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

Our decision document recording our decision-making process

The Permit Number is:	EPR/DP3038JC/A001
The Applicant is:	Verus Oak Energy Limited
The Installation is located at:	Land at Giffords Recycling Kelvin Way West Bromwich B70 7JR

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/DP3038JC/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/DP3038JC. We refer to the permit as "the **Permit**" in this document.

The Application was duly made on 5 July 2018.

The Applicant is Verus Oak Energy Limited. We refer to Verus Oak Energy Limited as "the **Applicant**" in this document. Where we are talking about what would happen after the Permit is granted, we call Verus Oak Energy Limited "the **Operator**".

Verus Oak Energy Limited's proposed facility is located at Land at Giffords Recycling, Kelvin Way, West Bromwich, B70 7JR. We refer to this as "the **Installation**" in this document.

How this document is structured

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Glossary of acronyms used in this document

AAD	Ambient Air Directive (2008/50/EC)
APC	Air Pollution Control
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
BAT	Best Available Technique(s)
BAT-AEL	BAT Associated Emission Level
BREF	BAT Reference Note
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
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
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
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
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)
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
TDI	Tolerable daily intake
TEF	Toxic Equivalent Factors
TGN	Technical guidance note
TOC	Total Organic Carbon
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 the Applicant 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 of 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 5 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 the determination (see below).

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

2.2 Consultation on the Application

We carried out consultation on the Application in accordance with the EPR, our statutory PPS and our own internal guidance Regulatory Guidance 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 (GOV.UK) and consultation web site (Citizen Space) from 9 July to 6 August 2018 and again from 18 October to 30 November 2018. The notice contained all the information required by the IED, including telling people where and when they could see a copy of the Application. We also placed an advertisement in the Express & Star and Sandwell Chronicle on 18 October 2018.

We made a copy of the Application and all other documents relevant to our determination (see below) available to view on our Public Register at the Environment Agency, Sentinel House, 9 Wellington Crescent, Fradley Park, Lichfield, WS13 8RR.

We also placed copies of the Application at the following locations:

- Central Library, High Street, West Bromwich, B70 8DZ
- Sandwell College, Sandwell Central Campus, 1 Spon Lane, West Bromwich, B70 6AW.
- Lodge Community Centre, Lodge Road, West Bromwich, B70 8PJ.
- Bethel Convention Centre**,** Kelvin Way, West Bromwich B70 7JW

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":

- Sandwell Metropolitan Borough Council – Planning Authority
- Sandwell Metropolitan Borough Council – Environmental Health
- Public Health England
- Director of Public Health, Sandwell Metropolitan Borough Council
- Health & Safety Executive (HSE)
- Food Standards Agency
- Severn Trent (Sewerage Undertaker)
- National Grid
- Birmingham & the Black Country Wildlife Trust
- West Midlands Canal & Rivers Trust
- Natural England
- Highways England

These are organisations whose expertise, democratic accountability and/or local knowledge make it appropriate for us to seek their views directly. Under our Working Together Agreement with Natural England, we only inform

Natural England of the results of our assessment of the impact of the Installation on designated Habitats sites. We have done so in this determination.

In addition to our advertising the Application, we undertook a programme of extended public consultation. A public event was held on 7 November 2018 at Bethel Convention Centre, Kelvin Way, West Bromwich B70 7JW. Further details along with a summary of consultation comments and our response to the representations we received can be found in Annex 4. We have taken all relevant representations into consideration in reaching our determination.

2.3 Requests for further Information

Although we were able to consider the Application duly made, we did in fact need more information in order to determine it, and issued information notices on 04/12/2018 and 28/03/2019. A copy of each information notice and the responses received were placed on our Public Register.

In addition to our information notices, we received additional information during the determination from the Applicant as shown in the table below.

Description of information received	**Date Received**
Clarification of noise impact assessment aspects.	16/10/2018
Updated addendum to air quality impact assessment.	18/10/2018
Noise contour plot.	05/04/2019
Confirmation of back-up continuous emissions monitoring system (CEMS).	16/04/2019
Abnormal emissions assessment for PCBs.	02/05/2019
Updated emission points plan.	07/05/2019
Annual mean nitrogen dioxide concentrations at receptor locations.	21/05/2019
Clarification on the management of ash quench water.	10/07/2019

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

Finally we consulted on our draft decision from 6 June 2019 to 4 July 2019. A summary of the consultation responses and how we have taken into account all relevant representations is shown in Annex 4B.

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 Waste Framework Directive, 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" include:

> *"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, operation of a back-up electricity generator for emergencies and surface water management. 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 will be located at the Kelvin Way Trading Estate, West Bromwich. The Birmingham Canal forms the southern boundary of the site, with Spon Lane Basin located adjacent to the northern boundary. The nearest residential area is approximately 250 metres north of the site. The Fens Pool SAC is located within 10 km of the Installation. There are no Sites of Specific Scientific Interest (SSSI) within 2 km of the site, but there are six Local Nature Reserves within this distance.

The Applicant submitted a site 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 undertake the permitted activities

within the site boundary. Further information on the site is provided below at section 4.2.

4.1.3 What the Installation does

The Applicant has described the facility as an Energy Recovery Facility (ERF). 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, the process is never-the-less 'incineration' because it is considered that its main purpose is the thermal treatment of waste.

The Installation will receive waste in covered vehicles or containers. The vehicles will be weighed on a weighbridge before proceeding to the reception hall, and then deposited into a bunker.

The waste will be transferred into the furnace and will fall onto the grate. Combustion will be controlled by feeding primary air via the underside of the grate and secondary air will be injected higher up in the grate. The furnace will be designed to ensure that the combustion gases are maintained, after the last injection of combustion air, to at least 850°C for at least 2 seconds. (This is a requirement of Chapter IV of IED).

Hot gases from the incineration of waste will be recovered in a water tube boiler and will produce high pressure superheated steam, in combination with superheaters. The steam from the boiler will then feed a steam turbine. Steam will be condensed in an air-cooled condenser and recycled to the boiler as part of a closed loop water system.

Emissions to air will be minimised by cleaning the combustion gases as follows:

- Oxides of Nitrogen (NOx) using Selective Non-Catalytic Reduction (SNCR)
- Acid gas abatement using lime injection
- Dioxins using activated carbon injection
- Particulate matter using bag filters

The Installation will generate electricity at a rate of 39 MWe with 35 MWe supplied to the grid.

The key features of the Installation can be summarised in the figure and table below:

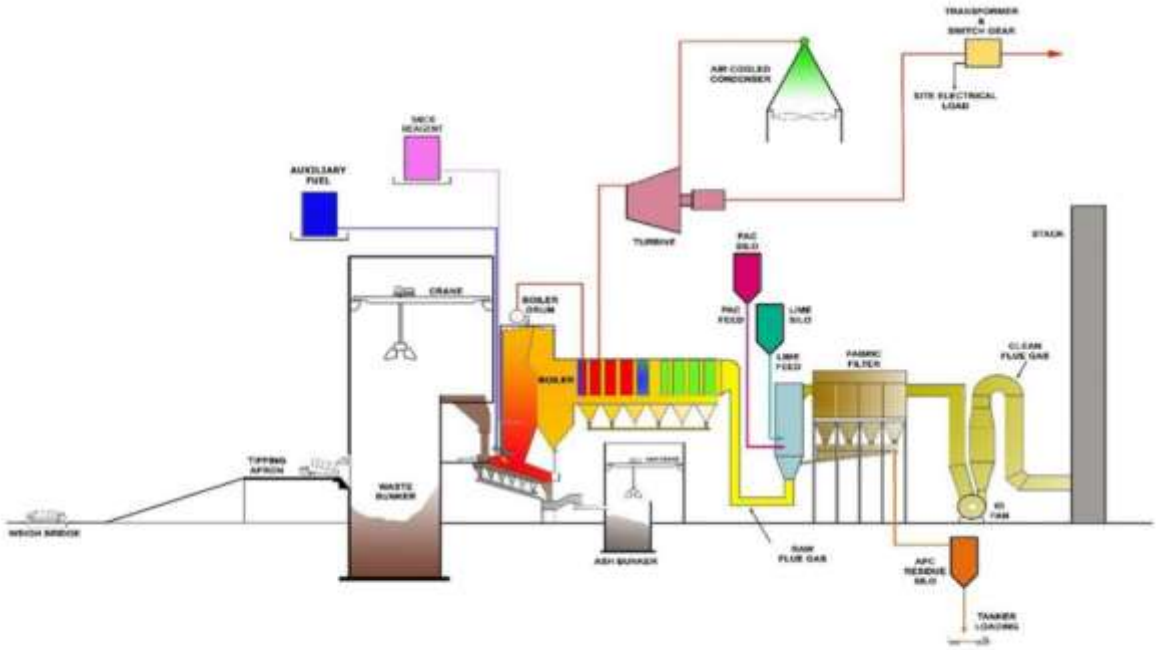

Figure 1.1 - Indicative Process Diagram

Waste throughput, Tonnes/line	400,000 tonnes/annum (360,000 tpa used in the nominal design calculations)	45 tonnes/hour
Waste processed	Municipal Solid Waste, Commercial & Industrial Waste, Refuse Derived Fuel	
Number of lines	1	
Furnace technology	Moving Grate	
Auxiliary Fuel	Fuel oil, liquefied petroleum gas or natural gas	
Acid gas abatement	Dry	Lime
NOx abatement	SNCR	Ammonia or urea
Reagent consumption	Auxiliary fuel: 2,000 te/annum Ammonia: 2,200 te/annum Lime: 16,800 te/annum Activated carbon: 550 te/annum	
Dioxin abatement	Activated carbon	
Stack	400316, 289945	
	Height, 98 m	Diameter, 3 m
Flue gas	Flow, 78 Nm^3/s	Velocity, 16.5 m/s
	Temperature, 130°C	
Electricity generated	39 MWe	312,000 MWh (based on 8,000 hours operation per year)
Electricity exported	35 MWe	280,000 MWh (based

		on 8,000 hours operation per year)
Electricity used on site	4 MWe	
Steam conditions	Temperature, 400°C	Pressure, 60 bar

4.1.4 Key Issues in the Determination

The key issues arising during this determination were the proximity of the proposed Installation to human receptors and human health impacts from emissions to air. We therefore describe how we addressed these issues in most detail in this document.

4.2 The site and its protection

4.2.1 Site setting, layout and history

The site is underlain by superficial Quaternary Glacial Till (Mid Pleistocene Diamicton). The superficial deposits are recorded as being underlain by bedrock strata comprising the Carboniferous Alveley Member (Mudstone), which is described as 'red mudstone and sandstone, fine to medium-grained with thin Spirobis limestone beds and Pedogenic limestone (caliche).

Mapping indicates that the Alveley Member is underlain by the Carboniferous Halesowen and Etruria Formations (sandstones and mudstones), both of which contain thin seams of coal. These formations are recorded as being underlain by coal measures comprising the carboniferous Middle Coal Measures Formation (mudstone), which contains thick (potentially workable) seams of coal.

The nearest coal seam outcrop to the site is located approximately 900 metres to the southwest (Brooch coal seam) and a further coal seam outcrop is recorded 1.5 km to the west (Two Foot coal seam). Whilst dip directions are not shown on these coal seam outcrops, cross section mapping indicates the Middle Coal Measures Formation within this area dip slightly down towards the southeast (i.e. relatively horizontal). The mapping also shows significant areas of made ground within the area of these coal seam outcrops and further afield to the north and south. A geological fault is recorded approximately 500 metres to the west of the site, trending approximately north to south and down-throwing strata to the east.

Investigations undertaken indicates that the majority of the site is underlain by a secondary aquifer of undifferentiated layers. A very small area within the north east corner of the site is a secondary aquifer of permeable layers.

There are no surface water features within the Installation boundary. However, the Birmingham-Wolverhampton Canal runs adjacent to the southern boundary of the site.

The site was developed as a foundry, with two canal basins present within the far west and east of the site, a watercourse within the centre, and a canal (Spon Lane Locks) present immediately outside the southern boundary. The canal basins were later infilled by the 1970s, as indicated by the presence of refuse/ slag heaps within the west of the site and further afield, this tipping took place from the late 1950s until 1973. In the early 2000s, the site (and area to the south beyond Spon Lane Locks) were redeveloped to their present-day layout.

4.2.2 Proposed site design: potentially polluting substances and prevention measures

A range of chemical substances and hazardous materials associated with the waste incineration process, including SNCR reagent, lime and activated carbon, will be stored on site. These materials will be stored in accordance with current technical guidance. All liquid chemicals will be stored in controlled areas, with appropriate secondary containment.

The SNCR reagent and boiler water treatment chemicals will be stored in suitable containers or stainless steel bunded storage tanks provided with a pressure relief valve and vent scrubber system, as appropriate. In the event of a spillage, the bunds will retain the liquid.

Lime and activated carbon will be stored within separate storage silos and will be dosed with separate dosing controls. Storage will be in dedicated steel silos with equipment for filling from a tanker through a sealed pipework system. Delivery to site will be by bulk powder tanker.

Boiler water treatment chemicals will be used to control water hardness, pH and scaling and will be delivered in sealed containers and stored in the water treatment room.

Fuel oil will be used on site for the mobile plant and equipment. The fuel will be stored in a dedicated storage tank. There will also be portable bottles of oxygen and acetylene gas stored on site for welding purposes. The gas bottles will be kept secure in a separate compound.

Surface water run-off from all external areas of hardstanding (roads and storage areas) will be discharged into the surface water system having passed through interceptors. All surface water run-off will be collected in the site surface water drainage system and discharged to sewer via the combined sewerage system for the site.

External areas of hardstanding will be provided with kerbed containment, where appropriate, to prevent any potential spills from causing pollution of the ground /groundwater and surface water. Tanker off-loading of chemicals will take place within areas of concrete hardstanding with falls to a gully and/or a sump.

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 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.

The Applicant has submitted a site condition report which does not include a report on the baseline conditions as required by Article 22. The Applicant states that the current site will undergo remediation during site preparation and proposes to obtain baseline reference data at that time. We have therefore set pre-operational condition 7 requiring the Operator to provide the site baseline data prior to the commencement of commissioning of the Installation.

We have assessed the management and physical measures described in the Application and consider that the likelihood of incidents involving loss of containment is low and that the overall risk to the local environment is not significant.

4.2.3 Closure and decommissioning

Having considered the information submitted in the Application, we are satisfied that appropriate measures will be in place for the closure and decommissioning of the Installation, as referred to in section 2.11 of the Supporting Information Document in the Application. Pre-operational condition 1 requires the Operator to have an Environmental Management System in place before the Installation is operational, and this will include a site closure plan.

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

4.3 Operation of the Installation – general issues

4.3.1 Administrative issues

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

4.3.2 Management

The Applicant has stated in the Application that they will implement an Environmental Management System (EMS) that will be certified to ISO14001 standards. A pre-operational condition (PO1) is included in the Permit requiring the Operator to provide a summary of the EMS prior to commissioning of the plant and to make available for inspection by the Environment Agency, 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 in the Permit requiring the Operator to report progress towards gaining accreditation of its EMS.

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

4.3.3 Site security

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

4.3.4 Accident management

The Applicant has not submitted an Accident Management Plan. However, having considered the other information submitted in the Application, we are satisfied that appropriate measures will be in place to ensure that accidents that may cause pollution are prevented but that, if they should occur, their consequences are minimised. An Accident Management Plan will form part of the Environmental Management System and must be in place prior to commissioning as required by pre-operational condition 1.

The Applicant submitted a Fire Prevention Plan (FPP) which we have assessed. The Applicant states that this is a preliminary Fire Prevention Plan (FPP) for the Installation and will be subject to review following completion of detailed process design, which has not yet been undertaken.

However, as part of this Application, we have assessed the overarching principles of storing and processing large levels of combustible waste at the Installation. Where more information is required to ensure that the detailed design proposals are capable of meeting the FPP guidance, we have set pre-operational condition 11 in the Permit to ensure that the Operator submits a revised FPP to the Environment Agency for assessment and approval prior to the commencement of commissioning. The pre-operational condition will provide the Operator with an appropriate timeframe to develop the detailed site-specific measures prior to commissioning.

We have not approved the FPP and we accept it is not appropriate to finalise it at this present time. We consider that the Applicant will be able to produce a

satisfactory FPP in due course. The Environment Agency's FPP guidance does not replace other statutory requirements or applicable legislation with respect to fire prevention measures. The Applicant is expected to comply with all relevant legislation with respect to prevention and management of fires. The environment and human health are not at risk from pollution from fires at this Installation as no waste can be accepted, processed or any commissioning commence until the Environment Agency approves the updated FPP in writing prior to commissioning. Given the duration of time it would take for the Installation to commence full commercial operation, we consider that this is a reasonable and proportionate approach to permitting plants of this size.

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**	**Notes**
The Application	Supporting Information of the application document provided in response to section 3a – technical standards, Part B3 of the application form (*excluding section 2.12 and reference to co-incineration and 100 metres stack height*); Annex 4 – Environmental Risk Assessment.	Duly made 05/07/2018
Response to Schedule 5 Notice dated 04/12/2018	Operating techniques described in the responses to the Notice: Response 1 (capacity /annual throughput of installation), Response 3 (stack height), Response 4 (Application documents), Response 17 (waste and waste handling), Response 21 (energy efficiency and consumption).	Received 27/02/2019
Additional information	Confirmation of back-up continuous emissions monitoring system (CEMS).	Received 16/04/2019
Response to Schedule 5 Notice dated 28/03/2018	Operating techniques described in the responses to the Notice: Response 3 (site plan and point source emissions), Response 4 to 6 (management of odour emissions), Response 7 (management of fugitive dust emissions), Response 8 and 9 (management of pests). Pest Management Plan v2.	Received 18/04/2019
Additional information	Odour management plan	Updated and approved as required by

		pre-operational condition 8.
Additional information	Fire prevention plan	Updated and approved as required by pre-operational condition 11.
Additional information	Clarification on the management of ash quench water	10/07/2019

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 of the Permit.

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.

The waste incineration plant will take a mixture of Municipal Solid Waste (MSW), Refuse Derived Fuel and Commercial & Industrial Waste. Some of the waste types that the Applicant requested appeared to be for recyclable material, such as EWC 15 01 01 – Paper and cardboard packaging. The Applicant confirmed that these wastes would only be received if they were contaminated and not suitable for recycling. The Permit restricts separately

collected fractions to those which prove to be unsuitable for recovery (Condition 2.3.4c).

A detailed waste specification will be agreed with the waste suppliers, prior to the Operator receiving the wastes on site. There will be on-site procedures for reviewing wastes at the weighbridge and for checking incoming wastes against the agreed specifications on a regular basis, including the tipping of sample loads onto the floor of the tipping hall for visual inspection prior to transfer into the waste bunker. Crane drivers and other operatives will be trained in order to undertake these tasks.

The pre-acceptance and acceptance checks on wastes being delivered to the Installation will include audits of waste producers and/or fuel suppliers to review their operations to confirm that the wastes are in accordance with the waste descriptions, specifications and EWC codes specified in the Permit.

The Applicant reports that documented procedures for pre-acceptance and acceptance of all wastes will be developed prior to the commencement of commercial operation. We have set pre-operational condition 5 in the Permit which requires the Operator to submit pre-acceptance and acceptance procedures to the Environment Agency for approval prior to the commencement of commissioning. This will ensure that the Operator has robust measures in place to prevent unsuitable wastes from arriving at the Installation for incineration.

We have limited the capacity of the Installation to 400,000 tonnes per annum. This is based on the Installation operating 8,000 hours per year at a nominal capacity of 45 tonnes per hour. Although the risk assessments were based on continual operation of 8,760 hours per year, the Applicant confirmed that they would not incinerate more than 400,000 tonnes per year.

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 details 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:

- Good maintenance and housekeeping techniques and regimes across the whole plant.

- Plant condition monitoring will be carried out on a regular basis. This will ensure, amongst other things, that motors are operating efficiently, insulation and cladding are not damaged and that there are no significant leaks.

- Site operatives will be trained in energy awareness and will be encouraged to identify opportunities for energy efficiency improvements.

- The boilers will be equipped with economisers and superheaters to optimise thermal cycle efficiency without prejudicing boiler tube life, having regard for the nature of the fuel that is being burnt.

- Unnecessary releases of steam and hot water will be prevented, to avoid the loss of boiler water treatment chemicals and the heat contained within the steam and water.

- Low grade heat will be extracted from the turbine and used to preheat combustion air in order to improve the efficiency of the thermal cycle.

- Steady operation will be maintained where necessary by using auxiliary fuel firing.

- Boiler heat exchange surfaces will be cleaned on a regular basis to ensure efficient heat recovery.

The Application states that the specific energy consumption, a measure of total energy consumed per unit of waste processed, will be 132.75 kWh/tonne. The Installation capacity is 400,000 tonnes per annum.

Data from the BREF for Municipal Waste Incinerators shows that the range of specific energy consumptions is as specified in the table below.

MSWI plant size range (t/yr)	**Process energy demand (kWh/t waste input)**
Up to 150,000	300 – 700
150,000 – 250,000	150 – 500
More than 250,000	60 – 200

The BREF says that it is BAT to reduce the average Installation electrical demand to generally below 150 kWh/tonne of waste with an LCV of 10.4 MJ/kg. The LCV in this case is expected to be 10 MJ/kg. Taking account of the difference in LCV, 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 where a plant generates electricity only, it is BAT to recover 0.4 – 0.65 MWh/tonne of waste (based on LCV of 10.4 MJ/kg) for raw waste inputs or 0.6 – 1.0 MWh/tonne of waste (based on LCV of 15.2 MJ/kg) for pre-treated wastes. Our technical guidance note, EPR 5.01 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 Installation will generate 39 MW of electricity from 360,000 tonnes of waste (nominal design), which represents 10.8 MW per 100,000 tonnes/year of waste burned (0.87 MWh/tonne of waste). The Installation is therefore at the top end of the indicative BAT range.

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

Our CHP-R guidance also states that opportunities to maximise the potential for heat recovery should be considered at the early planning stage, when sites are being identified for incineration facilities. 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 have made comments about this to Sandwell Metropolitan Borough Council (the planning authority) in our role as a statutory consultee for the planning application.

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

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

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

They are however general indicators 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. The R1 factor can only be determined from operational data over a full year. At application stage, it is only possible to make a provisional assessment.

(v) Choice of Steam Turbine

The steam will be fed to a steam turbine which will be used to generate electricity. The proposed steam turbine enables the selection of steam pressures to optimise electrical output and overall plant efficiency. Steam will be extracted from the steam turbine at various pressures. This will be used to supply heat for internal processes (e.g. de-aeration and condensate preheating) and plume abatement at the stack.

The proposed steam conditions are 400°C and 60 bar. These are at the higher end of the range seen for similar plants, which will maximise energy recovery.

(vi) Choice of Cooling System

An Air-Cooled Condenser (ACC) will be used to condense the steam output from the turbine with return of the condensate to the boiler.

The Applicant considered air-cooled condensers (ACC) and water-cooled condensers (WCC). Both are outlined as potential BAT options in our Sector Guidance Note EPR 5.01. The WCCs use a recirculating water supply to condense the steam. Air-cooled condensers use air rather than water to condense steam.

Water-cooled systems require a nearby watercourse to supply significant volumes of water and to receive the discharge of the heated cooling water. Whilst there is a canal adjacent to the site which could supply water for cooling purposes, the Applicant reports that it would not be feasible to discharge the heated water back into the canal. Furthermore, the impact and costs of the alternative which is to discharge large volumes of abstracted water from the canal to sewer would be significant. Taking this into consideration, the Applicant considered that WCC is not considered to be BAT for this Installation.

The Applicant has chosen ACCs as they do not require large volumes of water and do not generate a visible plume. The Applicant considers that the use of ACCs is BAT for the proposed Installation. We agree with the Applicant's assessment.

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

The Applicant carried out an assessment of the potential for operating the Installation as a high-efficiency cogeneration installation and has concluded that this will not be possible because it will not be technically feasible to supply the required amount of heat.

The Applicant submitted a cost-benefit assessment of opportunities for high efficiency co-generation within 15 km of the Installation, in which they calculated the net present value (NPV). If the NPV is positive (i.e. any number more than zero) it means that the investors will make a rate of return that makes the scheme commercially viable. A negative NPV means that the project will not be commercially viable. The Applicant's assessment showed a net present value of -2.86 which demonstrates that operating as a high-efficiency cogeneration installation will not be financially viable. We agree with the Applicant's assessment and will not require the Installation to operate as a high-efficiency cogeneration plant.

The Applicant stated that the Installation would be CHP-Ready and submitted a CHP-Ready assessment based on our guidance. The assessment showed that the Installation would be capable of supplying heat to the above identified scheme, should it become viable in the future.

We consider that the Installation will recover heat as far as practicable, and therefore that the requirements of Article 14(5) are met.

(viii) Permit conditions concerning energy efficiency

Pre-operational condition 2 (PO2) requires the Operator to carry out a comprehensive review of the available heat recovery options prior to commissioning, in order to ensure that waste heat from the plant is recovered as far as possible.

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

The Operator is required to report energy usage and energy generated under condition 4.2 and Schedule 5. The following parameters are required to be reported: total electrical energy generated, electrical energy exported, total energy usage and energy exported as heat (if any). Together with the total waste burned per year, this will enable the 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 Applicant provided an indicative water flow diagram as the final water balance is still subject to detailed design. It is anticipated that the Installation will consume approximately 9 m^3/hr of town mains water. This water consumption is taken from other waste incineration facilities with a similar capacity.

The water systems have been designed so that where practicable, process effluent will be re-used within the process. The majority of the process effluent generated at the plant will be within the ash quench system. In addition, there will be a small amount of water which will discharge via the stack from soot blowing.

Any excess effluent which cannot be re-used within the process will be discharged to sewer in accordance with a trade effluent consent. We have set pre-operational condition 10 in the Permit which requires the Operator to provide an updated water balance detailing the annual volume of water from town mains supply and the estimated water demand of the waste incineration plant, prior to the commencement of commissioning. This is to ensure that the usage of water is minimised in the waste treatment process in accordance with BAT.

Under condition 4.2 and Schedule 5 in the Permit, the Operator is required to report with respect to raw material usage including consumption of lime, activated carbon and ammonia or 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 to abate NOx. These are the most significant raw materials that will be used at the Installation, other than the waste feed itself (addressed in section 4.3.6). The efficiency of the use of auxiliary fuel will be tracked separately as part of the energy reporting requirement under condition 4.2.1. Optimising reagent dosage for air abatement systems and minimising the use of auxiliary fuel 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, air pollution control residues and recovered metals.

The first objective is to avoid producing waste at all. Waste production will be avoided by achieving a high degree of burnout of the ash in the furnace, which results in a material that is both reduced in volume and in chemical reactivity. Condition 3.1.3 and associated Table S3.4 specify limits for total

organic carbon (TOC) of <3% /loss on ignition (LOI) of <5% in bottom ash. Compliance with this limit will demonstrate that good combustion control and waste burnout is being achieved in the furnace 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 3 (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 on-going programme of monitoring.

The Application proposes that, where possible, bottom ash will be transported to a suitable recycling facility, from where it could be re-used in the construction industry as an aggregate. However, if a suitable recovery facility will not accept the residue, it may be transferred to a non-hazardous landfill for disposal.

Having considered the information submitted in the Application, we are satisfied that the waste hierarchy referred to in Article 4 of the 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 the environment and human health 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 PC 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). Environmental Standards 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 (AAD) Limit Values
- Ambient Air Directive and 4th Daughter Directive Target Values
- UK Air Quality Strategy (AQS) Objectives
- Environmental Assessment Levels (EALs)

Where an AAD limit value exists, the relevant standard is the AAD limit value. Where an AAD limit value does not exist, AAD target values, UK AQS Objectives or EALs are used. Our web guide sets out EALs which have been derived to provide a similar level of protection to the environment and human health as the AAD limit values, AAD target values and AQS Objectives. In a very small number of cases, e.g. for emissions of Lead, the AQS Objective is more stringent that the 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.

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 judgement 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 judgement 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 Annex 5 of the Application (Report No: J1898/7/F8). The assessment comprises:

- Dispersion modelling of emissions to air from the operation of the waste incineration plant.
- 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's stack 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 /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 dispersion model, which is a commonly used computer model for regulatory dispersion modelling. The model used 5 years of meteorological data between 2011 and 2015, collected from the weather station at Birmingham Airport, located 17 km south east of the proposed site. The Applicant considered this station as the most suitable source of meteorological data due to its proximity to 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 46(2) and Annex VI of the IED. These substances are:
    - Oxides of nitrogen (NOx), 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)
- Second, they assumed that the Installation operates continuously at the relevant long-term or short-term ELVs, i.e. the maximum permitted emission rate (except for emissions of arsenic, chromium and nickel, which are considered in section 5.2.3 of this decision document).
- Third, the model also considered emissions of pollutants not covered by Annex VI of IED, specifically ammonia (NH_3), polycyclic aromatic hydrocarbons (PAH) and Polychlorinated biphenyls (PCBs). Emission rates used in the modelling have been drawn from data in the Waste Incineration BREF.

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

The Applicant has carried out background air quality monitoring to support the air quality impact assessment. This data is summarised in the Application and has been used by the Applicant to establish the background (or existing) air quality against which to measure the potential impact of the waste incineration plant.

In their assessment, the Applicant considered background pollutant concentrations from Defra modelled background maps[1], the UK Urban and Rural Heavy Metals Network[2], West Bromwich Automatic Urban and Rural Network (AURN), and Sandwell Metropolitan Borough Council (SMBC) automatic monitoring stations and diffusion tubes. The site is located within the Sandwell Borough-wide Air Quality Management Area (AQMA) for annual mean NO_2, due to exceedances of the ES at some locations within the Borough. We completed our own checks of background concentrations, and consider that the values used in the Applicant's assessments of PECs are likely representative of receptor locations, including for annual mean NO_2.

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 are 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. Whilst we have used the Applicant's modelling predictions in the table below, we have made our own simple verification calculation of the percentage process contribution and predicted environmental concentration. Any such minor discrepancies do not materially impact on our conclusions.

[1] http://uk-air.defra.gov.uk/data/laqm-background-home
[2] https://uk-air.defra.gov.uk/data/metals-data

Table 5.1 – Predicted long-term and short-term impact to air from the Installation

Assessment of emissions to air – Non-metals

Pollutant	ES	Background[11]	Process Contribution (PC)		Predicted Environmental Concentration (PEC)[11]	
	µg/m³	µg/m³	µg/m³	% of ES	µg/m³	% of ES
NO_2	40[1]	37.4	0.6	1.5	38.0	94.0
	200[2]	-	18	9.0	-	-
PM_{10}	40[1]	-	0.04	0.1	-	-
	50[3]	-	0.2	0.4	-	-
$PM_{2.5}$	25[1]	-	0.04	0.16	-	-
SO_2	266[4]	10	29	10.9	39	14.7
	350[5]	-	25	7.14	-	-
	125[6]	-	1.9	1.5	-	-
HCl	750[7]	-	7.85	1.04	-	-
HF	16[8]	-	0.004	0.03	-	-
	160[7]	-	0.7	0.44	-	-
CO	10000[9]	-	13.1	0.13	-	-
	30000[10]	-	13.08	0.04	-	-
VOCs (as 1,3 butadiene)	2.25[1]	0.32	0.04	1.78	0.360	16.0
PAH (as benzo[a]pyrene)	0.00025[1]	-	$8.9x10^{-07}$	0.36	-	-
NH_3	180[1]	-	0.04	0.02	-	-
	2500[10]	-	1.7	0.07	-	-
PCBs	0.2[1]	-	0.000021	0.01	-	-
	6[10]	-	0.00065	0.01	-	-
Dioxins		-	$4 x10^{-10}$		$4 x10^{-10}$	

Note 1 – Annual mean
Note 2 – 99.79th %ile of 1-hour means
Note 3 – 90.41st %ile of 24-hour means
Note 4 – 99.9th ile of 15-min means
Note 5 – 99.73rd %ile of 1-hour means
Note 6 – 99.18th %ile of 24-hour means
Note 7 – 1-hour average
Note 8 – Monthly average
Note 9 – Maximum daily running 8-hour mean
Note 10 – 1-hour maximum
Note 11 – Where the long-term process contribution is demonstrated to be less than 1% of the long-term ES and where the short-term process contribution is less than 10% of the short-term ES (a level below which we consider to indicate insignificant impact), we consider that examination of the PEC and background is not necessary.

Assessment of emissions to air – Metals

Pollutant	ES	Background[4]	Process Contribution		Predicted Environmental Concentration[4]	
	µg/m³	µg/m³	µg/m³	% of ES	µg/m³	% of ES
Cd	0.005[1]	0.002	0.0002	4.0	0.002	44.0
Tl		-	0.002		-	
Hg	0.25[1]	-	0.0002	0.08	-	-
	7.5[2]	-	0.01	0.13	-	-
Sb	5[1]	-	0.002	0.04	-	-
	150[2]	-	0.01	0.01	-	-
Pb	0.25[1]	-	0.002	0.8	-	-
Co		-	0.00002		-	-
Cu	10[1]	-	0.002	0.02	-	-
	200[2]	-	0.01	0.01	-	-
Mn	0.15[1]	0.001	0.0002	1.33	0.012	8.0
	1500[2]	-	0.01	0.01	-	-
V	5[1]	-	0.002	0.04	-	-
	1[3]	-	0.01	1.0	-	-
As	0.003[1]	0.001	0.0001	3.33	0.001	36.7
Cr (II)(III)	5[1]	-	0.002	0.04	-	-
	150[2]	-	0.01	0.01	-	-
Cr (VI)	0.0002[1]	-	0.000001	0.5	-	-
Ni	0.02[1]	0.00279	0.0009	4.4	0.003	18.4

Note 1 – Annual mean
Note 2 – 1-hr Maximum
Note 3 – 24-hr Maximum
Note 4 – Where the long-term process contribution is demonstrated to be less than 1% of the long-term ES and where the short-term process contribution is less than 10% of the short-term ES (a level below which we consider to indicate insignificant impact), we consider that examination of the PEC and background is not necessary.

(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}, $PM_{2.5}$, hydrogen chloride, hydrogen fluoride, carbon monoxide, PAHs, ammonia, PCBs, mercury, antimony, lead, copper, vanadium and chromium (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. These are:

- Nitrogen oxides (expressed as NO_2), Sulphur dioxide, VOCs (as 1,3-butadiene), cadmium, manganese, arsenic and nickel.

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 decision document.

5.2.2 Consideration of key pollutants

(i) Nitrogen dioxide (NO_2)

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

Our assessment of the long-term NO_2 PC (around 1.5%) agrees with the Applicant's prediction in consideration of expected modelling uncertainties at worst impacted receptor locations. This represents a worst-case meteorological year prediction assuming continuous emissions at the ELV. We note that the PEC is high due to the high background concentration in the AQMA, which has been declared for annual mean NO_2. Even considering this conservative background, our results indicate that the long-term NO_2 ES would not be exceeded at the most impacted receptor locations. Therefore, exceedances of the long-term ES for NO_2 as a result of the proposed Installation are unlikely.

(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 µg/m^3 and a short-term daily average of 50 µg/m^3. For $PM_{2.5}$ the ES of 25 µg/m^3 as a long-term annual average 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 that the plant emits particulates continuously at the IED Annex VI limit for total dust, whereas actual emissions from similar plant are normally lower.
- It assumes all particulates emitted are below either 10 microns (PM_{10}) or 2.5 microns ($PM_{2.5}$), when some are expected to be larger.

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

The above 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) <u>Acid gases, SO_2, HCl and HF</u>

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. Hydrogen fluoride has two 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 be screened out as insignificant in that the short-term process contribution is <10% of the short-term ES values (1 hour and 24-hour mean) only. Emissions of SO_2 cannot be screened out as insignificant for the 15-min mean in that the short-term process contribution is >10% of the short-term ES value. Whilst SO_2 emissions cannot be screened out as insignificant, the Applicant's modelling shows that the Installation is unlikely to result in a breach of the ES. The Applicant is required to prevent, minimise and control SO_2 emissions using BAT, this is considered further in Section 6. We are satisfied that SO_2 emissions will not result in significant pollution.

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

The above tables show that for CO emissions, 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 CO to be BAT for the Installation.

The above tables show that for VOC 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 1,3 butadiene for their assessment of the impact of VOCs. This is based on this substance having the lowest ES of organic species likely to be present in VOCs (other than PAH, PCBs, dioxins and furans).

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

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

From the tables above, all the other 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.

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 NOx abatement system.

The Applicant is required to prevent, minimise and control VOCs emissions using BAT, this is considered further in Section 6. We are satisfied that VOCs 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 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.

Annex VI of IED sets three limits for metal emissions:

- An emission limit value of 0.05 mg/m^3 for mercury and its compounds (formerly WID group 1 metals).
- An aggregate emission limit value of 0.05 mg/m^3 for cadmium and thallium and their compounds (formerly WID group 2 metals).
- An aggregate emission limit of 0.5 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:

- Hg, Sb, Cr(II)(III), Cu and Pb

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, Mn and V

This left emissions of As, Ni 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 Annex VI of the IED sets an aggregate limit, the Applicant's assessment assumes that each metal is emitted individually at the relevant aggregate emission limit value. This is 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 As and Cr(VI), the Applicant used representative emissions data from other municipal waste incinerators using our guidance note, "*Guidance to*

Applicants on Impact Assessment for Group 3 Metals Stack Releases – version 4".

The 2009 report of the Expert Panel on Air Quality Standards (EPAQS) – "Guidelines for Metal and Metalloids in Ambient Air for the Protection of Human Health", sets non-statutory ambient air quality guidelines for arsenic, nickel and chromium (VI). These guidelines have been incorporated as ESs in our guidance 'Air emissions risk assessment for your environmental permit'

Chromium (VI) is not specifically referenced in Annex VI of IED, which includes only total chromium as one of the nine Group 3 metals, the impact of which has been assessed above. The EPAQS guidelines refer only to that portion of the metal emissions contained within PM_{10} in ambient air. The guideline for chromium (VI) is 0.2 ng/m^3.

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. We have considered the proportion of chromium (VI) to total chromium in the APC residues collected upstream of the emission point for existing municipal waste incinerators and have assumed these to be similar to the particulate matter released from the emission point. This data shows that the mean chromium (VI) emission concentration (based on the bag dust ratio) is 3.5×10^{-5} mg/m^3 (max 1.3×10^{-4}).

The Applicant has used the above data to model the predicted chromium (VI) impact. The PC is predicted as 0.3% of the EAL. This assessment shows that emissions of chromium (VI) screen out as insignificant.

While emissions of arsenic did not screen out as insignificant, it was assessed as being unlikely to give rise to significant pollution.

Thallium and Cobalt do not have an EAL. As shown below, the process contribution of these metals is similar to that of the other metals and we consider the emissions of these metals to be not significant.

Pollutant	**EQS / EAL**	**Background Concentration**	**PC Long Term µg/m^3**	**PC Short Term µg/m^3**
Cobalt	None	None available	2×10^{-5}	0.0009
Thallium	None	None available	0.002	0.09

We agree with the Applicant's conclusions. Improvement condition 7 (IC7) has been set in the Permit to assess actual emissions of arsenic and nickel against those assumed. 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)

Sandwell MBC has declared an AQMA with respect to NO_2 for the whole administrative area. As well as calculating the peak ground level concentration, the Applicant has modelled the concentration of key pollutants at 42 specified residential locations within the surrounding area. From the Applicants model, the long-term process contribution at 5 of the 42 sensitive receptor locations are marginally above 1% of the ES, all the other sites screen out. Our predictions indicated that the highest predicted long-term process contribution of NO_2 would not be insignificant, but that it would still be very small (i.e. less than 1.5% of the ES) and likely to be conservative because we have used a 'worst case' 70% long-term NOx to NO_2 conversion ratios. Conversion is likely to be less in areas with high background NOx, e.g. from road traffic sources.

As the process contributions exceeded the insignificance criterion for long-term NO_2, we considered predicted environmental concentrations (PECs) using the highest recorded background concentrations within the vicinity of these locations. We used the highest recorded concentration from the Sandwell Metropolitan Borough Council (SMBC) automatic monitoring station 'PS2B (West Bromwich Roadside)' from 2012, as presented in their 2017 air quality annual status report. This is a roadside monitoring station, whereas our maximum predicted concentrations on the grid are set back a small distance from the closest road. Concentrations drop-off significantly with distance from the road traffic sources. Even using this conservative background concentration in combination with our highest predicted concentrations, PECs were not found to exceed the ES of 40 µg/m^3 within the Sandwell AQMA.

Given the above, we consider that the risk of the site causing an exceedance of the annual NO_2 ES within the Sandwell AQMA is low. Overall, whilst emissions cannot be screened out as insignificant, the Applicant's modelling shows that the Installation is unlikely to result in a breach of the ES within the AQMA.

The Applicant is required to prevent, minimise and control emissions using BAT; this is considered further in Section 6.

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 include the application of BAT, which may in some circumstances dictate tighter emission limits and controls than those set out in 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. Sections 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."

The European Integrated Pollution Prevention and Control Bureau stated in the Reference Document on the Best Available Techniques for Waste Incineration August 2006 "European health impact assessment studies, on the basis of current evidence and modern emission performance, suggest that the local impacts of incinerator emissions to air are either negligible or not detectable."

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 PM_{10} emissions and proximity to MWIs, and no association with the opening of MWIs on changes in risks of infant mortality or sex ratio.

The final part of the study, published on 21 June 2019, 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 and furans, 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.

Dioxin Intake Models: Two models are available to predict the dioxin 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 are the HHRAP model.

HHRAP has been developed by the United States Environmental Protection Agency (USEPA) 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 sizes, such as for children of different ages. In the UK, the COT has set a TDI for dioxins, furans and dioxin-like PCBs of 2 picograms I-TEQ/Kg-body weight/day (N.B. a picogram is a million millionths (10^{-12}) of a gram).

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

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 applying its methodology to small affected areas. Those concerns generally relate to the fact that the exposure-response coefficients used in the COMEAP report are derived 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 NOx, SO_2 and particulates cannot be screened out as insignificant in an Environmental Impact Assessment where 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 were considered in determining this Application as described in Annex 4 of this decision 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 Installation, were significantly below the recommended TDI levels.

Table 5.3 – Predicted maximum daily intake of dioxins, furans and dioxin-like PCBs from the Installation

Receptor	Maximum predicted daily intake (pg I-TEQ/kg-BW/day) [1]
Receptor 19 (Infant)	0.011
Receptor 19 (Child)	0.0046
Receptor 19 (Adult)	0.0016
Note 1 – Data shown is the calculated maximum daily intake of dioxins of the most impacted local receptor resulting from the operation of the proposed Installation (I-TEQ/ kg-BW/day).	

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 $PM_{0.1}$ was 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 $PM_{2.5}$ levels. The 2016 data also shows that road traffic contributed 5.35% of PM_{10} and 4.96% of $PM_{2.5}$ and that domestic wood burning contributed 22.4% PM_{10} and 34.3% of $PM_{2.5}$ levels. This is consistent with the assessment of this Application which shows emissions of PM_{10} to air to be insignificant.

In 2016, a paper by Jones and Harrison concluded that 'ultrafine particles (<100 nm) 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}, $PM_{2.5}$, hydrogen chloride, hydrogen fluoride, carbon monoxide, PAHs, ammonia, PCBs, mercury, antimony, lead, copper, vanadium and chromium (II)(III) have all indicated that the Installation's emissions screen out as insignificant; where the impact of emissions of nitrogen oxides, sulphur dioxide, VOCs (as 1,3-butadiene), cadmium, manganese, arsenic, nickel and chromium (VI) have not been screened out as insignificant, 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 human health impact assessment. Our screening check calculations of dioxins, furans and dioxin-like PCB intakes, indicate that the PC is likely to be less than 1% of the COT TDI and is therefore insignificant.

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 is concluded that the operation of the proposed Installation 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 they raised no concerns with respect to unacceptable effects on the human food chain as a result of the operations at the Installation. Details of the responses provided by Public Health England, (and on behalf of the Local Authority Director of Public Health) 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 Installation 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 10 km of the Installation:

- Fens Pools

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

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

Local Nature Reserves

- Priory Woods

Local Wildlife Sites

- Snow Hill to Wolverhampton Railway
- Balls Hill Branch Canal
- Sandwell Valley
- Priory Woods, Sandwell Valley
- Galton Valley
- Holly Lane, West Smethwick
- Galton Valley
- Broadwell Park, Tame Valley
- Stream off Europa Avenue

5.4.2 Habitats Assessment

The Applicant's Habitats assessment was reviewed by the Environment Agency's technical specialists for modelling, air quality, conservation and ecology technical services, who agreed with the assessment's conclusions, that there would be no likely significant effect on the interest features of the protected sites.

Toxic contamination – NOx, SO_2, NH_3 and HF

The modelling information provided by the Applicant has predicted that emissions of NOx, SO_2, NH_3 and HF do not exceed 1% of the relevant long-term critical level or 10% of the relevant short-term critical level for Fens Pools SAC (see Table 5.4a below).

Table 5.4a – Maximum modelled concentrations of NOx, SO_2, NH_3 and HF at Fens Pools SAC

Habitat site	Parameter	Critical level (µg/m³)	PC (µg/m³)	PC as % of CLe	Significance
Fens Pools SAC	**NO_2** (annual mean)	30	0.04	0.13	Insignificant: PC<1% of LT threshold
	NO_2 (daily mean)	75	2.1	2.8	Insignificant: PC<10% of ST threshold
	SO_2 (annual mean)	20	0.01	0.05	Insignificant: PC<1% of LT threshold
	NH_3 (annual mean)	3	0.002	0.06	Insignificant: PC<1% of LT threshold
	HF (weekly mean)	0.5	0.002	0.4	Insignificant: PC<1% of LT threshold
	HF (daily mean)	5	0.01	0.2	Insignificant: PC<10% of ST threshold

Nutrient nitrogen enrichment

Table 5.4b below shows the predicted nitrogen deposition rates at Fens Pools SAC. The background concentration for nutrient nitrogen for Fens Pools SAC was obtained from the Air Pollution Information Service (APIS) website. There is no available critical load for nutrient nitrogen for the site.

Table 5.4b – Modelled nutrient nitrogen deposition at Fens Pools SAC

Habitat site	Critical Load (CLo) kgN/ha/yr	Background N deposition kgN/ha/yr	PC N deposition kgN/ha/yr	PC as % of minimum threshold level	Significance
Fens Pools SAC (Standing open water and canals) *Triturus cristatus* – Great crested newt	*[Note 1]*	13.86	0.02	N/A	N/A
Note 1 – No critical load is available for this habitat site and there is no comparable habitat with established critical load estimates.					

The Applicant provided a habitats impact assessment which showed that nitrogen nutrient deposition will not have any likely significant effect on the interest features at the Fens Pools SAC. The Environment Agency conducted check modelling of the habitats impact assessment and the results were consistent with those of the Applicant. We can conclude no likely effect from nutrient nitrogen deposition at the Fens Pools SAC.

Acidification

Table 5.4c below shows the predicted acid deposition rates at Fens Pools SAC. The background concentration for acid deposition for Fens Pools SAC was obtained from the APIS website. There is no available critical load for acid deposition for the site.

Table 5.4c – Modelled acid deposition rates at Fens Pools SAC

Habitat site	Critical Load (CLo) keq/ha/yr	Background deposition keq/ha/yr	PC deposition keq/ha/yr	PC as % of threshold level	Significance
Fens Pools SAC (Standing open water and canals) *Triturus cristatus* – Great crested newt	*[Note 1]*	Nitrogen: 0.99 Sulphur: 0.36 Total: 1.35	0.02	N/A	N/A
Note 1 – No critical load is available for this habitat site and there is no comparable habitat with established critical load estimates.					

The Applicant provided a habitats impact assessment which showed that acid deposition will not have any likely significant effect on the interest features at the Fens Pools SAC. The Environment Agency conducted check modelling of the air quality assessment and the results were consistent with those of the Applicant. We can conclude no likely effect from acid deposition at the Fens Pools SAC.

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 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 assessed the dispersion of the relevant pollutants against critical level criteria for the protection of vegetation and ecosystems which is summarised in the following table. The values shown represent the highest concentrations predicted for at the most impacted receptor for each pollutant.

Table 5.4d – Maximum critical level concentrations on local wildlife sites within 2 km of the Installation

Pollutant	Critical level (µg/m^3)	PC (µg/m^3) [1]	PC as % of Critical level
SO_2	10 (LT)	0.2	2.0
NOx (as NO_2)	30 (LT)	0.8	3.0
	75 (ST)	7.7	10.0
HF	0.5 (LT)	0.01	3.0
	5 (ST)	0.03	1.0
NH_3	1 (LT)	0.04	4.0
Note [1] – PC is given as the highest concentration predicted for the most impacted non-statutory sites.			

The Applicant has assessed the critical loads for nitrogen and acid deposition against critical load criteria for sites as obtained from APIS which is summarised in the following table. The values shown represent the highest concentrations predicted for at the most impacted receptor for each pollutant.

Table 5.4e – Maximum critical load concentrations on local wildlife sites within 2 km of the Installation

Pollutant	Critical load (most severe criterion used to exemplify receptors)	PC [1]	PC as % of Critical load
Nitrogen deposition	10 kg N/ha/yr	0.4 kg N/ha/yr	4.0
Acid deposition	0.55 keq/ha/yr	0.4 keq/ha/yr	4.0
Note [1] – PC is given as the highest concentration predicted for the most impacted non-statutory sites.			

The tables above show that the PCs are well below the critical levels or loads. We are satisfied that the proposed Installation will not cause significant pollution at the conservation sites. The Applicant's assessment of non-statutory sites was reviewed by the Environment Agency's technical specialists for modelling, air quality, conservation and ecology technical services, who agreed with the assessment's conclusions, that the proposal will not have a significant impact on the non-statutory sites. The Applicant is required to prevent, minimise and control emissions using BAT, this is considered further in section 6 of this decision document.

5.5 Impact of abnormal operations

Article 50(4)(c) of IED requires that waste incineration and co-incineration plants 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 following worst-case scenario has been assumed:

- Dioxin emissions of 10 ng/Nm^3 (100 x normal)
- Metal emissions are 100 times those of normal operation
- NOx emissions of 550 mg/Nm^3 (1.375 x normal)
- Metal emissions other than mercury are 5 times those of normal operation
- Particulate emissions of 150 mg/Nm^3 (5 x normal)
- SO_2 emissions of 450 mg/Nm^3 (2.3 x normal)
- HCl emissions of 900 mg/Nm^3 (15 x normal)
- HF emissions of 90 mg/Nm^3 (22.5 x normal)
- PCBs emissions of 5 mg/Nm^3 (1,000 x normal)

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

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

Table 5.5 – Predicted abnormal emissions impact to air from the Installation

Pollutant	ES	Background	Process Contribution (PC)		Predicted Environmental Concentration (PEC)[7]	
	µg/m³	µg/m³	µg/m³	% of ES	µg/m³	% of ES
NO_2	200[2]	65.6	24.8	12.4	90.4	45.2
PM_{10}	50[3]	--	1	2.00	--	--
SO_2	266[4]	9.8	65.3	24.5	75.1	28.2
	350[5]	9.8	56.3	16.09	66.1	18.9
HCl	750[6]	1.42	150	20	151.4	20.19
HF	160[6]	--	15.8	9.8	--	--
Hg	7.5[1]	--	0.15	2.00	--	--
Sb	150[1]	--	0.031	0.02	--	--
Cu	200[1]	--	0.0783	0.04	--	--
Mn	1500[1]	--	0.162	0.01	--	--
PCBs	6[1]	--	0.00065	0.01	--	--
Cr (II)(III)	150[1]	--	0.248	0.17	--	--
Dioxins			7.40×10^{-10}		7.40×10^{-10}	

Note 1 – 1-hr Maximum
Note 2 – 99.79th %ile of 1-hour means
Note 3 – 90.41st %ile of 24-hour means
Note 4 – 99.9th ile of 15-min means
Note 5 – 99.73rd %ile of 1-hour means
Note 6 – 99.73rd %ile of 1-hour means
Note 7 – Where the long term process contribution is demonstrated to be less than 1% of the long term ES and where the short term process contribution is less than 10% of the short term ES (a level below which we consider to indicate insignificant impact), we consider that examination of the PEC and background is not necessary.

From the table above, the emissions of the following substances are considered insignificant, in that the PC is less than 10% of the short-term ES for PM_{10}, hydrogen fluoride, mercury, antimony, copper, manganese, PCBs and chromium (II)(III).

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 PEC is well below 100% of the short term ES for NO_2, SO_2 and HCl.

We have not assessed the impact of abnormal operations against long term ES for the reasons set out above. Except that if dioxin emissions were at 10 ng/m³ for the maximum period of abnormal operation, there would be an increase in the TDI reported above. We consider that this represents the

worst-case situation and is in practice a highly unlikely scenario. In these circumstances, the TDI would be 0.004 pg (I-TEQ/ kg-bw/day), which is 0.2% of the COT-TDI limit of 2 pg (I-TEQ)/ kg-bw/day (calculated as a human lifespan of 70 years with appropriate proportions as an infant, child and adult). At this level, emissions of dioxins will still not pose a risk to human health.

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 one particular kind has been chosen 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. The pollutants are nitrogen oxides, sulphur dioxide, VOCs (as 1,3-butadiene), cadmium, manganese, arsenic and nickel.

- 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. A final draft of the BAT conclusions was published in December 2018, however it is not expected that the BAT Conclusions will be published (and come into force) until the second half of 2019.

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 their 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 the environment and human health 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 Waste Incineration BREF elaborates the furnace selection criteria as:

- The use of furnace (including secondary combustion chamber) dimensions that are large enough to provide for an effective combination of gas residence time and temperature such that combustion reactions may approach completion and result in low and stable CO and TOC emissions to air and low TOC in residues.
- The use of a combination of furnace design, operation and waste throughput rate that provides sufficient agitation and residence time of the waste in the furnace at sufficiently high temperatures.
- The use of furnace design that, as far as possible, physically retains the waste within the combustion chamber (e.g. grate bar spacing) to allow its complete combustion.

The BREF also provides a comparison of combustion and thermal treatment technologies and factors affecting their applicability and operational suitability used in the EU and for all types of wastes. There is also some information on the comparative costs. The table below has been extracted from the Waste Incineration BREF tables. This table is also in line with our Sector 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 treatable; better combustion control possible.	As air-cooled grates but risk of grate damaging leaks and higher complexity	TOC 0.5 % to 3 %	Slightly higher capital cost than air-cooled
Rotary Kiln	Can accept liquids and pastes. Solid feeds more limited than grate (owing to refractory damage) often applied to hazardous wastes	<10 t/h	Very well proven with broad range of wastes and good burn out even of HW	Throughputs lower than grates	TOC <3 %	Higher specific cost due to reduced capacity
Fluid bed - bubbling	Only finely divided consistent wastes. Limited use for raw MSW often applied to sludges	1 to 10 t/h	Good mixing; Fly ashes of good leaching quality	Careful operation required to avoid clogging bed; Higher fly ash quantities.	TOC <3 %	FGT cost may be lower; Costs of waste preparation
Fluid bed - circulating	Only finely divided consistent wastes; Limited use for raw MSW, often applied to sludges / RDF.	1 to 20 t/h most used above 10 t/h	Greater fuel flexibility than BFB; Fly ashes of good leaching quality	Cyclone required to conserve bed material; Higher fly ash quantities	TOC <3 %	FGT cost may be lower. Costs of preparation
Oscillating furnace	MSW / heterogeneous wastes	1 – 10 t/h	Robust; Low maintenance; Long history; Low NOx level; Low LOI of bottom ash	Higher thermal loss than with grate furnace; LCV under 15 GJ/t	TOC 0.5 – 3 %	Similar to other technologies

Technique	Key waste characteristics and suitability	Throughput per line	Advantages	Disadvantages / Limitations of use	Bottom Ash Quality	Cost
Pulsed hearth	Only higher CV waste (LCV >20 GJ/t) mainly used for clinical wastes	<7 t/h	Can deal with liquids and powders	bed agitation may be lower	Dependent on waste type	Higher specific cost due to reduced capacity
Stepped and static hearths	Only higher CV waste (LCV >20 GJ/t); Mainly used for clinical wastes	No information	Can deal with liquids and powders	Bed agitation may be lower	Dependent on waste type	Higher specific cost due to reduced capacity
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	1 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 operation / maintenance costs
Gasification – entrained flow	mixed plastic wastes; other similar consistent streams; not suited to untreated MSW; gasification less widely used/proven than incineration	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 pre-treatment costs high
Gasification - fluid bed	Mixed plastic wastes; shredded MSW; shredder residues; sludges; metal rich wastes; other similar consistent streams; less widely used/proven than incineration	5 – 20 t/h	Temperatures e.g. for Al recovery; separation of 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
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 required; not widely proven; need market for syngas	Dependent on process temperature; Residue produced requires further processing, sometimes combustion	High pre-treatment, operation and capital costs

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

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

The various options for thermal treatment of the proposed combination of waste materials have relative benefits and disadvantages. All the options are capable, subject to appropriate abatement measures being taken, of performing within IED emission limits (although limited emissions performance data are reported in respect of gasification and pyrolysis). Whilst moving grate systems generate higher raw gas pollutant concentrations, the application of abatement, which is still required for all options, enables compliance with IED limits and in many instances, performance to achieve emissions well below these levels.

The Applicant discounted fixed hearth as the technology is suitable for low volumes of consistent waste. Fixed hearth technologies have difficulty in meeting the Chapter IV IED emission limits, mainly due to the semi-batch nature of the fuel travel on the grate and de-ashing operations. Therefore, this system is not considered practical and has not been considered any further.

Pulsed hearth technology has been used for waste fuels, such as refuse derived fuels, in the past, as well as other solid wastes. However, there have been difficulties in achieving reliable and effective burnout of waste and it is considered that the burnout criteria required by the IED would be difficult to achieve using this system. Therefore, the Applicant considers that the pulsed hearth system is not considered practical for the proposed Installation.

Rotary kilns have been proven to achieve good fuel agitation and associated burn-out. Rotary kilns are widely used within the cement industry which uses a consistent fuel feedstock and they have been widely used within the healthcare sector in treating clinical waste, but they have not been used in the UK for large volumes of waste derived fuels. The energy conversion efficiency of a rotary kiln is lower than that of other waste incineration technologies due to the large areas of refractory lined combustion chamber.

An Oscillating kiln is used for the incineration of municipal waste at one site in England and some sites in France. Like the rotary kiln, the energy conversion efficiency in these systems is lower than that of other waste incineration technologies due to the large areas of refractory lined combustion chamber.

The capacity of the rotary or oscillating kiln unit is limited to 8 tonnes per hour. If this is applied to the proposed Installation, approximately 7 furnaces would be required to achieve the design throughput. This is not considered practical and would lead to significant efficiency losses, therefore this option has not been considered any further.

The Applicant considered Pyrolysis and Gasification with the production of syngas. However, these systems normally require some form of external heat source, which may be from the combustion of part of the syngas. Various suppliers are developing pyrolysis and gasification systems for the disposal of waste derived fuels. However, these systems are not considered proven. Currently there are no operational pyrolysis or gasification systems which are of a capacity required to process the proposed design capacity for the proposed Installation. Therefore, these systems are not considered to be available and have not been considered any further.

Fluidised bed combustion can sometimes lead to slightly lower NOx generation, although injection of ammonia solution is still required to achieve the IED emission limits. Fluidised bed technologies are designed to treat large quantities of waste derived fuels and are therefore regarded as being an appropriate combustion technology for the proposed Installation. Fluidised beds are only appropriate when the fuel is consistent. Any deviations in fuel composition can result in operational issues with the bed. Some fluidised bed suppliers will require fuel to achieve a very tight fuel specification which can require an additional pre-treatment process to be installed to ensure that the fuel composition is appropriate for combustion.

The Applicant concluded that only moving grate and fluidised bed incineration systems were technically proven options at large scale and suitable for the proposed Installation. This is broadly in line with the Waste Incineration BREF.

The Applicant considered the following options in more detail:

1. Moving Grate Furnace – Option 1
2. Fluidised Bed – Option 2

- Fluidised beds are designed for the combustion of relatively homogeneous fuel. Therefore, fluidised beds are appropriate for untreated waste which have been pre-processed to produce an RDF, such as that proposed for the Installation.

- Emissions from each option are similar. Although fluidised beds can achieve lower NOx emissions, in practice secondary abatement would still be required. Abated emissions would be similar to moving grate with NOx emissions dependent on the abatement technique although using a fluidised bed would benefit from a lower reagent use.

- Raw material usage for moving grate is lower than fluidised bed due to sand being required for fluidised bed.

- Differences in GWP between each option are not significant. The energy requirements for each option are very similar. The amount of carbon dioxide emitted will be dependent on the carbon content of the waste and will therefore be essentially the same for each option. The amount of energy that can be recovered from the waste is a consideration for GWP, in that if more energy is recovered, less fossil

fuel will be required to be combusted elsewhere. The energy conversion efficiencies for options 1 and 2 are similar.

- The overall quantity of residues generated is similar for each option, although fluidised bed will generate more hazardous waste air pollution control residues than moving grate.

- There are no significant differences in odour, noise and accident risks between the options.

- The estimated costs associated with fluidised bed are 6% higher than moving grate on an annualised basis.

Furthermore, the moving grate system will be able to process large volumes of waste-derived fuel compared to a fluidised bed system. In this context and alongside in particular the fact that its reliability at a commercial scale is proven and that it provides a cost-effective option, the Applicant has selected moving grate as the thermal treatment technology and considers it to be BAT for the proposed Installation.

We have considered the assessments made by the Applicant and agree that the furnace technology chosen represents BAT. We believe that, based on the information gathered by the BREF process (see table above), the chosen technology will achieve the requirements of the IED for all emissions to air including TOC/CO and the TOC in bottom ash.

Boiler Design

In accordance with our Sector 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 computational fluid dynamics (CFD) to ensure no pockets of stagnant or low velocity gas;
- boiler passes are progressively decreased in volume so that the gas velocity increases through the boiler; and
- Design of boiler surfaces to prevent boundary layers of slow-moving gas.

Any of the options listed in the BREF and summarised in the table above can be BAT. The Applicant has chosen a furnace technique that is listed in the BREF and we are satisfied that the Applicant has provided sufficient justification to show that their technique is BAT. This is not to say that the other techniques could not also be BAT, but that the Applicant has shown that their chosen technique is at least comparable with the other BAT options. We believe that, based on the information gathered by the BREF process, the

chosen technology will achieve the requirements of Chapter IV of the IED for the air emissions of TOC/CO and the TOC on bottom ash.

6.2 BAT and emissions control

The prime function of flue gas treatment (FGT) 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 FGT 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 FGT systems as:

- type of waste, its composition and variation
- type of combustion process, and its size
- flue-gas flow and temperature
- flue-gas content, size and rate of fluctuations in composition
- 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
- release of noise.

Taking these factors into account, the Sector 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 5 mg/m^3	Max temp 250°C	Multiple compartments Bag burst detectors	Most plants
Wet scrubbing	May reduce acid gases simultaneously	Not normally BAT Liquid effluent produced	Require reheat to prevent visible plume and dew point problems	Where scrubbing required for other pollutants

Ceramic filters	High temperature applications Smaller plant	May “blind” more than fabric filters		Small plant High temperature gas cleaning required
Electrostatic precipitators	Low pressure gradient. Use with bag filter may reduce the energy consumption of the induced draft fan.	Not normally BAT		When used with other particulate abatement plant

The Applicant proposes to use fabric filters for the abatement of particulate matter. Fabric filters provide reliable abatement of particulate matter to below 5 mg/m^3 and are BAT for most installations. The Applicant proposes to use multiple compartment filters with burst bag detection to minimise the risk of increased particulate emissions in the event of bag rupture.

Emissions of particulate matter have been previously screened out as insignificant, and so the Environment Agency agrees that the Applicant’s proposed technique is BAT for the Installation.

6.2.2 Oxides of Nitrogen

Oxides of Nitrogen: Primary Measures				
Technique	**Advantages**	**Disadvantages**	**Optimisation**	**Defined as BAT in BREF or TGN for:**
Low NOx burners	Reduces NOx at source		Start-up, supplementary firing	Where auxiliary burners required
Starved air systems	Reduce CO simultaneously			Pyrolysis, Gasification systems
Optimise primary and secondary air injection				All plant
Flue Gas Recirculation (FGR)	Reduces the consumption of reagents used for secondary NOx control May increase overall energy recovery	Some applications experience corrosion problems		All plant unless impractical in design (needs to be demonstrated)

The Applicant proposes to implement the following primary measures:

- Low NOx burners – this technique reduces NOx at source and is defined as BAT where auxiliary burners are required.
- Optimise primary and secondary air injection – this technique is BAT for all plant.
- Flue gas recirculation (FGR) – this technique reduces the consumption of reagents for secondary NOx control and can increase overall energy recovery, although in some applications there can be corrosion problems – the technique is considered BAT for all plant.

The Applicant reports that the choice of whether to include FGR is supplier dependent. Some furnace suppliers have designed their combustion systems to operate with FGR and these suppliers can gain benefits of reduced NOx generation from the use of FGR. Other suppliers have focused on reducing NOx generation through the control of primary and secondary air supply and the furnace design, and they can gain little if any benefit from the use of FGR. On this basis, the Applicant proposes to consider whether or not to install FGR at the Installation during the technology procurement process.

We have included pre-operational condition 13 in the Permit which requires the Operator to confirm whether or not FGR will be installed on site with appropriate justification as part of the final design for approval by the Environment Agency prior to the commencement of commissioning.

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 <70 mg/Nm^3 Reduces CO, VOC, dioxins	Expensive Re-heat required – reduces plant efficiency		All plant
Selective non-catalytic reduction (SNCR)	NOx emissions typically 150 – 180 mg/Nm^3	Relies on an optimum temperature around 900 °C, and sufficient retention time for reduction May lead to ammonia slip	Port injection location	All plant unless lower NOx release required for local environmental protection.
Reagent Type: Ammonia	Likely to be BAT Lower nitrous oxide formation	More difficult to handle Narrower temperature window		All plant

Reagent Type: Urea	Likely to be BAT			All plant

There are two recognised techniques for secondary measures to reduce NOx. These are Selective Catalytic Reduction (SCR) and Selective Non-Catalytic Reduction (SNCR). For each technique, there is a choice of ammonia or urea as reagent.

Selective Catalytic Reduction can reduce NOx levels to below 70 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. The periodic replacement of the catalysts also produces a hazardous waste.

Selective Non-Catalytic Reduction can typically reduce NOx levels to between 150 and 180 mg/m^3. It relies on an optimum temperature of around 900°C and sufficient retention time for reduction. Selective Non-Catalytic Reduction is more likely to have higher levels of ammonia slip. The technique can be applied to all plant unless lower NOx releases are required for local environmental protection. Ammonia or urea 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. Either reagent is BAT and the use of one over the other is not normally significant in environmental terms.

The Applicant proposes to use SNCR, but has not confirmed whether or not ammonia or urea will be the reagent. At the time of application, the technology provider has not been selected. The Applicant proposes to confirm the SNCR abatement reagent during the technology procurement process. We have included pre-operational condition 13 in the Permit which requires the Operator to provide the details of the reagent for the SNCR abatement with appropriate justification as part of the final design for approval by the Environment Agency prior to the commencement of commissioning.

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

Abatement Option	**Cost of NOx abated £/tonne**	**PC (long term)**	**PEC (long term)**
SCR	£3,530	0.21	29.71
SNCR	£1,870	0.60	30.10
FGR + SNCR	£2,280	0.60	30.10

Based on the figures above, the Applicant considers that the additional cost of SCR over SNCR is not justified by the reduction in environmental impact. We agree with the Applicant's assessment that SCR is not BAT in this case, and SNCR is BAT for the Installation. The amount of ammonia or urea used for NOx abatement will need to be optimised to maximise NOx reduction and

minimise NH_3 slip. Improvement condition 6 (IC6) requires the Operator to report to the Environment Agency on optimising the performance of the NOx abatement system. We have set monitoring and reporting requirements for NH_3 and N_2O emissions in the Permit (see Table S3.1 and S4.1).

6.2.3 Acid Gases – SOx, 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 gas oil 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

The Applicant proposes to implement the following primary measures:

- Use of low sulphur fuels for start-up and auxiliary burners – gas should be used if available, where fuel oil is used, this will be low sulphur (i.e. <0.1%), this will reduce SOx at source.

  The Applicant proposes to use either fuel oil, liquefied petroleum gas or natural gas as support fuel for start-up, shut down and for the auxiliary burners. The Applicant reports that the project is currently under development. Whilst there are ongoing discussions with technology providers and the Engineering, Procurement and Construction (EPC) Contractors, at this stage a technology provider/ EPC Contractor has not been appointed for the delivery of the project. Therefore, until they are appointed and they have undertaken design of the proposed layout of equipment and plant, the type of auxiliary fuel cannot be confirmed.

  We have included pre-operational condition 13 in the Permit which requires the Operator to provide the details of the type of auxiliary fuel to be used on site with appropriate justification as part of the final design for approval by the Environment Agency prior to the commencement of commissioning.

- Management of heterogeneous wastes – this will disperse problem wastes such as PVC by ensuring a homogeneous 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		Plants with high acid gas and metal components in exhaust gas – HWIs
Dry	Low water use Reagent consumption may be reduced by recycling in plant Lower energy use Higher reliability	Higher solid residue production Reagent consumption controlled only by input rate		All plant
Semi-dry	Medium reaction rates Reagent delivery may be varied by concentration and input rate	Higher solid waste residues		All plant
Reagent Type: Sodium hydroxide	Highest removal rates Low solid waste production	Corrosive material ETP sludge for disposal		HWIs

Reagent Type: Lime	Very good removal rates Low leaching solid residue Temperature of reaction well suited to use with bag filters	Corrosive material May give greater residue volume if no in-plant recycle	Wide range of uses	MWIs, CWIs
Reagent Type: Sodium bicarbonate	Good removal rates Easiest to handle Dry recycle systems proven	Efficient temperature range may be at upper end for use with bag filters – Leachable solid residues Bicarbonate more expensive	Not proven at large plant	CWIs

There are three recognised techniques for secondary measures to reduce acid gases. These are wet, dry and semi-dry. 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.

The Applicant has therefore considered dry and semi-dry methods of secondary measures for acid gas abatement. Either can be BAT for this type of facility.

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

In both dry and semi-dry systems, the injected powdered reagent reacts with the acid gases and is removed from the gas stream by the bag filter system. The powdered materials are either lime or sodium bicarbonate. Both are effective at reducing acid gases, and dosing rates can be controlled from continuously monitoring acid gas emissions. The decision on which reagent to use is normally economic. Lime produces a lower leaching solid residue in the APC residues than sodium bicarbonate and the reaction temperature is well suited to bag filters. It tends to be lower cost, but it is a corrosive material and can generate a greater volume of solid waste residues than sodium

bicarbonate. Both reagent is BAT, and the use of one over the other is not significant in environmental terms in this case.

For this Installation, the Applicant proposes to use a dry system using hydrated lime on the basis that it is a proven, effective and efficient reagent for neutralising acid gases and well suited to operation with bag filters. Moreover, the reaction temperature for lime systems match well with the optimum adsorption temperature for carbon which is dosed at the same time. The Environment Agency is satisfied that this system is BAT for the proposed Installation.

Dosage rates of hydrated lime will be controlled and monitored to ensure usage is optimised and to avoid over-dosage resulting in increased quantities of unreacted material within the APC residues. Dosage will be controlled against raw gas concentrations of SO_2 and HCl. Flow of reagent will be monitored and alarmed to indicate a failure. Reagent will be recalculated to minimise usage. The amount of reagent used for abatement will need to be optimised to maximise acid gas reduction and minimise hydrated lime waste. Improvement condition 6 requires the Operator to report to the Environment Agency on optimising the performance of the hydrated lime injection abatement system.

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

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

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

In this case, the Applicant proposes separate 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.	Combined feed rate usually controlled by acid gas content.		All plant. Separate feed normally BAT unless feed is constant and

				acid gas control also controls dioxin release.

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. The BAT for mercury removal is accomplished by dosing of activated carbon into the exhaust gas stream. This can be combined with the acid gas reagent or dosed separately. Where the feed is combined, the combined feed rate will be controlled by the acid gas concentration in the exhaust. Therefore, separate feed of activated carbon would normally be considered BAT unless the feed was relatively constant.

In this case, the Applicant proposes separate feed and we are satisfied their proposals are BAT.

6.3 BAT and global warming potential

This section summarises the assessment of greenhouse gas impacts which has been made in the determination of this 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 NOx abatement. The global warming potential of N_2O is 310 times that of CO_2. The Applicant will therefore be required to optimise the performance of the secondary NOx 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 be constant for all options considered in the BAT assessment. Any differences in the GWP of the options in the BAT appraisal will therefore arise from small differences in energy recovery and in the amount of N_2O emitted.

The Applicant considered energy efficiency and compared SCR to SNCR 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 an Energy Recovery Facility incorporating a waste incineration plant. 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. These intentionally-produced POPs are not relevant where waste incineration is concerned, as 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 it 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 decision 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 850ºC 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 250ºC to 450ºC; and
- 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 explained 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 incorporates all the above requirements of the UN-ECE BAT guidance and delivers 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 (Table S3.1). 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 decision document details the assessment of emissions to air, which includes dioxins and concludes that there will be no adverse effect on human health from either normal or abnormal operation.

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

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

http://www.eea.europa.eu/publications/EMEPCORINAIR4/sources_of_HCB.pdf]

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

We have assessed the control techniques proposed for dioxins by the Applicant and have concluded that they are appropriate for dioxin control. We are confident that these controls are in line with the UN-ECE BAT guidance and will minimise the release of HCB, PCB and PeCB. We are therefore satisfied that the substantive requirements of the Convention and the POPs Regulation have been addressed and complied with.

6.5 Other Emissions to the Environment

6.5.1 Emissions to water

There will be no discharge to controlled waters from the proposed Installation.

Waste water generated at the Installation will consist of:

- process effluent collected in the process water drainage system (e.g. boiler blowdown);
- waste water from the water treatment process;
- condensate from the condensate tank; and
- effluent generated through washing and maintenance procedures

Bottom ash collected at the end of the combustion grate and boiler ash collected at the bottom of the boiler passes will be removed by a wet ash conveyor. The extractor will comprise a water-filled trough (or ash quench) into which the ash will fall. The ash will be transferred from the ash quench to the bottom ash storage area via an inclined conveyor. The purpose of the ash quench is to cool and moisten the bottom ash to limit dust emissions and to ensure an airtight seal to the furnace to avoid air ingress.

Waste water from the ash quench system will be collected in the waste water pit and re-used. As some of the water will be lost from the ash quench system (when wet ash is removed), the waste water from the other effluent generating processes within the Installation (see above) will be collected in the waste water pit and will be used to replace water which is lost in the cooled and wetted ash which is removed from the ash quench system.

In the event that there is excess effluent within the waste water pit, it will be discharged to sewer in accordance with a trade effluent consent, which will be regulated by Severn Trent Water. The waste water pit will provide acid dosing for pH adjustment and settlement of waste waters collected within the incineration line. Prior to discharge to sewer, the wastewater will be pH adjusted to ensure that it is suitable for discharge in accordance with the trade effluent consent. The waste water pit will be subject to a preventative maintenance regime, and if required will be able to be emptied via gulley-sucker or equivalent, prior to transfer off-site to a suitably licenced waste management facility.

All ash handling arrangements, including loading into vehicles for transfer off-site, will be undertaken within enclosed buildings which will prevent the release of waste water from the ash handling and quench system to the site surface water drainage system. All process drainage systems within the process buildings, including the ash handling and storage areas, will be directed to the waste water pit to be re-used within the ash quench systems.

The Applicant has not submitted a detailed site drainage plan for the proposed Installation. The Applicant reports that the project is currently under development. Whilst there are ongoing discussions with technology providers and the Engineering, Procurement and Construction (EPC) Contractors, at this stage a technology provider/ EPC Contractor has not been appointed for the delivery of the project. Therefore, until they are appointed and they have undertaken design of the proposed layout of equipment and plant, the site drainage details cannot be confirmed.

We have included pre-operational condition 10 in the Permit which requires the Operator to provide the details of the site drainage arrangements and details of containment infrastructure for approval by the Environment Agency prior to the commencement of commissioning.

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

6.5.2 Emissions to sewer

The Installation will give rise to process effluents comprising boiler blowdown, waste water from the water treatment process and washdown waters. The process effluents will be collected in a waste water pit and recirculated through the ash quench system. All excess process effluents which cannot be recirculated will be collected in the waste water system, prior to discharge to sewer.

The effluent will be subject to treatment at the nearest sewage treatment works. The Applicant reports that a trade effluent consent for the discharge of effluent to sewer from the Installation will be applied for and secured prior to commencement of commissioning.

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. As the ultimate discharge to the environment is controlled by another consent that will protect the environment, we do not consider that any specific limits are necessary in this Permit.

6.5.3 Fugitive emissions

The IED specifies that plants must be able to demonstrate that they are 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 must be arranged (Article 46(5) of the IED).

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

- All chemicals will be stored in an appropriate manner incorporating the use of suitable secondary and other measures (such as acid and alkali resistant coatings) to ensure appropriate containment and tertiary abatement measures. Secondary containment facilities will have capacity to contain whichever is the greater of 110% of the largest tank or 25% of the total tankage, in case of failure of the storage systems.

- Wastes will be stored within the Installation's reception hall on impermeable surfaces. All surfaces will be of hardstanding and designed to accommodate the operations carried out. No wastes will be processed or stored outside the building.

- External areas of hardstanding will be provided with kerbed containment, where appropriate, to prevent any potential spills from causing pollution of the ground /groundwater and surface water. Tanker off-loading of chemicals will take place within areas of concrete hardstanding with falls to a gully and/or a sump.

- Adequate quantities of spillage absorbent materials will be made available on site, at easily accessible locations, where liquids are stored.

- Process water drains within the Installation will drain to the sedimentation basin. External areas will be fitted with a shut-off alarm which will be linked to the fire detection systems to contain any contaminated water from firefighting on site. Additional storage of firefighting water will be available from site kerbing.

- Lime and air pollution control residues stored in silos will be filled by bulk tanker. These raw materials will be offloaded pneumatically into the relevant silos with displaced air vented through a reverse pulse jet filter. Silos will be fitted with high-level control and alarm. Silos will be

equipped with a vent fitted at the top with a fabric filter. Filter residues will be returned to the silo. Cleaning of the filter will be done automatically with compressed air after the filling operation. The filter will be inspected regularly for leaks.

- Air which is displaced from deliveries of SNCR reagent will be vented back into the tanker via a filter and the tank will be fitted with an emergency pressure valve which will discharge to atmosphere via a filter.

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

6.5.4 Odour

Waste incineration plants have the potential to cause odour from the reception areas including the waste bunker. However, odour is not usually a major issue for this sector with the usual control measures being highly effective in preventing odour nuisance at receptors.

The Applicant proposes to employ the following methods and techniques to prevent and minimise odour emissions at the proposed Installation:

- Fast-action roller shutter doors will be provided for vehicle access and egress to the reception building.
- Waste will be delivered in covered vehicles or within containers.
- Bulk storage of waste will occur inside the reception building to prevent odour release.
- All plant areas will be cleaned out regularly to prevent the build-up of putrescible waste.
- Waste will not be delivered to the site during periods of extended shut-down to prevent build-up of waste. Procedures will be in place to divert waste away from the site during shut-down.
- Bunker management procedures (mixing and periodic emptying and cleaning) will be employed to avoid the development of anaerobic conditions;
- Wastes will be rotated on a “first-in first-out” principle to avoid the generation of putrescible odours.
- Olfactory monitoring of odour will be undertaken at the site boundary.
- The tipping hall and waste bunker will be maintained under negative pressure created by drawing of combustion air from the top of the waste reception building to create an air flow direction into the building minimising the potential for dust and odour emissions and keeping external doors closed where possible.

We consider the above measures to be acceptable.

Odour impacts are more likely to occur during periods of shut-down of an incineration line at the site either due to a malfunction or during scheduled maintenance. With only one incineration line proposed at this Installation, there will be no negative pressure to extract and destroy odorous compounds in the event of a shut-down scenario. Consequently, we requested that the Applicant demonstrate how odour emissions during shut-down periods will be prevented and /or minimised.

The Applicant's initial proposals to mitigate against generation of significant odour pollution was via the use of a micronutrient agent to biologically treat odorous compounds on the surface of the waste. With no evidence collected under controlled conditions that demonstrated that the method and technology were effective, we did not accept this proposal as BAT. We therefore requested additional information from the Applicant with respect to the management of odour emissions at the Installation. The request was via an information notice dated 4 December 2018.

In response to the information notice, the Applicant revised their odour control approach, proposing to extract the odorous air and treat it via adsorption (carbon filtration) and particulate filtration. The Applicant did not provide detailed information on the type of carbon filtration system proposed and associated operating parameters in order to justify that this system could be considered to be BAT for odour control. We therefore requested additional information from the Applicant with respect to the carbon filtration system and associated operating parameters. The request was via an information notice dated 28 March 2019.

The Applicant provided additional information on 18 April 2019. The Applicant states that the operational temperature of the carbon filter system will be approximately the same as the ambient temperature in the waste reception area. These will typically be below 30ºC. Ventilation in the waste reception area, provided either by the boiler fan or by the carbon filtration system when the boiler fan is not operating, will maintain these ambient temperatures by drawing air in through louvres in the waste reception area /tipping hall from the external environment.

The operational humidity of the air extracted through the odour abatement system will be similar to ambient humidity. The louvres will typically be closed to minimise the ingress of rainfall during periods of shutdown. The design will include provisions to isolate the carbon filtration system from ambient air when not in operation. Depending on the final design, this may include introducing nitrogen into the carbon filtration system when not in use. Subject to detailed design and recommendations from suppliers, heaters may be used to reduce relative humidity of the air entering the filter, or to dry the carbon filters if installed in a duty /standby arrangement.

As the carbon filtration system will only be utilised intermittently for odour control during periods of shut-down, the Applicant reports that a fixed bed system, where the contaminated gas passes through a stationary bed of adsorbent, will be designed and installed for the Installation. The Applicant

highlighted the key odorous compounds from stored municipal solid waste as hydrogen sulphide, mercaptans and organic acids. The Applicant states that the choice of media will be determined during detailed design.

We agree that carbon adsorption of these pollutants would be effective to prevent and /or minimise odour emissions during shut-down periods and is BAT for this Installation. We have set pre-operational condition 8 (PO8) which requires the Operator to provide an updated odour management plan which includes:

- The type of carbon media for the proposed odour abatement system
- A monitoring procedure, outlining how the following parameters will be sampled: inlet and outlet VOC concentrations, bed operating temperatures, inlet gas temperatures, gas flow rate, pressure differential and gas moisture content; and
- Trigger levels to initiate remedial actions and determine when the carbon filter media requires replacement

We have set improvement condition 9 (IC9) in the Permit which requires the Operator to provide the results of air flow checks through the main building and demonstrate that negative pressure is maintained during shut-down periods to ensure that adequate extraction will be achieved.

The improvement and pre-operational conditions allow the Environment Agency to confirm the assumptions made by the Operator – that the odour abatement system and provision of negative pressure will be effective to minimise the release of odour emissions from the Installation and prevent odour pollution.

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

6.5.5 Noise and vibration

The Application contained a noise impact assessment which identified local noise-sensitive receptors, potential sources of noise at the proposed Installation and noise attenuation measures. Measurements were taken of the prevailing ambient noise levels to produce a baseline noise survey and an assessment was carried out in accordance with BS 4142:2014 to compare the predicted plant rating noise levels with the established background levels. The Applicant included the impact of noise emissions on the new School Academy on Kelvin Way which is currently under construction, following a request for additional information.

The assessment concluded that during daytime and night time periods, the operation of the proposed Installation at the predicted noise levels would be unlikely to cause complaints at any of the assessment locations as the change in noise impact at the sensitive receptors was assessed as being below marginal significance in line with BS 4142.

The assessment carried out by the Applicant was based on equipment that has not yet been installed in buildings that have not yet been built. From the information supplied within the Application, we consider that the proposed Installation will not cause an additional noise impact at the nearest sensitive receptors. Pre-operational condition 12 (PO12) has been set in the Permit requiring the submission of a programme of monitoring at the Installation and in the surrounding environment to establish noise levels during plant commissioning and operation as specified in the Application. This will ensure that any impact can be identified and rectified at the earliest opportunity.

Based upon the information in the Application and the condition described, we are satisfied that 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.

6.6 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 BAT as laid down in the decisions on BAT Conclusions.

At the time of writing of this document, no BAT Conclusions have been published for waste incineration or co-incineration.

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

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

(i) Local factors

We have considered the information submitted by the Applicant with respect to impact on residential properties, Listed Buildings and ecological receptors. The impact of the proposed Installation on these features is not significant. We consider that no further measures are required.

(ii) National and European ESs

There are no additional National and European EQS (including Article 18) that need to be considered other than the limits in Chapter IV of the IED to protect the local environment.

(iii) Global Warming

Carbon dioxide 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 recovery of energy from waste. Controls in the form of restrictions on the volume and type of waste that can be accepted at the Installation and permit conditions relating to energy efficiency effectively apply equivalent technical measures to limit CO_2 emissions.

(iv) Commissioning

The proposed Installation will undergo a period of commissioning before the plant becomes fully operational. The IED and the conditions set out in the Permit cover activities at the Installation once it is fully operational – receiving waste, burning waste and providing electricity to the grid. Prior to commissioning of the Installation, the Applicant shall submit a commissioning plan to the Environment Agency for approval outlining the expected emissions during different stages of commissioning, the expected duration and timeline for completion of activities and any necessary action to protect the environment in the event that actual emissions exceed expected emissions.

It is recognised that certain information provided in the Application is based upon design data or data from similarly designed operational plant. The commissioning stage provides an early opportunity to verify much of this information and the following points will be verified by the Applicant:

- A commissioning plan to be agreed with the Environment Agency (required under pre-operational condition 4).
- Development of procedures to demonstrate process control of expected emissions under different operating conditions; plant operation conforms to conditions set out in the Permit (required under improvement condition 3);
- Abatement plant optimisation (required under improvement condition 6);
- Calibration of CEMs equipment (required under improvement condition 8);
- Verification of combustion chamber residence times, temperature and oxygen content (required under improvement condition 4 and 5; pre-operational condition 6).

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;
- gather information about the performance of the SNCR system;
- establish data on the release of dioxin-like PCBs and PAHs from the incineration process; and
- 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. We have set pre-operational condition 9 (PO9) which requires the Operator to provide specific arrangements for continuous and periodic monitoring of emissions to air prior to the commencement of commissioning of any part of the proposed Installation.

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

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

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

6.7.3 Continuous emissions monitoring for dioxins and heavy metals

Chapter IV of IED specifies manual extractive sampling for heavy metals and dioxin monitoring. However, Article 48(5) of the IED enables the Commission to act through delegated authority to set the date from which continuous measurements of the air emission limit values for heavy metals, dioxins and furans shall be carried out, as soon as appropriate measurement techniques are available within the Community. No such decision has yet been made by the Commission.

The Environment Agency has reviewed the applicability of continuous sampling and monitoring techniques to the proposed Installation. Recent advances in monitoring techniques have allowed standards to be developed for continuous mercury monitoring, including both vapour-phase and particulate mercury. There is a standard which can apply to CEMs which measure mercury (EN 15267-3) and standards to certify CEMs for mercury, which are EN 15267-1 and EN 15267-3. Furthermore, there is an MCERTS-certified CEM which has been used in trials in the UK and which has been verified on-site using many parallel reference tests as specified using the steps outlined in EN 14181.

In the case of dioxins, equipment is available for taking a sample for an extended period (several weeks), but the sample must then be analysed in the conventional way. A CEN committee has agreed Technical Specifications (EN TS 1948-5) for continuous sampling of dioxins. This specification will lead to a CEN standard following a validation exercise which is currently underway. According to IED Article 48(5), "As soon as appropriate measurement techniques are available within the Union, the Commission shall, by means of delegated acts in accordance with Article 76 and subject to the conditions laid down in Articles 77 and 78, set the date from which continuous measurements of emissions into the air of heavy metals and dioxins and furans are to be carried out. This is yet to happen. However, our extant 'dioxin enforcement policy' recommends continuous sampling of dioxins where multiple emission exceedances occur and no clear root cause can be identified. Therefore, should continuous sampling be required at a later date during the operation of the proposed Installation, then sampling and analysis shall comply with the requirements of EN TS 1948.

For either continuous monitoring of mercury or continuous sampling of dioxins to be used for regulatory purposes, an emission limit value would need to be devised which is applicable to continuous monitoring. Such limits for mercury and dioxins have not been set by the European Commission. Use of a manual sample train is the only technique which fulfils the requirements of the IED. At the present time, it is considered that in view of the predicted low levels of mercury and dioxin emissions, it is not justifiable to require the Operator to install additional continuous monitoring or sampling devices for these substances.

In accordance with its legal requirement, the Environment Agency reviews the development of new methods and standards and their performance in industrial applications. In particular, the Environment Agency considers continuous sampling systems for dioxins to have promise as a potential means of improving process control and obtaining more accurate mass emission estimates.

6.8 Reporting

We have specified the reporting requirements in Schedule 5 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 decision of Sandwell Metropolitan Borough Council to refuse planning permission on 13 June 2018.
- The report and decision notice of Sandwell Metropolitan Borough Council accompanying the refusal of planning permission.

- The response of the Environment Agency to the local planning authority in its role as consultee to the planning process.

We have reviewed the reasons given for the refusal of planning permission and specifically whether this conclusion is based on information given in the Environmental Statement. We are satisfied that these matters are entirely matters of planning policy and not relevant to our determination. The pollution control and planning regimes are intended to be complementary and should avoid duplication. From our consideration of all the documents above, the Environment Agency considers that no additional or different conditions are necessary.

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

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

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

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

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

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

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

Article 23(1) requires the permit to specify:

(a) the types and quantities of waste that may be treated;
(b) for each type of operation permitted, the technical and any other requirements relevant to the site concerned;
(c) the safety and precautionary measures to be taken;

(d) the method to be used for each type of operation;
(e) such monitoring and control operations as may be necessary;
(f) such closure and after-care provisions as may be necessary.

These are all covered by permit conditions. The permit does not allow the mixing of hazardous waste so Article 18(2) is not relevant.

We consider that the intended method of waste treatment is acceptable from the point of view of environmental protection so Article 23(3) does not apply. Energy efficiency is dealt with elsewhere in this document but we consider the conditions of the permit ensure that the recovery of energy take place with a high level of energy efficiency in accordance with Article 23(4).

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

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

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

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

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

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

This Application is being consulted upon in line with this statement, as well as with our guidance RGS 6 on Sites of High Public Interest, which addresses specifically extended consultation arrangements for determinations where public interest is particularly high. This satisfies the requirements of the Public Participation Directive.

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

7.2 National primary legislation

7.2.1 **Environment Act 1995**

(i) Section 4 (Pursuit of Sustainable Development)

We are required to contribute towards achieving sustainable development, as considered appropriate by Ministers and set out in guidance issued to us. The Secretary of State for Environment, Food and Rural Affairs has issued *The Environment Agency's Objectives and Contribution to Sustainable Development: Statutory Guidance (December 2002)*. This document provides guidance to the Environment Agency on such matters as the formulation of approaches that the Environment Agency should take to its work, decisions about priorities for the Environment Agency and the allocation of resources. It is not directly applicable to individual regulatory decisions of the Environment Agency".

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

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. There is no SSSI which could be affected by the proposed Installation.

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.

7.3 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 conclude that there will be no likely significant effect on any European Site. We consulted Natural England by means of an Appendix 11 assessment, and they agreed with our conclusion, that the operation of the Installation would not have a likely significant effect on the interest features of protected sites.

The habitat assessment is summarised in greater detail in section 5.4 of this decision document. A copy of the full Appendix 11 Assessment can be found on the Public Register.

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

Consideration has been given to whether any additional requirements should be imposed in terms of the Environment Agency's duty under regulation 3 to secure compliance with the requirements of the Water Framework Directive 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.

We are satisfied that granting this Application with the conditions proposed would not cause the current status of the water body to deteriorate.

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.

7.4 Other relevant legal requirements

7.4.1 **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 RGS 6 and the Environment Agency's Building Trust with Communities toolkit.

ANNEX 1: 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 and S3.1(a) in Schedule 3 of the Permit.
45(1)(d)	The permit shall include the requirements for pH, temperature and flow of waste water discharges.	Not applicable
45(1)(e)	The permit shall include the sampling and measurement procedures and frequencies to be used to comply with the conditions set for emissions monitoring.	Conditions 3.5.1 to 3.5.5 and Tables S3.1, S3.1(a), S3.3 and S3.4 in Schedule 3 of the Permit.
45(1)(f)	The permit shall include the maximum permissible period of unavoidable stoppages, disturbances or failures of the purification devices or the measurement devices, during which the emissions into the air and the discharges of waste water may exceed the prescribed emission limit values.	Conditions 2.3.11 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 parts 4 or determined in accordance with part 4 of Annex VI.	Conditions 3.1.1 and 3.1.2 and Tables S3.1 and S3.1a.
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 requirements of the Directive.
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	Conditions 2.3.11 and 2.3.12

IED Article	Requirement	Delivered by
	hours per year. Limits on dust (150 mg/m^3), CO and TOC not to be exceeded during this period.	
47	In the event of breakdown, reduce or close down operations as soon as practicable. Limits on dust (150 mg/m^3), CO and TOC not to be exceeded during this period.	Condition 2.3.7
48(1)	Monitoring of emissions is carried out in accordance with Parts 6 and 7 of Annex VI.	Conditions 3.5.1 to 3.5.5. 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 3.5.3, and Tables S3.1 and S3.1(a).
48(3)	The competent authority shall determine the location of sampling or measurement points to be used for monitoring of emissions.	Conditions 3.5.3 and 3.5.4.
48(4)	All monitoring results shall be recorded, processed and presented in such a way as to enable the competent authority to verify compliance with the operating conditions and emission limit values which are included in the permit.	Conditions 4.1.1 and 4.1.2, and Tables S4.1 and S4.4.
49	The emission limit values for air and water shall be regarded as being complied with if the conditions described in Part 8 of Annex VI are fulfilled.	Conditions 3.1.1, 3.1.2 and 3.5.5.
50(1)	Slag and bottom ash to have Total Organic Carbon (TOC) <3% or loss on ignition (LOI) <5%.	Conditions 3.5.1 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 and 2.3.8, Pre-operational condition PO6 and Improvement condition IC5 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

IED Article	Requirement	Delivered by
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 (Pre-operational condition PO2) and then every 2 years (Conditions 1.2.1 to 1.2.3)
50(6)	Relates to the feeding of infectious clinical waste into the furnace.	No infectious clinical waste will be burnt
50(7)	Management of the Installation to be in the hands of a natural person who is competent to manage it.	Conditions 1.1.1 to 1.1.3 and 2.3.1 of the Permit.
51(1)	Different conditions than those laid down in Article 50(1), (2) and (3) and, as regards the temperature Article 50(4) may be authorised, provided the other requirements of this chapter are met.	No such conditions have been allowed.
51(2)	Changes in operating conditions do not cause more residues or residues with a higher content of organic polluting substances compared to those residues which could be expected under the conditions laid down in Articles 50(1), (2) and (3).	No such conditions have been allowed.
51(3)	Changes in operating conditions shall include emission limit values for CO and TOC set out in Part 3 of Annex VI.	No such conditions have been allowed.
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, 3.6 and 3.7.
52(2)	Determine the mass of each category of wastes, if possible, according to the EWC, prior to accepting the waste.	Condition 2.3.4 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, 3.5.1 and 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 3.2.1.
53(3)	Test residues for their physical and chemical characteristics and polluting potential including heavy metal content (soluble fraction).	Condition 3.5.1 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 2: Pre-operational conditions

Based on the information in 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 this 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.

Reference	Pre-operational measures
PO1	Prior to the commencement of commissioning, the operator shall send a summary of the site Environment Management System (EMS) to the Environment Agency and obtain the Environment Agency's written approval to it. 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). 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 from the waste incineration process, including operating as CHP or supplying district heating, 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. The commissioning plan shall include the expected emissions to the environment during the different stages of commissioning, the expected durations of commissioning activities and the actions to be taken to protect the environment and report to the Environment Agency in the event that actual emissions exceed expected emissions. Commissioning shall be carried out in accordance with the commissioning plan as approved.
PO5	Prior to 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, detailing the waste pre-acceptance and acceptance procedures to be used at the site. The waste pre-acceptance and acceptance procedures shall include the process and systems by which unsuitable wastes and hot loads will be controlled and managed at the Installation. The procedures shall be implemented in accordance with the written approval from the Environment Agency.
PO6	No later than one month after the final design of the furnace and combustion chamber, the operator shall submit a written report to the

Reference	Pre-operational measures
	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.
PO7	Prior to the commencement of commissioning, the operator shall submit a report, and obtain the Environment Agency's written approval to it, on the baseline conditions of soil and groundwater at the Installation. The report shall contain the information necessary to determine the state of soil and groundwater contamination so as to make a quantified comparison with the state upon definitive cessation of activities provided for in Article 22(3) of the IED. The report shall contain information, supplementary to that already provided in the Application Site Condition Report, needed to meet the information requirements of Article 22(2) of the IED.
PO8	Prior to the commencement of commissioning, the operator shall submit an updated odour management plan and obtain the Environment Agency's written approval to it. The plan shall detail the type of carbon media for the proposed odour abatement system. The plan shall include a monitoring procedure for the odour abatement system. In particular, the procedure shall outline how the following parameters will be monitored: • Inlet and outlet VOC concentration • Bed operating temperature • Inlet gas temperature • Gas flow rate • Differential pressure • Gas moisture content The monitoring procedure shall identify trigger levels to initiate remedial actions and determine when the carbon filter media requires replacement.
PO9	At least three months prior to the commencement of commissioning (or other date agreed in writing with the Environment Agency), 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
PO10	Prior to the commencement of commissioning, the operator shall submit a report, and obtain the Environment Agency's written approval to it, on the following aspects: • An updated water balance detailing the annual volume of water from town mains supply and the estimated water demand of the waste incineration plant; • A final site drainage plan; and • Details of the containment infrastructure at the site, including all sub-surface structures and equipment. The report shall also include an inspection and maintenance programme for the

Reference	Pre-operational measures
	containment infrastructure and equipment at the site.
PO11	Prior to the commencement of commissioning, the operator shall submit an updated fire prevention plan (FPP) and obtain the Environment Agency's written approval to it. The FPP must be written in line with the Environment Agency's guidance, Fire prevention plans: environmental permits and shall include the following aspects: • Bunker management procedures which demonstrate how residual waste will be removed from the bunker when new waste deliveries commence. It must clearly show that the 'first-in first-out' principle will be achieved. • Design specifications and construction details of the firewalls. • Evidence to show that the design, installation and maintenance of the building fire detection and suppression systems will be covered by an appropriate UKAS accredited third party certification scheme or a demonstrable alternative third-party accreditation. • Design of the firewater containment system which shows how all firewater generated when extinguishing a fire will be contained on site. The operator shall provide calculations to demonstrate that the capacity of the containment infrastructure is sufficient. • Final design of systems for the provision of water supported by evidence that the water supply available on site is capable of extinguishing a fire within four hours; or, where appropriate justify alternative measures.
PO12	Prior to the commencement of commissioning, the operator shall provide the Environment Agency with a written report and obtain the Environment Agency's written approval to it. The report shall describe the detailed programme of noise and vibration monitoring that will be carried out at the site at the commissioning stage and also when the plant is fully operational. The report shall include confirmation of locations, time, frequency and methods of monitoring. The monitoring programme shall be carried out in accordance with the Environment Agency's written approval.
PO13	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 report that includes 'as built' detailed final site design for the following aspects: • Confirmation of whether or not flue gas recirculation will be installed as a primary NOx reduction measure. If not, a detailed justification should be provided. • Confirmation of reagent (ammonia or urea) to be used for the SNCR abatement system with justification for the choice of reagent. • Confirmation of fuel to be used for the auxiliary burners with justification for the choice of fuel.

ANNEX 3: Improvement conditions

Based on the information in the Application, we consider that we need to set improvement conditions. These conditions are set out below – justifications for these are provided at the relevant section of this 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.

Improvement programme requirements		
Reference	**Requirement**	**Date**
IC1	The operator shall submit a written report to the Environment Agency on the implementation of the site 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, 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 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.	Report for approval to be submitted at least 2 months before validation testing or as agreed in writing with the Environment Agency.
IC5	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.

Improvement programme requirements		
Reference	**Requirement**	**Date**
	During commissioning, the operator shall 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 in accordance with the methodology as approved under Improvement Condition 4 (IC4). The operator shall submit a written report to the Environment Agency on the validation of residence time, oxygen and temperature whilst operating under normal load, minimum turn down and overload conditions. The report shall identify the process controls used to ensure residence time and temperature requirements are complied with during operation of the waste incineration plant.	Report submitted within 2 months of the completion of commissioning.
IC6	The operator shall submit a written report to the Environment Agency describing the performance and optimisation of: • The Selective Non-Catalytic Reduction (SNCR) system 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.	Within 4 months of the completion of commissioning.
IC7	The operator shall carry out an assessment of the impact of emissions to air of the following component metals subject to emission limit values As 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 EQS/EAL. 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.
IC8	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 Environment Agency within 3 months of completion of commissioning. Full summary

Improvement programme requirements		
Reference	**Requirement**	**Date**
		evidence compliance report to be submitted within 18 months of completion of commissioning.
IC9	The operator shall carry out tests to demonstrate whether the furnace combustion air will ensure that negative pressure is achieved throughout the reception hall. The tests shall demonstrate whether air is pulled through the reception hall and bunker area and into the furnace with dead spots minimised. The operator shall also carry out tests of methods used to maintain negative pressure during shut-down periods to ensure that adequate extraction will be achieved. 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.

ANNEX 4: Consultation Responses

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 decision is summarised in this Annex. Copies of all consultation responses have been placed on the Environment Agency Public Register.

The Application was advertised on the Environment Agency website from 9 July to 6 August 2018 and again from 18 October 2018 to 30 November 2018 and in the Express & Star and Sandwell Chronicle on 18 October 2018. The Application was made available to view at the Environment Agency Public Register at Sentinel House, 9 Wellington Crescent, Fradley Park, Lichfield, WS13 8RR.

Additionally, copies of the Application were placed at the following locations:

- Central Library, High Street, West Bromwich, B70 8DZ
- Sandwell College, Sandwell Central Campus, 1 Spon Lane, West Bromwich, B70 6AW.
- Lodge Community Centre, Lodge Road, West Bromwich, B70 8PJ.
- Bethel Convention Centre**,** Kelvin Way, West Bromwich B70 7JW

The following statutory and non-statutory bodies were consulted during the determination:

- Sandwell Metropolitan Borough Council – Planning Authority
- Sandwell Metropolitan Borough Council – Environmental Health
- Public Health England
- Director of Public Health, Sandwell Metropolitan Borough Council
- Health & Safety Executive
- Food Standards Agency
- Severn Trent (Sewerage Undertaker)
- National Grid
- Birmingham & the Black Country Wildlife Trust
- West Midlands Canal & Rivers Trust
- Natural England
- Highways England

1) Consultation Responses from Statutory and Non-Statutory Bodies

Representations from Public Health England dated 27/07/18	
Brief summary of issues raised	**Summary of action taken / how this has been covered**
We recommend that any Environmental Permit issued for this site should contain conditions to ensure that emissions to air from dust, noise and odours are prevented, controlled and managed such that they do not adversely impact upon public health.	We have included permit conditions to address these concerns (see conditions 3.3, 3.4 and 3.6 in the Permit).
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.	The proposed Installation will be operated in accordance with our sector technical guidance notes, EPR 5.01 – The Incineration of Waste and H4 – Odour Management.

Representations from Sandwell Metropolitan Borough Council, Environmental Health dated 24/07/18	
Brief summary of issues raised	**Summary of action taken / how this has been covered**
The Council questions the reason the environmental permit application is proceeding given the planning application was refused on 13 June 2018.	The planning permission process considers the need, scope and scale of proposed developments in the context of local and regional plans and infrastructure requirements. The environmental permitting process considers the design and operational techniques associated with the plant in the context of its on-going operation against its stated purpose. The planning permission process is completely independent to our process for determining an environmental permit. We have a duty to determine the application made to us and that is what we have done. The proposed Installation will need to have both planning permission and an environmental permit to operate. Each one can be granted without the other. If we grant the environmental permit, it does not guarantee that the local planning authority will grant the planning permission and vice versa. This is because both processes are assessed by different criteria.
The Council requests that conditions are placed in the permit to ensure all reasonable steps are used by the operator to prevent or minimise release of noise from the installation.	We have inserted condition 3.4 and pre-operational condition 12 in the Permit which will ensure that emissions of noise and vibration do not cause pollution off-site.

The Council requests that conditions are placed in the permit to limit the risk of noise disturbance to residential premises to the north of the installation by restricting heavy goods vehicle movements onto site and off-site within certain time periods.	The opening hours of the proposed Installation are considerations for the local planning authority (Sandwell Metropolitan Borough Council) via any planning consent. We consider that the noise condition 3.4 in the Permit is sufficient to ensure that the risk of noise disturbance is prevented and/or minimised.
The Council requests that specific controls and conditions are included in the permit to ensure management of odour and flies are proactively addressed.	We have inserted conditions 3.3 and 3.6 in the Permit which will ensure that emissions of odour and impact of pests do not cause pollution off-site.
The Council requests that transfer off-site should be conditioned to be time limited, to reduce the risk of odour and fly nuisance.	The operator will transfer waste off-site in the form of incinerator bottom ash (IBA) and air pollution control residues (APCR). The transfer of waste will be in enclosed vehicles to prevent fugitive emissions off-site. Permit condition 3.2 ensures that the Operator takes appropriate measures to prevent these emissions. We consider that this is sufficient as we do not consider these wastes are inherently odorous or attractive to flies. The maximum time the Operator will store non-compliant waste on site prior to transfer off-site will be specified in the waste pre-acceptance and acceptance procedures which will be submitted to the Environment Agency for approval prior to the commencement of commissioning as specified by pre-operational condition 5. These procedures and our standard conditions for odour and flies will provide the necessary protection.
The Council comments that a sprinkler system is not considered BAT for odour abatement. It is not understood how dust suppression will abate odour.	We agree with this comment. The Applicant provided additional information in response to an information notice dated 4 December 2018. A sprinkler system will be used for dust suppression. A carbon filtration system is proposed for the plant in the event of a shut-down and /or maintenance scenario.
The Council requests that the Operator should be required to submit the bunker management procedures for prior approval by the Environment Agency, prior to operation of the installation. The procedures should specify the frequency of periodic emptying and cleaning of the bunker to reduce the risk of odour emissions.	We have inserted pre-operational condition 11 in the Permit which requires the Operator to provide a Bunker Management Procedure prior to the commencement of commissioning. We consider that the same measures that will reduce the risk of fires will reduce the risk of odour emissions with respect to bunker management. Additional measures to prevent and /or minimise odour emissions are detailed in section 6.5.4 of this decision document.
The Council requests that Operating and Maintenance Procedures should be produced with consideration given to waste storage	Operating and Maintenance Procedures will be covered in the Site Environmental Management System which needs to be in

times, emptying and clearing waste (feedstock) areas handling and holding areas.	place prior to the commencement of site operations as required under condition 1.1.
The Council requests that consideration should be given to whether the interlocked system is sufficient or if alarms to notify the operator of any ELV breach are also required.	The Applicant describes waste charging in section 2.2.3.7 of the Supporting Information in the Application. We have reviewed the procedures and we consider these to be BAT in accordance with our sector guidance note EPR 5.01 – *The Incineration of Waste*. The Operator proposes an interlock system for waste charging. The Installation will incorporate systems to notify the Operator of an ELV breach (see below).
The Council requests that the Operator should ensure that the silos have audible and visible alarms which trigger in the control room. In addition, the silos should be fitted with low level alarm systems to ensure the Operator does not run-out of the key component of the abatement system.	The Installation will benefit from a number of process control features and prevent the development of abnormal operating conditions. Operations (including the abatement system) will be controlled and monitored using the Supervisory Control and Data Acquisition (SCADA) system which creates documentation that can be accessed on site and in remote locations. The system will provide a range of control and monitoring functions that automate and monitor actions throughout the plant. Any malfunction will be detected by the Operator and dealt with appropriately. These procedures are designed to ensure the integrity of the plant throughout its life. We do not consider it necessary to require the Operator to fit low level alarm systems to the raw materials silos. The proposed measures are standard measures and are consistent for this industry sector.
The Council suggests that the Environment Agency inserts a permit condition which specifies that the Operator should initially assess any third-party competence that will be subcontracted and conduct periodic re-assessments of the competence to ensure ongoing compliance with the permit conditions.	Verus Oak Energy Limited applied for an environmental permit under the Environmental Permitting Regulations 2016 to operate the Kelvin Energy Recovery Facility. We have determined the application submitted to us. We have decided to grant an environmental permit to Verus Oak Energy Limited, the Operator. Our decision was taken in accordance with our guidance on what a competent operator is. Verus Oak Energy Limited will operate the proposed Installation under an Environmental Management System (see condition 1.1 in the Permit) and all conditions specified in the Permit. Permit condition 1.1 requires the Operator to use competent persons whether employees or sub-contractors.

Representations from National Grid dated 27/07/18	
Brief summary of issues raised	**Summary of action taken / how this has been covered**
The National Grid requests that the Environment Agency notifies them of our proposed decision as they have a number of assets that may be affected by the proposed Installation.	We consulted National Grid of our "minded to" decision on 6 June 2019.

Representations from Highways England dated 12/11/18	
Brief summary of issues raised	**Summary of action taken / how this has been covered**
No concerns raised.	No further action.

Representations from Natural England dated 04/12/18	
Brief summary of issues raised	**Summary of action taken / how this has been covered**
No issues raised. In respect of the Appendix 11 (Habitats) submission, Natural England agreed with our conclusions that there will be no likely significant effect at Fens Pools SAC site as a result of emissions from the Installation.	No further action.

No representations were received from the following organisations
• Sandwell Metropolitan Borough Council – Planning Authority • Director of Public Health, Sandwell Metropolitan Borough Council • Health & Safety Executive • Food Standards Agency • Severn Trent (Sewerage Undertaker) • Birmingham & the Black Country Wildlife Trust • West Midlands Canal & Rivers Trust

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

The consultation responses received were wide ranging and a number of the issues raised were outside the Environment Agency's remit in reaching its permitting decisions. Specifically, questions were raised which fall within the jurisdiction of the planning system, both on the development of planning policy and the grant of planning permission.

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

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

Representations were received from the Member of Parliament for West Bromwich East, Rt. Hon. Tom Watson MP, who raised the following issues:

Representations from the Rt. Hon. Tom Watson for West Bromwich East Constituency	
Brief summary of issues raised	**Summary of action taken / how this has been covered**
Concern as to whether the design of the waste plant will use 'best available techniques' to reduce emissions and their impact on the environment.	We have assessed the information provided by the Applicant with respect to the design of the facility. The proposed Installation will be operated in accordance with best available techniques (BAT) to prevent or control pollution and in accordance with our technical guidance note, EPR 5.01 – The Incineration of Waste. We consider that the proposals meet the requirements of BAT for this industry sector. Refer to section 6 of this decision document.
Concern regarding the proximity of the site to residential homes, local schools and the historic Chance Glass Works site. Concern the development will have consequences on the shape and use of the land around the site in terms of its potential impact and will blight the landscape.	Decisions over land use and visual amenity are matters for the local planning authority (Sandwell Metropolitan Borough Council). The location of the Installation is a relevant consideration for Environmental Permitting, but only in so far as its potential to have an adverse environmental impact on communities or sensitive environmental receptors. The environmental impact is assessed as part of the determination process and has been reported upon in the main body of this decision document. We are satisfied that there will be no unacceptable impacts.
Concern as to whether the Applicant's proposals to address the impact of noise and odour from traffic on site are adequate.	The impact of noise and vibration is addressed in section 6.5.5 of this decision document. The Applicant submitted a noise impact assessment with the Application. Additional information was submitted in response to an information notice dated 4 December 2018, with respect to the new School Academy on Kelvin Way that is currently undergoing construction. We reviewed the noise impact assessment and we are satisfied that emissions of noise and vibration will not give rise to complaints. Permit condition 3.4 will ensure that emissions of noise and vibration do not cause pollution off-site at any time of day or night. We have set pre-operational condition 12 in the Permit requiring the submission of a programme of monitoring at the proposed Installation and in the surrounding environment to establish noise levels during plant commissioning and operation. This will ensure that any impact can be identified and rectified at the earliest opportunity. The impact of odour emissions is addressed in section 6.5.4 of this decision document. We are satisfied that appropriate measures will be in place to prevent or where that is not practicable to minimise odour and to

	prevent pollution from odour.
Concern regarding the impact of particulate matter emissions given the location of the site and whether the pollution control measures proposed by the Applicant are satisfactory. Concern regarding nano-particles and minute plastics and the ability to monitor the small particles.	We have discussed the health impact of small particles (section 5.3.3) and abatement of particulates (section 6.2.1) in this decision document. The Applicant proposes to use bag or fabric filters for the abatement of particulate matter (including nano-particles and minute plastics) at the proposed Installation. The use of bag filters is regarded as BAT for controlling particulate emissions from energy from waste plants across Europe. There has been much research on the use and effectiveness of bag filters over a number of years. For example, some detailed investigations in the USA looked at the collection efficiency of fabric filters for particle sizes from 10 microns down to 0.2 microns (i.e. 200 nm). The efficiency of fabric filters ranged from 99.2% to over 99.9%. More recent research in Finland provided similar results, showing collection efficiencies from 99% to well over 99.99% for fabric filters. Additionally, a research team in Italy examined the emissions of nanoparticles from several energy from waste plants and found that fabric filters were effective at collecting well over 99.99% of nanoparticles (measured by weight). At their smallest, nanoparticles behave rather like 'sticky' gas molecules. The mechanism by which they are collected on the dust cakes which form on filter bags means that these filters are particularly effective on the finest of particles. Thus, applying the research data conservatively, fabric filters are effective at removing at least 99% of all particle sizes. At this level of performance, the key measure is the concentration of particulates remaining in the gases after the filter and therefore emitted from the stack and at the levels that will be emitted, there will be no significant impact on human health.

b) Representations from Community and Other Organisations

Representations were received from an organiser of the petition to the planning application containing more than 500 signatories, a number of these issues are the same as those raised by the Local MP. Additional issues raised were:

Representations from the Organiser of Planning Petition	
Brief summary of issues raised:	**Summary of action taken / how this has been covered**
Concern regarding the competence and operational experience of the applicant in running the plant and in emergencies.	We are satisfied that Verus Energy Oak Limited will be able to operate the proposed Installation so as to comply with the conditions we have included in the Permit. Verus Energy Oak Limited have sufficient resources and expertise to operate the proposed Installation. The decision was taken in accordance with our guidance on what a

	competent operator is.
Application is totally based on modelling or scoping exercises and not on professional experience.	Our assessment is based on modelling as the Installation has not yet been built so we cannot use actual data from this plant. The modelling is based on a worst-case scenario and data from other operational plants. The Operator will be required to demonstrate that the data submitted in the determination is accurate as part of commissioning, prior to actual commercial operation. For incineration applications, we normally require Applicants to submit a full air dispersion modelling as part of their application. Air dispersion modelling enables the pollutant process contribution to be predicted at any environmental receptor that might be impacted by a plant. Using dispersion models, it is possible to predict where the plume from the proposed Installation will travel and where it will come to ground, taking into account different weather conditions. These models are able to predict the concentration of pollutants from the Installation in the atmosphere on an hourly, daily or yearly basis. As part of our determination of the Application, we have audited the dispersion modelling which has been carried out by the Applicant. Modern atmospheric dispersion models have been extensively tested to check whether the predictions given by the models match up with actual measurements. We would only accept well validated models used to predict effects from industrial processes that we regulate. The results of the modelling, which are presented in detail in the Application, indicate that the impact from the proposed Installation is small. The modelling results also indicate that overall levels of pollutants, when combined with existing air quality, are well within the air quality standards laid down in the regulations.
Concern regarding the impact of emissions of pollutants on human health.	The impact of emissions from the plant on human health is discussed in sections 5.2, 5.3 and 5.5 of this decision document. We audited the Applicant's air quality and human health risk assessment. We have also undertaken sensitivity analysis including the use of background levels, dispersion of pollutants and the effect of terrain. We consider that all relevant sensitive human receptors have been taken into account. The proposed Installation is unlikely to contribute to an exceedance of the air quality standards for human health. We do not consider that there will be any significant harm to human health.

Concern regarding the impact of odour emissions on nearby residential receptors.	The impact of odour emissions is discussed in section 6.5.4 of this decision document. We are satisfied that odour will not be an issue based on the measures proposed in the Application and a pre-operational condition (PO8). Our experience from permitting and regulating other energy from waste plants and other facilities indicate that amenity issues such as odour are best finalised during the commissioning stage. Prior to the commencement of commissioning, the Applicant will provide an updated OMP for us to approve. This will ensure that odour emissions will not have significant impact on the local community. The Applicant cannot commence commissioning or accept waste on site until we give our approval, hence the local community is protected. We shall also take into account any developments in odour abatement technology and regulations at the time the plan is assessed.
Concern regarding the impact of vermin on nearby residential receptors.	Vermin are not usually an issue at waste incineration plants because the waste is only stored for a short period of time. The Applicant confirmed that bunker management would be used to mix the waste and that storage time would be 4 to 5 days which we consider is appropriate. The Applicant provided a pest management plan as part of the application and additional information on pest management during the determination. We consider that the plan adequately addresses the issue of pests. We have set condition 3.6 in the Permit to ensure that the risk of pollution from pests is minimised.
Concern regarding the impact of litter on nearby residential receptors.	Measures will be in place to prevent fugitive emissions as set out in section 6.5.3 of this decision document. Waste will be delivered in enclosed delivery vehicles and tipped into the bunker within the reception building. We are satisfied that impacts from litter are unlikely to occur. Condition 3.2 in the Permit will provide controls.
Concern regarding the impact of emissions on birds and other wildlife.	We carried out an audit of the Applicant's air quality impact assessment including impact on ecological receptors. Our assessment shows that site emissions will not have a significant effect on any ecological site, protected species or interest features of the habitat sites (see section 5.4 of this decision document).
Concern regarding the risk from fires and the applicant's ability to manage incidents.	Please refer to section 4.3.4 of this decision document. The Environment Agency's fire prevention plan guidance addresses the waste materials stored and processed on site. The Applicant submitted a fire prevention plan (FPP). We are satisfied that the Operator will be able to control fire risk. However, we recognise

	that some of the finer details (such as the exact location of hydrants for example) may change after the detailed design stage. We have set pre-operational condition 11 for the Operator to submit a revised FPP after the detailed design stage. The Operator cannot start commercial operations unless this is approved by the Environment Agency. We shall take into account any developments in technology and regulations at the time the plan is assessed.
Concern that a new school development on Kelvin Way has not been taken into account in the application.	We raised this issue with the Applicant during the determination via an information notice dated 4 December 2018. The Applicant provided further information which showed that there would be no significant impact on the new school development on Kelvin Way with respect to air quality and noise and vibration emissions. We have assessed the additional information provided by the Applicant and we agree with their conclusions. Emissions of odour, pests and litter have been addressed (see above).
Concern regarding land contamination from the seepage of pollutants into abandoned mine workings beneath the site. Concern regarding the pollution of the canal from spillage of run-off water and fire suppression systems from the plant.	Measures will be in place to prevent emissions to groundwater. These are summarised in section 6.5.3 of this decision document.

c) Representations from Individual Members of the Public

A total of 51 responses were received from individual members of the public. A public drop-in event held by the Environment Agency on 7 November 2018 was attended by 47 persons, who were a mixture of local residents and the business community potentially impacted by the proposed Installation. A number of these responses came from people attending the drop-in event. Many of the issues raised were the same as those considered above. Only those issues additional to those already considered are listed below:

Representations from Individual Members of the Public	
Brief summary of issues raised:	**Summary of action taken / how this has been covered**
Impact of emissions on human health	
Concern there is insufficient evidence of the long-term health implications for people and the environment particularly as the plant is near a heavily populated area.	The United Kingdom Interdepartmental Liaison Group on Risk Assessment (UK-ILGRA) state that the precautionary principle should be invoked when there is good reason to believe that harmful effects may occur and the level of scientific uncertainty about the consequences or likelihood of the risk is such that the best available scientific advice cannot assess the risk with sufficient confidence to inform decision making.

	The Health Protection Agency (Response to British Society for Ecological Medicine Report, "The Health Effects of Waste Incinerators) say that "as there is a body of scientific evidence strongly indicating that contemporary waste management practices, including incineration, have at most a minor effect on human health and the environment, there are no grounds for adopting the 'precautionary principle' to restrict the introduction of new incinerators". We have considered a range of reports as described in Chapter 5 of this decision document and more research is being undertaken although it is not anticipated to change anything significantly. We consulted Public Health England during this determination with respect to the impact of emissions from the proposed Installation on human health. Their comments on the Application are summarised in this Annex. We have assessed the impacts of the Installation and we are satisfied that the operations will not cause significant pollution of the environment or harm to human health.
Concern regarding Sandwell air limits increasing above World Health Organisation Guidelines when the incinerator starts to operate.	The risks of air emissions on human health is discussed in sections 5.2, 5.3 and 5.5 of this decision document. The emission limit values in the Permit are set by the Industrial Emissions Directive and they are protective of human health. The Environment Agency takes advice from Public Health England (PHE) on the health implications of incinerators generally and specifically on each application for an environmental permit (including whether or not other health guidelines are likely to be exceeded). We consulted PHE and the Director of Public Health for Sandwell during the determination of this Application. Their comments are summarised in this Annex. The Application contains detailed assessments of the impact of the emissions on the health of the local population. The assessments use worst-case assumptions about emissions and exposure routes, and employ the latest methods based on current scientific thinking. We have assessed the impacts of the Installation and we are satisfied that the operations will not cause significant pollution of the environment or harm to human health.
Question in relation to current health levels of local residents in the area and whether this is as a result of the poor air quality.	The responsibility of studying local trends in public health within Sandwell Borough lies with the Director of Public Health for Sandwell and Public Health England (PHE). We are unable to comment on whether the current health levels of

	local residents are as a direct result of poor air quality. We consulted with the Director of Public Health for Sandwell, the local authority environmental health and PHE during the permit determination. PHE responding on behalf of the Director of Public Health stated that they did not have any significant concerns regarding risk to health of the local population from the proposed Installation, 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 (refer to PHE's comments and our response to their comments above).
Concern regarding the health of children in the local area given that arsenic, nickel, cadmium, benzene, benzo(a)pyrene and chromium will be exceeded for children.	This is not so. The process contribution from the Installation alone is less than 1% of the TDI at the most impacted receptor. The small changes in emissions released from the Installation does not affect the conclusions of the assessment due to the level of insignificance which has been demonstrated. The impact assessment of metals and other pollutants is discussed in section 5.2 of this decision document. Section 5.3 explains that pollutants are assessed against air quality standards (Environmental Standards) as these are protective of human health. We are satisfied that there will not be a significant impact from metals and other pollutants on human health.
Concern regarding the impact of increased traffic and contribution to poor air quality in the area.	The impact of traffic on the local community are relevant considerations for the grant of planning permission and do not form part of the environmental permit decision-making process except in terms of how they affect the prevailing background pollutant levels. Where there are established high background concentrations contributing to poor air quality, the increased level of traffic might be significant in these limited circumstances, which is not the case here. The Environmental Permitting Regulations are concerned with control of emissions from the proposed Installation and in determining this Application under these regulations, we have considered the impact of emissions on local air quality. The Applicant has demonstrated that emissions from the operation of the proposed Installation are well below the ES. We are satisfied that there is no risk to the ES being breached within the locality of the site. We will regulate the operational activities at the proposed Installation as defined in the Permit and this will commence when any waste is first brought to the site.

Concern the plant will restrict natural sunlight, visibility and air movement which may enable the movement of air pollutants in the area.	The obstruction of natural light and visibility due to the size of the building is a matter that will be considered by the local planning authority. We have considered the size and impact of the incineration building with respect to the dispersion of pollutants in this determination. We consider that emissions from the Installation will not have a significant impact on human receptors or the environment.
Impact of fugitive emissions	
Impact of fugitive emissions on human health.	Measures will be in place to prevent fugitive emissions as set out in section 6.5.3 of this decision document.
Management of accidents	
Concern regarding the impact of accidents including the release of toxic fumes and explosions on nearby receptors.	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 the commencement of commissioning as required by a pre-operational condition (PO1). The EMS will also include a preventative maintenance scheme to reduce the chance of equipment failure.
Management of fires	
Concern that there is only one way in and one way out and what would happen if there is a fire and the Fire Brigade cannot gain access to attend the fire.	The Applicant states that the entrance to the site from Kelvin Way, is a two-way road and will be used by waste and raw material delivery vehicles delivering to the facility. Within the installation boundary, full access is available to the perimeter of the site for waste and raw material delivery vehicles – in some areas this includes two-way vehicle movements. The waste and raw material delivery vehicles are the same size as fire-fighting engines. We do not consider that there will be any difficulty with respect to access for the emergency services.
Public consultation	
Concern as to whether the public consultation was adequate. The letters were not sent out in any other languages apart from English and did not reflect the make-up of the local residents.	The way in which we consulted on this Application is described in Chapter 2 of this decision document. Due to the level of the local community's concerns about this Application, we have been keen to speak to local people, valuing the opportunity to hear about any local factors that could be important in our decision making. Our intention was to reach as many people as possible. The Application was advertised on the Environment Agency website from 9 July to 6 August 2018 and again from 18 October 2018 to 30 November 2018 and in the Express & Star and Sandwell Chronicle on 18 October 2018.

	Details of the application and supporting documents were placed on the Environment Agency's consultation web site (Citizen Space) and on our Public Register. We also placed paper copies of the Application at several locations within the community. We sent out email notifications to interested parties which included the MP's office, local councillors and members of the public, to make them aware of the application and the public drop-in session held in November 2018. Our notification included instructions on how non-English speaking residents could gain access to an interpreter. The Environment Agency is satisfied that the consultation is in accordance with its Public Participation Statement and was adequate and effective. We consider we took appropriate steps to inform people of the Application and how they could provide representations.
Compliance	
Concern regarding taking enforcement action after breach of permit conditions – damage already done and the local community and environment affected.	We will regulate the proposed Installation by making sure that the Operator complies with the conditions of the Permit. We will do this by: • requiring continuous monitoring of the main pollutants for which limits are set and periodic monitoring for other pollutants; • carrying out audits of the Operator's procedures and methods for emissions monitoring; • regular announced and occasional unannounced inspections; • adding or changing conditions in the Permit if required; • requiring the Operator to inform us if they exceed any of the emission limits in the Permit, or if they fail to comply with any operating conditions; • investigating non-compliance with any condition of the Permit; and • taking enforcement action if needed, including issuing notices, prosecuting serious breaches or potentially revoking the Permit. We undertake a combination of announced and unannounced compliance visits as we do for other plants. There is no reason to believe that the Operator will be unable to comply with the conditions of the Permit. In the event there are breaches of the Permit conditions, we have a range of sanctions which can include taking remedial action to limit the consequences or ultimately revoking the Permit.

Question regarding how we would ensure that the equipment controlling emissions will not break down.	A modern incinerator is equipped with a large number of alarms which alert the Operator to any problems on the plant, either with combustion control, abatement equipment or high readings on the emission monitors. The Operator will take prompt action in response to all alarms, and in some cases an automatic controlled shut-down would be initiated to prevent any impact on the environment and human health. The IED requires that abatement equipment (technology to reduce emissions) and continuous emission monitors are operational at all times when waste is being burned. The IED includes a few allowances to this under very specific circumstances and for strictly limited periods, but in practice, these periods of "abnormal operation" are rarely seen. All such operation must be notified to us without delay. In addition, the Operator is required to have a maintenance and replacement programme in place to minimise the risk of plant breakdown under the site EMS.
Other issues	
Concern regarding the capability of the concrete bunker preventing seepage of waste into groundwater.	The Applicant provided additional information in response to an information notice dated 4 December 2018. The base of the bunker will be constructed of reinforced concrete, and the whole structure has been designed as a water retaining structure. Any doors within the dividing wall will be 2-hour fire rated. The structural design and construction of this dividing wall shall be such that the integrity of the fire barrier is maintained in the event of the collapse of the bunker hall roof due to a fire in the bunker. The walls and base of the bunker will be resistant to crane grab impact and the impingement of water cannon jets. Any exposed steel columns located at the front of the waste bunker shall be protected against structural damage caused by fire or mechanical damage. This protection shall be provided by concrete encasement or other acceptable means and shall extend from the base of the column to the level of the waste feed hopper. We consider that the risk of waste seepage from the base of the bunker into groundwater is low.
The application has been refused twice. Why has another application been made?	It is unclear which application the respondent is referring to. We have not refused an environmental permit application from the Applicant. This is a new environmental permit application to operate a waste incineration plant and that is what we are determining. Refer to our response to Sandwell Metropolitan Borough Council above. The Applicant has the right to submit an environmental permit application when they wish.

	We have a legal duty to assess any application submitted to us and that is what we have done.
Concern there is a possibility that there are mine shafts underground on the site which could increase the risks posed.	We have examined the site condition report and a report from the Coal Authority used in the determination of the existing permit EPR/CP3233FB. The report states that the site is in the likely zone of influence from workings in 1 seam of coal at 270 m to 320 m depth, and last worked in 1927. Any ground movement from these coal workings should have stopped by now. The reports states that the site is not in the likely zone of influence of any present underground coal workings. The site where the incinerator will be located is currently occupied by a waste recycling facility (Giffords Recycling Limited) regulated by the Environment Agency. The waste incinerator will be built on the site when the existing waste recycling facility has been vacated. The Operator will take into account the geology of the site and any associated risks during site preparation and construction. We do not believe that there would be an increase of risks as a result of the waste incinerator.
What relevant environmental regulatory requirements and technical standards does this waste plant incineration meet?	The Applicant has submitted an environmental permit application which meets the requirements of the Environmental Permitting Regulations 2016 and the Industrial Emissions Directive (IED). The proposals are in accordance with our sector guidance note EPR 5.01 and the BAT Reference Document for Waste Incineration.
Concern that there is an inaccurate statement regarding the distance of the proposed plant from residential receptors.	The Applicant corrected this error in their response to an information notice dated 4 December 2018. The error does not change any conclusion of the impact assessment undertaken by the Applicant.
Will there be compensation if health effects do occur in the future?	We do not consider health effects will arise as a result of emissions from the Installation. If they did, the question of compensation would be fact-specific and would have to be considered at that time.
Concern regarding the impact of light pollution.	Light pollution from the Installation is a matter that will be considered by the local planning authority. We would expect the impact of light to be limited in accordance with the National Planning Policy Framework. The requirement to use energy efficiently will mean lighting at the proposed Installation will be kept to a minimum.

B) Advertising and Consultation on the Draft Decision

This section reports on the outcome of the public consultation on our draft decision carried out between 6 June 2019 and 4 July 2019.

a) Consultation Responses from Statutory and Non-Statutory Bodies

Representations were received from Public Health England, who raised the following issues:

Representations from Public Health England dated 25/06/19	
Brief summary of issues raised	**Summary of action taken / how this has been covered**
PHE re-iterates the position held by the Health Protection Agency (precursor to Public Health England) published in its document entitled "The Impact on Health of Emissions to Air from Municipal Waste Incinerators" in 2009 as follows: "*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. This view is based on detailed assessments of the effects of air pollutants on health and on the fact that modern and well managed municipal waste incinerators make only a very small contribution to local concentrations of air pollutants*". 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 continues to take all appropriate measures to prevent or control pollution, in accordance with the relevant sector technical guidance or industry best practice.	No further action. The proposed Installation will be operated in accordance with our sector technical guidance notes, EPR 5.01 – The Incineration of Waste and H4 – Odour Management.

b) Representations from Individual Members of the Public

A total of 7 responses were received from individual members of the public. Many of the issues raised in the consultation were the same as those raised previously and already reported in section A of this Annex. Where this is the case, the Environment Agency response has not been repeated and reference should be made to section A for an explanation of the particular concerns or issues. Also some of the consultation representations received were on matters which are outside the scope of the Environment Agency's powers under the Environmental Permitting Regulations. Our position on these matters is as described previously.