Determination of an Application for an Environmental Permit under the Environmental Permitting (England & Wales) Regulations 2010

Decision document recording the decision making process

The Application reference number is:	EA/EPR/WP3133KP/A001
The Permit number is:	EA/EPR/WP3133KP
The Application was duly made on:	13th July 2009
The Operator is:	United Utilities Waste Operations Limited
The facility is located at:	Sinfin Lane, Derby, Derbyshire DE24 9GF

What this document is about

This is a decision document, which accompanies a permit.

This document explains how we have considered the Applicant's Application, and why we have included the specific conditions in the permit we have issued 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. Except where, 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 EA/EPR/WP3133KP/A001. We refer to the application as "the **Application**" in this document in order to be consistent.

The number we have given the permit is EA/EPR/WP3133KP.

The Application was duly made on 13th July 2009.

The Applicant is United Utilities Waste Operations Limited as "the **Applicant**" in this document. Where we are talking about what would happen after the Permit is granted, we call United Utilities Waste Operations Limited "the **Operator**".

United Utilities Waste Operations Limited proposed facility is located at Sinfin Lane, Derby, Derbyshire DE24 9GF. We refer to this as "the **Installation**" in this document.

How this document is structured

Glossary of acronyms used in this document
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2. How we reached our decision
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Environmental issues: emissions and their control
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Annexes

Annex 1: Application of the Waste Incineration Directive
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Glossary of acronyms used in this document

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

AQMA	Air Quality Management Area
AQMAU	Air Quality Modelling and Assessment Unit
BAT	Best Available Technique(s)
BAT-AEL	BAT Associated Emission Level
BREF	BAT Reference Note
DAA	Directly associated activity
DD	Decision document
EIAD	Environnemental Impact Assessment Directive (85/337/EEC)
ELV	Emission limit value
EPR	Environmental Permitting (England and Wales) Regulations 2010 (SI 2010 No. 675)
EQS	Environmental quality standard
HRA	Human Rights Act 1998
IPPCD	Integrated Pollution Prevention and Control Directive (2008/1/EC)
LCPD	Large Combustion Plant Directive (2001/80/EC)
LfD	Landfill Directive (1999/31/EC)
MBT	Mechanical Biological Treatment
MWI	Municipal waste incinerator
OPRA	Operator Pollution Risk Assessment
PPS	Public participation statement
PR	Public register
RGS	Regulatory Guidance Series
RRS	Resource Recovery Solutions
SAC	Special Area of Conservation
SED	Solvent Emissions Directive (1999/13/EC)
SCR	Selective catalytic reduction
SGN	Sector guidance note
SHPI(s)	Site(s) of High Public Interest
SNCR	Selective non-catalytic reduction
SPA	Special Protection Area
SPMP	Site protection and monitoring programme
SSSI	Site of Special Scientific Interest
SWMA	Specified waste management activity
WFD	Waste Framework Directive (2006/12/EC)
WID	Waste Incineration Directive (2000/76/EC)

1. Summary of Our Decision

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

We consider that, in reaching this 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.

The permit contains many conditions taken from our standard Environmental Permit template. We developed these conditions after consultation with industry and other groups (LAs, NGOs, the public), having regard to the legal requirements of the Environmental Permitting Regulations and other relevant legislation.

This document does not therefore include an explanation for these standard conditions. Where they are included in the permit, we have considered the application and accepted the details are sufficient and satisfactory to make the standard condition appropriate. This document does, however, provide an explanation of our use of "tailor-made" or installation-specific conditions, or where our permit template provides two or more options.

2. How we reached our decision

The Applicant held pre-application discussions with us, the notes from these meetings have been placed on the public register and where relevant used in assessing the Application.

We considered the Application was duly made because it was in the correct form and contained sufficient information for us to begin our determination but not that it necessarily contained all the information we would need to complete that determination: see below.

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.

We carried out consultation on the Application in accordance with the EPR, our statutory Public Participation Statement (PPS) and our own RGS Note 6 for Determinations involving Sites of High Public Interest. We consider that this process satisfies and frequently goes beyond the requirements of the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, which are directly incorporated into the IPPCD, which applies to the Installation and the Application. We have also taken into account our obligations under the Local Democracy, Economic Development and Construction Act 2009 (particularly Section 23). This requires us, where we consider it appropriate, to take such steps as we consider appropriate to secure the involvement of representatives of interested persons in the exercise of our functions, by providing them with information, consulting them or involving them in any other way. In this case, our consultation already satisfies the Act's requirements.

We advertised the Application by a notice placed on our website, which contained all the information required by the IPPCD, including telling people where and when they could see a copy of the Application. We also placed an advertisement in the Derby Telegraph in July 2009.

We placed a paper copy of the Application and all other documents relevant to our determination (see below) on our Public Register located at our Trentside Office Scarrington Road, Nottingham, NG2 5FA, and also sent a copy to Derby City Council for its own Public Register. Anyone wishing to see these documents could do so and arrange for copies to be made.

We re-advertised the Application on our website and in the Derby Telegraph in September 2009 due to the original advert giving the wrong address of the local authority's public register, and we therefore extended the consultation to allow interested persons more time to make comments.

We sent copies of the Application to the following bodies, including those with which we have "Working Together Agreements".

- Derby City Council
- The Food Standards Agency (FSA)
- NHS Derby City
- Derbyshire County (PCT)
- Severn Trent Water
- Health Protection Agency
- Health & Safety Executive (HSE)

These are bodies whose expertise, democratic accountability and/or local knowledge make it appropriate for us to seek their views directly.

In addition to our advertising the Application, we undertook a programme of extended public consultation by holding public surgeries at Pride Park on the 6th October 2009 and Sinfin Community Centre on the 7th October 2009.

Written comments were invited and accepted by the Agency well beyond the formal consultation period. We summarise the consultation comments and our response to them in Annexes 2 & 3. We have taken all relevant representations into consideration in reaching our determination.

We also consulted on the draft decision in accordance with the requirements of (a) the Environmental Permitting Regulations (England & Wales) 2010, (b) our statutory Public Participation Statement and (c) our Regulatory Guidance Series No EPR 6 for Determinations involving sites of high public interest. This consultation was carried out between 17th September 2010 and 18th October 2010, again we accepted consultations beyond the formal consultation stage. We summarise the consultation comments and our response to them in Annex 3.

Although we were able to consider the Application duly made, we did in fact need more information in order to determine it, and issued an information notice on 31st March 2010. A copy of the information notice was placed on

our public register and sent to Derby City Council for inclusion on its register, as was the response when received.

The applicant has provided additional information on the performance of the technology, water consumption, impacts of abnormal operation, and the relationship between Resource Recovery Solutions (RRS) / United Utilities (UU). The applicant has also confirmed that the operational management of the site will take into account any requirement to protect the Common Lizard and its habitat. A copy of the information was placed on the public register and sent to Derby City Council for inclusion on it's register.

3. The legal framework

The Permit will be granted under regulation 13 of the Environmental Permitting Regulations. The Environmental Permitting regime is a legal vehicle which delivers the relevant legal framework for permitting activities falling within its scope. The Application is for a regulated facility as defined in the EPR, and in particular is:

- an *installation* for the purposes of the IPPCD;
- a *waste incineration installation* under the WID;
- an *operation* covered by the WFD, because it processes waste; and
- subject to aspects of other relevant legislation which also have to be addressed.

We address some of the legal requirements directly where relevant in the body of this document. Any other requirements are covered in a section towards the end of the document.

We consider that in granting this 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

4.1.1 The permitted activities

The Installation is subject to EPR because it carries out an activity listed in Part 2 of Schedule 1 to the EPR:

- Section 5.1 Part A (1) (c) – incineration of non-hazardous waste in an incineration plant with a capacity of 1 tonne or more per hour.

The Waste Incineration Directive defines “incineration plant” as follows;

> "Incineration plant" means any stationary or mobile technical unit and equipment dedicated to the thermal treatment of wastes with or without recovery of the combustion heat generated. This includes the incineration by oxidation of waste as well as other thermal treatment processes such as pyrolysis, gasification or plasma processes in so far as the substances resulting from the treatment are subsequently incinerated.
>
> This definition covers the site and the entire incineration plant including all incineration lines, waste reception, storage, on site pretreatment facilities, waste-fuel and air-supply systems, boiler, facilities for the treatment of exhaust gases, on-site facilities for treatment or storage of residues and waste water, stack, devices and systems for controlling incineration operations, recording and monitoring incineration conditions

Many activities which would normally be categorised as “directly associated activities” for EPR purposes, such as air pollution control plant, the ash storage bunker and the MBT waste pre treatment are therefore included in the listed activity description.

An installation also comprises any unlisted “directly associated activities”, which at this Installation includes the generation of electricity using a steam turbine. This is one installation, because the incineration plant and the steam turbine are successive steps in an integrated activity.

Together, these listed and unlisted activities define the legal boundary of the Installation.

4.1.2 The site

The site has an area of approximately 3.4 hectares and comprises a Brownfield site located to the side and rear of Railway Cottages, Sinfin Lane Derby DE24 9GF. The grid reference for the site is; 435230, 333010.

The Applicant submitted a plan which we consider is satisfactory, showing the site of the Installation and its extent. A plan is included in Schedule 7 to the

Permit, and the Operator is required to carry on the permitted activities within the site boundary. The site is approximately 3km south of Derby City Centre.

4.1.2.1 Residential Properties

The nearest housing is the Railway Cottages that are directly to the north west of the site. There are further residential properties to the North West and South West.

4.1.2.2 Designated Sites and other Sensitive Conservation Locations

A search was undertaken for statutory conservation sites within the appropriate screening distances applicable to this installation.

Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and RAMSAR sites are considered if they are within 10km of an installation. Sites of Special Scientific Interest (SSSIs), locally designated sites and non designated sites are considered if they are within 2km.

There is no European or National designated sites within these screening distances.

There is one locally designated nature conservation site and a number of non designated sites within 2km of the site.

The impact of the installation on these sites is considered in Section 5 of this document.

4.1.2.3 Surface Water and Groundwater

There are no surface water features located on the site. The Cuttle Brook is about 300m to the southwest and is partially culverted. It flows to the south east away from the site. The site is located on Mercia Mudstone which is a minor aquifer of high permeability. No water is abstracted from the ground within 1800m of the site.

4.1.2.4 Flooding risk

The site is not in a current flood risk area,

4.1.3 What the Installation does

The purpose of the installation is the disposal of residual municipal waste with the recovery of energy, using gasification as the thermal treatment technology. The treatment processes has capacity for the treatment of 200,000 tonnes of waste per year at the installation.

The activity consists of the following processes;

- Waste is delivered to the site by refuse collection lorries, road sweepers and bulk transport vehicles, which are covered or otherwise contained.

- Waste is delivered to the waste bunker inside the fully enclosed reception hall, the doors are closed when waste deliveries are not taking place.

- The reception hall is maintained under negative pressure. This minimises odours, dust or litter escaping from the building.

- The overhead gantry cranes in the reception hall are used to remove large recyclables and non processable objects. The feed hoppers to the waste pretreatment have grills which catch oversized materials.

- Physical pre-treatment which includes shredding is used to recover recyclables including metals and other bulky recyclables contained with the waste. Non combustible items, such as stone glass and metals will be removed at this stage.

- A proportion of the waste is then dried for about two weeks, using natural biological processes to create a refuse derived fuel (RDF).

- The refuse derived fuel is mixed with the physically pre-treated fuel to create a mixed waste fuel of consistent calorific value of around 11.7 MJ/Kg. This is done to optimise the efficiency of the Advance Conversion Technology (ACT) process.

- The ACT process thermally treats the mixed waste fuel. The ACT process uses a patented gasification process.

- The process consists of two chambers, the primary gasification chamber and secondary thermal oxidation chamber.

- The primary gasification chamber is equipped with a fixed horizontal, oil cooled grate. Hydraulic scrappers ensure a steady transport of the waste derived fuel along the grate. A guillotine is used at the inlet to the chamber to control the thickness of waste on the grate and the ingress of air.

- Combustion in the primary chamber occurs in a reduced oxygen environment (sub stoichiometric). This environment produces a syngas, which is composed mainly of carbon monoxide and hydrogen (85 per cent), with smaller quantities of carbon dioxide, nitrogen, methane and various other hydrocarbon gases.

- This gas is passed to the secondary thermal oxidation chamber, where it is burnt with excess air. The temperature is maintained at 850^{o}C or above, in accordance with the requirements of the Waste Incineration Directive (WID)

- Each chamber has diesel fuel burners for operation in predetermined conditions such as pre heating during start up and when temperatures within the oxidation chamber are at risk of falling below the required 850^{o}C. The Diesel Fuel Oil used for firing the auxiliary burners is low sulphur and is delivered in bulk and stored in a bunded tank.

- As the gasification process is completed the spent fuel mix drops in an ash quench basin where recycled and fresh water is used to cool the ash. It also provides a sealing function like the trap on a sink, preventing air ingress into the combustion chamber.

- The bottom ash is collected and stored in a storage bay within the building. It is removed from site to a third party recycling facility for use

as construction aggregate, subject to its suitability. Sampling of the bottom ash will be carried out to ensure effective burn out is being achieved by testing for total organic carbon (TOC) of the residual ash.

- A Heat Recovery Steam Generator (HRSG) will be located at the exit of the exhaust gas from the secondary oxidation chamber. The steam will be fed to a steam turbine which will generate electricity. Steam will be produced at a temperature of 380°C and a pressure of 23 bar.

- Water for steam generation will be taken from the mains and treated prior to its use in the boilers. Water treatment used in the process includes corrosion inhibitors and chemicals to control pH which are delivered in appropriate containers and stored in bunded areas. Steam will be condensed in air-cooled condensers and then returned to the boiler. When the impurities such as minerals in the water reach a certain concentration some water is drained from the system. This "blow down" water is used to quench the hot ashes from the primary gasification chamber.

- The process will generate approximately 12MW of electricity of which 8.7 MW will be exported, after the site's own electrical needs have been met. This is enough power for 14,000 homes. Facilities (steam or hot water pass-outs) for the potential further recovery of energy through the use of waste heat will be provided and maintained to allow any opportunities for its use to be capitalised upon, should they become practicable.

- The plant will be designed to meet the requirements of BAT and WID for releases to air by a combination of good process design and operation and abatement equipment.

- Exhaust gases will pass from the boiler to the gas cleaning equipment. The design of the boilers, based on a computational fluid dynamics assessment (CFD), is optimised to minimise emissions and dioxin reformation by quickly reducing the flue gas temperature through the critical temperature range to avoid dioxin *de novo* synthesis.

- Lime will be directly injected into the flue gas duct to neutralise acid gases.

- Powdered activated carbon (PAC) is injected into the flue gas duct via a diffuser and will absorb (primarily) dioxins and mercury.

- The use of reagents in the abatement of acid gases will be controlled by downstream monitoring of hydrogen chloride (HCl) optimising the efficiency of gas scrubbing and reagent usage.

- Hydrated lime ($Ca(OH)_2$) and powdered activated carbon (PAC) which are used for the flue gas cleaning process are delivered by bulk tanker and offloaded pneumatically into storage silos.

- Bag filters will remove the fly ash plus excess and spent reagent as the gases pass across the bag fabric. The build up of the reagent on the

bag enhances the performance of the system. Reverse pulses of compressed air will be used to remove the accumulated particulate (Air Pollution Control (APC) residues) from the bags. The APC residues will then be transferred under vacuum to a sealed storage silo and sent for disposal off site by licensed contractors subject to permitting legislation applicable to waste.

- The cleaned gas will then discharge to atmosphere via a 55-metre stack at an efflux velocity in excess of 26.75m sec^{-1} at maximum throughput.
- Emissions from the stack will be continuously monitored for: particulates, carbon monoxide (CO), sulphur dioxide (SO_2), hydrogen chloride (HCl), oxygen (O_2), oxides of nitrogen (NO and NO_2 expressed as NO_2) and volatile organic compounds (VOCs as total organic carbon [TOC]) and water (H_2O).
- Periodic monitoring of the stack emissions will be undertaken for dioxins, furans, dioxin like PCBs, polyaromatic hydrocarbons (PAHs) hydrogen fluoride (HF) antimony, arsenic, lead, chromium, cobalt, copper, manganese, nickel, vanadium, mercury, cadmium, thallium and their compounds.

- All process waters will pass to a process water storage tank which is designed for, as near as practicable, closed loop recycling of waters used by the process. Excess waste water will be discharged to sewer in accordance with a trade effluent discharge consent.

- There is no discharge of process liquids to controlled waters or groundwater. Uncontaminated surface water will be collected via an interceptor before discharge into the existing sewer system. The water from roofs is collected in the rainwater storage tank for use in the process, any excess is discharged to sewer. Foul water from site welfare will be discharged to sewer.

- Various maintenance materials (e.g. oils, greases, antifreezes, welding and fire fighting gases etc.) are stored in bunded areas.

4.1.4 Key Issues in the Determination

The key issue arising during this determination was that the proposed site of the installation is located in the proximity of an area that has been declared an Air Quality Management Area (AQMA) by Derby City Council due to an exceedance of the annual mean of 40 µg m^{-3} for nitrogen dioxide. We want to ensure that in permitting this installation we don't impair the implementation of measures to control nitrogen dioxide levels in the AQMA with a view to the removal of the AQMA. We will accomplish this by ensuring the installation is achieving BAT. We therefore describe how we determined these issues in more detail in this document.

4.2 The site and its protection

4.2.1 Site setting, layout and history

The site is a Brownfield site and has a long legacy of potentially contaminative historic land uses. These include a worked out clay pit and associated brick works. The site was subsequently the location of a tannery. The demolition materials from the tannery were used to fill in the clay pit.

The site will require extensive remediation to return it to use. The remediation of the site and ensuring it is suitable for the proposed use is the responsibility of the Local Planning Authority, and will be secured through planning permission conditions.

The applicant will have to demonstrate that the site is suitable for its proposed use to the planning authority with regards to maters such as ground stability and the impacts of any historic land contamination.

The post remediation report will be used as the benchmark of the site condition at the outset of permitted activities. A preoperational condition (P005) relates to the provision of this information.

4.2.2 Proposed site design: potentially polluting substances and prevention measures

In order to prevent any further contamination of the site post remediation, the proposed design of the installation will minimise the possibility of the loss or spillage of potentially polluting substances. In the event of a loss or spillage, secondary measures will minimise the environmental impact. The package of proposed measures include:-

- All roads, pavements and floor slabs will be underlain with leachate resistant membrane.
- All kerb and floor joints will be sealed with an appropriate leachate resistant sealant.
- All sub-surface structures (i.e. drains and tanks) will be designed to be water resistant and will be underlain with the leachate resistant membrane
- Underground tanks will be double-walled with leak detection between the walls and overflow protection.
- Storage of auxiliary fuel (diesel) will be with a purpose-built storage tank equipped with overfill protection and containment in line with regulatory requirements.

This is detailed in section 6 of the Impact Assessment Report submitted in support of the application.

4.2.3 Closure and decommissioning

Having considered the information submitted in the Application, we are satisfied that the appropriate measures will be in place for the closure and decommissioning of the Installation, as referred to in the Closure Management Report of the application.

The Operator has to satisfy us, if it wants to surrender the Permit, that the necessary measures have been taken, both to avoid any pollution risk resulting from the operation of the Installation, and to return the site to a satisfactory state, having regard to the state of the site before the Installation was put into operation. To do this, the Operator has to apply to us for surrender, which we will not grant unless and until we are satisfied that these requirements have been complied with.

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.

We are aware of the sale of United Utilities Waste Operations Limited, this sale was completed on the 22nd October 2010 and is of the complete company. This means that the legal entity and company number will remain the same, so for the purposes of this determination the operator has remained the same. We remain satisfied that appropriate management systems and management structures will be in place for this Installation and that the Operator will comply with the Permit conditions.

The applicant has notified us they have changed their registered address since we consulted on our decision. The permit has been updated with this new address.

Preoperational Condition 04 in the Permit requires the Operator to submit a written report to us on the implementation of its Environmental Management System (EMS) and the progress made in the accreditation of the system by an external body, or if appropriate submit a schedule by which the EMS will be subject to accreditation. This has to be provided at least 3 months before treating any waste, this will give us the opportunity to review the position and take action if necessary before the Operator proceeds to the stage of commissioning.

The incineration of waste is not a specified waste management activity (SWMA). The Agency has considered whether any of the other activities taking place at the Installation are SWMAs and has concluded that, as a consequence of the withdrawal of the proposed Hazardous waste transfer station from the application (correspondence from applicant received July 2010), there are no SWMAs. It is therefore concluded that the Permit can be granted independently of any decision on planning permission

We are satisfied that the submitted Operator Pollution Risk Assessment (OPRA) profile and score is accurate. The OPRA score will be used as the basis for subsistence and other charging, in accordance with our OPRA Scheme.

4.3.2 Management

The Operator has stated that they will implement the Environmental Management System (EMS) outlined in the application and its certification in accordance with ISO14001. The Agency recognises that certification of the EMS cannot take place until the installation is operational. Pre-operational condition PO04 is included requiring the Operator to provide a summary of the EMS prior to commissioning of the plant and to make available for inspection all EMS documentation.

Having considered the information submitted in the Application, we are satisfied that appropriate management systems and management structures will be in place for this Installation, and that sufficient financial, technical and personnel 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 the applicant has outlined the structure and key principles of an Accident Management Plan. Having considered this and other information submitted in the Application, we are satisfied that appropriate measures will be in place to ensure that accidents that may cause pollution are prevented but that, if they should occur, their consequences are minimised. The Accident Management Plan is a key document in the Environment Management System (EMS), pre operational condition PO04 covers the EMS.

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 descriptions contained in the Application:

Description	Parts Included	Justification
The Application EPR/WP3133KP/A001	The following Sections of the Application Management Plan: **Chapter 5 Management Report all sections** **Chapter 6 Operational Techniques Report sections;**	The applicant must operate the Installation in accordance with descriptions contained within the documents provided in support of the application to insure compliance with permit conditions.

	Section 4 Waste Reception Section 5 Waste Pre-treatment Section 6 Mechanical Biological Treatment Section 7 Thermal Treatment Section 8 Residual Materials Management Section 9 Plant Commissioning **Chapter 7 Resource Management Report** Section 2 Raw Materials Management Section 3 Water Management Section4 Energy Management **Chapter 8 Emissions Management Report (including fugitive emissions, odour and noise) all sections** **Chapter 9 Accident management Plan all sections** **Chapter 10 Closure Management Report all sections**	
Further Information Schedule 5 Notice dated 31/03/10	Response to question 8 Bag Filter Maintenance Response to question 9 Odour Control during Biofilter Maintenance Response to question 10 Air Quality Revised Chromium VI Standards Response to question 11 Boiler Water Treatment Further information Section 13.2.2 Plant Construction & Commissioning	The applicant must operate the Installation in accordance with descriptions contained within the documents provided in support of the application to insure compliance with permit conditions.
Withdrawal of specified waste management activities (Hazardous Waste	Amended Site Plan and letter referencing what sections of the application are withdrawn.	The applicant no longer proposes to undertake these specified waste management activities

Transfer Station) from the Permit Application		which were included in the original application.
Further information in support of Schedule 5	Section 6 NOx limit values to demonstrate BAT	To ensure that the impact of the installation has an insignificant impact on the environment

The details set out above describe the outline techniques that will be used for the operation of the installation that have been assessed by the Agency as BAT; they form part of the Permit through Permit condition 2.3 and Table S3.1 in the Permit Schedules.

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

Raw Material or Fuel	Specifications	Justification
Gas Oil	< 0.1% sulphur content	Maximum sulphur content will be 0.1% w/w in accordance with Sulphur Content of Liquid Fuels Regulations.

Article 4(4) of the WID requires that the Permit must list explicitly the categories of waste which may be treated. The Application contains a list of those wastes coded by the European Waste Catalogue (EWC) number, which the Applicant believes may appear 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.

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 and the proposed thermal treatment technology is suitable for such wastes;
(ii) these wastes are likely to be in the design calorific value (CV) range for the plant;
(iii) these wastes are unlikely to contain components that cannot be processed safely at the installation.

The Installation will take residual waste i.e. that which is not separately collected or otherwise recovered, recycled or composted. Waste codes for separately collected or recovered fractions of waste are not included in the list of permitted wastes except where they cannot be recycled or re-used and are otherwise destined for landfill.

The installation will be designed, constructed and operated using BAT for the installation 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 in the rest of this document.

4.3.7 Energy efficiency

4.3.7.1 Consideration of energy efficiency

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

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

- The extent to which the Installation meets the requirements of Article 6(6) of the WID, which requires that heat "*shall be recovered as far as practicable*". This issue is covered in this section. It is important to understand, however, that the potential for using waste heat is largely determined by decisions taken by other bodies, such as planning decisions on the location of the Installation.

- 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.

4.3.7.2 Use of energy within, and generated by 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 efficient use of energy.

- Selection of low energy systems for providing heating, cooling and lighting.
- Complying with, and exceeding where practical, the Energy Conservation requirements as defined under the Building Regulations Part L.
- Carry out life cycle analysis of energy systems in order to verify selection. Thermal modelling will be considered.
- Consideration of sub-metering of each building and/or energy use.
- Use of day lighting systems

An energy policy that demonstrates the operator's commitment to continuous improvement in energy efficiency will be developed as part of the site's Environmental Management System. The Installation will generate electricity only and has been specified to maximise electrical output with little or no use of waste heat. The Agency's relevant technical guidance note, SGN EPR S5.01, states that using indicative BAT for municipal waste incineration, where electricity only is generated, will mean that 5-9 MW of electricity should be recoverable per 100,000 tonnes of waste burned.

This issue was explored further with the applicant and, in a response dated 5th July 2010, the applicant provided further information on efficiency.

The applicant pointed out that the majority of facilities do not pretreat and recover metals prior to combustion. On the other hand, this facility will further recover ferrous and non-ferrous metals and incorporate an MBT facility to prepare the waste for gasification. The applicant claimed that if the electricity used in pre-treatment is included, the efficiency would equate to 6.1 MW_e/ 100 kt waste. If the gasification activity is considered in isolation to the waste pre-treatment and metals recovery, the efficiency is 8.62 MW per 100 kt, which is at the top end of the figures suggested in SGN EPR S5.01. The Installation is therefore toward the lower end of plant efficiency in terms of electricity recovered on the indicative BAT range.

It can be concluded that although upon initial inspection, the installation appears toward the bottom of the scale in terms of energy efficiency, this reflects the energy expenditure involved in the recovery of additional recyclable materials (and the consequential energy savings elsewhere) and the low CV of the waste, furthermore the installation won't be dependant on the maintenance of a high waste CV to be operationally viable.

The SGN and the WID both require that, as well as maximising the primary use of heat to generate electricity, waste heat should be recovered as far as practicable, i.e. by identifying and utilising opportunities for Combined Heat and Power (CHP) and district heating. Where waste heat currently cannot be recovered, provision for future installation, such as by including tie-in points for a heat distribution network at the outlet of the power generating unit, should be made. Permit condition 1.2.2 requires this.

The location of the Installation largely determines whether waste heat can be utilised, and this is a matter for the planning authority. The installation has the capacity to provide low grade steam for a district heating scheme, as demonstrated in existing facilities in Europe. However, at present no district heating network, either for residential or commercial premises, has been identified for this installation. The viability of developing a suitable network on a commercial basis will continue to be reviewed during the lifetime of the plant. Establishing a district heating network to supply residential local users would involve significant technical, financial and planning challenges such that this is not seen as a practicable proposition at present but will be kept under review. There is however adjacent industry, which could possibly utilise heat from the installation without the challenges of providing a network. Conditions 1.2.2 and 1.2.3 have 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.

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

4.3.7.3 Compliance with Article 6(6) of the WID

The previous section describes our assessment of energy utilisation. Article 6(6) of the WID requires that heat "*shall be recovered as far as practicable*". The Government's guidance on the WID (EPR WID Guidance, 2009) lists the

following hierarchy of heat recovery options, with (e) as the least preferred option and the optimum being a combination of the other four options:

a) use of waste heat from boiler water cooling system

b) use of a boiler for steam generation or electricity generation

c) use of exhaust steam for process heating or CHP schemes

d) internal heat exchange for primary air heating and/or flue gas reheating

e) no heat recovery.

The Application proposes b) use of a boiler for steam generation or electricity generation

The WID guidance also states that opportunities to maximise the potential for heat recovery should be considered at the early planning stage, when sites are being identified for incineration facilities. In our role as a statutory consultee on the planning application, we ensured that the issue of energy utilisation was brought to the planning authority's attention.

We consider that, within the constraints of the location of the Installation explained above, the Installation will recover heat as far as practicable, and therefore that the requirements of Article 6(6) are met, in so far as the Agency's remit under the EPR is concerned.

4.3.7.4 Permit conditions concerning energy efficiency

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

The Operator is required to report energy usage and energy generated under condition 4.2 and Schedule 4. The following parameters are required to be reported: total electrical energy generated; electrical energy exported; total energy usage and energy exported as heat (if any). Together with the total waste burned per year, this will enable the Agency to monitor energy efficiency at the Installation and take action if at any stage the energy efficiency is not considered acceptable.

4.3.8 Efficient use of raw materials

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

The Operator is required to report with respect to raw material usage under condition 4.2. and Schedule 4, including consumption of lime and activated carbon used per tonne of waste burned. This will enable the Agency to assess whether there have been any changes in the efficiency of the air pollution control plant.

Hydrated lime will be used for acid gas abatement and powdered activated carbon (PAC) will used to minimise the emissions of mercury, dioxins and furans. Improvement condition IC4 requires the operator to submit a report describing the performance and optimisation of the abatement control measures including the optimisation of reagent dosing. This will allow the Agency to ensure that the raw materials are being used efficiently.

Low Sulphur Gas Oil is to be used as an auxiliary fuel. Natural gas was only available though an interruptible supply, so availability can not be guaranteed to suit the operational requirements of the site.

Mains water will be used for the boiler plant. Process waters will be recycled for ash quench, and use will be made on the site of grey water. Grey water is waste water generated from domestic activities such as laundry and bathing.

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

The IPPC regulations require operators to minimise waste, reduce product loss and optimise their process. This requirement relates to 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 ferrous and non ferrous 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 [3.1.2 and associated Table S3.4] specify limits for total organic carbon (TOC) in bottom ash of 3%. Compliance with this limit will demonstrate that good combustion control and waste burnout is being achieved in the furnaces and waste generation is being avoided where practicable.

Most incinerator bottom ash (IBA) is likely to 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. The Operator is required to characterise this waste in accordance with the List of Waste Regulations 2005.

Air pollution control (APC) residues from flue gas treatment are hazardous waste and therefore must be sent for disposal to a landfill site licensed to accept hazardous waste, or to an appropriately permitted facility for treatment.

In order to ensure that the IBA and APC residues are adequately sampled to comply with permit monitoring requirements, pre-operational condition PO02 requires the Operator to provide a written plan for approval detailing the ash sampling protocols. Table S3.4 requires the Operator to carry out an ongoing programme of monitoring.

Recovered ferrous and non-ferrous metals will be sent for recovery.

The Application also proposes that, where possible, bottom ash will be transported to a suitable bottom ash recycling facility, from where it could be re-used in the construction industry as an aggregate. The Applicant is currently investigating options for the use of bottom ash.

Having considered the information submitted in the Application, we are satisfied that waste production will be avoided as far as possible, and where waste is produced it will be recovered unless technically and economically impossible.

We are satisfied that waste from the Installation that cannot be recovered will be disposed of using a method that avoids or reduces any impact on the environment. Standard condition 1.5.1 will ensure that this position is maintained.

5 Minimising the Installation's environmental impact

This section of the document explains how we have approached the critical issue of assessing the likely impact of the Installation on human health and the environment, and what measures we are requiring to ensure a high level of protection. For an installation of this kind, the principal emissions are those to air, although we also consider those to land and water.

5.1 Environmental impact

5.1.1 Methodology

We have reviewed the Applicant's assessment of the likely environmental impact of emissions from the Installation. This is an important step in determining what conditions are appropriate for the Permit, and in particular the basis for setting emission limit values (ELVs).

The impact assessment has adopted the criteria set out in the Environment Agency's Horizontal Guidance Note H1- Environmental Risk Assessment for Permits. The first step in this process is to screen out those emissions which are environmentally insignificant. H1 sets the following criteria for releases to air:

- the contribution to **long-term** ground level concentrations is less than **1%** of the relevant air quality standard; and
- the contribution to **short-term** ground level concentrations is less than **10%** of the relevant air quality standard.

The H1 methodology is based on the conservative approach, which adopts a "worst-case scenario" approach, as explained below. If, on this conservative basis, the emission's impact is assessed as "insignificant", then the Agency considers that the proposed technique for minimising pollution is BAT, as it would not be reasonable or proportionate to require an operator to take further or additional steps, or incur additional expenditure, where no material environmental benefit results.

It is important to understand that an exceedance of these H1 thresholds does not mean an emission will have a **significant** impact, but only that it cannot be screened out as **insignificant**.

Where an emission cannot be screened out at this stage, a more detailed assessment should be carried out to determine the actual environmental impact, for example, by taking into account existing background (ambient) concentrations of the emission in question and using further dispersion modelling. The Applicant has in this case provided a detailed air dispersion model.

Where an emission is not ultimately screened out as insignificant, the Applicant is required to consider all the potentially available techniques for minimising the emission, and to explain why its specific proposal is in fact BAT for the Installation. We will not necessarily agree, and we may at the very least require further information before we are prepared to accept the

Applicant's justification: the consultation on the Application may also yield information that shapes our determination in this respect.

In the event that the Predicted Environmental Concentration (PEC) which is the sum of the background and the process contribution, exceeds 70% of the long term air quality standard or 100% of the short term air quality standard, the Agency may require the Applicant to go beyond what would normally be considered BAT for the Installation in order to ensure that there is no significant pollution or risk to human health.

Once the BAT for the Installation are established, we set ELVs based on use of those BAT. However, that is not the end of the exercise, because we also take into account local factors (for example, particularly sensitive receptors nearby such as a SSSI) and relevant Environmental Quality Standards (see further below). Again, even if we agree with the Applicant as to what is BAT, these additional factors may lead us to include more stringent conditions than those proposed by the Applicant. If we consider that emissions would cause significant pollution, we would refuse the Application.

WID on the other hand is based on setting mandatory emission limit values. Although the WID 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. As the WID itself states, its limits are "*a necessary but not sufficient condition*" for compliance with the requirements of the IPPCD, which also applies to this Installation. The IPPCD requires that emissions should be prevented or minimised, so it may be possible and desirable to achieve emissions below WID limits.

Even if the WID limits are appropriate, operational controls complement the emission limits and should generally result in emissions below the maximum allowed; whilst the limits themselves provide headroom to allow for unavoidable process fluctuations. Actual emissions are therefore almost certain to be below emission limits in practice, because any operator who sought to operate its installation continually at the maximum permitted level would almost inevitably breach those limits regularly, simply by virtue of normal fluctuations in plant performance, resulting in enforcement action (including potentially prosecution) being taken. The assessment is therefore a "worst-case" scenario.

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

5.1.2 Assessments

5.1.2.1 Air Quality

The Operator assessed the Installation's potential emissions to air against the relevant air quality standards, and potential impact upon local habitat sites and human health. The human health risk assessment is based on the maximum predicted ground concentration and assumes that land is used for food production, regardless of what the land use is on the map. Therefore in considering human health, land used for the production of food in the locality

such as allotments, farms, schools and gardens is considered. The human health risk assessment also assumes that the most vulnerable human receptors could be present in any of the surrounding land usages, including industrial and commercial premises.

The assessments predicted the potential effects on local air quality from the Installation's stack emissions using dispersion models to model the air quality impact of existing and proposed industrial installations. The operator used both the ADMS 4 and AERMOD dispersion models. The models used 5 years of meteorological data collected from Watnall. The station is approximately 19 km to the north-east of the Installation site. The datasets were supplied by ADM Ltd, the UK agent for Trinity Consultants. Although the land in the area around the Installation is only gently undulating, with no sharp changes in gradient, terrain effects have been considered within the model. OS Landform Panorama DTM data has been used to generate the terrain dataset required by ADMS, at a grid resolution of 64 x 64 (high resolution). The concentrations reported in the assessments were the maximum ground level concentrations predicted by the dispersion modelling packages over the 5 years of meteorological data.

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

- First, they assumed that the ELVs in the Permit would be those in the WID.
- Second, they assumed that the Installation operates continuously at the short-term and long-term WID emission limit values, i.e. the maximum permitted emissions under the WID.

The way in which the Applicant used dispersion models, its selection of input data, and the assumptions it made have been reviewed by the Agency's specialist Air Quality Modelling and Assessment Unit (AQMAU), so that we have satisfied ourselves that the modelling presented is a reasonably reliable picture. AQMAU agreed with the Applicant's conclusion, that the predicted concentrations of all pollutants considered were well within the relevant air quality objectives and environmental assessment levels. AQMAU also audited the air quality and human health impact assessment and agreed that the conclusions drawn in the reports can be relied upon.

The results of the model are summarised in the tables below:

a) Long-term impact of emissions to air

Pollutant	EQS / EAL	Back-ground Conc	Process Contribution (PC)	PC as % of EQS / EAL	Predicted Environmental Concentration (PEC)	PEC as % EQS / EAL	Screens Out <1% Yes/No
PM10	40	23.203	0.117	0.29	23.32	58.3	Yes
PM2.5	25	14.503	0.117	0.47	14.62	58.5	Yes
VOC, as benzene	5	0.533	0.117	2.34	0.65	12.9	No
HCl	20		0.117	0.59	n/a	n/a	Yes
S02	50	5.884	0.586	1.17	6.47	12.9	No
NO2	40	35	0.6	1.5	35.6	89	No
Cd	0.005	0.0003	0.000317	6.35	0.000617	12.30	No
Tl	1	0.00003	0.000269	0.03	0.000299	0.03	Yes
Hg	0.25	0.00008	0.000586	0.23	0.000666	0.27	Yes
Sb	5	0.0054029	0.0000871	0.002	0.00549	0.11	Yes
As	0.003	0.001202	0.000288	9.6	0.00149	49.7	No
Cr	0.0002	n/a	1.92E-06	0.97	n/a	n/a	Yes
Co	0.2	0.0002	0.000161	0.08	0.000361	0.18	Yes
Cu	2	0.024998	0.000502	0.03	0.0255	1.28	Yes
Ni	0.02	0.001497	0.000763	3.82	0.00226	11.32	No
Pb	0.5	0.0012	0.00154	0.31	0.00274	0.55	Yes
V	5	0.002401	0.0000290	0.00058	0.00243	0.05	Yes
Dioxin	n/a	3.019E-08	6.61E-09	n/a	3.68E-08	n/a	Yes
Furan	n/a	3.799E-08	6.61E-09	n/a	4.46E-08	n/a	Yes
PAH (as benzo{a}pyrene)	0.001	0.0002095	1.15E-05	1.15	2.21E-04	22.1	Yes

Note 1 All the above concentration figures are in $\mu g/m^3$

b) Short-term impact of emissions to air

Pollutant	EQS / EAL	Back-ground Conc	Process Contribution (PC)	PC as % of EQS / EAL	Predicted Environmental Concentration (PEC)	PEC as % EQS / EAL	Screens Out <10% Yes/No
PM10 90%ile of 24-hour means	50	46.403	0.407	0.81	46.81	93.6	Yes
HCl	800		10.651	1.33	n/a	n/a	Yes
SO2 99.9%ile of 15 min means	125	11.762	13.058	10.45	24.82	19.86	Yes
SO2 99.73%ile of 1 hour means	350	11.755	9.135	2.61	20.89	6.0	Yes
SO2 99.18%ile of 24 hour means	266	11.76	4.320	1.62	16.08	6.0	Yes
NO2	200	70	1	0.5	71	35.5	Yes
Cd	1.5	0.0006	0.0288	1.92	0.0294	2.00	Yes
Tl	30	1E-04	0.0244	0.08	0.0245	0.08	Yes
Hg	7.5	0.0002	0.0532	0.71	0.0534	0.71	Yes
Sb	150	0.01078	0.00792	0.0052	0.0187	0.01	Yes
As	15	0.0024	0.0262	0.17	0.0286	0.19	Yes
Cr	0.0002	n/a	1.92E-06	0.96	n/a	n/a	Yes
Co	6	0.0004	0.0146	0.24	0.0150	0.25	Yes
Cu	60	0.05	0.0456	0.08	0.0956	0.16	Yes
Mn Max 24 mean	150	0.011	0.00360	0.002	0.0146	0.01	Yes
Mn Max 1 hour mean	1500	0.0022	0.0138	0.0009	0.0160	0.01	Yes
Ni	30	0.003	0.0693	0.23	0.0723	0.24	Yes
V	1	0.004801	0.000069	0.0069	0.00487	0.49	Yes
CO	10000	400	15.18	0.15	415.18	4.2	Yes

Note 1 All the above concentration figures are in $\mu g/m^3$

Note 2 For the assessment of short term impacts the PEC is determined by adding twice the long term background concentration to the short tem process contribution.

From the tables above the following emissions can be screened out as insignificant in that the process contribution is < 1% of the long term EQS/EAL or <10% of the short term EAQ/EAL. PM10, PM2.5, HCl, Ti, Hg, Sb, Cr, Co, Cu, Pb and V. The predicted environment concentrations of these emissions as a percentage of the EAL/ELV is less than 70%, so won't result in significant pollution. Therefore we consider the Applicant's proposals for preventing and minimising the emissions of these substances to be BAT for the Installation.

Also from the table above NO_2 emissions are considered to have the potential to give rise to significant pollution in that the process contribution exceeds 70% of the long term EQS/EAL or 100% of the short term EQS/EAL. For emissions of NO_2, we have carefully considered whether additional measures are required above what would normally be considered BAT in order to prevent significant pollution. For the remaining 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 5.2 of this document. With the application of BAT as discussed in section 5.2, we are satisfied that none of the emissions will give rise to significant pollution.

c) Assessment of emissions of PM_{10} and $PM_{2.5}$

Not withstanding that both PM_{10} and $PM_{2.5}$ have screened out, given the public interest in $PM_{10}$and $PM_{2.5}$ we have given the matter more attention here.

The impact on air quality from particulate emissions has been assessed against UK Air Quality Standards for PM_{10}; the Clean Air for Europe (CAFE) objectives and World Health Organisation (WHO) guidance for $PM_{2.5}$.

For PM_{10}, the UK Air Quality Standards are a long term annual average of 40 $\mu g/m^3$ and 50 $\mu g/m^3$ as a short term daily average. For $PM_{2.5}$, CAFE proposes a new urban background level of 25 $\mu g/m^3$ to be achieved by 2020; whereas the WHO guidance value is 10 $\mu g/m^3$. Both the CAFE and the WHO values are based on long term average concentrations.

The impact of the installation against these standards and guidelines is shown in the table below – all concentrations are shown as $\mu g/m^3$. The assessment assumes that all particulate emissions are PM_{10} or $PM_{2.5}$ and that both PM_{10} and $PM_{2.5}$ will be emitted at the WID emission limit values

Pollutant	EQS / EAL	Back-ground Conc	Process Contribution (PC)	PC as % of EQS / EAL	Predicted Environmental Concentration (PEC)	PEC as % EQS / EAL
PM_{10}	40	23.20	0.117	0.29	23.32	58.3
	50	46.40	0.407	0.81	46.81	93.6
$PM_{2.5}$	25	14.50	0.117	0.47	14.62	58.5
	10	14.50	0.117	1.17	14.62	146.2

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

- It assumes that the plant emits particulates continuously at the WID limit. Whereas actual emissions using the proposed abatement technology elsewhere are 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.

The above assessment shows that the predicted process contribution for emissions of PM_{10} is below 1% of the long term air quality standard and below

10% of the short term air quality standard and so can be considered insignificant.

The above assessment also shows that the predicted process contribution for emissions of $PM_{2.5}$ is below 1% of the CAFE air quality objective but slightly above 1% of the WHO guideline.

The assessment shows that $PM_{2.5}$ emissions are slightly in excess of the Environment Agency's threshold of 1% and so cannot be considered insignificant, when considered against the WHO guideline. The assessment is based very much on a worst case scenario, and in reality the process contribution is expected to be <1% of the WHO guideline. Background levels of $PM_{2.5}$ are currently below the CAFE air quality objectives but above the WHO guideline.

In Michael Kay's proof of evidence to the planning appeal against the refusal of planning permission for the installation, it is stated that the Victory Road AQMA "relates to PM_{10} pollution which was attributable to the former QDF foundry. Extensive monitoring since the closure of the foundry has shown the PM_{10} concentrations to be well within the National Air quality Objective and step are in hand to commence the procedure to revoke this AQMA".

It is therefore the case that the published local background figures for PM_{10} which were used for the air quality assessment were much higher than the current background levels of PM_{10} in the area, this means that our assessment was very conservative.

There is currently no measurement standard specifically for fine particulate matter in the $PM_{2.5}$ fraction released from the stack. Whilst the Agency is confident that current monitoring techniques will capture the fine particle fraction ($PM_{2.5}$) for inclusion in a measurement of total particulate matter, a permit condition 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 Agency is satisfied that the health of the public would not be put at risk by emissions of fine particulate matter. Improvement condition IC1 has been imposed requiring the Operator to carry out tests to determine the particle size distribution in the exhaust gas emissions.

d) Treatment of New EPAQS Guidelines on Arsenic, Nickel and Chromium (VI)

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, proposes new ambient air quality guidelines for arsenic, nickel, beryllium and chromium (VI).

Arsenic, nickel and chromium are three of the nine Group 3 metals whose emissions are subject to a mandatory minimum emission limit by the WID. WID sets an aggregate limit of 0.5 mg/m^3 for all nine Group 3 metals. Emissions of beryllium are not subject to an emission limit in WID.

The EPAQS guidelines refer only to that portion of the metal emissions contained within PM_{10} in ambient air. The new guidelines are 3 ng/m^3 for

arsenic, 20 ng/m^3 for Nickel and 0.2 ng/m^3 for chromium (VI). These are significantly lower than current Environmental Assessment Levels.

The WID limit for Group 3 metals of 0.5 mg/m^3 covers gaseous and vapour forms of the metals and their compounds as well as that present in particulate matter. WID has a separate emission limit values for emissions to air of total particulate material. The EPAQS guideline also refers to chromium (VI) only whereas the Group 3 WID limit includes all chromium. The EPAQS report estimates that 20% of environmental chromium is present as chromium (VI).

The applicant was asked to reassess the environmental impact of chromium VI in the light of EPAQS guidance. The original assessment was revisited on the basis of the typical total chromium emission values from similar Energos facilities and the chromium (VI) levels predicted using the EPAQ estimation i.e. 20% of the total chromium emission would be as chromium (VI).

The predicted process contribution (PC) for total chromium given in the dispersion modelling report, assuming that chromium emissions would be a weighted percentage of the ELV for Group 3 metals, is 0.00097 µg/m3. Based on the further assumption that 20% of the total chromium emission would be chromium (VI), the predicted PC for chromium (VI) alone would be 0.00019 µg/m3 or 97% of the proposed EAL set out within the EPAQS report.

A comparison of the modelled emission concentrations against typical emission concentrations, measured at comparable operational installations elsewhere in Europe, are summarised in the table below.

Emission	WID Limit Emissions		Typical Plant Emissions	
	mg/Nm3	g/s	mg/Nm3	g/s
Total Particulate	10	0.3218	0.16	0.00515
PM10	1.33	0.0427	0.152	0.00489
Total chromium	0.0825	0.0026545	0.00082	0.00002639

*Note: Actual data on PM*10 is not currently available – the estimate in the above table is based on the Air Quality Expert Group Report (2005) that puts *PM*10 from Waste Sector sources at 13.3% of total particulate emissions.

It can be seen that typical emissions of total chromium within the group 3 metal emissions are only around 1% of the mass that would be emitted should the installation be operating at the WID ELV. Using the EPAQ 20% estimate for chromium (VI), the estimated chromium (VI) emission for the installation, based on typical emission data, is < 0.000164 mg/Nm3 or < 5.277E-06 g/s. On this basis reassessment of the expected emissions from Sinfin WTF against the proposed EPAQS long term guideline for chromium (VI) equates to a calculated PC of 1.92E-06 µg/m3 or 0.96% of proposed EAL.

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 concentration of total chromium and chromium (VI) 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. We have also attained particle emission data for arsenic and nickel. These data show:

Measurement	Mean	Minimum	Maximum
Proportion of Cr VI to total Cr in APC residues (as %)	0.7	0.03	2.1
Total chromium emission concentration (mg/m^3) [1]	0.007	0.001	0.033
Arsenic emission concentration (mg/m^3) [1]	0.0013	0.0003	0.003
Nickel emission concentration (mg/m^3) [1]	0.018	0.002	0.132

Note [1] in stack measurement as concentration of particle fraction in stack gases

In order to check the applicant's assessment of chromium VI, we carried out our own analysis using the emission figures listed in the above table. Assuming that chromium is emitted at the maximum level of 0.033 mg/m3, it will give a process contribution of 0.000386 µg/m3. If we further assume that the chromium VI proportion is highest (i.e. 2.1%), PC for chromium VI will be 0.000008 µg/m3. This is equivalent to PC being 4% of EAL. If we use the mean figures, then the PC is 0.28% of EAL.

This assessment shows that based on expected realistic emissions, a breach of the air quality guidelines is unlikely.

Therefore taking all these factors into account, it is considered appropriate to set an improvement condition requiring confirmation of the assessment made above based on actual measurements of emissions. This is included as IC6. A period of one year's data has been specified to take account of any natural variation in the waste composition. The Improvement Condition seeks to verify whether the actual releases are as expected within these limits, in which case no further action is required.

In the event that the assessment were to indicate a risk of the air quality guidelines being exceeded, the Agency could specify a specific emission limit value for Arsenic, Nickel or Chromium as appropriate or seek beyond BAT improvements to the abatement technology employed.

5.1.2.2 Human health risk assessment

In carrying out air dispersion modelling and comparing the predicted environmental concentrations with air quality standards and environmental action levels; the Applicant has effectively made a health risk assessment for many pollutants. Air quality standards and environmental actions levels have been developed primarily in order to protect human health; and for many pollutants exposure by inhalation is the principal exposure route.

The Applicant's assessment of the impact from PM_{10}, $PM_{2.5}$, HCl, Ti, Hg, Sb, Cr, Co, Cu, Pb and V have all indicated that the installation emissions are insignificant; where the impact of emissions of VOC, SO_2, NO_2, Cd, As, Ni PAH 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 and are not considered significant.

However for dioxins, furans and some metals, the principal exposure route is through ingestion, usually through the food chain, and the risk to health is through accumulation in the body over a period of time.

5.1.2.3 Assessment of Health Effects from Dioxins, Furans and Metals

The Applicant has assessed the potential health impacts of the predicted emissions of metals from the proposed facility, along with emissions of dioxins and furans, using the US EPA Human Health Risk Assessment Protocol (HHRAP) and the Industrial Risk Assessment Programme (IRAP) database. Ground level concentrations of the assessed substances were calculated using air dispersion models. This is set out in Appendix C Health Impact Assessment of the Application.

The HHRAP identifies compounds of potential concern (COPC) which are included in the IRAP database. The compounds assessed in the human health impact assessment were: dioxins & furans, antimony, arsenic, cadmium, chromium, mercury, lead, nickel and thallium.

The IRAP model was used to assess the potential human health impacts resulting from exposure of local people to the identified persistent substances through the key pathways of inhalation of air and ingestion of food and soil. The assessment considers the potential impact of the persistent pollutants through long-term cumulative exposure over a human lifetime, taken as 70 years. The model was applied to a worst–case scenario, which represented an individual exposed for a life-time to the effects of the maximum predicted airborne emissions and consuming mostly locally grown food.

The IRAP model applies hazard indices for different categories of local receptors, classified as “farmers” and “residents”, based upon the level of expected exposure. It is assumed that a farmer proportionally eats more locally grown food than a resident and therefore represents a more sensitive receptor to the assessed compounds. The model considers all locations within the modelled area as potential receptors, and identifies farmer and resident receptors by selecting the locations in the rural or residential land use areas where airborne concentrations and wet and dry deposition rates are highest.

The IRAP model database defines a large number of physical and chemical parameters for each assessed compound to represent its behaviour in the environment, and toxicity factors to determine the carcinogenic risk or exposure hazard. Parameters are also used in the model to characterise the location and surroundings of the modelled area and the receptors that are within it. The model calculated the additional dose of compounds of potential concern (dioxins, furans and metals) received by local receptors resulting from the operation of the proposed facility. This was calculated for a variety of farmer and resident receptors which were selected based upon the maximum predicted airborne concentration and maximum predicted deposition rates.

The human health risk assessment used the IRAP model to calculate and assess the risk to local human receptors from carcinogenic and non-carcinogenic health effects. Calculated dose of dioxins and furans received by local receptors was also assessed against Tolerable Daily Intake (TDI) levels established by the World Health Organisation (WHO) and the UK Committee on Toxicity (COT) and finally metals were assessed against a total diet study background intake of metals.

Health effects other than the risk of developing cancer which could potentially be associated with metals and dioxins/furans include a variety of toxic health effects. These non-carcinogenic health effects were assessed using the IRAP model by means of a hazard quotient, which was calculated taking into account potential ingestion and inhalation of the Compounds of Potential Concern. A hazard index was then produced which represents the sum of the hazard quotients for each compound, based upon the predicted exposure concentration being divided by a Reference Dose established for that compound. The Reference Doses used in the model are set at conservative levels with the aim of protecting human health from potential effects. A Hazard Index less than 1.0 indicates that there is no increased health risk and that the assessed contaminants are present at concentrations below those that could cause effects in humans, even if the chemicals have additive effects. For all modelled local receptors the hazard index was found to be at most 17% of the harm threshold i.e. the highest calculated hazard index had a value of 0.172.

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 airborne concentrations and consuming mostly locally grown food), it was concluded that the operation of the proposed facility will not pose a significant carcinogenic or non-carcinogenic risk to human health.

5.1.2.4 Environment Agency Review of Health Risk Assessment

The Agency has reviewed the methodology employed by the Applicant to carry out the health impact assessment from persistent substances.

The applicant used health risk software IRAP-h. This method reports values in the form of Cancer Risk and a Hazard Quotient. We undertook our own check calculations using both US EPA HHRAP and HMIP methodology. Our check calculations predict that the daily for dioxins is unlikely to be exceeded. As our check calculations showed the impact was so low, it was not necessary to ask the applicant to report their values in a form comparable against the daily. We agree with the applicant that the risk from exposure to dioxins is likely to be low.

We are satisfied that the Applicant's conclusions presented above by the Applicant are soundly based. We accept that the potential emissions of dioxins, furans and metals from the proposed facility are unlikely to have an impact upon human health.

The Health Protection Agency (HPA) and Primary Care Trust (PCT) were consulted on the application submitted for the proposed facility and concluded that they had no significant concerns regarding the risk to the health of the local population from the installation. The Food Standards Agency (FSA) was also consulted during the permit determination process and they concluded that it is unlikely that there will be any unacceptable effects on the human food chain as a result of the operations at the installation.

The FSA has reported that recent dietary studies have shown that estimated total dietary intakes of dioxins and dioxin-like PCBs by all age groups fell by around 50% between 1997 and 2001, and are expected to continue to fall. In 2001 the average daily intake by adults in the UK from diet was 0.9 pg WHO-

TEQ/kg bodyweight. The daily intake predicted by our modelling is substantially below this figure.

Details of the responses provided by the PCT, HPA and FSA to the consultation on this application can be found in Annex 2.

5.1.2.5 Other Health Considerations

In September 2009 the HPA produced a position statement entitled "The Impact on Health of Emissions to Air from Municipal Waste Incinerators". This was then reproduced in February 2010 as an advisory document RPE-13. Their comments can be summarised 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. The Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment has reviewed recent data and has concluded that there is no need to change its previous advice, namely that any potential risk of cancer due to residency near to municipal waste incinerators is exceedingly low and probably not measurable by the most modern techniques. Since any possible health effects are likely to be very small, if detectable, studies of public health around modern, well managed municipal waste incinerators are not recommended."

This statement concurs with our previous comments that our assessment of emissions for the proposed plant will not result in a significant risk to human health.

5.1.2.6 Particulates smaller than 2.5 microns

The Operator will be required to monitor particulate emissions using the method set out in EN 13284-1. 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. This means that particulate monitoring data effectively captures everything above 0.3 microns and much of what is smaller. It is not expected that even smaller particles 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 and in particular on children's health because of their high surface to volume ratio, making them more reactive and their very small size and 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 Health Protection Agency (HPA) 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 the Committee on the Medical Effects of Air Pollutants (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. The HPA notes 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.

The HPA 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. This is borne out by the assessment of this application which shows emissions of PM_{10} to be insignificant. The HPA note that in a sample collected in a day at a typical urban area the proportion of $PM_{0.1}$ is around 5-10% of PM_{10}. It goes on to say that PM_{10} includes and exceeds $PM_{2.5}$ which in turn includes and exceeds $PM_{0.1}$.

5.2 Impact of abnormal operations

The Waste Incineration Directive (WID) defines abnormal operations under Article 13 (1) as: *"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 and the purified waste water of the regulated substances may exceed the prescribed emission limit values."*

WID Article 13 (2 to 4) further defines that:

- The waste cannot be combusted for a period longer than four hours uninterrupted where emission limit values are exceeded.
- The cumulative duration of operation during such conditions shall not exceed 60 hours over one year and that this cumulative duration applies to those lines which are linked to a single flue gas cleaning device.
- Total dust emissions shall under no circumstances exceed 150 mg/Nm^3 expressed as a half hour average.
- Emission limit values for CO and TOC shall not be exceeded.

The applicant considered the following abnormal events along with their effect on emissions during this period.

5.2.1.1 Monitoring Equipment Failure

Abnormal operation resulting from the failure of a monitoring device in itself is not expected to affect emissions and redundancy has been built into the system to ensure that any period of abnormal operation due to failure of a monitoring device is minimised. It is very unlikely that a short period when monitoring does not occur will coincide with an emission above the limit. The Agency agrees with this argument and accepts that no further consideration is needed for this type of event.

5.2.1.2 Failure of NOx Control

NOx emissions control is achieved by primary measures only on this installation and no secondary purification systems are utilised. As such there are no abnormal conditions and no further consideration is required for this type of event.

5.2.1.3 Failure of Bag Filter for Particulate and Metal Control

Bag filters are used to abate the releases of particulates and heavy metals (by the removal of metal oxides that have formed on the surface of the particulate matter that is then removed by the filter). WID Article 13 specifies that under no circumstances shall particulate emissions exceed 150 mg/Nm3 expressed as a half hour average. For the purpose of this assessment, it has been assumed that the maximum WID limit of 150 mg/Nm3 is reached for particulate emissions which is equivalent to a 5:1 increase. It is then reasonable to assume that metal emissions will increase by the same ratio.

5.2.1.4 Failure of Scrubbing System for Acid Gas Control

In relation to control of acid gases such as SO_2, HCl and HF, the abnormal event considered is a failure of the lime dosing system which acts as the scrubbing agent and would be classified as the purification system under WID. For the purpose of this assessment the concentration of the pollutants prior to lime injection is considered appropriate and the following has been used:

- SO_2 emissions at 600 mg/Nm^3.
- HCl emissions at 600 mg/Nm^3.
- HF emissions at 60 mg/Nm^3.

5.2.1.5 Failure of Carbon Injection for Mercury and Dioxin Control

Injection of activated carbon is used for the control of dioxins and mercury and the abnormal event considered is the failure of this injection system. The applicant used the following emission levels for this assessment.

- Dioxin emissions at 0.86 ng/Nm3 . However, the Agency has also looked at dioxins increasing by a factor of 100 (see later).
- Mercury emissions are assumed to increase by a factor of 100 in the absence of other data which is consistent with other assessments of this nature.

5.2.1.6 Scenarios Considered

The applicant considered the following two scenarios.

- The expected abnormal operating scenario for the plant is that 1 line is operating under abnormal conditions while the other 2 lines are operating normally; and
- The worse case scenario for the plant is that all 3 lines are operating under abnormal conditions although this is highly unlikely.

5.2.1.7 Methodology for Impact Assessment

Two methodologies were employed:
- H1 assessment methodology (April 2010) was used to assess the impact associated with particulates, metals, SO_2, HCl and HF. This assessment evaluates the process contribution against %PC and %PEC significance criteria using the latest set of EQS/EAL; and
- For dioxin emissions, the assessment considered the potential increase in dose rate (pg TEQ/Kg/Day) for adults and infants against USEPA health significance criteria.

Scenario 1:The results of the H1 assessment for both long term and short term impact are shown in the table below:

Emission	EAL/EQS ug/m³	Background ug/m³	PC Normal ug/m³	PC Abnormal ug/m³	PC % EAL	Less Than H1 criteria (Yes/No)	Screen As Insignificant (Yes/No)
LONG TERM IMPACT							
Sulphur Dioxide	350	5.88	0.35	0.3568	0.102	Yes	Yes
Particulate Matter	40	23.2	0.0694	0.0719	0.180	Yes	Yes
Hydrogen Chloride	750	NA	0.0694	0.0799	0.011	Yes	Yes
Hydrogen Fluoride	16	NA	0.0069	0.0080	0.050	Yes	Yes
Cadmium	0.005	0.0003	0.0002	0.0002	3.84	No	No
Thallium	1	0.00003	0.0002	0.0002	0.016	Yes	Yes
Mercury	0.25	0.00008	0.0003	0.0004	0.140	Yes	Yes
Arsenic	0.003	0.0012	0.0002	0.0002	7.11	No	No
Antimony	5	0.0054	0.0001	0.0001	0.001	Yes	Yes
Chromium	5	0.0022	0.0000	0.0000	0.000	Yes	Yes
Chromium VI	0.0002	0.00029	0.0000	0.0000	0.38	Yes	Yes
Cobalt	0.2	NA	0.0001	0.0001	0.047	Yes	Yes
Copper	10	0.025	0.0030	0.0030	0.030	Yes	Yes
Lead	0.25	0.012	0.0009	0.0009	0.370	Yes	Yes
Manganese	150	0.011	0.0009	0.0009	0.001	Yes	Yes
Nickel	0.02	0.0015	0.0005	0.0005	2.279	No	No
Vanadium	5	0.024	0.0000	0.0000	0.000	Yes	Yes
SHORT TERM IMPACT							
Sulphur Dioxide	350	11.76	29.42	29.5728	8.449	Yes	Yes
Particulate Matter	50	46.4	4.4133	4.4586	8.917	Yes	Yes
Hydrogen Chloride	750	NA	8.8266	9.0303	1.204	Yes	Yes
Hydrogen Fluoride	160	NA	0.5884	0.6096	0.381	Yes	Yes
Cadmium	1.5	0.0006	0.0040	0.0041	0.27	Yes	Yes
Thallium	1	0.00006	0.0034	0.0034	0.340	Yes	Yes
Mercury	7.5	0.00016	0.0074	0.0074	0.099	Yes	Yes
Arsenic	15	0.0024	0.0036	0.0045	0.03	Yes	Yes
Antimony	150	0.0108	0.0011	0.0011	0.001	Yes	Yes
Chromium	150	0.0044	0.0001	0.0001	0.000	Yes	Yes
Chromium VI	0.0002	0.00058	0.0000	0.0000	8.05	Yes	Yes
Cobalt	0.2	NA	0.0020	0.0020	1.003	Yes	Yes
Copper	200	0.05	0.0633	0.0639	0.032	Yes	Yes
Lead	0.25	0.024	0.0194	0.0196	7.847	Yes	Yes
Manganese	1500	0.022	0.0191	0.0192	0.001	Yes	Yes
Nickel	20	0.003	0.0096	0.0097	0.048	Yes	Yes
Vanadium	1	0.048	0.0004	0.0004	0.037	Yes	Yes

The table above shows that all emissions, with the exception of the long term impact of cadmium, arsenic and nickel, are below the 1% PC significance criteria and as such can be considered insignificant. In further considering the long term impact of cadmium, arsenic and nickel; the predicted environmental concentration (PEC) for each pollutant has been determined and assessed against the EAL/EQS. The results of the additional assessment is shown in the table below and it can be seen that the %PEC for each pollutant is blow the 70% PEC criteria and as such impact can be considered not to be significant.

Emission	EAL/EQS ug/m³	Background ug/m³	PC Abnormal ug/m³	PEC Abnormal ug/m³	PEC Abnormal % EAL	Less Than H1 criteria (Yes/No)	Screen As Insignificant (Yes/No)
LONG TERM IMPACT							
Cadmium	0.005	0.0003	0.0002	0.0005	9.84	Yes	Yes
Arsenic	0.003	0.0012	0.0002	0.0014	47.11	Yes	Yes
Nickel	0.02	0.0015	0.0005	0.0020	9.78	Yes	Yes

Scenario 2: The table low repeats the above calculations for scenario 2.

Emission	EAL/EQS ug/m³	Background ug/m³	PC Normal ug/m³	PC Abnormal ug/m³	PC % EAL	Less Than H1 criteria (Yes/No)	Screen As Insignificant (Yes/No)
LONG TERM IMPACT							
Sulphur Dioxide	350	5.88	0.35	0.3764	0.108	Yes	Yes
Particulate Matter	40	23.2	0.0694	0.0769	0.192	Yes	Yes
Hydrogen Chloride	750	NA	0.0694	0.1009	0.013	Yes	Yes
Hydrogen Fluoride	16	NA	0.0069	0.0101	0.063	Yes	Yes
Cadmium	0.005	0.0003	0.0002	0.0002	3.98	No	No
Thallium	1	0.00003	0.0002	0.0002	0.016	Yes	Yes
Mercury	0.25	0.00008	0.0003	0.0004	0.143	Yes	Yes
Arsenic	0.003	0.0012	0.0002	0.0003	9.99	No	No
Antimony	5	0.0054	0.0001	0.0001	0.001	Yes	Yes
Chromium	5	0.0022	0.0000	0.0000	0.000	Yes	Yes
Chromium VI	0.0002	0.00029	0.0000	0.0000	0.39	Yes	Yes
Cobalt	0.2	NA	0.0001	0.0001	0.048	Yes	Yes
Copper	10	0.025	0.0030	0.0031	0.031	Yes	Yes
Lead	0.25	0.012	0.0009	0.0009	0.378	Yes	Yes
Manganese	150	0.011	0.0009	0.0009	0.001	Yes	Yes
Nickel	0.02	0.0015	0.0005	0.0005	2.325	No	No
Vanadium	5	0.024	0.0000	0.0000	0.000	Yes	Yes
SHORT TERM IMPACT							
Sulphur Dioxide	350	11.76	29.42	29.5728	8.449	Yes	Yes
Particulate Matter	50	46.4	4.4133	4.4586	8.917	Yes	Yes
Hydrogen Chloride	750	NA	8.8266	9.0303	1.204	Yes	Yes
Hydrogen Fluoride	160	NA	0.5884	0.6096	0.381	Yes	Yes
Cadmium	1.5	0.0006	0.0040	0.0042	0.28	Yes	Yes
Thallium	1	0.00006	0.0034	0.0035	0.347	Yes	Yes
Mercury	7.5	0.00016	0.0074	0.0076	0.101	Yes	Yes
Arsenic	15	0.0024	0.0036	0.0063	0.04	Yes	Yes
Antimony	150	0.0108	0.0011	0.0011	0.001	Yes	Yes
Chromium	150	0.0044	0.0001	0.0001	0.000	Yes	Yes
Chromium VI	0.0002	0.00058	0.0000	0.0000	8.21	Yes	Yes
Cobalt	0.2	NA	0.0020	0.0020	1.024	Yes	Yes
Copper	200	0.05	0.0633	0.0652	0.033	Yes	Yes
Lead	0.25	0.024	0.0194	0.0200	8.006	Yes	Yes
Manganese	1500	0.022	0.0191	0.0196	0.001	Yes	Yes
Nickel	20	0.003	0.0096	0.0099	0.049	Yes	Yes
Vanadium	1	0.048	0.0004	0.0004	0.038	Yes	Yes

Like scenario 1, all emissions with the exception of the long term impact of cadmium, arsenic and nickel are below the 1% PC significance criteria and as such can be considered insignificant. In further considering the long term impact of cadmium, arsenic and nickel; the predicted environmental concentration (PEC) for each pollutant has been determined and assessed against the EAL/EQS. The results of the additional assessment is shown in the table below and it can be seen that the %PEC for each pollutant is blow the 70% PEC criteria and as such impact can be considered not to be significant.

Emission	EAL/EQS ug/m³	Background ug/m³	PC Abnormal ug/m³	PEC Abnormal ug/m³	PEC Abnormal % EAL	Less Than H1 criteria (Yes/No)	Screen As Insignificant (Yes/No)
LONG TERM IMPACT							
Cadmium	0.005	0.0003	0.0002	0.0005	9.98	Yes	Yes
Arsenic	0.003	0.0012	0.0003	0.0015	49.99	Yes	Yes
Nickel	0.02	0.0015	0.0005	0.0020	9.83	Yes	Yes

5.2.1.8 Health Impact Assessment of Dioxin Emissions

In the table below, the applicant, considered the impact of dioxins for the worst case scenario (scenario 2) against the USEPA criteria of 1 pg TEQ/kg/day for adults and 60pg TEQ/kg/day for infants. It should be remembered that the criteria set by CoT in UK is 2 pg TEQ/kg/day.

Emission	PC ug/m³	PC Abnormal ug/m³	%Increase Caused by Abnormal PC	Max Exposed individual pg/kg/day	Exposure Due to Abnormal Ops pg/kg/day	Less Than USEPA criteria (Yes/No)	Screen As Insignificant (Yes/No)
Dioxin Long Term	6.94116E-13	7.34696E-13	5.846	0.0969	0.102564923	Yes	Yes
Dioxin Short Term	1.4711E-11	1.5571E-11	5.846	0.0969	0.102564923	Yes	Yes

We also looked at the impact of dioxins if their emissions increased by a factor of 100. The maximum long term PC for dioxins under normal operating conditions is 0.1ng/m^3. Under abnormal operating conditions it will be 0.1 x [(100 x (60/8000)) + (7940/8000))] = 0.174ng/m^3. As the abnormal operation would as a maximum increase the annual mean dioxin contribution from the plant from 0.1ng/m^3 to 0.174ng/m^3 (i.e. 74%) we can conclude that the maximum dioxin intakes could be increased by 74% if the activated carbon injection system was not operational for the maximum time allowed by the permit. Using the figures for the maximum exposed individual from the above table, it will mean TDI of 0.18 pg/kg/day (1.74 x 0.102565 = 0.178). This is less than 10% of the TDI.

We are satisfied that the following conclusions drawn by the applicant are justifiable.

- The process contribution for long and short term impact for particulates, metals, SO_2, HCl and HF with the exception of the long term cadmium, arsenic and nickel were below the 1% PC significance criteria specified in H1.
- The predicted environmental contribution for long term impact of cadmium, arsenic and nickel were below the 70% PEC significance criteria specified in H1.
- The predicted dose rate for dioxins during maximum application of abnormal operating conditions resulted in a marginal increase (<0.05%) in the maximum dose rate predicted in the health impact assessment submitted with the original application documents

5.3 Best Available Techniques

5.3.1 Scope of consideration

In this section, we explain how we have determined which are the Best Available Techniques for this Installation. We explained how we approached this in 5.1.1 above. The structure of this section is as follows:

- The first issue we address is the fundamental choice of incineration technology. There are a number of alternatives, and the Applicant has explained why it has chosen one particular kind for this Installation.

- We then consider control measures for the emissions which were not screened out as insignificant above. They are: VOC, SO_2, NO_2, Cd, As, N, and PAH.

- We also 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, Persistent Organic pollutants (POPs) are considered, as we explain below.

5.3.2 The choice of furnace

The prime function of the furnace is to achieve maximum combustion of the waste. The WID requires that the plant (furnace in this context) should be designed to deliver its requirements. The main requirements of the WID 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 a 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.

- 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 retain 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 (Tables 4.7 to 4.9) used in EU and for all types of wastes. There is some information on the comparative costs.

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

Comparison of thermal treatment technologies – based on BREF tables 4.7, 4.8 and 4.9.

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	Only finely	1 to 20 t/h	Greater fuel	Cyclone	TOC	FGT

- circulating	divided consistent wastes. Limited use for raw MSW, often applied to sludges / RDF	most used above 10 t/h	flexibility than BFB Fly ashes of good leaching quality	required to conserve bed material Higher fly ash quantities	<3 %	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 G/t	TOC 0.5 – 3 %	Similar to other technologies

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
Gasific-ation - entrained flow	- mixed plastic wastes - other similar consistent streams not suited to untreated MSW gasification	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 pretreatment costs

	less widely used/proven than incineration					high
Gasific-ation - 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 noncombustibles -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	pretreated 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 req. not widely proven need market for syngas	- dependent on process temperature residue produced requires further processing sometimes combustion	High pretreatment, operation and capital costs

Overall, any of the furnace technologies listed above 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

The Applicant has proposed to use a furnace technology comprising Gasification consisting of two chambers. The primary gasification chamber is equipped with a fixed horizontal, oil cooled grate. Combustion in the primary chamber occurs in a reduced oxygen environment (sub stoichiometric), producing a syngas, which is passed to the secondary thermal oxidation chamber, to be burnt with excess air. This technology is identified in the tables above as being considered BAT in the BREF or TGN for this type of waste feed.

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, the chosen technology will achieve the requirements of the WID for the air emission of TOC/CO and the TOC on bottom ash.

5.3.3 BAT and emissions control - choice of Flue Gas Treatment Technology

The prime function of flue gas treatment is to reduce the concentration of pollutants in the exhaust gas to a level at which they will cause no significant environmental harm. 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 flue-gas treatment (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.

The Technical Guidance Note points to the following technologies being BAT:

Particulate matter				
Technique	Advantages	Disadvantages	Optimisation	Defined as BAT in BREF or TGN for:
Fabric filters (BF)	Reliable abatement of particulate matter to below 5mg/m^3	Max temp 250°C	Multiple compartments Bag burst detectors	Most plants
Wet scrubbing	May reduce acid gases simultaneously.	Not BAT on its own. 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 BF may reduce the energy consumption of the induced draft fan.	Not BAT on their own.		When used with other particulate abatement plant

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 Recycling (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)
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 < 70mg/ m^3 Reduces CO, VOC, dioxins	Expensive. Re-heat required – reduces plant efficiency		All plant
Selective non-catalytic reduction (SNCR)	NOx emissions typically 150 - 180mg/m^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	More difficult to handle Narrower temperature window		All plant
Reagent Type: Urea	Likely to be BAT Lower nitrous oxide formation			All plant

Acid gases and halogens : Primary Measures				
Technique	Advantages	Disadvantages	Optimisation	Defined as BAT in BREF or TGN for:
Low sulphur fuel, (< 0.2%S)	Reduces SOx at source		Start-up, supplementary firing.	Where auxiliary fuel required.
Management of problem	Disperses sources of	Requires closer control		All plant with heterogeneous

waste streams	acid gases (e.g. PVC) through feed.	of waste management		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 Energy required for plume reheat		

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

Carbon dioxide				
Technique	Advantages	Disadvantages	Optimisation	Defined as BAT in BREF or TGN for:
Maximise net energy recovery	All measures will reduce the impact of CO_2 emissions.			All plants
Use low Carbon support fuels			Natural Gas. Low Sulphur Gas Oil	Both are BAT.

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

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.

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.

Overall, any of the abatement techniques listed above would be considered as BAT provided the Applicant has justified it in terms of:

- 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.

The Applicant has proposed to use a FGT system comprising Lime directly injected into the flue gas duct to neutralise acid gases. Powdered activated carbon (PAC) injected into the flue gas duct via a diffuser to absorb (primarily) dioxins and mercury. Bag filters will remove the fly ash plus excess and spent reagent as the gases pass across the bag fabric.

These techniques are identified in the tables above as being considered BAT in the BREF or TGN for this type of waste feed.

The Applicant does not propose to make use of secondary NO_x reduction techniques. The Applicant has provided operational data from similar plants operating in Norway to demonstrate that high levels of NO_x reduction can be achieved using primary measures alone. The Applicant's justification is that given the low NO_x levels that can be achieved using their process; secondary measures whether SNCR or SCR do not produce sufficient additional reductions as to be justifiable. The Applicant has provided information on cost verses benefit of installing SNCR and SCR to show that it is not financially viable and so does not meet the availability test in BAT.

The Environment Agency would expect to see secondary NO_x reduction measures in place on most incineration plant. This is because the secondary techniques employed represent BAT for further reducing NOx releases from the levels achieved by primary techniques alone. However, the Agency accepts that at the primary NO_x levels which the Applicant claims for the technology proposed, further NOx reduction by secondary techniques might not be BAT because of the disproportionate cost associated with significantly smaller reductions in NOx releases. This is however crucially dependent on the Applicant achieving the NO_x release levels claimed. To ensure this occurs, the Agency proposes to set an additional ELV for NO_x to ensure that the mean release is significantly below the limit normally imposed for daily and ½-hourly monitoring measurements.

Secondary reduction techniques are likely to provide a "damping effect" which will reduce the short-term fluctuations in released NOx emissions associated with primary control methods. Although mean NO_x emissions will be significantly below those associated with conventional incineration plant, they are likely to be subject to greater fluctuation around the mean.

Notwithstanding these fluctuations, the Agency is satisfied that the emissions can be contained within the half hourly and daily mean NO_x limits set by WID, but additionally has included a limit of 105 mg/m^3 as an annual mean based on the performance of the plants referenced by the technology supplier.

Based on this annual limit, the impact of NO_x emissions within the AQMA is predicted to be less than 1% of the AQS for NO_2. Even taking account of the elevated background levels from increased traffic movements associated with the incinerator, NO_x emissions are not expected to result in a breach of the AQS for NO_2 of 40 $\mu g/m^3$ as an annual average.

The additional ELV thus achieves two objectives. Firstly, it will ensure that primary control measures are tuned to minimised NO_x emissions in line with those operating in Norway which is BAT for this Installation. Secondly, it will not lead to any breach of the A/EQS and it ensures that the impact on the AQMA are reduced below 1% of the AQS, at which point the impact can be considered insignificant.

We have considered the individual elements of the FGT system and agree that they are BAT. We have considered the FGT system as a whole and agree that it is BAT and the concentration of pollutants in the exhaust gas will cause no significant environmental harm. We believe that, based on the information gathered by the BREF process, the chosen combination of technologies will achieve the requirements of the WID for the air emission of dust, NOx, SO_2, HCl, metals and dioxins/furans as a minimum.

5.3.4 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 IPPCD purposes.

It should be noted that the electricity generated by the Installation will result in a reduction in emissions of CO_2 elsewhere, as virgin fossil fuels will not be burnt to create the same electricity. The Applicant has therefore included within their Global Warming Potential (GWP) calculations a CO_2 offset for the net amount of electricity exported from the Installation.

Taking this into account, the applicant calculated that the total emissions of CO_2 from the installation are estimated at 172,000 tonnes year. At this level emissions cannot be characterised as insignificant. The Installation is not subject to the Greenhouse Gas Emissions Trading Scheme Regulations 2003; therefore it is a requirement of IPPCD to investigate how emissions of CO_2 might be prevented or minimised.

GWP has therefore been a factor in the Applicant's BAT assessment. There are a number of areas in which a difference can be made to the GWP of the Installation. These normally relate to the choice of secondary abatement system for NO_x which is not relevant to this installation.

In summary: the following factors influence the GWP of the facility:-

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 drawn from the public supply:

On the credit side

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

The assessment shows that the GWP of the plant is dominated by the emissions of carbon dioxide that are releases as a result of waste combustion. This is constant for all options considered in the BAT assessment.

The differences in the GWP of the options in the BAT appraisal thus arise from small differences in energy recovery and use...

Taking all these factors into account, the Operator's assessment shows their preferred option is best in terms of GWP, on the basis that they seek to continue to seek to improve the efficiency of the installation through exploring opportunities for heat recovery.

The Environment Agency agrees with this assessment and that the chosen option is BAT for the installation.

It should be noted that CO_2 is an inevitable product of the combustion of waste. The amount of CO_2 emitted will be essentially determined by the quantity and characteristics of waste being incinerated, which are already subject to conditions in the Permit. It is therefore inappropriate to set an emission limit value for CO_2, which could do more than recognise what is going to be emitted. The gas is not therefore targeted as a key pollutant under the IPPC Directive or under the Waste Incineration Directive, e.g. it is not included in Annex III to the IPPCD, 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 destruction of waste. Controls in the form of restrictions on the volume and type of waste that can be accepted at the Installation and permit conditions relating to energy efficiency effectively apply equivalent technical measures to limit CO_2 emissions.

5.3.5 BAT and POPs

International action on Persistent Organic pollutants (POPs) is required under the UN's Stockholm Convention, which entered into force in 2004 and has been signed by 151 nations. The EU implemented the Convention through the POPs Regulation (850/2004), which is directly applicable in UK law. The Agency is required by national POPs Regulations (SI 2007 No 3106) to give effect to Article 6(3) of the EC POPs Regulation when determining applications for environmental Permits. However, it needs to be borne in mind that this application is for a particular type of installation, namely a waste incinerator.

The Stockholm Convention distinguishes between intentionally- and unintentionally-produced POPs. Intentionally-produced POPs are those used deliberately (mainly in the past) in agriculture (primarily as pesticides) and industry. Those intentionally-produced POPs are not relevant where waste incineration is concerned. This is logical, not least because 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; and
- PCBs.

The UK's national implementation plan for the Stockholm Convention, published in 2007, makes explicit that the relevant controls for unintentionally-produced POPs, such as might be produced by waste incineration, are

delivered through a combination of IPPC and WID requirements. That would, as required by the IPPC Directive, include an examination of BAT, including potential alternative techniques, with a view to preventing or minimising harmful emissions. These have been applied as explained in this document, which explicitly addresses alternative techniques and BAT for the minimisation of emissions of dioxins.

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

"*Member States shall, when considering proposals to construct new facilities or significantly to modify existing facilities using processes that release chemicals listed in Annex III, without prejudice to Council Directive 1996/61/EC, 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.*"

We believe that the Permit ensures that the formation and release of POPs will be prevented or minimised. As we explain above, high-temperature incineration is one of the prescribed methods for destroying POPs. The requirements of the Stockholm Convention in relation to *unintentionally-produced POPs* are delivered through the IPPCD and the WID, which require the use of BAT to prevent or, where that is not possible, minimise all harmful emissions, including POPs.

The release of **dioxins and furans** to air is required by the WID 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 Government is of the opinion that, in addition to the requirements of the WID, the WHO-TEQ values for both dioxins and dioxin-like PCBs should be specified for monitoring and 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. EPR require monitoring of a range of PAHs and dioxin-like PCBs in waste incineration Permits 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 identified by DEFRA in the Environmental Permitting Guidance on the WID. 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 5.3.1 of this document details the assessment of emissions to air, which includes dioxins and concludes that there will be no adverse effect on human health from either normal or abnormal operation.

Hexachlorobenzene (HCB) is 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]

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 will also minimise the release of HCB.

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

5.4 Setting ELVs and other Permit conditions

5.4.1 Translating BAT into Permit conditions

As we have explained above, establishing the BAT for the Installation is not the end of the exercise, as local factors and national and European EQSs must also be considered, to see whether different requirements are indicated. This section explains how we have determined the conditions included in the Permit.

5.4.2 Local factors

The proposed site of the installation is located in an area that has been declared an AQMA by Derby City Council due to exceedance of the annual mean of 40 μgm^{-3} for nitrogen dioxide. We want to ensure that in permitting this installation we don't impair the implementation of measures to control NOx concentrations and ultimately remove the air quality management area

5.4.3 National and European EQSs

As detailed in section 5.1 the environmental impact of the installation has been assessed against relevant EQS, at the levels of performance required by WID. The installation will not result in the breach of any EQSs. Therefore it is appropriate to adopt the limits proposed by WID as ELVs for this installation. However as mentioned in section 5.3.2, we want to support Derby City Council with measures towards improving air quality in the locality to allow the removal of the AQMA, through the setting of a lower ELV for oxides of nitrogen.

This is discussed within the subsequent section.

5.4.4 Emissions to air

The applicant has provided sufficient information through both the application and further information provided in support of the Schedule 5 request, to demonstrate the installation is achieving BAT with regards to emissions of oxides of nitrogen. The predicted emission levels for oxides of nitrogen are less than 1% of the EQS. 1% is considered insignificant. In achieving this level of performance the installation is achieving an emission level in excess of that required by WID. We have therefore revised the ELV for oxides of nitrogen to reflect this level of performance and ensure that the emissions from the installation are not having a significant impact on the AQMA.

5.4.5 Emissions to water

There are no emissions to water.

5.4.6 Emissions to sewer

All uncontaminated surface water from the installation will be passed through a 3-stage interceptor and an attenuation pond prior to discharge to sewer at release point S1

The facility will use approximately 33,800m^3 of mains water per year. No additional surface or ground water abstraction is required.

The facility is designed to store waste process water from a variety of sources such as boiler drains, ash discharge overflow and rainwater runoff from potentially contaminated areas. This water is then reused within the process for bottom ash quenching. Under unusual conditions, for example, during boiler cleaning there may be a need for overflow of this water and it will be discharged to public sewer under a trade effluent consent at release point S2 or pumped out for final disposal by tanker. Any discharge would be controlled by the trade effluent consent and so there is no need for the Agency to set limits as releases are infrequent and capable of being treated by the sewage treatment works which in turn has limits set to protect the environment.

5.4.7 Fugitive emissions

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

The WID specifies that plants must be able to demonstrate that the plant is designed in such a way as to prevent the unauthorised and accidental release of polluting substances into soil, surface water and groundwater. In addition storage requirements for contaminated water of Article 8(7) must be arranged. The applicant has detailed in the Operational Techniques Report under section 3.3.11 Foul Water, Trade Effluent and Contaminated Water Management, how they propose to store contaminated water. We conclude that article 8(7) is satisfied.

5.4.8 Odour

Based upon the information in the application we are satisfied that the appropriate measures will be in place to prevent pollution from odour.

Waste accepted at the installation will be delivered in covered vehicles or within containers and bulk storage of waste will only occur in the installation's waste bunker. A roller shutter door will be used to close the entrance to the tipping hall outside of the waste delivery periods and air will be drawn from above the waste storage bunker in order to prevent odours and airborne particulates from leaving the facility building.

Biofilters will be used to filter the air from the MBT, we are satisfied that these will prevent pollution from odour from the bio drying process.

5.4.9 Noise and vibration

Based upon the information in the application and further information that was provided as a consequence of the Schedule 5 response, we are satisfied that the appropriate measures will be in place to prevent pollution from noise and vibration.

The application contained a noise impact assessment which identified local noise-sensitive receptors which included Railway Cottages which are the nearest receptors to the installation, potential sources of noise at the proposed plant and noise attenuation measures. Measurements were taken of the prevailing ambient noise levels to produce a baseline noise survey and an assessment was carried out in accordance with BS4142 to compare the predicted plant rating noise levels with the established background levels. The assessment concluded that during daytime and evening periods the operation of the plant at the predicted noise levels would be unlikely to cause complaints at any of the assessment locations.

5.5 Monitoring

5.5.1 Monitoring during normal operations

We have decided that monitoring should be carried out for the parameters listed in tables S4.1 to S4.5 in Schedule 4 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.

For emissions to air, the methods for continuous and periodic monitoring are in accordance with the Agency's Guidance M2 for monitoring of stack emissions to air.

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

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

In accordance with the WID, failure of CEMs (except for those for Particulates, TOC, and CO), is allowed for up to 4 hours at a time and a total of 60 hours in a year. CEM failure outside these periods will require the feeding of waste to be stopped.

5.5.3 Other Monitoring Requirements

Other monitoring requirements have been set by the Agency in Condition 3.5.1 and Schedule 4 of the permit. These monitoring requirements have been imposed in order to enable correction of measured concentration of substances to the appropriate reference conditions; to an Environmental Permit requirement that dioxin-like PCBs and PAHs should be monitored and to deliver the requirements of WID for monitoring of residues and temperature in the combustion chamber.

In addition improvement condition IC1 requires an exercise be carried out to determine the size distribution of the particles emitted from the stacks to identify the fractions in the PM_{10}, $PM_{2.5}$ and $PM_{1.0}$ ranges. This reflects the latest scientific research which indicates that very fine particles have the most potential to adversely affect health. This is a standard improvement condition being imposed on all incinerators in order to gather information on the contribution of waste incineration generally to emissions of very fine particles.

5.5.4 Continuous emissions monitoring for dioxins and mercury

The WID specifies manual extractive sampling for mercury and dioxin monitoring against defined standards. However continuous emission monitoring equipment for both substances is now available. The Agency has reviewed the applicability of these techniques to the installation.

Until recently there was no CEM which could measure solid phase (particulate) mercury as well as vapour phase mercury. However there are now instruments which claim to measure total mercury such as the MERCEM instrument manufactured by Sick-Maihak, which is CEMS certified. The Committee European de Normalisation (CEN) has recently published a standard for total mercury to be determined by automated measuring systems (EN 14884:2005). However the British Standards Institute has objected to manner in which the standard has been developed and believes it does not entirely fulfil its purpose.

In the case of dioxins, equipment is available that can take a sample over an extended period (several weeks), but the sample must then be analysed in the conventional way. Despite good ability to track the same trends in changing dioxin concentrations, systematic differences are observed between continuous sampling and manual sample train measurements in which continuous sampling records dioxin concentrations higher than manual sample trains. The lack of a primary reference method (e.g. involving a reference gas of know concentration of dioxin) prohibits any one approach being considered more accurate than another. Manual sample trains are more applicable for dioxin monitoring against an emission limit value in accordance with WID requirements where dioxin methods are required to

meet EN1948. Cross-stack sampling in accordance with EN13284-1 (the low dust standard) is a pre-requisite of EN1948, whereas continuous sampling techniques are designed for operation at one or at most two fixed points across the stack.

For either continuous monitor 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 and this makes it difficult for the Agency to act unilaterally in the case of UK incinerators. Use of a manual sample train is the only technique which fulfils the requirements of the WID. At the present time, it is considered that in view of the predicted low levels of mercury and dioxin emission it is not justifiable to require the operator to install continuous monitoring for these substances.

In accordance with its legal requirement to do so the Agency is always reviewing the development of new methods and standards and their performance in industrial applications. In particular the 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

5.6 Reporting

We have specified the reporting requirements in Schedule 5 of the Permit either to meet the reporting requirements set out in the WID, or to ensure data is reported to enable timely review by the Agency to ensure compliance with permit conditions and to monitor the efficiency of material use and energy recovery at the installation.

6 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.

6.1 The EPR 2010 and related Directives

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

6.1.1 Schedules 1 and 7 to the EPR 2010 – IPPC Directive

We address the requirements of the IPPCD in the body of this document above.

There is one requirement not addressed above, which is that contained in Article 9(2) IPPCD.

Article 9(2) of the IPPC Directive requires that “In the case of a new installation or a substantial change where Article 4 of Directive 85/337/EC applies, any relevant information obtained or conclusion arrived at pursuant to

articles 5, 6 and 7 of that Directive shall be taken into account for the purposes of granting an environmental 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 take into consideration 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 Derby City Council Planning Services was to refuse planning permission on 17th December 2009.
- The report and decision notice of the local planning authority 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.

The application for development consent was refused by the Derby City Council Planning Committee. The three reasons given for refusal by the planning authority are as follows;

1. The proposal would result in significant harm to the environment by virtue of the emissions from the plant which would result in a severe detriment to residential amenity in the area, including increasing public perception of associated health risks, and accordingly, the proposal would be contrary to the saved policies W4, W5, W6 and W8 of the Derby and Derbyshire Waste Local Plan and policies GD2, GD5, EP14 and E12 of the adopted City of Derby Local Plan Review.

2. Traffic generated by the proposal would exacerbate existing traffic problems in the area and would be likely to result in a severe detriment to the local Air Quality Management Area which in turn would have a knock on effect on the air quality for local residents. The proposal, would therefore, be contrary to the saved policies W2, W5, W6, W8 and W10 of the Derby and Derbyshire Waste Local Plan and GD5, GD8, EP14, E12, T1, T4, T6, T7, T8 and T10 of the adopted City of Derby Local Plan Review.

3. The size, bulk and design of the proposed building would rudely intrude into the outlook from the adjoining residential properties and would be

out of character with the surrounding commercial/industrial buildings. As a consequence of this shortcoming, the proposal would be contrary to the saved policy W7 of the Derby and Derbyshire Waste Local Plan and GD2, GD4, GD5 and E23 of the adopted City of Derby Local Plan Review.

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.

Reason 1 above explicitly states that "the proposal would result in significant harm to the environment by virtue of emissions from the plant." The decision was not based on the report of professional planning officers as they advised the Planning Control Committee that consent should be granted, and is not supported by the Environmental Statement.

The Government's Planning Policy Statements Nos. 10 and 23 make it clear that the pollution control and planning regimes are intended to be complementary and should avoid duplication. The control of emissions from the plant are the regulatory responsibility of the Environment Agency under the Environmental Permitting Regulations. The Environment Agency has made extensive and detailed consideration of the environmental impact of emissions from the plant, in particular on its impact on the air quality management area, as set out in this document. We are satisfied that the proposal would not result in significant harm.

Reason 2 relates to the impact of the additional traffic on the local road network, including a severe detriment to the local Air Quality Management Area. The impact of emissions from road traffic is not a matter that the Environment Agency would normally take into consideration. However in this case, we have considered the effect of road traffic on the AQMA as part of our assessment on whether the emissions to air from the installation will result in significant harm to the air quality management area. We are satisfied that notwithstanding any environmental impact from the additional traffic, the installation will not result in significant detriment to the local air quality management area.

On reason 3, we are satisfied that this matter is entirely one for local planning policy and not relevant to our determination.

Therefore from our consideration of all the documents above, the 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.

6.1.2 Schedule 9 to the EPR 2010 – Waste Framework Directive

As the Installation involves the treatment of waste, it is carrying out a *waste operation* for the purposes of the EPR 2010, 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, as well as other specified requirements.

We must give effect to Article 4 of the WFD, which requires that waste is *recovered* or *disposed* of without endangering human health and without using processes or methods which could harm the environment, and in particular:

(a) Without risk to water, air or soil, or to plants or animals;
(b) Without causing a nuisance through noise or odours;
(c) Without adversely affecting the countryside or places of special interest.

We have addressed these objectives elsewhere in this document. The conditions of the Permit protect the environment and ensure that there is no harm to any features identified above.

Schedule 9 also requires that records referred to under Article 14 are kept and made available to the Agency on request. Conditions relating to the collection, maintenance, storage and availability of records form part of the Permit.

We are also required to give effect, where *disposal* operations are involved, to Article 5, which requires that appropriate measures are taken to establish an integrated and adequate network of disposal installations, taking account of the best available technology not involving excessive costs. The network must enable the Community as a whole to become self-sufficient in waste disposal and the Member States to move towards that aim individually, taking into account geographical circumstances or the need for specialised installations for certain types of waste. This network must enable waste to be disposed of in one of the nearest appropriate installations, by means of the most appropriate methods and technologies in order to ensure a high level of protection for the environment and public health.

Waste planning is primarily the responsibility of the Waste Disposal Authority and the Local Authority. We note that the Application has been refused planning permission by the Local Planning Authority, but that this decision is subject to appeal, which has yet to be heard.

In determining this Application we have had regard to the Government's Waste Strategy, we have also considered Planning Policy Statement 10: Planning for Sustainable Waste Management (PPS10). We have also had regard to the waste policies of the Local Authority and in particular those specified in the reasons for refusing planning permission.
We note that in the report to the Planning Control Committee of 17th December 2009, which recommends the grant of planning permission, it states that 'there is an identified need for the proposal in that there is a Regional Plan necessity for diversion from landfill" – this statement is not contradicted in the refusal reasons given by the Committee.

Whilst planning permission has been refused and is subject to appeal, we are satisfied that the proposed Installation will have no adverse impact on the environment or human health. It can make a contribution towards providing

an integrated network of disposal facilities taking account of best available technologies.

In addition, Schedule 9 requires the Agency, in relation to *disposal* operations:
(b) to implement, so far as material, any waste management plan; and
(c) to ensure that the permit covers:

(i) The types and quantities of waste;
(ii) The technical requirements;
(iii) The safety precautions to be taken;
(iv) The disposal site;
(v) The treatment method.

The matters referred to in paragraph (c) above are addressed through Permit conditions. There is a subjective element to the consideration of planning issues. Ultimately, whether the proposals implement the waste management plan will be for the Planning Inspector to determine. So far as this determination is concerned, we have considered the issue, as we are required to do and we are satisfied that our decision implements, so far as material, the waste management plan.

6.1.3 Schedule 13 to the EPR 2010 – Waste Incineration Directive

We address the WID in detail in Annex 1 to this document.

6.1.4 Schedule 22 to the EPR 2010 – Groundwater, Water Framework and Groundwater Daughter Directives

To the extent that it authorises the discharge of pollutants to groundwater (a "groundwater activity" under the EPR 2010), 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 installation are permitted. The Permit also requires material storage areas to be designed and maintained to a high standard to prevent accidental releases.

6.1.5 Directive 2003/35/EC – The Public Participation Directive

Regulation 59 of the EPR requires the Agency to prepare and publish a statement of its policies for complying with its public participation duties.

The Agency has published such a document and this Application is being consulted upon in line with our public participation statement, as well as with the Agency's Regulatory Guidance Note RGS6 on Sites of High Public Interest, which addresses specifically extended consultation arrangements for determinations where public interest is particularly high. This satisfies the requirements of the Public Participation Directive.

Our decision in this case has been reached following a programme of extended public consultation, both on the original application and later, separately, on the draft permit and a draft decision document. The way in which this has been done is set out in Section 2. A summary of the responses received to our consultations and our consideration of them is set out in Annex 2.

6.2 National primary legislation

6.2.1 Environment Act 1995

6.2.1.1 Section 4 (Pursuit of Sustainable Development)

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

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

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

6.2.1.2 Section 7 (Pursuit of Conservation Objectives)

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.

As discussed in section 5.1.2.3 of this document, there are no national designated statutory conservation sites within the relevant screening distances for this installation.

We have considered the impact of the installation on local wildlife sites within 2Km and we are satisfied that no additional conditions are required.

6.2.1.3 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, as discussed in section 5.2 of this document, we have considered the impact of the installation on the AQMA that exists in the proximity of the site. The applicant has demonstrated that the emissions from the installation screen out as having an insignificant impact on this AQMA at the expected emission rate, which is lower than that required by WID. We have therefore set an ELV to ensure the impact is negligible. No additional or different conditions are appropriate for this Permit.

6.2.2 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.

6.2.3 Countryside and Rights of Way Act 2000 (CROW 2000)

Section 85 of this Act imposes a duty on 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.

6.2.4 Wildlife and Countryside Act 1981

Under section 28G of the Wildlife and Countryside Act 1981 the 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 Agency has a duty to consult Natural England/Countryside Council for Wales in relation to any permit that is likely to damage SSSIs.

We assessed the Application and concluded that the Installation will not damage the special features of any SSSI, as none fall within the 2km screening distance agreed with Natural England.

6.2.5 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.

6.3 National secondary legislation

6.3.1 The Conservation of Natural Habitats and Species Regulations 2010

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

6.3.2 Water Framework Directive Regulations 2003

Consideration has been given to whether any additional requirements should be imposed in terms of the Agency's duty under regulation 3 to secure the requirements of the Water Framework Directive through (inter alia) EP permits, but it is felt that existing conditions are sufficient in this regard and no other appropriate requirements have been identified.

6.3.3 The Persistent Organic Pollutants Regulations 2007

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

Annex 1

APPLICATION OF THE WASTE INCINERATION DIRECTIVE

1 Introduction

The WID is transposed into domestic law by the Environmental Permitting (EP) Regulations 2010. Regulation 35 requires the Regulator to ensure that the provisions in Schedule 13 (provision in relation to waste incineration) have effect. Schedule 13 lists the provisions of the WID with which compliance has to be ensured when the regulator is exercising its Permitting function.

This Installation is an incineration plant as defined by the WID and therefore must comply with the requirements.

1.1 Paragraph 3 of Schedule 13 to the EP Regulations requires an application for an EP Permit relating to a "waste incineration Installation" to contain the information specified in Article 4(2) of the WID. The Agency is satisfied that all the information required by this Article was provided by the Applicant.

1.2 Paragraph 4 of Schedule 13 to the EP Regulations requires the regulator to exercise its Permit making functions in such a way as to ensure compliance with a series of provisions of the WID. The following table addresses each of the specified provisions and how compliance will be ensured. The Agency is satisfied that, when waste is treated at the Installation, the requirements of the EP Regulations and the WID will be complied with.

WID Article	Requirement	Delivered by
4(3)	measurement techniques for emissions into the air comply with Annex III	See below on compliance with Article 11
4(4)	compliance with any applicable requirement of directives on: Urban Waste Water Treatment, the IPPC, Air Quality Framework, Dangerous Substances, Landfill.	Relevant requirements of all the Directives are delivered via EPR.
4(4)(a)	list explicitly the categories of waste that may be treated; using the European Waste Catalogue ("EWC") including information on the quantity of waste where appropriate.	Condition 2.3.3 and Table S3.2 in Schedule 3 of the Permit
4(4)(b)	Permit shall include the total waste incinerating capacity of the plant	Condition 2.3.3 and Table S3.2 in Schedule 3
4(4)(c)	specify the sampling and measurement procedures used to satisfy the obligations imposed for periodic measurements of each air and water pollutant.	Conditions 3.5.1 and Tables S4.1, S4.1(a), S4.2, S4.3 and S4.4. also compliance with Articles 10 and 11
5(1)	Take all necessary precautions concerning delivery and reception of wastes, to prevent or minimise	EPR require prevent or minimise pollution. - Volume 2 of the

	pollution.	Application defines how this will be carried out. - conditions 2.3.1, 2.3.3, 3.2, 3.3 and 3.4
5(2)	determine the mass of each category of wastes, if possible according to the EWC, prior to accepting the waste.	Volume 2 of the application describes procedures for the reception and monitoring of incoming waste
6(1)	(a). Slag and bottom ash to have Total Organic Carbon (TOC) is < 3% or loss on ignition (LOI) is < 5%. (b) flue gas to be raised to a temperature of 850ºC for two seconds, as measured at representative point of the combustion chamber. (c) 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	(a) Conditions 3.5.1 and Table S4.5 (b) The application specifies measurement point. Condition 2.3.6 specifies temperature (c) Condition 2.3.7
6(2)	Relates to co-incineration plants	Not relevant
6(3)	automatic waste feed prevention: (a) at start up until the specified temperature has been reached or if this temperature is not maintained (b) when the CEMs show that ELVs are exceeded due to disturbances or failure of abatement.	Condition 2.3.6
6(4)	Different conditions than those in 6(1) may be authorised	No such conditions have been allowed
6(5)	emissions to air do not give rise to significant ground level pollution, in particular, through exhaust of gases through a stack	Emissions and ground-level impacts are discussed in the body of this document,
6(6)	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 every 2 years (Condition 1.3. 3)
6(7)	Relates to the feeding of infectious clinical waste into the furnace	No infectious clinical waste will be burnt
6(8)	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 t
7(1)	Incineration plants to comply with the ELVs in Annex V.	Conditions 3.1.1 and 3.1.2 and Tables S4.1 and S4.1a
7(2)	Relates to co-incineration	Not relevant
7(3)	measured ELVs to be standardised in	Schedule 7 defines

	accordance with Article 11.	standardisation requirement
7(4)	Relates to co-incineration	Not relevant
8(1) – 8(6)	All relate to conditions for water discharges from the cleaning of exhaust gases	There are no such discharges as condition 3.1.1 prohibits this.
8(7)	(a) prevention of unauthorised and accidental release of any polluting substances into soil, surface water or groundwater. (b) storage capacity for contaminated rainwater run-off from the site or for contaminated water from spillage or fire-fighting	The application explains the measures to be in place for achieving the directive requirements
9	(a) residues to be minimised in their amount and harmfulness, and recycled where appropriate (b) prevent dispersal of dry residues and dust during transport and storage (c) test residues for their physical and chemical characteristics and polluting potential including heavy metal content (soluble fraction)	(a)conditions 1.5.1 and 3.5.1 (b) conditions 1.5.1 2.3.1 and 3.2.1 (c) . Condition 3.5.1 and table S4.5
10(1) and 10(2)	measurement equipment shall be installed and techniques used to monitor the incineration process, and that the measurement requirements shall be laid down in Permits	condition 3.5.1, and tables s4.1 and s4.1(a), emissions to air, and table s4.4, process monitoring requirements
10(3)	Installation and functioning of CEMs for emissions to air and water to be subjected to regular control, testing and calibration	condition 3.5.3, and tables s4.1, s4.1(a), and s4.4
10(4)	Sampling points to be specified in Permits	tables s4.1 and s4.1(a), and s4.4
10(5)	periodic measurements to air and water to comply with Annex III, points 1 and 2	tables s4.1 and s4.1(a), and s4.4 specify the standards to be used.
11(2)	Continuous measurement of NOx, CO, total dust, TOC, HCl, and SO2 and periodic measurement of HF, heavy metals, dioxins and furans plus the measurement of combustion chamber temperature and concentration of O2, pressure, temperature and water content of the exhaust gases	condition 3.5.1 and tables s4.1, s4.1(a) and s4.4.
11(3)	verify the residence time and minimum temperature as well as oxygen content of exhaust gases	Improvement condition IC3
11(4)	Periodic rather than Continuous measurement of HF if HCl is abated and limit values not exceeded	Condition 3.1.2 and table s4.1
11(6)	Conditional option of periodic	Option not applied

	measurement for HCl, HF and SO_2 instead of CEMs	except for HF as per Article 11(4) above
11(7)	reduction in the monitoring frequency for heavy metals, dioxins and furans under certain conditions, provided the criteria in article 17 of WID are available	Not applied as no such criteria available
11(8)	sets out reference conditions for standardisation of measurements	Schedule 7 sets the same reference conditions
11(9)	recording and reporting requirements	Section 4 and Schedules 5 and 6
11(10)	Sets out criteria for compliance with ELVs in Annex V	conditions 3.1.2 and tables s4.1, s4.1(a) and s4.4
11(11)	Specifies when ELVs apply, how averages are calculated (including the use of Annex III) and how many values can be discarded	table S4.1, note 2
11(12)	Average values for HCl, SO_2 and HF to be determined as per Articles 10(2), 10(4) and Annex III	See Articles 10(2), 10(4) and 11(11) above
11(14) to 11(16)	addresses the monitoring of waste water from the cleaning of exhaust gases	There are no such releases from the Installation.
11(17)	Competent authorities to be informed if ELVs are exceeded	Condition 4.3.1
12(2)	An annual report on plant operation and monitoring for all plants burning more than 2 tonne/hour waste.	Condition 4.2.2
13(1)	specify maximum period of unavoidable stoppages, disturbances or failures of purification or CEMs, during which air or water ELVs may be exceeded	Conditions 2.3.6 to 2.3.9
13(2)	cease the feed of waste in the event of a breakdown	condition 2.3.10
13(3)	Limits the maximum period under 13(1) above to 4 hours uninterrupted duration in any one instance, and with a maximum cumulative limit of 60 hours per year	condition 2.3.10.
13(4)	Limits on dust (150 mg/m3), CO and TOC not to be exceeded	Condition 2.3.6 and Table s4.1(a)

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Annex 2

CONSULTEE RESPONSES FROM PUBLIC BODIES

This section contains a summary of responses to consultation of the Application and the way in which we have taken these into account in the determination process.

Response received from Health & Safety Executive

Brief Summary of Issues Raised	Summary of Agency response to issue raised
None received	No action required

Response received from Health Protection Agency and NHS DERBY Primary Care Trust (PCT)

Brief Summary of Issues Raised	Summary of Agency response to issue raised
Letter dated 16 September 2009 The response highlighted four issues for the Environment Agency to take into consideration in the determination of the application. These were:	
1. Impact of abnormal operations should be included in air quality assessments	Although this assessment was not included in the original application, it was subsequently provided by the applicant. This is discussed in the main body of this document
2. EA should seek comments from LA on the nuisance impact of the plant during construction and operation	Nuisance control during construction is for the planners. The applicant has proposed a Construction Environmental Management Plan. Post construction, plant operations will be regulated by the Environment Agency in accordance with the permit. We discuss the main issues relating to plant operations and performance in the main body of this document.
3. The Applicant should have detailed accident management plan as required by EPR 5.01	The Applicant has stated that they will implement the Environmental Management System outlined in the application and its certification in accordance with ISO14001. A pre-operational condition is

	included requiring the Operator to provide a summary of the EMS prior to commissioning of the plant and to make available all EMS documentation. EMS will include an accident management plan. Permit condition 1.2.1 requires the operator to maintain an accident management plan.
4. EA and LA should ensure that the development assesses any historical contamination	The site will require extensive remediation to make it suitable for its proposed use. The applicant will have to demonstrate that the site is suitable for its proposed use to the planning authority with regards to maters such as ground stability and the impacts of any historic land contamination. The post remediation report will be used as the benchmark of the site condition at the outset of permitted activities. A preoperational condition (P004) has been included to require this information

Response received from Derby City Council

Brief Summary of Issues Raised	Summary of Agency response to issue raised
Environmental Health Department of Derby City Council, sent a copy of their response to Planning Department which they had provided as comments on the planning application. Most of the issues covered related to planning. However, some issues relating to air quality were also highlighted	Air quality impacts, odour, noise, accident management etc have all been discussed in the main body of this document

Response received from Food Standards Agency

Brief Summary of Issues Raised	Summary of Agency response to issue raised
1. The Applicant should ensure that pre-acceptance procedures for waste being received at the site are suitable and that good practices of storing and handling wastes are maintained to prevent any abnormal emissions or spillages, which could result in	The application provided details of the proposed waste reception and treatment on site. We reviewed these and are satisfied that the plant operations will not lead to unacceptable pollution risks. It is unlikely that any spillages will

contamination entering the food chain 2. Should bottom ash be re-used for example in the manufacture of aggregate for the construction industry, this will be acceptable as long as the controls include regular testing for dioxins against an agreed specification and the material remains subject to 'Duty of Care' until use. 3. Provided that the Operator complies with Technical Guidance Note IPPC S5.06 (Guidance for the Recovery and Disposal of Hazardous and Non-Hazardous Waste) and Draft Sector Guidance Note IPPC S1.01 (Combustion Activities), it is unlikely that there will be any unacceptable effects on the human food chain.	contaminate the food chain Bottom ash is defined as waste and its use remains subject to Duty of Care. The permit requires on going monitoring of the ash for heavy metals and dioxins. To be used as an aggregate would require the ash to meet the requirements of a product specification. Permit conditions are based on the current regulations and our own guidance notes and continued compliance with these conditions is legally binding.

<u>Annex 3a</u>. Representations from Members of the Public, local councillors and campaign groups

<u>Representations from Local Councillors</u>

Environment Agency responses are given in *italic* under each issue

a) A letter was received from Councillor Prem Chera. The following concerns were raised: -

- Extra traffic emissions in an area of already poor air quality.

  Any increase in traffic and its effect on local air quality is an issue for the planning authorities. We have however in our air quality modelling factored in an increase in background levels of pollutants as a consequence of increased traffic movements, to determine if the combination of vehicle movements and emissions from the permit would result in an unacceptable impact on air quality and the Air Quality Management Area. The results of this assessment are discussed in the decision document.

- Public concern about the perception of health risk that is it cannot be proven beyond doubt that the plant would not impact adversely on health.

  Whilst it is not possible prove 'no risk beyond doubt' advice from national health advisory bodies assures us that the facility will have no measurable effect on the health of local people

a) An email was received from Councillors Christopher Poulter, Williams & David Hayes. They raised the following concerns: -

General

- What is the EA's role in assessing the benefits to global warming reduction of the proposed plant? Are there net benefits in terms of greenhouse gas emissions associated with incinerating waste rather than putting it into landfill?

  Compared to landfill, incineration with energy recovery is much better in terms of global warming potential because the methane released from landfill has a GWP which is around 20 times higher than that of CO2 emitted by an incinerator. Another point to be noted is that almost half of the residual waste going for incineration is organic material of renewable origin and is therefore carbon neutral.

- Various protesters are claiming that radioactive waste will be incinerated in the plant. What is the EA's response to this claim?

  The permit will not allow the incineration of radioactive waste. Radioactive waste requires a separate permit for its combustion.

Planning Permission Phase

- What role does the EA play in the granting of planning permission?

  Environment Agency is a consultee on planning application

- Can the EA request that conditions are applied when the planning permission is granted? Examples might cover; On site monitoring by EA of initial plant start up and the run up to full power operation; The Periodicity of the measurement of emissions in both the chimney stack and the surrounding 5 km locality by both the EA and the operator.

  Plant commissioning, start up and operation at full power are already subject to the permit we issue. Similarly, we will specify how often the emissions are monitored and where as part of the permit.

- What hazardous chemicals are on the list of products that will be emitted in the exhaust gases of the combustion process?

  The main emissions from the plant will be: particulates, carbon monoxide (CO), sulphur dioxide (SO2), hydrogen chloride (HCl), oxygen (O2), nitrogen oxides (NOx) and volatile organic compounds (VOC). In addition, very small quantities of hydrogen fluoride, heavy metals, dioxins and furans, dioxin-like PCBs and polyaromatic hydrocarbons will also be emitted. All these pollutants will be subject to abatement techniques to reduce their environmental effect. The permit imposes very tight limits on the concentrations that can be released

- From what sources has the list of hazardous chemicals been created?

  The list of pollutants that require monitoring comes from national (EPR) and European (WID) legislation.

- On what operational experience is the applicant's environmental impact assessment (EIA) based?

  The acceptability or otherwise of the EIA is a question for the planning authority

- Exactly which documents listed on the city council's planning website constitute the applicant's EIA?

  This is a question for the planning authority

Initial Operation

- Will there be a phased run up to full power to test the plant and its emissions?

  The permit requires the operator to submit a commissioning plan designed to demonstrate that permit conditions will be met under all anticipated operating conditions. The plant will go through a commission phase when all components of the plant including emission

control will be optimised. The commissioning plan will include the expected emissions to the environment during the different stages of commissioning, the expected durations of the commissioning activities and the action to be taken to protect the environment and report to the Environment Agency.

- Will there be emissions measurement on the plant and its locality during initial operation?

  See above

- Who will carry out the measurements of emissions?

  Emission monitoring will be carried out by the Operator.

- Over what area will the fall out be measured?

  Emissions are all measured at source not in 'fall out'.

- To whom will the measurements be reported?

  All emission monitoring results are reported to the Agency who will place these on its public register and will also send a copy to the Local Authority for their public register.

- Will the measurements be reported publicly?

  Yes. These will be available on public registers held by the Environment Agency and Local Authority.

- Against what standards will emission measurements be assessed?

  Standards and limits are listed in the permit. Where BS-EN standards are available, then these must be used. Otherwise, ISO or other international standards will be used.

- Do these standards have concentration limits for all known by products of the incineration products of the incineration process?

  Yes

- Which document defines the acceptable concentrations of emissions in the surrounding locality?

  European and national air quality standards. Where these do not exist, the Environment Agency has EALs.

- Is there a lower limit to the particle size that is subject to these standards?

  The issue of particle size and the standards applicable is discussed in the Decision Document.

Normal operation

- Who will carry out in plant and surrounding locality monitoring of emissions during normal operation? What role will EA have in carrying out independent monitoring?

  Monitoring requirements for the installation are specified in the permit and it is the duty of the Operator to undertake these. We will either carry out check monitoring of pollutants using our own independent contractors or undertake on-site auditing of operator monitoring.

  Local Air quality targets have been set by the Government for the protection of health and councils must check local air quality against these targets every 3 years.

- To whom will these measurements be reported?

  The Operator reports to the Environment Agency

- Will EA carry out unannounced audits of plant operation and emissions monitoring?

  See above. We undertake both announced and unannounced visits.

Representations from members of the public and campaign groups

Brief Summary of Issues Raised Health Effects	Our Response
• Increased cancer risk, asthma, bronchitis, heart attacks, lung disease, clinical depression, behavioural problems, dementia, strokes, Parkinson's disease and altered gene function. • Reduction in life expectancy in neighbouring areas. • Toxicity associated with heavy metals • Release of pollutants, particularly dioxins and particulate and the possible impacts on health which may "disrupt foetal and infant development".	The main issues raised here are health effects. The assessment of health risk has been discussed as part of the decision document.
• Effect on the health of pets	In seeking the protection of human health, wildlife and associated habitats, we also achieve a high level of protection for pets.
• Corby Case highlighting impacts of particulate material (Dioxins) resulting in birth defects	This concerned remediation of a contaminated site rather than the operation of a regulated activity. We have assessed the impacts of the proposed installation including the impact of dioxins and are satisfied that they are acceptable.
Location	**Our Response**
• Proximity to residential areas and businesses. • Surrounding area suffers from poor air quality and elevated levels of poor health, the proposal is going to make worse. Area already has elevated Cancer rates • Why in a already deprived area • Proposal is racist, as a lot of the residents in the surrounding areas are from minority groups and that they were being disadvantaged by proposals that would have an adverse impact on their environment. • Proximity of installation to sources of waste • The site is located on a aquifer	The choice of installation site is a matter for planning and not for our determination. The environmental and health impacts of the installation are discussed in the main body of the document.

Technology	Our Response
• Technology being untested and unproven and as such did not represent Best Available Technique (BAT).	The basic principle of the technology i.e. gasification followed by combustion of the syngas is well established. In addition, the technology provider has a number of reference plants working in Europe. In any case, the plant will have to comply with permit conditions if it were to carry on operating.
• Limited information on control systems in the application.	We are satisfied with the information on control systems.
• The Isle of Wight incinerator which uses a similar technology is not working.	We are aware of the problems at the Isle of Wight plant, which uses ACT technology but a very different abatement and boiler system. We do not believe this site will have similar problems
Emissions to Air	**Our Response**
• Why has data from similar processes not been taken into account in the determination of this permit?	We have looked at the data from plants based on this technology and are satisfied that the operator will be able to comply with the permit conditions.
• Amount of CO2 Emissions and the resulting Global Warming Potential • The impact of the level of NOx that the plant is going to emit on the air quality management area and the accuracy of claims by the applicant regarding the NOx emissions from the plant in relation to the levels set by the Waste Incineration Guidance. • The effectiveness of filters in the abatement of P.M. 2.5. • How emissions are monitored and regulated in particular P.M. 2.5 • Heavy metal emissions	The issues of Global Warming Potential, impact on NOx on AQMA, measurement and effect of PM 2.5, heavy metals and Persistent Organic Pollutants have all been discussed in the decision document.
• Emissions from the pre-treatment of waste	We assessed the information on the releases from the waste pre-treatment facilities and are satisfied that their impact will be minimal.
• The bypassing of the abatement plant	There is no abatement

at start up	bypass.
• The site is in a low laying area which will result in poor plume dispersion.	Plume dispersion is assessed as part of the air quality assessment. This is discussed in the decision document.
• Combination effects from other processes	We have looked at the possible in-combination effect of the proposed Cyclamax plant at Raynesway. The distance between the two sites means there won't be any cumulative or in combination effects. The combination effect of existing processes and road traffic has been assessed as part of our air quality assessment. Any further Permit applications will have to consider cumulative and in combination effects.
Traffic	**Our Response**
• Noise due to increase in traffic movements; • Air quality impact from additional traffic	This is not a Permitting issue. We have however consided an increase in background levels of pollution as a consequence of increased traffic in our assessments.
Financial Loss	**Our Response**
• Reduction in property prices.	Not a Permitting issue
Operator Competence	**Our Response**
• Compliance issues at other incinerators. • United Utilities Convictions elsewhere. • Operator experience.	Having considered the information submitted in the Application, we are satisfied that appropriate management systems and management structures will be in place for this Installation, and that sufficient financial, technical and personnel resources are available to the Operator to ensure compliance with all the Permit conditions.
• Lack of a management system.	Pre-operational condition, PO04, addresses the provision of a management system.

Waste Codes	Our Response
• The presence of hazardous waste codes. • Site is going to take radioactive waste • Disposal of Energy Efficient Light bulbs containing mercury • List of waste types is incomplete	A complete list of waste permitted at the installation is included in the permit. It does not allow the burning of hazardous or radioactive waste. The plant will incorporate activated carbon injection to control the emissions of mercury (and dioxins) and will have to meet the emission limits specified in the permit
Communication / Consultation Process	**Our Response**
• Concerns that not all of the surrounding residents and business were aware of the proposal, and its possible implications. • Local stakeholders have not been engaged with by the applicant • Young people have not been engaged with • Environment Agency Advert detailing the application gave incorrect location of public register	Section 2 of the main document discusses how we carried out public consultation, including this second consultation. We rectified the mistake in advertisement by readvertising and allowing extra time for comments.
Disposal of Ash	**Our Response**
• Effluent released to sewer would contain pollutants including ash • Majority of ash would be landfilled • Ash will be toxic	Permit condition 1.5.1 requires the operator to take appropriate measures to ensure that waste produced by the activities is avoided or reduced, or where waste is produced it is recovered wherever practicable or otherwise disposed of in a manner which minimises its impact on the environment
Planning	**Our Response**
• Many residents asked the questions same questions as the councillors regarding planning	See response given to the councillor's questions.
Recycling	**Our Response**
• Recycling saves 3.4 times as much energy as incineration, thereby saving CO_2; • It is not residual waste as there is no form of recycling treatment. • The cost of recycling and re-using is less than the cost of incineration. • The level of recycling will be compromised in the local area • Insufficient exploration of alternatives -	We are very much in support of recycling. The installation will take source segregated residual waste and should not affect recycling levels in the local area. The waste will go through pre processing where further recyclable materials will be

waste minimisation, composting & recycling. • Environment Agency claims to be supporter of Zero Waste, yet at none of the surgeries was this made clear and only boards showing the incineration processes or espousing them were in evidence.	separated and recovered. Energy recovery, as in this case, is the major step towards 'zero waste' to landfill. Our public surgery focussed on explaining the processes involved in the application.
Electricity Generation	**Our Response**
• Amount of waste required to generate one KW of electricity. • The main purpose of the plant is incineration and not the generation of electrical power and burning waste to generate electricity is not as efficient as burning gas and coal.	Energy efficiency is discussed in the decision document. The installation is primarily designed for disposal of residual waste. However, it does recover energy in the form of electricity. It would be wrong to compare the efficiency of waste incineration with that of fossil fuels as the primary purpose of the installation is not energy generation.
Determination Process	**Our Response**
• One resident asked on what criteria we assess Applications and how a decision will be made.	This is explained as part of the decision document.
Ecological impacts	**Our Response**
• Several residents expressed concerns about the presence of a protected species on the site.	We have commented on this in the decision document in the section detailing our assessment of the Impact on Habitats sites, SSSIs and non- statutory conservation sites.
Impacts on land quality	**Our Response**
• Several residents expressed concerns about depositions of dioxins on land affecting soil quality and food production.	This issue has been discussed in the decision document in the section covering the Assessment of Health Effects from Dioxins, Furans and Metals.
Safety	**Our Response**
• One resident expressed concern about the risk of a fire and the resulting toxic effects. This concern was raised again following a fire at a recycling plant. Another resident referred to the Health & Safety at Work Act of 1974 which imposes a 'duty of care' on all concerned parties to secure the health, safety and	The operator is required to have an Environmental Management System (EMS) and submit this to the Agency before the start of commissioning. EMS incorporates an accident management plan. In any case, an environmental

welfare of persons at work.	permit does not remove the duty of the operator to comply with Health and Safety rules.
Precautionary Principle –	**Our Response**
• Several residents asked if the Environment Agency is failing to apply the precautionary principal in the determination of this application.	This implies that a precautionary approach should be applied. The United Kingdom Interdepartmental Liaison Group on Risk Assessment (UK-ILGRA) state in their paper "The Precautionary Principle: Policy and Application" 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".
Reclamation of the site	**Our Response**
• The site is a filled in clay pit then a tannery. Concerns about the impact on the environment and human health during the reclamation phase	Not a permitting issue. This will be dealt with through the planning process. Pre-operational condition PO04 requires the Operator provide a copy of the site remediation report when site remediation works have been

	completed.
Other Regulatory Issues	**Our Response**
• The proposal is in breach of the Environment Act and the Human Rights Act • The facility goes against the Persistent Organic Pollutants Treaty.	In the decision document we explain how we have addressed these legal requirements, to the extent that we have not addressed them elsewhere in this document.
Water use	**Our Response**
• The proposal makes inefficient use of water	The applicant has provided a revised estimation of expected water consumption. The application describes the applicant's proposed management of water use on site. In essence, the facility is designed to store waste process water from a variety of sources such as boiler drains, ash discharge overflow and rainwater runoff from potentially contaminated areas. This water is then reused within the process for bottom ash quenching. Under unusual conditions, for example, during boiler cleaning there may be a need for overflow of this water and it will be discharged to public sewer under a trade effluent consent or pumped out for final disposal by tanker.
Use of Lime in the abatement technology	**Our Response**
• The production of lime results in significant emissions of CO2, therefore contributing indirectly to the plants CO2 emission • The process will cause local acid rain	As discussed in section on abatement technologies, the use of lime is BAT. The plant will only use small quantities of lime and the permit will ensure this and all raw materials are used efficiently. Lime is used to remove acid gases that cause acid rain.

Annex 3b. Representations from Members of the Public, local councillors and campaign groups

This section reports on the outcome of the public consultation on the draft decision carried out between 17 September 2010 and 18 October 2010.

Approximately 30 representations were made. All of these representations have been considered. The way in which relevant issues have been considered is summarised below. Where an issue is raised by more than one person it is not repeated. In some cases the issues raised during the consultation were the same as those raised previously and are reported in Annex 3a of this document. Where this is the case the Environment Agency response has not been repeated and reference should be made to Annex 3a for an explanation of the particular concerns or issues.

Environment Agency responses are given in *italic* under each issue

Representations from MPs and Local Councillors

a) A letter was received from Mrs. Heather Wheeler Member of Parliament of South Derbyshire, who made the following comments;

Providing the inspector is happy that there are no health concerns or other environmental issues which might affect my constituents I am happy for the development to go ahead.

The Inspector will assess these issues as part of the consideration of the planning appeal. For our part we are satisfied that the proposal will not cause significant pollution or harm to human health.

b) A letter was received from Councillor Alan Graves, which included the following points;

1. The health concerns surrounding these type of plants show a worrying trend in air pollution despite filters that are purported to 'capture' all poisonous emissions.

   The environmental and health impacts of the installation are discussed in the main body of the document.

2. The alternative processes that could be used for recycling have been given proper consideration and would be less harmful to the environment in which we live.

   We are very much in support of recycling. The installation will take source segregated residual waste and should not affect recycling levels in the local area.

   The waste will go through pre processing where further recyclable materials will be separated and recovered. Energy recovery, as in this case, is the major step towards 'zero waste' to landfill.

3. Due to its status as a city, Derby is already heavily polluted compared to non urban areas, and Sinfin and Osmaston, the area where this

permit is being applied for, suffers some of the worst statistics for cancer, respiratory illness and poor health.

The environmental and health impacts of the installation are discussed in the main body of the document.

c) A letter was received from Councillor Robin Turner, who wrote on behalf of himself and Councillor Baggy Shanker;

- Concern was raised that NO_2 is already above the 40.0μg/m^3 value in the AQMA.

  There are two air quality standards (AQS) for nitrogen dioxide (NO_2), there is an annual average of 40μg/m3 and a 1-hour mean of 200μg/m3, which must not be exceeded any more than 18 times in a calendar year.

  In the case of the annual mean standard, this requires assessment at the building facades of dwellings, nurseries, schools and hospitals. For the 1- hour mean, it is locations such as the pavements of busy shopping streets and cafes with outdoor seating that are relevant.

  For the purposes of the air quality assessment for this application the most current data from NO_2 *diffusion tubes within the AQMA have been used by AQMAU to calculate the current* NO_2 *levels at the building facades of dwellings, nurseries, schools and hospitals. This has been calculated to an annual average value of 35μg/m^3 for* NO_2*, which is less than the AQS standard annual average of 40μg/m^3.*

- The assertion about virgin fossil fuels not being burnt elsewhere is of dubious merit. Any existing dedicated generation plant would perform at much higher efficiency than the proposed plant. Those plants would produce less CO_2 for the same electricity and in fact the Relative Efficiency based on the existing generation fuel mix, and certainly on the future generation fuel mix, is poor and likely to be less than the suggested efficiency.

  The primary function of the installation is the disposal of waste. The generation of electricity is a useful product of this process. It is therefore wrong to compare the export efficiency of an EfW facility with a power station using 'primary fossil fuels'. The energy efficiency of the plant is considered in section 4.3.7 of this document.

- Concerns were raised that the proposal should not be considered in isolation from the emissions from the additional traffic, that the Air Quality Management Area had not been adequately considered and that it should not impair the implementation of measures to control NOx concentrations and ultimately remove the air quality management area.

  In our modelling assessment consideration was given to an increase in road traffic in the background levels of NOx to account for vehicle movements associated with the installation. Section 5.1 describes our assessment.

In section 4.1.4 we state "The key issue arising during this determination was that the proposed site of the installation is located in the proximity of an area that has been declared an Air Quality Management Area (AQMA) by Derby City Council due to an exceedance of the annual mean of 40 μgm^{-3} for nitrogen dioxide. We want to ensure that in permitting this installation we don't impair the implementation of measures to control nitrogen dioxide levels in the AQMA with a view to the removal of the AQMA".

We concluded that the operation of the process including vehicle movements would not result in a breach of the AQMA for NOx and that it would not impair the implementation of the local authority's action plan to control nitrogen dioxide levels in the AQMA with a view to the removal of the AQMA.

- The Health Protection Agency statement does not refer to traffic effects on the level of NO_2 .

  The HPA statement relates to the emissions from within the boundaries of the installation that will be covered by the environmental permit. This is what an environmental permit controls. However as already stated in our modelling assessment, in the particular circumstances of this application consideration was given to an increase in road traffic in the background levels of NOx to account for vehicle movements associated with the installation.

- Electricity export -In the final two paragraphs on page 17 it is admitted that the plant is at the lower end of plant efficiency. The statement that "It can be concluded that although… energy saved elsewhere…"about recyclable materials is not backed up in any way. It is applying a system of "marginal costing" to a fundamental engineering issue and that is wrong. The gains from recycling metals from domestic waste will be small because there is little of that material in the Black Bin waste stream. Therefore arguments about electrical energy being saved by that process are largely inconsequential yet they are given space in the document."

  The efficiency of the installation is within the range of what is considered indicative of the best available technique (BAT). The range of figures presented as "indicative BAT are derived from the performance of existing installations, which don't undertake the recovery of additional recyclable materials. This installation undertakes pre-treatment for the additional recovery of recyclable materials. The facility is permitted to treat 200,000 tonnes of waste a year. As discussed in the decision document, the pre processing of the waste removes metals, moisture and unprocessable waste. As a consequence the residual waste for incineration will be 140,000 tonnes a year.

  We are therefore satisfied the installation is achieving BAT in terms of energy efficiency.

- Reference was made to the first two paragraphs of page 18 and 4.3.7.4 on page 19 referring to conditions 1.3.1 and 1.3.2 in the Draft Permit and whether this should have referred to condition 1.2 energy efficiency

  This was a typographical error that has been corrected. It is not considered that it would have misled anyone.

- It was queried whether there was any likelihood of finding a user for the waste heat and that if not this would affect energy efficiency.

  Energy efficiency was assessed on the basis of heat not being exported. As stated in section 4.3.7.2 of the decision document ; "the location of the Installation largely determines whether waste heat can be utilised, and this is a matter for the planning authority. However to ensure no potential opportunity is lost Condition 1.2.2 and 1.2.3 of the permit requires "The operator shall provide and maintain steam and/or hot water pass-outs such that opportunities for the further use of waste heat may be capitalised upon should they become practicable" and "The operator shall review the practicability of Combined Heat and Power (CHP) implementation at least every 2 years. The results shall be reported to the Agency within 2 months of each review".

- It was queried whether the main purpose of the plant is for the generation of electricity as an Energy from Waste plant.

  The waste incineration directive (WID) requires that when waste is incinerated, energy is recovered. The plant recovers energy and so it can be described as an energy from waste plant. However, the main purpose of the installation is the disposal of waste by incineration.

- It was queried whether the operator was legally bound to export any electricity.

  The operator is legally bound to generate and indeed to export electricity by the permit in accordance with what they have written in their application.

  The documents provided in support of the application for an environmental permit, and subsequently incorporated into the permit confirm that the process will export 8.7MW of electricity.

- Concerns were raised over the adequacy of the energy reporting requirements and whether this should be required more frequently and about the reports being available to the public.

  Our reporting requirements are consistent with the requirements that we have imposed on other EfW plants. We do not consider that monthly reporting would be of any further benefit with regards to energy efficiency. In preparing an annual report on energy efficiency, information on the variability of energy efficiency from month to month will be provided. This information is made available on the public register, so this information is available to the public.

The periods for the review of energy recovery and the practicality of CHP reflect the likely pace of change in the market place with regards to the availability of new technologies and potential customers for the CHP.

The permit conditions does not preclude the operator from carrying out more frequent reviews of energy efficiency and CHP, should opportunities become available for improvement. The improvement of efficiency and the sale of heat and power is in addition to boosting environmental performance, financially attractive to the operator.

Representations from members of the public and campaign groups

a) A number of consultations were received from Friends of the Earth, some at least of which seem to have been intended for the Applicant to answer at the planning inquiry. The issues raised which are relevant to our determination are summarised below.

- Issues were raised in relation to Persistent Organic Pollutants

  Section 5.3.5 of the Decision Document explains how the Agency has considered this.

- Concerns were raised about the adequacy of dioxin monitoring.

  Dioxin emission limits and the frequency of monitoring has been set in line with the WID requirements. Operational controls in the Permit will control the level of dioxin emissions. If considered appropriate we can undertake our own monitoring at any time.

- Issues were raised in respect of other incinerators breaching their permit limits.

  This document relates to the determination of a permit application for a proposed facility at Sinfin Lane, it would therefore be incorrect to compare it to an existing installation with a different operator and technology. Breach of permit conditions is an offence and should it happen appropriate action in accordance with our enforcement policy.

- Concern was raised that recyclable wastes such as plastics may be burnt to achieve an appropriate calorific value

  We have assessed the list of wastes that the installation is proposing to treat, a complete list of waste permitted at the installation is included in the permit. Separately collected plastics will only be allowed where they have been contaminated and cannot be recycled.

- Concern was raised about nearby allotments being polluted.

  The environmental and health impacts of the installation are discussed in the main body of the document.

- Concerns were raised with respect to the waste hierarchy and whether the proposed facility would undermine this.

  The proposal is to burn residual mixed municipal waste. It is for the

waste collection authority to decide how to collect waste but the permit will only allow separately collected fractions of waste that are normally suitable for recycling to be burnt where they are contaminated and cannot be recycled.

- Concerns were raised that the Human Health Risk Assessment only considered emissions from the stack.

  Regulated activities can present different types of risk to the environment, including: Odour, Noise and vibration, Accidents, Fugitive emissions to air and water, releases to air, discharges to ground or groundwater. We have considered all these and the details are in the main body of this document.

- Concerns were raised about underlying health issues in the area which the facility would exacerbate

  The environmental and health impacts of the installation are discussed in the main body of the document.

- Concern as to whether our assessment included emissions from other processes in the area particularly as PM2.5 emissions are slightly in excess of 1%.

  The combination effect of existing processes (which will include emissions from other stacks in the area) and road traffic has been assessed as part of our air quality assessment. We and the applicant also included an allowance in the background for an increase in traffic due to the installation in our assessment.

  Our assessment shows that $PM_{2.5}$ emissions are slightly in excess of our threshold of 1% and so cannot be considered insignificant when considered against the WHO guideline. The assessment is based very much on a worst case scenario (based on the process operating continuously at WID), and in reality the process contribution is expected to be <1% of the WHO guideline.

  Improvement condition IC1 requires an exercise be carried out to determine the size distribution of the particles emitted from the stacks to identify the fractions in the PM_{10}, $PM_{2.5}$ and $PM_{1.0}$ ranges.

- The EA has not considered the cumulative impact of particulates from the *OGEN STACK* or the extra traffic.

  We assume that the "OGEN STACK" refers to the application EA/EPR/YP3838TF/A001 by Clarke Power Services Limited. As the Clarke Power application was made after this application, Clarke Power has had to assess the cumulative effects on air quality.

  Any further Permit applications will also have to consider cumulative and in combination effects.

- The impact of emissions of volatile organic compounds, sulphur

dioxide, nitrogen dioxide, cadmium, arsenic, nickel and poly-aromatic hydrocarbons have not been screened out as insignificant. The predicted environmental concentrations are not considered significant, how can the EA state that the impact of these is not considered significant, when cadmium, arsenic, nickel and poly-aromatic hydrocarbons will not be constantly monitored?

Environmental impact assessment is detailed in the Decision Document. Monitoring frequency is in line with the WID and Environmental Permitting Regulations. It is the operational controls that actually limit emissions, monitoring only confirms the position.

- Concern was expressed that NOx limits would not be met.

  We have reviewed operational data from similar plants operating in Norway to demonstrate that high levels of NO_x reduction can be achieved using primary measures alone as proposed by the applicant. The rolling annual average we have set for NO_x is 52% of the WID limit. In order to comply with this limit the process will have to operate below 50% of WID for the majority of the operational year. We are satisfied that the limit can be achieved.

- Concerns were raised about the level of dioxin emissions including existing emissions, monitoring of them and their potential impact on health particularly birth defects and cancer. Reference was made to an article on 'nano-particles' about finding such material in birth cords and aborted foetuses. Concern was raised about emissions of 'nano-particles' into the air, with no way of knowing what the operator will emit.

  The plant will not be allowed to operate if it cannot meet the emission limits specified in the permit. Releases of dioxin are controlled by; (a) plant design to achieve minimum residence in the temperature range where dioxins can reform, (b) subjecting the flue gases to a temperature of 850^{o}C to destroy dioxins and their precursors and (c) injecting activated carbon to abate any dioxins that do form. Although the monitoring of dioxins is periodic, the control techniques are in operation all the time.

  In addition to scheduled visits, the Environment Agency also makes unannounced site visits.

  Our assessment of the human health risk assessment is contained within section 5.1.2.2 of the decision document, an assessment of the risks associated with dioxins is a key part of our assessment.

  Section 5.3.5 of the Decision Document explains how the Persistent Organic Treaty is fulfilled.

- Concerns were raised about what will happen to any ash, whether it will be hazardous and whether it can be recycled due to possible contamination.

The management of ash from the process is discussed in section 4.3.9 of the decision document which covers Avoidance, recovery or disposal with minimal environmental impact of wastes produced by the activities. Any waste generated will be assessed and dealt with appropriately. Waste production will be minimised. Any waste produced will be recovered wherever practicable. Where this is not possible it would be disposed of. This will be done in compliance with relevant legislative requirements. Any facility that receives waste from this facility would do so under and in accordance with its own permit.

- Questions were asked about the testing of the ash and leachate and if it will be done on site and how frequently?

  The process won't produce any leachate. Testing requirements for ash, including the frequency are detailed in the permit.

- A query was raised regarding the disposal of 'heavy metal and dioxin contaminated water'.

  There will be no 'heavy metal and dioxin-contaminated waste water'. Apart from waste water from welfare facilities and rainwater, the principal source of water disposed of to sewer is 'blow down' water from the boiler. Boiler blow down is the removal of water from a boiler. Its purpose is to minimize scale, corrosion, carryover, and other specific problems like occur in a domestic kettle, shower or washing machine. Blow down is also used to remove suspended solids present in the system. These solids are caused by feedwater contamination which in this case is from the water mains.

  Blowdown water is used to quench the hot bottom ash. This water is absorbed by the bottom ash which is hydroscopic, so there is no release of this quench water to sewer.

  It should be noted that water disposed of to sewer is going to a permitted water treatment facility. The permit applicable to a water treatment works will cover the types of effluent/waste waters it can receive. The consent to discharge that will be agreed between the operator and the sewerage undertaker will reflect these parameters.

- Concern was raised over the efficiency of injecting activated carbon.

  The permit specifies tight emission limits for the release of dioxins and mercury. Worldwide experience shows that the injection of activated carbon is an effective abatement technique.

- Concerns about the British Standards Institute objecting to the manner in which the mercury measuring systems have been established, therefore requiring the precautionary principle to be adopted.

  The BS concerns relate to the method for continuous measurement of mercury which is not a requirement of WID or the Permit. The Operator will be using a BS method for the measurement of mercury (BS EN 13211).

- Has the carbon footprint of the quarrying of lime and carbon used for abatement been considered?

  This is outside the scope of environmental permitting which is concerned with emissions from the installation itself. As discussed in the section on abatement technologies, the use of lime and carbon is BAT. The plant will only use small quantities and the permit will ensure these and all raw materials are used efficiently.

- Concern was raised over Operator competence

  This is addressed in the main body of this document.

- A question was asked about the content of APC residues.

  The permit requires that the APC residues are analysed for their dioxin and heavy metal content.

- There was concern that dioxins would be created in the first chamber due to its temperature.

  There is no scientific evidence to show that dioxins are produced in the gasification chamber. Gases from this chamber are combusted and subjected to the 850^{o}C / 2 second residence time before being cleaned and released to the environment.

- Concerns were raised about accident management measures.

  The operator is required to have an Environmental Management System (EMS) which includes an accident management plan and submit this to the Agency before the start of commissioning.

- The waste could include low energy light bulbs containing mercury.

  Used low energy bulbs should be recycled and not incinerated or landfilled. However, we accept that some people might deposit them in their domestic waste. It should be remembered that the amount of mercury in these bulbs is small and the plant will incorporate activated carbon injection to control the emissions of mercury (and dioxins) and will have to meet the emission limits specified in the permit.

- How much electricity will be produced?

  The process will generate approximately 12MW of electricity of which 8.7 MW will be exported, after the site's own electrical needs have been met. This is enough power for 14,000 homes. The permit also requires the operator to report on the amount of electricity the process generates and exports.

- Are the greenhouse gases from the burning of the fuel oil, added to the 172,000 tonnes of carbon dioxide produced by the incinerator every year?

Yes.

- Concerns were raised about water consumption and whether sufficient water resources are available

  Only the installations use of water is within the environmental permitting regime, which is why we assess and challenge figures presented for water consumption. The applicant has provided a revised estimation of expected water consumption.

  The application describes the applicant's proposed management of water use on site. In essence, the facility is designed to store waste process water from a variety of sources such as boiler blow downs, ash discharge overflow and rainwater runoff from potentially contaminated areas. This water is then reused within the process for bottom ash quenching. Under unusual conditions, for example, during boiler cleaning there may be a need for overflow of this water and it will be discharged to public sewer under a trade effluent consent or pumped out for final disposal by tanker.

  The permit requires that water consumption is reported to the Environment Agency.

  We are satisfied that water use will be minimised.

- There was a query about how much ash would be disposed of to sewer.

  Disposal of either bottom ash or fly ash to sewer is not allowed.

- There was concern about the potential pollution of Cuttle Brook.

  There is no proposal to discharge waste water to the Cuttle Brook. The only discharges of water from the site are to the sewer, this is detailed in the permit.

- An issue was raised about noise impact on the occupiers of Caxton Street.

  We have reviewed the applicants assessment of noise, this is discussed in section 5.4.9 Noise and Vibration

  Further more improvement condition requires that "The operator shall submit a written report to the Agency demonstrating, by measurements made during commissioning, at appropriate locations, whether operation of the Installation has any significant adverse impact on noise levels".

- A question was asked where we had discussed what happens if there is a fire.

  The accident management plan, which will form part of the management system will detail how the environmental impacts of a fire

would be minimised, for example dealing with fire fighting water. This document will be provided through pre operational condition PO04.

General fire safety in England and Wales is delivered through compliance with the Regulatory Reform (Fire Safety) Order 2005. The legislation implements a risk based approach to fire safety in community, industrial and business premises. It requires the responsible person (usually the employer, owner or occupier) to carry out a fire safety risk assessment and implement appropriate fire precautionary and protection measures, and to maintain a fire management plan.

Fire and Rescue Authorities are the principal enforcers and have a statutory duty to enforce the requirements of the legislation.

- It was questioned as to whether the process was incineration rather than gasification

  We consider it is a gasification plant although both gasification and incineration plant are permitted as incineration plant as defined in the WID.

- Concern was raised that the burning of plastic gives a net negative contribution of greenhouse gases.

  The list of wastes included in the permit does not allow the burning of separately collected plastics unless they are contaminated (i.e. unsuitable for recycling) and destined for landfill.

- Reference was made to the revised Waste framework Directive and the requirement to have a waste prevention programme

  Condition 1.4 in the permit covers the avoidance, recovery and disposal of wastes produced by the activity. We also detail how we have delivered the requirements of the extant Waste Framework Directive in section 6 of our decision document. The proposal will not inhibit waste prevention but will allow for any residual waste arising to be dealt with.

- Reference was made to there being no mention of women's groups in the draft permit

  The permit is concerned with regulating specific activities on a specific site. The point referred to applies at a much higher level. During the development of the National Implementation Plan for the POPs Treaty, the Government was assisted by a Dioxin Strategy Group. Women's Environmental Network participated in this group.

- Concern was raised about the lack of information on dioxins and POPs at the public meetings.

  Whilst not a representation on our draft decision, the Public surgeries were part of the public consultation and were an opportunity for

members of the public to come and speak to the Environment Agency's staff directly about any concerns they may have had. As we wish to limit our environmental impact and maximise the use of our resources, we do not produce reams of paper on the various issues we might get asked about at such events. If it was not possible to answer a specific question or provide additional information at the time, our staff endeavour to get back to people with the information required.

Section 2 of the main document discusses how we carried out public consultation.

- Concern was raised about whether the application adequately addressed health issues

  We consider that we had adequate information on which to make a decision

- It was questioned whether incineration has a higher social cost than landfilling.

  Waste Strategy 2007 states "Reliance on landfill is already reducing and this should become the home of last resort for waste. The Government will continue to pursue the reduction of the use of landfill while recognising that landfill may continue to have a place for disposal of some wastes, such as some hazardous wastes and as a means of restoring exhausted minerals workings" On the other hand, the Strategy aims to encourage a variety of technologies of energy recovery so that unavoidable residual waste is treated in the way which provides the greatest benefits to energy policy.

b) A number of consultations were received from Sinfin, Spondon and all Against Incineration (SSIAN).

1. Page ii of the draft permit introductory note indicates the "main feature of the facility is an energy from waste plant which will process 200,000 tonnes of municipal waste" RRS promoted their proposal as burning 140,000 tonnes of waste in the ACT so which is the true figure to be incinerated?

   The maximum amount of waste the facility is permitted to treat in a year is 200,000 tonnes. As discussed in the Decision Document, the pre processing of the waste removes metals, moisture and unprocessable waste. The residual waste that will be incinerated is 140,000 tonnes.

2. Page ii of the introductory note indicates 8.7MW of electrical energy will be sent to the national grid. Who will be responsible for taking such energy? Will this be the national grid or the local grid who in the case of the Derby area is E-on?
   The electricity is exported via the local grid. Only larger generators export direct to the national grid.

3. As the plant will operate 24 hours per day at an acknowledged low efficiency, will this displace higher efficiency energy plants which can be shut down at times of low energy requirement?

   The primary function of the facility is the incineration of waste, from which energy is recovered in the form of electricity. It is incorrect to compare the efficiency of an energy from waste facility with large power stations fuelled using fossil fuel such as oil, gas and coal. Electricity generated by EfW provides a very small percentage of the UK's electricity needs.

   It should be noted UK Energy Policy is not within the remit of the Environmental Permitting Regulations.

4. Concern was raised about the impact of abnormal operations

   The decision document explains the various WID abnormal operations scenarios, including a risk assessment of the environmental impact associated with these abnormal operation scenarios. Abnormal operations include failure of the CEMs which would not in itself increase emissions.

5. Who carries out the monthly monitoring of the bottom ash and APC residues?

   Monitoring is the responsibility of the operator.

6. How many litres of oil will be used per year to maintain the correct operational temperatures in the incineration process?

   The applicant has included in the application the thermal input to the process that would come from the oil. This is expressed in litres a year is 94,496 litres. This accounts for warm up cycles (from cold), temperature support by the secondary burner (only) and warm up from hot (after say a short duration shutdown where the plant is not cold) on a 'per line' basis.

7. On page 26 of the draft permit table S4.3 Performance Parameters why is there no section for total APC residues recycled?

   Please see the answer to question number eight.

8. Clarification was sought as to whether APC residues would be disposed of or recycled?

   Air pollution control (APC) residues from flue gas treatment are hazardous waste and therefore must be sent for disposal to a landfill site licensed to accept hazardous waste, or to an appropriately permitted facility for treatment.

   Synthetic gypsum (calcium sulphate) is derived as a by-product of certain industrial processes. The most important is flue gas desulphurisation (FGD) at coal fired power stations. This synthetic gypsum is 96% calcium sulphate.

The applicant is considering sending the fly ash to Castle Environmental at Stoke for reprocessing as a gypsum replacement material. Castle Environmental have a permit for an APC residue treatment plant, which uses a two stage 'washing' process to remove the leachable components in order that the residual APC following treatments meets the specification required for synthetic gypsum, which is used as a setting retardant in Ordinary Portland Cement (OPC) in place of primary sources.

Exploring options for recover is in accordance with Condition 1.4 in the permit which covers the avoidance, recovery and disposal of wastes produced by the activity.

9. Page 50 of the draft decision document highlights the benefit of installing secondary measures for NOx are not financially viable. Should financial viability be placed before air quality?

This issue was given careful consideration as a result of which we imposed an rolling annual NOx limit of 105 mg/m3. In achieving a rolling annual average of 52% (105 mg/m^3) of the WID limit, the process will have to operate at a level below 52%. Operating too near to this limit would result in emission limit breaches. Operating at this emission limit would mean that the emissions are less than 1% of the Air Quality Standard and are hence considered insignificant. This is in accordance with our Guidance, H1, where a process achieves an insignificant impact it is normal to consider that the process is achieving BAT. As the impact is insignificant, anything further would also be insignificant.

This said, we gave further consideration to how much more of an additional reduction could be achieved by secondary measures and when we talk about costs, our considerations are much wider than financial costs.

Other EfW that use secondary measures have to only achieve the WID limit of 200 mg/m^3 but no specified annual limit. On the other hand, this process is required to achieve an emission limit less than 52% (105 mg/m^3) of the WID limit.

As the NOx levels are so low from the primary measures used by this process alone, there is very little NOx for the reagent used in secondary measures to react with. As a consequence of this to achieve any further reduction in NOx using secondary measures, there would be problems with 'ammonia slip'. 'Ammonia slip' is a term to describe an emission to the environment (and consequential pollution) due to unreacted reagent. The use of secondary measures also results in increased use of resources which include the reagents.

This is why we concluded that further NOx reduction by secondary techniques is not BAT because of the disproportionate wider cost associated with significantly smaller reductions in NOx releases.

10. Page 52 of the draft decision document indicates the emission of 172,000 tonnes of CO_2 per year - do you agree this was calculated by RRS?

    Yes, but we do check the data submitted to us in support of an application.

c) Representations from members of the public.

Many of the issues raised during the consultation were the same as those raised previously, or are the same as the issues raised by FoE, SSIAN and the local Councillors. These are reported in Annex 3a and above and are not repeated.

1. A number of letters were received from members of the public with regard to news that Shanks Group had acquired the UK waste private finance initiative interests of United Utilities, and what that meant for this Permit.

   The situation has been clarified to us by the operator and explained in section 4.3. Administrative issues to reflect the situation at the time of permit issue. In short it does not affect our determination.

2. One member of the public enquired if the Environment Agency has undertaken a peer review of Professor Vyvyan Howard's research on nanoparticles and enforced permanent monitoring of air quality.

   We are aware of current research on the health effects of small particles, the Environment Agency takes public health advice from the Health Protection Agency (HPA) and the Primary Care Trust (PCT), who are expert in these areas.

   At the current time Professor Vyvyan Howard has not published any paper on the relationship between public health and Incineration that has been accepted for publication in a peer reviewed scientific journal.

Annex 4

IMPROVEMENT CONDITIONS

Ref No	Condition	Date	Reason
IC1	The operator shall submit a written proposal to the Agency to carry out tests to determine the size distribution of the particulate matter in the exhaust gas emissions to air from emission points A1 to A3, identifying the fractions within the PM_{10}, $PM_{2.5}$ and $PM_{1.0}$ ranges. The proposal shall include a timetable to carry out such tests and produce a report on the results. The operator shall carry out the tests as approved by the Agency and submit to the Agency a report on the results.	Proposal to be submitted to the Agency within 6 months of completion of commissioning. Report to be submitted within the period specified in the Agency's approval.	This reflects the latest scientific research which indicates that very fine particles have the most potential to adversely affect health. This is a standard improvement condition being imposed on all incinerator and gasification plants in order to gather information on the contribution from these facilities generally to emissions of very fine particles. It does not indicate any particular concern about the impact of emissions from this Installation.
IC2	The operator shall submit a written summary report to the Agency to confirm by the results of calibration and verification testing whether 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.	Initial calibration report to be submitted to the Agency within 3 months of completion of commissioning. Full summary evidence compliance report to be submitted within 18 months of commissioning.	In order to establish that they are fit for purpose in the installed condition as required by MCERTS.
IC3	The operator shall carry out checks to verify the residence time, minimum temperature and oxygen content of the exhaust gases in the secondary combustion chamber whilst operating under the anticipated most unfavourable operating conditions. The results shall be submitted in writing to the Agency.	Within 3 months of completion of commissioning.	Combustion conditions in the SCC under the most unfavourable operating conditions anticipated will be validated at the operational stage as required by WID (Article 11(3)).
IC4	The operator shall submit a report describing the performance and optimisation of the abatement control measures including: • the methodology to be used to optimise primary control measures for NO_x formation • the methodology to be used to optimise reagent dosing for acid gas abatement • the methodology to be used to	Within 5 months of completion of commissioning.	To optimise control measures for abatement to ensure that a balance will be struck between emissions of NO_x, N_2O and NH_3.

	optimise reagent dosing for dioxin and heavy metal abatement		
IC5	The operator shall submit a written report to the Agency demonstrating, by measurements made during commissioning, at appropriate locations, whether operation of the Installation has any significant adverse impact on noise levels.	Within 5 months of completion of commissioning.	To demonstrate by measurement whether the operation of the Installation has any significant adverse impact on noise levels at the sensitive receptors identified in the Application.
IC6	The operator shall carry out a revised assessment of the impact of emissions to air through the use of monitoring data collected during the first year of operation and air dispersion modelling. The assessment shall include the impact of emissions to air of arsenic, nickel and chromium (VI) using the Environmental Assessment Level (EAL) for the metal compounds in the PM_{10} fraction. A report on the revised assessment shall be submitted to the Agency.	Within 15 months of completion of commissioning.	Confirmation of the assessment made for arsenic, nickel and chromium (VI) based on actual measurements of emissions. A period of one year's data has been specified to take account of any natural variation in the waste composition. The Improvement Condition seeks to verify whether the actual releases are as expected within these limits, in which case no further action is required.

Annex 5

PRE-OPERATIONAL MEASURES

Ref No	Condition	Date	Reason
PO01	Prior to the commencement of commissioning; the Operator shall provide a written commissioning plan, including timelines for completion, for approval by the Agency. The commissioning plan shall include the expected emissions to the environment during the different stages of commissioning, the expected durations of commissioning activities and the actions to be taken to protect the environment and report to the Agency in the event that actual emissions exceed expected emissions. Commissioning shall be carried out in accordance with the commissioning plan as approved.	At least 3 months before treating any waste.	Commissioning trials are required for the Operator to demonstrate that the process is under control and that the emissions reliably meet the requirements of the WID.
PO02	The operator shall submit a written plan to the Agency detailing the ash sampling protocol to be used for Air Pollution Control (APC) residues and bottom ash, in conformance to Agency Guidance.	At least 2 months before treating any waste.	The ash sampling protocol can have a major effect on the results measured. Indicative BAT requires the protocol to be approved by the Agency.
PO03	The Operator shall provide a copy of the site remediation report when site remediation works have been completed.	Within a month of the completion of the report	To benchmark the site condition before the permitted activity commences, so that it can be determined if there has been any determination in site condition during the life of the permit activity at the point of permit surrender.
PO04	The Operator shall submit a written report to the Agency on the implementation of its Environmental Management System and the progress made in the accreditation of the system by an external body or if appropriate submit a schedule by which the EMS will be subject to accreditation.	At least 3 months before treating any waste and annually until EMS attained	According to the BREF (BAT 56), BAT is to implement and adhere to an Environmental Management System (EMS) that is appropriate to individual circumstances.