Methods and standards for sampling and analysis • Details of monitoring locations, access and working platforms
PO7	At least 3 months before the commencement of commissioning (or other date agreed in writing with the Environment Agency) the Operator shall submit, for approval by the Environment Agency, a methodology (having regard to Technical Report P4-100/TR Part 2 Validation of Combustion Conditions) to verify the residence time, minimum temperature and oxygen content of the gases in the furnace whilst operating under normal load, minimum turn down and overload conditions.
PO8	Prior to the commencement of commissioning, the Operator shall submit to the Environment Agency an updated Fire Prevention Plan (FPP). The Operator shall ensure that the updated FPP includes the following information: • details of the final design of the firewater containment and bunding arrangements within the Tipping Hall, including the fire water retention barriers utilised internally across all large roller shutter vehicle doors; • confirmation of the final height of the perimeter bund within the Tipping Hall; and • calculations which substantiate the final height of the perimeter bund within the Tipping Hall and demonstrate that the bund capacity thereby provided is sufficient to contain the worst case firewater scenario.

Table S1.4 Pre-operational measures	
Reference	**Pre-operational measures**
	The updated FPP shall also include any other minor amendments deemed necessary following completion of detailed design. All amendments to the FPP shall be clearly signposted by way of an accompanying cover letter.

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 below - justifications for these is 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.

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC1	The Operator shall submit a written report to the Environment Agency on the implementation of its Environmental Management System (EMS) and the progress made in the certification of the system by an external body or if appropriate submit a schedule by which the EMS will be certified.	Within 12 months of the completion of commissioning
IC2	The Operator shall submit a written proposal to the Environment Agency to carry out tests to determine the size distribution of the particulate matter in the exhaust gas emissions to air from emission point A1, A2 & A3, identifying the fractions within the PM_{10}, and $PM_{2.5}$ ranges. On receipt of written approval from the Environment Agency to the proposal and the timetable, the Operator shall carry out the tests and submit to the Environment Agency a report on the results.	Within 6 months of the completion of commissioning
IC3	The Operator shall submit a written report to the Environment Agency on the commissioning of the installation. The report shall summarise the environmental performance of the plant as installed against the design parameters set out in the Application. The report shall also include a review of the performance of the facility against the conditions of this permit and details of procedures developed during commissioning for achieving and demonstrating compliance with permit conditions and confirm that the Environmental Management System (EMS) has been updated accordingly.	Within 4 months of the completion of commissioning
IC4	The operator shall notify the Environment Agency of the proposed date(s) that validation testing is planned for.	Notification at least 3 weeks prior to validation testing
	During commissioning the operator shall carry out validation testing to validate the residence time, minimum temperature and oxygen content of the gases in the furnace whilst operating under normal load and most unfavourable operating conditions. The validation shall be to the methodology as approved through pre-operational condition PO7.	Validation tests completed before the end of commissioning

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC5	The Operator shall submit a written report to the Environment Agency describing the performance and optimisation of: • The Selective Non Catalytic Reduction (SNCR) system, the ceramic catalytic filter system (incorporating Selective Catalytic Reduction (SCR)) and combustion settings to minimise oxides of nitrogen (NOx). The report shall include an assessment of the level of NOx, N_2O and NH_3 emissions that can be achieved under optimum operating conditions. • The lime injection system for minimisation of acid gas emissions. • The carbon injection system for minimisation of dioxin and heavy metal emissions. • The ceramic filter system for minimisation of particulate matter.	Within 4 months of the completion of commissioning
IC6	The Operator shall carry out an assessment of the impact of emissions to air of the following component metals subject to emission limit values: Cd, Pb, Co, Mn, and Ni. A report on the assessment shall be made to the Environment Agency. Emissions monitoring data obtained during the first year of operation shall be used to compare the actual emissions with those assumed in the impact assessment submitted with the Application. An assessment shall be made of the impact of each metal against the relevant ES. In the event that the assessment shows that an environmental standard can be exceeded, the report shall include proposals for further investigative work.	15 months from the completion of commissioning
IC7	The Operator shall submit a written summary report to the Environment Agency to confirm that the performance of Continuous Emission Monitors for parameters as specified in Table S3.1 and Table S3.1(a) complies with the requirements of BS EN 14181, specifically the requirements of QAL1, QAL2 and QAL3. The report shall include the results of calibration and verification testing,	Initial calibration report to be submitted to the Agency within 3 months of completion of commissioning Full summary evidence compliance report to be submitted within 18

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
		months of completion of commissioning
IC8	During commissioning, the operator shall carry out tests to demonstrate whether the furnace combustion air will ensure that negative pressure is achieved throughout the reception / tipping hall. The tests shall demonstrate whether air is pulled through the reception / tipping hall and bunker area and into the furnace with dead spots minimised. The operator shall submit a report to the Environment Agency, for approval, summarising the findings along with any proposed improvements if required.	Within 3 months of completion of commissioning
IC9	The operator shall carry out a programme of dioxin and dioxin like PCB monitoring over a period and frequency agreed with the Environment Agency. The operator shall submit a report to the Environment Agency with an analysis of whether dioxin emissions can be considered to be stable.	Within 3 months of completion of commissioning or as agreed in writing with the Environment Agency
IC10	The operator shall carry out a programme of mercury monitoring over a period and frequency agreed with the Environment Agency. The operator shall submit a report to the Environment Agency with an analysis of whether the waste feed to the plant can be proven to have a low and stable mercury content.	Within 3 months of completion of commissioning or as agreed in writing with the Environment Agency
IC11	The Operator shall submit a report to the Environment Agency for approval on start-up and shut-down conditions over the first 12 months of operation. The report shall identify any amendments to the start-up and shut-down definitions that were described in the application.	Within 15 months of completion of commissioning or as agreed in writing with the Environment Agency

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 all consultation responses have been placed on the Environment Agency public register.

The original Application was advertised on the Environment Agency website from 31/07/18 to 29/08/18. An amended Application was advertised on the Environment Agency website from 09/04/19 to 10/05/19.

The following statutory and non-statutory bodies were consulted:

- Local Authority (Planning, and Environmental Health)
- Public Health England
- Department of Public Health
- Food Standards Agency
- Health & Safety Executive
- Fire & Rescue Service
- National Grid

1) Consultation Responses from Statutory and Non-Statutory Bodies

Response Received from Public health England (PHE)	
Brief summary of issues raised:	Summary of action taken / how this has been covered
It is understood that the application is for a renewable energy generation facility designed to recover energy from refuse derived fuel feedstocks using gasification for the generation of electricity……..Based solely on the information contained in the application provided, PHE has no significant concerns regarding risk to health of the local population from this proposed activity, providing that the applicant takes all appropriate measures to prevent or control pollution, in accordance with the relevant sector technical guidance or industry best practice.	No action required

Response Received from National Grid	
Brief summary of issues raised:	Summary of action taken / how this has been covered
National Grid submitted a 'holding objection' to the proposals due to the close proximity of the installation to their existing High Voltage Transmission Overhead Line.	We acknowledged National Grid's holding objection, also informing them that we considered the proximity of the proposed installation to their existing assets, and any potential for this to impact upon their operations, was a matter that should be addressed through the planning application process and not environmental permitting. In this respect we informed them that their holding objection was not a material consideration for our determination of the environmental permit application. It was subsequently agreed with National Grid that their correspondence could be shared directly with the Applicant and so we passed on the relevant information. Approximately 5 months after receiving the original holding objection from National Grid we received a further letter from them confirming that they no longer had any objections to the proposed installation. No further action was deemed necessary.

2) <u>Consultation Responses from Members of the Public and Community Organisations</u>

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

No representations were received.

b) <u>Representations from Community and Other Organisations</u>

No representations were received.

c) <u>Representations from Individual Members of the Public</u>

No representations were received.