

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

## Decision document recording our decision-making process

The Permit Number is:                   EPR/EP3034SN  
The Applicant / Operator is:       WasteNotts (Reclamation)  
  Limited  
The Installation is located at:       Incinerator Road, Off Cattle  
  Market Road, Nottingham, NG2  
  3JH

## What this document is about

This document refers to an application for a substantial variation to part of an installation which carries out the incineration of non-hazardous waste. It is the decision document, which accompanies the variation and consolidation notice.

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

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

## Preliminary information and use of terms

We gave the application for a substantial variation the reference number EPR/EP3034SN/V002. We refer to the substantial variation application as "the **Application**" in this document in order to be consistent.

The Applicant also requested that the changes brought about by the variation and the original permit are consolidated using the current permit template. We

agreed to this as there are a large number of changes brought about by the variation application, and it will allow the permit to be updated to modern conditions. This will make it easier for us and the Operator to be clear which conditions apply. Therefore this is the reason why we are planning to issue a variation and consolidation notice, although in this document we refer to this combined notice simply as “the **Variation**”.

The number we have given to the permit as varied will continue to be EPR/EP3034SN. We refer to the permit as “the **Permit**” in this document.

The number we have given to the Variation and consolidation notice is EPR/EP3034SN/V002. We refer to the Variation and consolidation notice as “the **Variation**” in this document

The Application was duly made on 20 May 2011.

The Applicant is WasteNotts (Reclamation) Limited. We refer to WasteNotts (Reclamation) Limited as “the **Applicant**” in this document. Where we are talking about what would happen after the Permit is varied (if that is our final decision), we call WasteNotts (Reclamation) Limited “the **Operator**”.

WasteNotts (Reclamation) Limited’s facility is located at Incinerator Road, Off Cattle Market Road, Nottingham, NG2 3JH. We refer to this as “the **Installation**” in this document. However it is actually part of a multi operator installation which consists of Eastcroft EfW Site (‘the Installation’ in this document) and a clinical waste incinerator operated by SRCL Limited (permit reference EPR/EP3230XE). The emissions from Eastcroft EFW site and the clinical waste incinerator are made via the same flue (see section 4.1.2 for further information).

## How this document is structured

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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.)

APC	Air Pollution Control
BAT	Best Available Technique(s)
BAT-AEL	BAT Associated Emission Level
BREF	BAT Reference Note
CEM	Continuous emissions monitor
CFD	Computerised fluid dynamics
CHP	Combined heat and power
COMEAP	Committee on the Medical Effects of Air Pollution
CROW	Countryside and rights of way Act 2000
CV	Calorific value
CW	Clinical waste
CWI	Clinical waste incinerator
DAA	Directly associated activity – Additional activities necessary to be carried out to allow the principal activity to be carried out
DD	Decision document
EAL	Environmental assessment level
EIAD	Environmental Impact Assessment Directive (85/337/EEC)
ELV	Emission limit value
EMAS	EU Eco Management and Audit Scheme
EMS	Environmental Management System
EPR	Environmental Permitting (England and Wales) Regulations 2010 (SI 2010 No. 675) as amended
EQS	Environmental quality standard
EU-EQS	European Union Environmental Quality Standard
EWC	European waste catalogue
FSA	Food Standards Agency
GWP	Global Warming Potential
HHRAP	Human Health Risk Assessment Protocol
HMIP	Her Majesty's Inspectorate of Pollution
HPA	Health Protection Agency
HRA	Human Rights Act 1998
HW	Hazardous waste

HWI	Hazardous waste incinerator
IBA	Incinerator Bottom Ash
IPPCD	Integrated Pollution Prevention and Control Directive (2008/1/EC)
I-TEF	Toxic Equivalent Factors set out in Annex I of WID
I-TEQ	Toxic Equivalent Quotient calculated using I-TEF
LCPD	Large Combustion Plant Directive (2001/80/EC)
LCV	Lower calorific value – also termed net calorific value
LfD	Landfill Directive (1999/31/EC)
LHB	Local Health Board
LOI	Loss on Ignition
MBT	Mechanical biological treatment
MSW	Municipal Solid Waste
MWI	Municipal waste incinerator
NOx	Oxides of nitrogen (NO plus NO <sub>2</sub> expressed as NO <sub>2</sub> )
Opra	Operator Performance Risk Appraisal
PAH	Polycyclic aromatic hydrocarbons
PC	Process Contribution
PCB	Polychlorinated biphenyls
PCT	Primary Care Trust
PEC	Predicted Environmental Concentration
POP(s)	Persistent organic pollutant(s)
PPS	Public participation statement
PR	Public register
PXDD	Poly-halogenated di-benzo-p-dioxins
PXB	Poly-halogenated byphenyls
PXDF	Poly-halogenated di-benzo furans
RDF	Refuse derived fuel
RGS	Regulatory Guidance Series
SAC	Special Area of Conservation
SED	Solvent Emissions Directive (1999/13/EC)
SCR	Selective catalytic reduction
SGN	Sector guidance note
SHPI(s)	Site(s) of High Public Interest

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

# 1 Our decision

We have decided to issue the Variation to the Applicant. This will allow them to operate their part of the Installation, subject to the conditions in the Variation.

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

This Application is a substantial variation to the existing Permit. The site is subject principally to the Integrated Pollution Prevention and Control Directive (IPPCD) and the Waste Incineration Directive (WID).

The Operator applied to:

- Increase the annual waste throughput of lines 1 and 2 by 20,000 tonnes each;
- Relax the tonnage restrictions on waste which is not mixed municipal waste. The Operator applied to remove the tonnage restrictions in Table 2.1.2, (however retaining the requirement in column 2 to ensure that separately collected fractions of municipal wastes can only be processed if recycling and recovery routes cannot be exploited). This is because they state that the grates have been improved due to refurbishment of the plant in 2009 and are capable of processing all of the different waste types included in the Permit without restriction.
- Amend the method of temperature measurement in the combustion chamber from measuring the temperature at two positions located at burner level to three positions in the roof of the combustion chamber instead.

# 2 How we reached our decision

The Application was duly made on 20 May 2011. This means we considered it was in the correct form and contained sufficient information for us to begin our determination but not that it necessarily contained all the information we would need to complete that determination.

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 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 Nottingham and Long Eaton Recorder, a free Newspaper serving the local community on 16/6/11.

We made a copy of the Application and all other documents relevant to our determination (see below) available for viewing on our Public Register at our Trentside Office, Scarrington Road, Nottingham, NG2 5FA and also sent a copy to Nottingham City Council for its own Public Register. Anyone wishing to see these documents could do so and arrange for copies to be made. The Applicant also provided a copy of the Application on CD, a number of copies of which were provided to the public on request.

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

- *Nottingham City Council – Environmental Health Department 24/5/11*
- *Nottingham City Primary Care Trust 24/5/11*
- *Food Standards Agency 24/5/11*
- *Health and Safety Executive 24/5/11*
- *Severn Trent Water 24/5/11*
- *Nottingham City Council Planning Department 2/8/11*

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. We did a press release and letters to key stakeholders (councillors MPs and local residents and groups in the area). The press release was issued on the 16th June 2011.

There is also a liaison group meeting which meets quarterly and is run by the Operator for representatives of the community at which a briefing on the Variation was given. We attend the liaison meeting independently to provide updates on the regulation of the Installation, where necessary. We received 178 written comments some of which were accepted beyond the formal consultation period. Further details along with a summary of consultation



comments and our response to the representations we received can be found in Annex 3. We have taken all relevant representations into consideration in reaching our determination.

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 10 June 2011. A copy of the information notice was placed on our public register and sent to Nottingham City local authority for inclusion on its register, as was the response when received.

In addition to our information notices, we received additional information during the determination from the Applicant by letter dated 8/07/11 regarding clarification on the Variation Application, by letter dated 1/09/11 regarding the relationship between calorific value and residence time and by email dated 9/12/11 regarding surrogate methods. A copy of this information was placed on our public register.

The Variation which we are issuing consolidates all of the changes brought about by the Variation Application with the original Permit and updates the Permit to modern conditions.

Finally we have consulted on our draft decision from 14 May 2012 to 14 June 2012. A summary of the consultation responses and how we have taken into account the representations is shown in Annex 3B.

### **3 The legal framework**

The Variation will be issued under Regulation 20 of the EPR. The Environmental Permitting regime is a legal vehicle which delivers most of the relevant legal requirements for activities falling within its scope. In particular, the Installation is:

- *Part of an installation* for the purposes of the IPPCD.
- a *waste incineration plant* as described by the WID;
- an *operation* covered by the WFD. Since the original permit was granted in 2005, the WFD has been revised. Revisions to the Waste Framework Directive have been implemented in England and Wales through the Waste (England and Wales) Regulations 2011 and ancillary legislation in Wales, which were both introduced in April 2011. The aim of the revised WFD is to promote waste prevention, increase recycling and ensure better use of resources, whilst protecting human health and the environment. It re-enacts much of the existing WFD and leaves the legal definition of waste unchanged, but it also contains a number of new features. The waste hierarchy is placed at the heart of waste management and there are new targets on recycling household and construction & demolition waste); and
- subject to aspects of other relevant legislation which also have to be addressed.

The conditions which have been amended as part of this Variation and the remaining conditions and schedules are consolidated into the new permit template which means that the conditions are all updated to modern standards.

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

We consider that in issuing the Variation, 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.

The EU Industrial Emissions Directive (IED) was passed in 2010. There is no enabling legislation yet in the UK, however this is expected to come into force in 2013. The IED is a recast Directive which will bring seven existing Directives into one, namely: IPPC; WID; LCPD, Solvent Directive and 3 Titanium Dioxide Directives.

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

## **4 The Installation**

### **4.1 Description of the Installation and related issues**

#### **4.1.1 The permitted activities**

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

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

The definition of a WID “incineration plant” includes:

*“the site and the entire incineration plant including all incineration lines, waste reception, storage, on-site pre-treatment 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 (see below), such as air pollution control plant, (including storage and preparation of treatment chemicals e.g. lime slaking), and the ash storage bunker, are therefore included in the listed activity description.

An Installation may also comprise “directly associated activities”, which at this Installation includes the generation of electricity using a steam turbine for Line 3 only. Table S1.1 (table 1.1.1 in the original Permit): Permitted Activities has been updated as part of the Variation to include the generation of electricity as a directly associated activity. Line 3 is permitted but is not yet constructed or operational, therefore any limits to the generation of electricity will be agreed in accordance with pre-operational condition PO10 (formerly 1.6.1(xi)). These activities comprise one Installation, because the incineration plant and the steam turbine are successive steps in an integrated activity.

Together, these listed and directly associated activities comprise part of the Installation which is covered by this Permit as varied.

Please note – the generation of electricity is not included for Lines 1 and 2 because Eastcroft EfW Facility is connected to the Nottingham District Heating Scheme providing energy in the form of steam to the heat station at London Road operated by Enviroenergy under a separate permit.

#### 4.1.2 The Site

The Nottingham waste incinerator Installation at Eastcroft comprises the Municipal Waste Incinerator (MWI) operated by WasteNotts (Reclamation) Ltd and the Clinical Waste Incinerator (CWI) operated by SRCL Ltd. The two incinerators form one Installation because both incinerators emit exhaust gases up the same flue in the main stack, however the emissions are monitored separately before they enter the stack. The most significant issue is the fact that as the CWI emissions are made via the same flue as the existing MWI lines, at least one of the existing MWI lines must be operating for sufficient efflux velocity to carry the CWI emissions up the stack. For further information, see the decision document for the original Permit (EP3034SN).

Condition 1.5.2 (formerly 2.12.1.1 in the original Permit) requires the Operator to notify the Operator of the Clinical Waste Incinerator (currently SRCL Ltd) immediately if both of the existing MWI lines are unavailable. The CWI would have to shut down under these circumstances. The Clinical Waste Incinerator permit also includes condition 2.12.1.1 which reads as follows, “*The Operator shall only operate the clinical waste incinerator when at least one induced draft fan serving the municipal waste incinerator is active and functioning at routine capacity*”.

In their comments on the draft Variation notice, the Applicant states that SRCL (the Operator of the Clinical Waste Incinerator) requires the use of an ID fan, and as long as one of these is in use at this site, then the clinical waste incinerator can be operated. Therefore the Applicant requested that condition 1.5.2 be amended so that it would cover the use of the Line 3 ID fan when this becomes operational. Therefore we have agreed to amend the condition as follows:-

1.5.2 *The Operator shall immediately notify the Operator of the clinical waste incinerator of any change in the operational status of lines 1, 2 or 3 that may impact on the operation of the clinical waste incinerator.*

This Variation relates only to the Municipal Waste Incinerator. The Clinical Waste Incinerator is unchanged and so has not been varied.

Further information on the site is addressed below at 4.3.

#### 4.1.3 What the Installation does

The Applicant has described the facility as Energy from Waste. Our view is that for the purposes of WID and EPR, the installation is an incinerator.

#### 4.1.4 Key Issues in the Determination

The key issues arising during this determination were related to the increased waste throughput and their effect on emissions to air, the ability of the plant to combust the different types of waste and the reliability of the amended temperature measurement method. These issues all related to compliance with WID.

In addition following a breach of dioxin emission limit value which occurred in January 2011; consideration was given to the ability of the plant to comply with the dioxin ELV. See section 5.3.2 below for further information.

#### 4.2 The site and its protection

This is unchanged by this Variation. For further information, see the decision document for the original Permit (EP3034SN). However Site Protection and Monitoring Programme (SPMP) conditions (2.10.11, 2.10.12 and 4.1.8) have no equivalent conditions in the new permit template. Instead the SPMP forms part of the site management system which is covered in section 1.1 of the Variation.

#### 4.2.3 Closure and decommissioning

This is unchanged by this Variation. For further information, see the decision document for the original Permit (EP3034SN).

#### 4.3 Operation of the Installation – general issues

##### 4.3.1 Administrative issues

This is a multi-Operator Installation. The Nottingham Waste Incinerator Installation comprises the Municipal Waste Incinerator operated by WasteNotts (Reclamation) Limited and the clinical waste incinerator operated by SRCL Limited. Both incinerators emit exhaust gases up the same flue in

the main stack, but the emissions are monitored separately before they enter the stack. See section 4.1.2 above for further information.

The incineration of waste is not a specified waste management activity (SWMA). The Environment Agency has considered whether any of the other activities taking place at the Installation are SWMAs and is satisfied that none are taking place.

We are satisfied that the Applicant's submitted Opra profile is accurate.

The Opra score will be used as the basis for subsistence and other charging, in accordance with our Charging Scheme. Opra is the Environment Agency's method of ensuring application and subsistence fees are appropriate and proportionate for the level of regulation required.

#### 4.3.2 Management

The Operator's Environmental Management System, is externally accredited to ISO 14001. This is an internationally recognised standard of environmental management. ISO 14001 certification indicates that the Applicant is capable of complying with permit conditions on management.

#### 4.3.3 Site security

This is unchanged by this Variation. For further information, see the decision document for the original Permit (EP3034SN).

#### 4.3.4 Accident management

This is unchanged by this Variation. For further information, see the decision document for the original Permit (EP3034SN).

#### 4.3.5 Off-site conditions

We do not consider that any off-site conditions are necessary as part of the determination of this Application.

#### 4.3.6 Operating techniques

The elements of the previous operating techniques which are still relevant have been retained in Table S1.2. Additional operating techniques which supersede those currently in place or which have been submitted as part of this Application have also been included.

<b>Table S1.2 Operating techniques</b>		
<b>Description</b>	<b>Parts</b>	<b>Date Received</b>
Application EPR/EP3034SN/A001	The response to question B2.1 in the Application form and section 2.1 of the application text (in process controls) with the exception of responses to B2.1.2 which details the incineration capacity; B2.1.14 which details the annual	28/03/05

<b>Table S1.2 Operating techniques</b>		
<b>Description</b>	<b>Parts</b>	<b>Date Received</b>
	waste throughput, and B2.1.4.4 which details temperature monitoring.	
	The response to question 2 in the Schedule 4 Notice (plant schematic).	05/08/05
	Section 2.2 of the Application text (abatement techniques).	28/03/05
	Section 2.4 of the Application text (raw materials and wastes to be incinerated. with the exception of section 2.4.2.2, "Wastes to be incinerated").	28/03/05
	Section 2.5 of the Application text (residual waste handling)	28/03/05
	Section 2.7.1 of the Application text (energy recovery).	28/03/05
	The response to question B2.10 in the Application form and section 2.10 of the application text (monitoring) with the exception of Table 2.8	28/03/05
	The additional information supplied concerning surrogate monitoring techniques and wastes to be incinerated with the exception of the surrogate monitoring techniques for particulates.	13/12/05
Minor operational change as detailed in letter from Operator	A change to the way the APCR (dry dust) is loaded into the tanker for removal off site, by the construction of a new purpose built enclosure which will speed up the process and provide increased protection for the environment.	09/10/08
Minor operational change as detailed in letter from Operator	Programme of refurbishment works which included: Replacement of the grate; Replacement feed chute and feeder table; Combustion controls; Replacement of the ash discharger; Replacement of boiler panels; Control systems; and Other general work.	08/01/09
Application EPR/EP3034SNV002	Supporting information document reference S1054-0100-0007SMO, sections 1 and 2 which refer to the changes to the permit including the annual waste throughput, removal of restrictions on certain waste types and the changes to temperature monitoring.	Dated 09/03/11
Email from Operator	Email confirming abnormal operations provisions required and the surrogate method for TOC.	Dated 09/12/11

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

Condition 2.1.7 which relates to when waste shall not be charged or shall cease to be charged into the incineration line has been replaced by the equivalent condition 2.3.9 in the Variation notice. However the provision for not charging or ceasing to charge when the oxygen level is below, or falls below, 6% (wet) by volume, is no longer included in the new condition or elsewhere in the Variation as the controls in the Permit in relation to TOC, CO and combustion temperature are sufficient to ensure good combustion conditions.

## Permitted wastes

Article 4(4) of the WID requires that the Permit must list explicitly the categories of waste which may be treated – these are included in Schedule 2. The table of Permitted Waste Types in Schedule 2 has been amended in accordance with the current permit template. The total capacity of the plant is also included at the top of this table.

As part of this Application the Applicant has requested that the tonnage limitations in the current Permit for waste which is not mixed municipal waste are removed, while retaining the limitations which ensures that separately collected fractions of municipal waste and packaging waste can only be processed if recycling or recovery routes cannot be exploited. The Applicant would also like to remove the limitation on commercial and industrial waste.

The Applicant states that the new grates which were installed as part of the refurbishment of the plant in 2009 are capable of processing all of the waste types listed in Schedule 6 of the Permit. The waste would be mixed in the bunker to ensure that the overall waste would be within the firing diagram for the facility, and many of the waste types are, in any case found within mixed municipal waste.

The Applicant also points out that they still have a long term contract to process all municipal waste from Nottingham City and so there is no potential for the plant to stop processing primarily municipal waste.

The original Permit (in table 2.1.2) restricted separately collected fractions of municipal waste and packaging waste to 8000 tonnes per year (5% of the annual throughput of 160,000 tonnes for lines 1 and 2) and this could only be accepted anyway if recycling / reuse options could not practically be exploited. The original Permit also restricted non-hazardous commercial and industrial wastes to 3200 tonnes per year (2 % of the annual throughput for lines 1 and 2) and this could only be accepted in combination with mixed municipal waste at low mass ratio.

The original incineration lines (1 and 2) were designed to burn waste fuel with a calorific value of approximately 6-12 MJ/kg. Therefore as long as the wastes accepted at the site have a CV within this design range - this is acceptable. Continued compliance with the emission limits (in particular CO and TOC) and the bottom ash burn out quality (TOC content) will indicate good combustion and therefore if it is likely that any inappropriate wastes are being burnt.

Therefore we agree to remove the quantity restrictions on separately collected fractions of municipal waste and packaging waste and on commercial and industrial wastes.

Regarding the additional limitations in table 2.1.2 in the original Permit for separately collected fractions, “only if recycling/reuse options cannot practically be exploited”, this statement is also no longer required as condition 2.3.3(c) will ensure that wastes separately collected for recycling can only be incinerated if they are contaminated and otherwise destined for landfill.

We also agree to the removal of the limitation on non hazardous commercial and industrial wastes which was previously included in table 2.1.2 which stated, “only in combination with mixed municipal waste at low mass ratio” as this is not required as the wastes will be mixed in the bunker prior to entering the combustion chamber and there are other controls in the permit as mentioned above which will help to ensure that appropriate waste at the correct mix is being burnt in the incinerator.

The list of permitted waste in Schedule 2 has been updated to list the waste in order of EWC code number. We have also removed the 99 waste codes because they do not have an appropriate description. The 99 codes which have been removed are as follows:

- 07 05 99,
- 09 01 99,
- 07 06 99.

In addition EWC code 20 01 40 which is for separately collected fractions of metal wastes has also been removed, as this type of waste should be sent to a Metals Recycling Facility and not burnt in an incinerator.

Therefore in summary, we are satisfied that the Applicant can accept the wastes contained in Schedule 2, Table S2.2 of the Variation because:

these wastes are categorised as municipal waste in the European Waste Catalogue or are non-hazardous wastes similar in character to municipal waste;

- (i) the wastes are all categorised as non-hazardous in the European Waste Catalogue and are capable of being safely burnt at the installation;
- (ii) these wastes are likely to be within the design calorific value (CV) range for the plant;
- (iii) these wastes are unlikely to contain harmful components that cannot be safely processed 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 fractions of waste are included in the list of permitted wastes, however they can only be accepted at the site if they prove to be unsuitable for recovery in accordance with condition 2.1.3(c).

### Capacity of the EfW Plant

The capacity of the Installation is currently limited to 160,000 tonnes per annum for Lines 1 and 2 which was planned to increase to 260,000 tonnes per annum when Line 3 becomes operational. The original Application already included proposals and the appropriate risk assessments for Line 3, these were assessed and the Permit was issued with the inclusion of Line 3.



At that time planning permission for line 3 had not been granted. Currently Line 3 cannot become operational unless certain conditions (a number of improvement conditions and pre-operational conditions – see Annexes 1 and 2 for further information) in the Permit are complied with. In the original Permit application the scenario of all 3 lines being operational was modelled and assessed and we issued the original Permit on this basis.

If the Operator wants to build a 4<sup>th</sup> line or any further lines, this will require a further substantial variation application.

This current Permit is based on the installation operating at a nominal capacity of 11.5 tonnes per hour for Lines 1 and 2 and 13 tonnes per hour on Line 3 (see Introductory note for the original Permit ref EP3034SN).

However as part of this Application (Section 2.1 of Supplementary report S1054-0100-0007SMO) it is stated that the maximum capacity for Lines 1 and 2 is 12.5 tph and that Line 3 is now expected to be virtually identical to the existing lines and will process up to 100,000 tonnes per annum.

This Variation increases the annual waste throughput of existing Lines 1 and 2 by 20,000 tonnes each to 100,000 tonnes each. Therefore the capacity of the Installation is increased to 200,000 tonnes per annum increasing to 300,000 tonnes per annum when line 3 becomes operational.

#### Measurement of Combustion Chamber Temperature

The purpose of temperature control applied to combustion gases is to ensure destruction of organic species in the flue gas. In this context, the important considerations are the requirements of the WID and how the plant delivers them.

The WID specifies a minimum combustion temperature of 850°C for non-hazardous waste. However, it allows competent authorities to specify a different temperature provided other conditions of the Directive are complied with. In other words the emphasis is on compliance with the requirements of the Directive limits. It should be noted that the condition of the Directive that is relevant to the flue gas temperature is the destruction of organic species. This compliance is achieved by meeting the emission limits for CO and TOC specified in the Directive.

As regards the temperature measurement point, the Directive says “near the inner wall or at another representative point of the combustion chamber as authorised by the competent authority..”

Condition 2.1.14 of the original Permit is now condition 2.3.10 in the Variation notice. The original Permit condition read as follows:

*“Line 1 and Line 2 incinerators shall be deemed to be operating at a temperature of at least 850°C if the average reading of the two thermocouples installed at each incineration line, as the case may be, is at least 750°C”.*

The thermocouples referred to in this condition are located at the burner level in the first pass of the combustion chamber. The Applicant would like to change their measurement approach to use a set of three thermocouples in the roof of the first pass instead. This is because the roof thermocouples are considered to be more reliable.

In order to determine the relationship between the roof thermocouples and the temperature in the combustion chamber, the Applicant commissioned a temperature measurement survey within the combustion chamber. The report from this study has been submitted as part of this Application. The conclusion of the study was that if the roof thermocouples were measuring a temperature of at least 720°C, the Operator would be confident that the temperature within the combustion chamber would be at least 850°C. We agree with the conclusion of the report.

Therefore the Applicant has requested that the condition is amended to the following:

*“Line 1 and line 2 incinerators shall be deemed to be operating at a temperature of at least 850°C if the average reading of the three thermocouples installed in the roof of the combustion chamber on each incineration line, as the case may be, is at least 720°C, or if the average reading of the two thermocouples installed at the burner level on each incineration line, as the case may be, is at least 750°C”.*

We do not agree with the choice of monitoring from 3 thermocouples or the average of the 2 thermocouples, therefore we have amended condition 2.3.10 to read as follows:

*Line 1 and Line 2 incinerators shall be deemed to be operating at a temperature of at least 850°C if the average reading of the three thermocouples installed in the roof of the combustion chamber on each incineration line is at least 720°C, or if one of the thermocouples in the roof is not operational, the average reading of the other two thermocouples installed in the roof of the combustion chamber on each incineration line is at least 720°C.*

We consider from the data provided by the Applicant that there is a consistent correlation between the temperature recorded by the thermocouples in the roof space and that measured at the burner line and that if the temperature is measured at 720°C in the roof thermocouples that the actual temperature of combustion will be greater than 850°C. The CFD modelling supports this. The difference between measured and CFD simulated values is relatively small and the correlation between measurements and CFD simulations can therefore be considered as very good. Importantly the CFD simulation can be seen to be conservative.

Basing control on the thermocouples in the roof is therefore not a derogation from the 850 °C requirement as specified in the WID which still applies. This

Variation will not allow operations at temperatures lower than 850°C. The Operator is also required to comply with the emission limits for CO and TOC (plus all other emission limits). Compliance with WID limits on CO and TOC in flue gases should ensure that the organic species in the flue gas are adequately destroyed.

Also to note that the temperature measurements are linked to the operation of the auxiliary burners which will start firing when the temperature falls below the set point. It should be remembered that to achieve continued compliance with the temperature requirement, the set point will be higher than the specified temperature.

#### 4.3.7 Energy efficiency

This was addressed as part of the determination of the original Application (for further information, see the decision document for the original Permit (EP3034SN). With the additional 40,000 tonnes throughput (20,000 tonnes per annum each for Lines 1 and 2) the site is still considered to be energy efficient as the excess heat produced will be used in the district heating system.

BAT for energy efficiency is the use of steam from boilers in on-site or off-site applications and the use of waste heat for CHP or district heating (potential to increase overall thermal efficiencies from approx 20% to 75%).

The Eastcroft EfW Facility is part of the Nottingham District Heating Scheme providing energy in the form of steam to the heat station at London Road owned by Enviroenergy which in turn is wholly owned by Nottingham City Council.

The premises on London Road convert the energy into electricity and hot water. Electricity is supplied to major customers using dedicated cabling. Hot water is distributed to customers over the extensive pipe network that covers much of the city centre. Customers have heat exchangers rather than boilers to keep their building warm and to provide a constant supply of hot water.

If energy were not recovered from Nottingham's waste, it is likely that fossil fuels would be burnt. The Nottingham District Heating Scheme are helping to tackle global warming by reducing emissions of CO<sub>2</sub> elsewhere in the UK (as virgin fossil fuels will not be burnt to create the same electricity).

It is considered that the increased waste throughput will be of additional benefit to the district heating scheme because currently when the Eastcroft Incinerator shuts down because it has reached the limits of the Permit (i.e. currently 160,000 for lines 1 and 2), the London Road Heat Scheme would not receive the steam and therefore would instead be required to burn fossil fuels.

The Applicant states (see letter dated 8/7/11 – Eastcroft Variation Clarification) that the primary purpose for requesting additional capacity at Eastcroft is due to increased reliability of the facility following significant modernisation activities which took place in 2009. The intention is not to increase the amount of waste burnt per hour. Following the 2009

refurbishment works, the throughput per hour of the plant has not gone up. However the available operational hours has increased due to improved plant reliability. The plant is capable of gaining more energy from less waste, this is highlighted by the improved burn out within the bottom ash – i.e combustion is more efficient. At times of planned shut down waste is sent to landfill and Enviroenergy are required to generate their own heat for the district heating scheme and use fossil fuels for electricity generation. Planned shut down periods in 2010 were artificially lengthened to manage the permitted annual tonnage limits, which were set within the permit based on the pre-modernised plant.

#### Permit conditions concerning energy efficiency

Pre-operational condition PO10 (which replaces former Improvement Condition 9) requires the Operator to carry out a comprehensive review of the potential for a full combined heat and power operation associated with line 3 in order to demonstrate that waste heat from the plant is recovered as far as possible.

Modern conditions 1.2.1 (a) to (c) and 1.2.2 are included in the Permit, which require the Operator to:

##### *1.2.1 The operator shall:*

- (a) take appropriate measures to ensure that energy is recovered with a high level of energy efficiency and energy is used efficiently in the activities;*
- (b) review and record at least every four years whether there are suitable opportunities to improve the energy recovery and efficiency of the activities; and*
- (c) take any further appropriate measures identified by a review.*

##### *1.2.2 For line 3, 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.*

The Operator is required to report energy usage and energy generated under condition 4.1.2 and Schedule 2; and condition 4.1.3 and schedule 4. The following parameters are required to be reported: total energy usage; steam exported (to London Road Heat Station), hot water exported (to London Road Heat Station) electrical energy imported (from London Road Heat Station). Together with the total MSW burned per year, this will enable the Environment Agency to monitor energy recovery efficiency at the Installation and take action if at any stage the energy recovery efficiency is less than proposed.

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

#### 4.3.8 Efficient use of raw materials

This is unchanged by this Variation. For further information, see the decision document for the original Permit (EP3034SN). However the conditions have been updated to modern conditions 1.3.1 (a) to (d) in the Variation.

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

This is unchanged by this Variation. For further information, see the decision document for the original Permit (EP3034SN). However the conditions in this section (previously Section 2.6 – Waste Recovery or Disposal, containing conditions 2.6.1, 2.6.2 and 2.6.3) have been updated to modern conditions 1.4.1 and 1.4.2 which have been included in the permit template to meet the requirements of the Waste Framework Directive, in particular the requirements of Article 4 of the WFD implementing the waste hierarchy.

#### 4.4 Compliance History

Compliance with the Permit conditions is generally good.

Since the Permit was issued in 2005, two enforcement notices have been served.

First of all in 2008 an enforcement notice and formal warning were issued after unabated emissions were released to the air for a total of 18 minutes. On the 21<sup>st</sup> April 2008 we were notified of two openings of the bag filter bypass, which occurred on 19<sup>th</sup> April 2008. The bypass was tripped due to a faulty temperature probe. This temperature probe was not in good operating condition which constituted a breach of condition 2.3.5 of the original Permit. An enforcement notice was issued (15/05/2008) which required the Operator to:

- Undertake a comprehensive review of the scope and content of the preventative maintenance programme in place for the flue gas treatment system, with particular regard to equipment and systems which may cause the bag filter bypass to open.
- Ensure that critical items are identified and the maintenance regime for such items is specified to ensure that they are maintained in good operating condition.
- A report shall be submitted to the Environment Agency which details the findings of the assessment and includes a timescale for implementing any improvements identified.

The incident was deemed to have had a minimal impact on air quality (Compliance Classification Scheme Category 3 non-compliance - ref 113118). The enforcement actions were completed within the time requested. The findings of the investigation were that the temperature probe had been in place for 9 years prior to failing and that more regular maintenance checks were required to prevent the bag filter bypass from opening again due to an erroneous high temperature reading.

The second enforcement notice was served on 24<sup>th</sup> March 2011 in relation to a breach of the dioxin limit on 24<sup>th</sup> January 2011. The dioxin reading was 1.81ng/m<sup>3</sup> during the site's scheduled full suite of extractive monitoring against the emission limit value of 0.1ng/m<sup>3</sup>. The enforcement notice required the dioxins / furans to be monitored every month for 6 months. The additional monitoring results all came back as within the limit of the permit, therefore there is no justification for changing the monitoring programme following this breach.

The Operator suggests that it could have been a lump of contamination which caused the high dioxin reading. This is because the CEMS (particulates, CO, NO<sub>x</sub>, SO<sub>2</sub>, HCl, TOC and O<sub>2</sub>) monitoring showed that the plant was operating normally and certainly within the bounds where typical dioxin emission results would have been expected. We required the Operator to investigate the reasons for breach and also to instigate monthly sampling on both incinerator lines. To date all the monthly results reported have been well below the emission limit which indicates that the problem is unlikely to be related to plant design, operation or the nature of wastes being burned. It gives support to the operators view that it was a rogue sample.

We instructed the Operator to assess the environmental impact of the breach of the dioxin limit (see report ref: S1054-0010-0080SMO, entitled 'Dioxin risk assessment', V2 dated 19<sup>th</sup> April 2011). Dioxins are monitored twice a year for each line, giving four readings in total. Since dioxins have a long term impact, it is necessary to determine an annual average emission rate. The most conservative approach is to assume that the January 2011 reading is representative of the entire period between the previous test on 18 August 2010 and the repeat test on 16 March 2011, a period of 210 days. The implicit assumption in this approach is that the plant stopped being in compliance after the compliant test on 18 August 2010 and only returned to compliance immediately before 16 March 2011 - which is unlikely. Also the August 2010 results are assumed to cover a period of 155 days.

The UK authorities have set a Tolerable Daily Intake of 2pg ITEQ/kg bodyweight /day. A Tolerable Daily Intake is an estimate of the amount of a contaminant expressed on a bodyweight basis, that can be ingested daily over a lifetime without appreciable health risk.

The results of the assessment using the conservative approach shows that the intake increases, as would be expected. However the impact remains small. For the Hypothetical Maximally Exposed Individual (HMEI), who only consumes locally produced food and spends his or her whole life living near to the plant, the plant only contributes 6.3% of the TDI. For a more typical resident, who consumes a small amount of locally produced food but who lives at the point of maximum impact for their entire life, the plant contributes less than 2.5% for local breast feeding infants, 1.6% of the TDI for children and less than 1% of the TDI for adults.

Dioxin concentrations at the Eastcroft Site are generally below the WID emission limit, so assuming that a single reading is representative of seven months of operation is conservative.

A report into the dioxin breach which was carried out on behalf of the Operator (Compliance Monitoring Investigation at Eastcroft Unit 2 2011, Quarter 1, dated 8/06/2011) concludes that dioxins cannot have been formed by an inadequate combustion process and so possible explanations include contamination during sampling or contamination during analysis of the sample in the laboratory.

Further details of the conclusion of the report are as follows:-

- 1. The high dioxin data point is atypical of the unit and orders of magnitude higher than any previous and subsequent measurements.*
- 2. It is clear that the order of magnitude is unlikely to be as a result of the process as this was working correctly.*
- 3. The monitoring procedures used are based on the required standard for the sampling and analysis of dioxins i.e. BS EN 1948.*
- 4. Monitoring and reporting of the combustion gases throughout the test period would enable the sampling team to see plant issues and poor operating conditions and so can provide additional information to the Operator.*
- 5. The possibility of contamination from another type of process is unlikely. This is shown by the fact that the field blank result, that all the isomer concentrations are all below the analytical detection limit confirming that there was no material present prior to the sampling.*
- 6. The plant AMS showed that the operation of the plant was compliant with the requirements of the plant's authorisation.*
- 7. The dioxin level reported is not typical of the emissions from this unit or plant. Regarding the actual value it is possible that there has been a mistake made during the process.*
- 8. The primary controls of dioxins were:*
  - Temperature above 850oC in the furnace;*
  - Generally low concentrations of CO, TOC and Particulate; and*
  - Activated carbon injection was operational.**These were all operational and complied with during the test periods.*
- 9. The value of a single test at such low levels is scientifically questionable. Collecting only one sample is in effect a snap shot of the process i.e. one six hour sample in 6 months. Also statistically speaking it is not best practice to use a single data point to prove a theory. The current undertaking of monthly*

*sampling for six months will provide a statistically improved basis of evidence of the dioxin emissions at Eastcroft.*

*10. There is no clear reason for the value reported. The plant data shows that plant operation is unlikely to have resulted in the increased levels. The possibility of an error in sampling i.e. retrieval, analysis of the sample or contamination cannot be eliminated. However it is not possible to conclusively prove that this is the case.*

The report also provides a list of 10 recommendations. As part of our regulation of the site, we accept the findings of the report and we will require that the recommendations of the report and carried out.

### **Prior to permit issue**

Prior to the issue of the original Permit the site was operating under an IPC authorisation (AH0653). There was a dioxin breach in 2005 prior to the issue of the original permit on 22 December 2005 (consideration was given to this dioxin breach in section 3.1.3.1 of the Decision Document for the original permit). The reading showed a value of 0.9ng/m<sup>3</sup> compared to the limit value in the permit at the time of 0.1ng/m<sup>3</sup>. Further tests by the Operator in June showed a return to compliance at 0.06ng/m<sup>3</sup> and the Environment Agency's monitoring contractors recorded three results all around 0.01ng/m<sup>3</sup> in July 2005. Investigations into the causes of this exceedence have been undertaken but without conclusive results. The combustion conditions prevailing on Line 2 at the time of the tests were normal, as was the operation of the flue gas treatment plant. The Operator believes that one factor in the high result may be the reported disturbance of dust from the duct wall during the monitoring. The possibility exists that this result is a spurious reading, although it is impossible to be certain of this. The reading was out of step with the previous 6 years of dioxin measurements at the site.

A section of the Incineration critique, Friends of the Earth states that, "In March 2005, the Environment Agency reported that during routine emissions sampling of the Eastcroft Incinerator in Nottinghamshire, the levels of dioxins released into the atmosphere were found to exceed their authorised amount by 900%. Given that dioxins are usually only measured every six months, the question arises whether emissions were nine times higher over the entire six months since the previous test".

As stated previously the impact on health from dioxins is through the food chain, by ingestion and over the long term. A short term exceedence, even of the magnitudes detailed above are unlikely to have an adverse impact on public health. Nevertheless, emissions at this level in the long term would be unacceptable, which is why we will always take action in these cases to bring emissions back within the permit emission limits which are based on WID.

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



- optimisation of combustion control to achieve a high level of destruction of organic species in the flue gas indicated by levels of CO and TOC
- avoidance of de novo synthesis of dioxins (i.e. minimising the residence of flue gases in the temperature range of 250-450 oC)
- reduction of deposits of airborne dust on the flue-gas path by effective cleaning
- the effective removal of particulate matter,
- injection of activated carbon

Granting of the requested Variation will in no way change any of the above control measures and will not affect dioxin emissions in the future. Dioxin monitoring at Eastcroft is in accordance with the requirements of the WID

### **ELV Breaches 2010**

In summary there were 3 breaches in total which included one for the Metals group (mercury and compounds) and two for carbon monoxide.

#### Metals group (mercury and compounds)

There was a breach for the Metals group (mercury and compounds) expressed as a total was recorded as 0.091mg/Nm<sup>3</sup> compared to the limit of 0.05mg/m<sup>3</sup> which occurred during the check monitoring carried out between 15/2/10 and 19/2/10. An investigation took place into the reason for the breach and no reason was found. However the subsequent monitoring results for mercury are within the ELV of 0.05mg/m<sup>3</sup> in the permit.

#### Carbon Monoxide

There were 2 exceedences of the emission limits for Carbon Monoxide. One occurrence was due to a substance within the incoming waste, this produced a spike within one 30 minute average period, while the other was as a result of an issue with waste feeding also producing a spike within one 30 minute average period. The daily averages remained well within the permitted level.

On 6<sup>th</sup> Jan 2010 a CO reading of 203 mg/Nm<sup>3</sup> half hourly average was recorded compared to the limit of 100mg/Nm<sup>3</sup>. A sharp increase in CO levels at the 20 minute mark of the 30 minute period is believed to have been caused by a hydrocarbon substance (thought to be a cylinder) present within the waste. Oxygen became depleted, temperatures increased and subsequently CO levels were raised. The previous half hour average was 12.81mg/Nm<sup>3</sup> with the reading following the incident returning back to 13.15mg/Nm<sup>3</sup>. The daily average reading was within the permitted levels at 17.58mg/Nm<sup>3</sup>

On 21st December 2010 a CO reading of 112 mg/Nm<sup>3</sup> half hourly average was recorded compared to the limit of 100 mg/Nm<sup>3</sup>. A spike in the oxygen levels accompanied by a sharp decrease in the flow rate of gases exiting the boiler was followed by the spike in CO and a reduction in temperatures. This would indicate a potential problem with waste feeding to the grate; auxiliary burners were used to raise temperatures and control combustion.

Combustion within the plant stabilised following the spike leaving the following half hourly value at 16mg/Nm<sup>3</sup>; the daily average was also well below the emission limit value at 15.56mg/Nm. Line 1 was also operating well within the ELV at 21.4mg/Nm.

### **ELV Breaches 2011**

There were no further ELV breach in 2011, except for the dioxin breach which occurred in January 2011, which has already been detailed above.

## **5. Minimising the Installation's environmental impact**

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, global warming potential and generation of waste. Consideration may also have to be given to Photochemical Ozone Creation Potential (POCP) and the effect of emissions being deposited onto land (where there are ecological receptors). All these factors are discussed in this and other sections of this document.

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

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

### **5.1 Assessment Methodology**

#### **5.1.1 Application of Environment Agency H1 Guidance**

A methodology for risk assessment of point source emissions to air, which we use to assess the risk of applications we receive for permits, is set out in our Horizontal Guidance Note H1 and has the following steps:

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

The H1 methodology uses a concept of “process contribution (PC)”, which is the estimated concentration of emitted substances after dispersion into the receiving environmental media at the point where the magnitude of the concentration is greatest. The guidance provides a simple method of calculating PC primarily for screening purposes and for estimating process contributions where environmental consequences are relatively low. It is

based on using dispersion factors. These factors assume worst case dispersion conditions with no allowance made for thermal or momentum plume rise and so the process contributions calculated are likely to be an overestimate of the actual maximum concentrations. More accurate calculation of process contributions can be achieved by mathematical dispersion models, which take into account relevant parameters of the release and surrounding conditions, including local meteorology – these techniques are expensive but normally lead to a lower prediction of PC. The Applicant has the choice to use either method.

### **Screen Out Insignificant Emissions**

Once short-term and long-term PCs have been calculated (either by dispersion factors or modelling), they are compared with Environmental Quality Standards (EQS) referred to as “benchmarks” in the H1 Guidance.

Where an EU EQS exists, the relevant standard is the EU EQS. Where an EU EQS does not exist, our guidance sets out a National EQS (also referred to as Environmental Assessment Level - EAL) which has been derived to provide a similar level of protection to Human Health and the Environment as the EU EQS levels.

PCs are considered **Insignificant** if:

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

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

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

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

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

### **Decide Whether Detailed Modelling is Needed**

Where an emission cannot be screened out as insignificant as a PC through applying the first stage of our H1 Guidance, it does not mean it will necessarily be significant.

In these circumstances, the H1 Guidance justifies the need for detailed modelling of emissions, long-term, short-term or both, taking into account the state of the environment before the Installation operates, where:

- local receptors may be sensitive to emissions;
- released substances fall under an Air Quality Management Plan;
- the long term Predicted Environmental Concentration (PEC) exceeds 70% of the appropriate long term standard, (where the PEC is equal to the sum of the background concentration in the absence of the Installation and the process contribution);
- the short term Process Contribution exceeds 20% of the headroom, (where the headroom is the appropriate short term standard minus twice the long term background concentration).

### 5.1.2 Applying the Guidance to the Application

We review the Applicant's detailed impact assessment to confirm whether or not we agree with the Applicant's conclusions with respect to H1 screening against the above criteria.

For those pollutants where the  $PEC_{\text{long term}}$  exceeds 70% of an EQS or the  $PC_{\text{short term}}$  exceeds 20% of the headroom between an EQS and the background concentration, we determine whether exceedences of EQS are likely. This is done through detailed audit and review of the Applicant's impact assessment taking headroom and modelling uncertainties into account. Where an exceedence of an EQS is identified, we may require the Applicant to go beyond what would normally be considered BAT for the Installation or refuse the application. Whether or not exceedences are considered likely, the Application is subject to the requirement to operate in accordance with BAT.

National EQSs do not have the same legal status as EU EQSs, and there is no explicit requirement to impose stricter conditions than BAT in order to comply with a national EQS. However, national EQSs are a standard for harm and any significant contribution to a breach is likely to be unacceptable.

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

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

In this Application, the Applicant has carried out detailed air dispersion modelling. We are satisfied that the model proposed reflects the likely impact of the emissions from the activity. We have carried out a detailed audit including check modelling of the Applicant's model and agree with their conclusions. We have applied the H1 criteria above to the model outputs, and this is described in the following sections.

## 5.2 Air Quality Assessment

### 5.2.1 Assessment of Air Dispersion Modelling Outputs

The Applicant assessed the Installation's potential emissions to air against the relevant air quality standards, and potential impact upon local habitat sites and human health. These assessments predicted the potential effects on local air quality from the Installation's stack emissions using ADMS 4.2, which is a commonly used computer model for regulatory dispersion modelling. The model used 10 years of meteorological data collected from Watnall in Nottingham between 1999 and 2009. The impact of the terrain surrounding the site upon plume dispersion was considered in the dispersion modelling. The concentrations reported in the assessments were the maximum ground level concentrations predicted by the dispersion modelling packages over the 10 years of meteorological data.

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

- First, they assumed that the ELVs in the Permit would be those in the WID.
- Second, and conservatively for all emissions to air except for metals, they assumed that the Installation operates continuously long-term WID emission limit values, i.e. the maximum permitted emissions under the WID.
- Third, for the assessment of emissions of metals - the Applicant has used representative emission data from suitable reference plants, and then used air dispersion modelling comparing the impacts against the relevant EQS / EAL in the H1 guidance (for further info see section 5.2.3 below).

The way in which the Applicant used dispersion models, its selection of input data, and the assumptions it made have been reviewed by the Environment Agency's modelling specialists to establish the robustness of the Applicant's air impact assessment. Our review of the Applicant's assessment leads us to agree with the Applicant's conclusion that the impact of the change in waste throughput is insignificant, although we do not necessarily agree with all their modelling methodology or the absolute numerical values of their predictions.

The Applicant concludes in the air quality assessment that the only substances not classified as insignificant are nitrogen dioxide and PAH's. The Applicant concludes that the impact of the change in waste throughput proposed by this Application has been considered and is shown to be insignificant.

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

**Assessment of long term impacts:**

Pollutant	EQS / EAL µg/m <sup>3</sup> unless otherwise stated	Back- ground Conc	Process Contribution (PC)	PC as % of EQS / EAL	Predicted Environmental Concentration (PEC)	PEC as % EQS / EAL
NO <sub>2</sub>	40	33.6	0.699	1.7	34.29	85.75
	16	-	0.005	0.03	-	-
HF						
Ammonia	180	-	0.050	<0.1	-	-
VOC's - benzene	5	0.89	0.050	1	0.94	18.8
VOC's 1,3- butadiene	2.25	0.13	0.050	2.22	0.18	8.0
PAH's – benzo[a]pyrene	0.00025	0.00014	0.000009987	4.0	1.50x10 <sup>-4</sup>	60.0
Mercury	0.25	0.00011	0.00024	0.1	-	-
Cadmium	0.005	0.0005	0.00012	2.4	6.20 x10 <sup>-4</sup>	12.4
Arsenic	0.003	0.001	0.00026	8.7	1.26x10 <sup>-3</sup>	42.0
Antimony	5	-	0.00026	<0.1	-	-
Chromium II & III)	5	0.0309	0.00026	<0.1	-	-
Chromium (VI)	0.0002	0.0309	0.000002	<1 <sup>Note 2</sup>	-	-
Copper	10	0.0439	0.00026	<0.1	-	-
Manganese	0.15	0.0346	0.00026	0.17	-	-
Nickel	0.02	0.0123	0.00026	1.3	0.01	50
Vanadium	5	0.0019	0.00026	<0.1	-	-

Note 1 All the above concentration figures are converted to µg/m<sup>3</sup> The applicant provided the data for PC's in the Air Quality Assessment, Table 5.2 for non metals (Highest ground level concentrations for 3 lines refurb.) and Table 4.8 for metals. We calculated the PC as % of EAL's and the PEC's where relevant from the Applicants data.

Note 2 The impact is <1% as Table 4.8 states that the PC is 0.92% of EAL - therefore the PC has been rounded up.

## Assessment of short term impacts:

Pollutant	EQS / EAL	Process Contribution (PC)	PC as % of EQS / EAL
NO <sub>2</sub>	200	5.460	2.73
SO <sub>2</sub>	266 (15 minute mean)	4.815	1.81
SO <sub>2</sub>	350 (1 hour mean)	3.610	1.0
SO <sub>2</sub>	125 (24 hour mean)	1.672	1.3
CO	10	0.005	<0.1
HCl	750	0.05	<0.1
HF	160	0.127	<0.1
Ammonia	2500	0.252	0.01
Mercury	7.5	0.00633	0.084
Antimony	150	0.00704	<0.1
Chromium (II and III)	150	0.00704	<0.1
Copper	200	0.00704	3.52x10 <sup>-3</sup>
Manganese	1500	0.00704	4.69x10 <sup>-4</sup>
Vanadium	1	0.00704	0.704

Note 1 All the above concentration figures are converted to µg/m<sup>3</sup>. The applicant provided this data for PC's in their Air Quality Assessment in Table 5.2 for non metals ((Highest ground level concentrations for 3 lines refurb.) and Table 4.8 for metals. We calculated the PC as % of EQS/EAL from the Applicant's data.

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 and <10% of the short term EAQ/EAL.

The insignificant emissions are HF, Ammonia, Mercury, Antimony, Chromium II & III, Copper, Manganese and Vanadium.

Also Chromium VI is <1% long term and there is no short term EQS/EAL. And CO, SO<sub>2</sub> and HCl are <10% of the short term EQS/EAL and there is no long term EQS/EAL.

Therefore, generally, we consider the Applicant's proposals for preventing and minimising the emissions of these substances to be BAT for the Installation.

Also from the tables above the following emissions (which were not screened out as insignificant) cannot be considered to have the potential to give rise to significant pollution in that the predicted environmental concentration is less than 70% of the long term EQS/EAL. These emissions are VOC's (benzene), VOC's (1,3, butadiene), Cadmium, PAH's (benzo [a] pyrene), Arsenic and Nickel.

However regarding PAH, the Applicant should not have screened this out as insignificant at less than 70% of the PEC because the background levels which have been used in the model have not been justified as representative. The

consultant extracted the BaP background value from the UK Toxic Organic Micropollutants (TOMPS) survey as the maximum for rural sites in England 2003 – 2007. However there are several urban sites in the UK survey that might be considered to be representative to Nottingham. Therefore we cannot rule out potential exceedences in Nottingham in the absence of direct measurements.

However the emission rates for PAH - benzo-a-pyrene (BaP) in the air quality assessment are derived from a concentration of 0.002mg/m<sup>3</sup>. This is overly conservative compared to data held by Fichtner (the consultant used for this application) in relation to PAH releases from waste incinerators. The consultant claims that waste incineration public registers indicate a maximum concentration of 0.0001mg/m<sup>3</sup> (i.e. 20 times lower). Therefore BaP emissions can be screened out as insignificant in that the process contribution would have been < 1% of the long term EQS/EAL using the latter data, also due to the fact that BaP has been conservatively considered to make up the whole of the PAH emission, which in reality it will not.

For the remainder of these emissions, the Applicant's proposals have previously been scrutinised to ensure that they are applying the Best Available Techniques to prevent and minimise emissions of these substances. This was reported in the original decision document. The Variation introduces no significant changes to these techniques - which are still BAT

Finally from the tables above nitrogen dioxide (NO<sub>2</sub>) is considered to have the potential to give rise to pollution as the Predicted Environmental Concentration exceeds 70% of the long term EQS/EAL (none of the Process Contributions exceed 20% of the short term EQS/EAL headroom).

Despite predicting a PC of greater than 1% of the long-term objective. Fichtner predicts no exceedence. This is due to their suggested background concentration of 33.6µg/m<sup>3</sup> providing sufficient headroom. However we do not consider the Applicants NO<sub>2</sub> background value to be reasonably precautionary. The value of 33.6 µg/m<sup>3</sup> is the average of three recent annual measurements at the Nottingham AQMA. This compares to a peak annual measurement from the Nottingham continuous analyser for 2009 at 34.5µg/m<sup>3</sup>. There are also local NO<sub>2</sub> diffusion tubes sites recording exceedences at locations of public exposure and outside the local Air Quality Management Area (AQMA's). An example of this is the site T (Queens Road) is less than 500 metres from the plant and in a location representative of public exposure has returned values for 52µg/m<sup>3</sup> and 35µg/m<sup>3</sup> during the past 2 years. This indicates a potential background exceedence with a predicted impact which is not insignificant.

The Applicant has made a comparison of the total impact of emissions to air including the increased waste throughput with that set out in the original Permit application. Table 5.2 of the Air Quality Assessment predicts a reduction in the process contribution for emissions of nitrogen dioxide. (For other emissions, where there is a slight increase over the short term of ground level contributions for some substances these are not considered to be



significant). Our detailed audit of the Applicant's modelling agrees with the Applicant's conclusions in the report which state that the impact of the increase in waste throughput is insignificant.

The Applicant states that the increase in waste throughput for three lines leads to a slight decrease in ground level concentrations. This is because the third line is now expected to be slightly smaller (due to the significantly reduced gas flow rate for line 3 calculated to be 26.9 AM3/sec compared to the original case of 35.3 Am3/sec - an effective reduction of 24%; and following refurbishment of lines 1 and 2. Due to the revised flow rates and amended stack configuration in line 3, there is a predicted net reduction in impact for most pollutants. This is not surprising as with a reduced overall exhaust gas flow, the theoretical maximum emission rates for each pollutant will also be reduced by the same level. In their Application report, the Applicant states "it is important to note that the third line which was modelled originally was expected to be larger than the existing lines, as it was expected to process more waste than one of the existing lines. However, the third line is now envisaged to be the same size as the existing lines and the air quality assessment has been updated to reflect this".

Also the modelled exhaust gas flow rates from the refurbished lines 1 and 2 show only a marginal increase from the modelled gas flow rates for lines 1 and 2 in the original application despite the increase in throughput of 20,000 tonnes per line per year.

Therefore taking conservative background values into account, as a PEC we cannot rule out exceedences of annual NO<sub>2</sub> due to potentially high background pollution. However the incremental increase from the proposal (increased waste throughput for lines 1 and 2) is likely to be insignificant at less than 1% of the EQS. We consider this a valid approach because line 3 is not yet operating and the existing pollution from lines 1 and 2 already contribute to background pollution.

The Applicant's proposals for NO<sub>2</sub> control have previously been scrutinised to ensure that they are applying the Best Available Techniques to prevent and minimise emissions of these substances. This was reported in the original decision document. This Application introduces no significant changes to these techniques - which are still BAT.

#### 5.2.2 Assessment of emissions of PM<sub>10</sub> and PM<sub>2.5</sub>

The impact on air quality from particulate emissions has been assessed against the EUEQS for PM<sub>10</sub> (particles of 10 microns and smaller) and the EU Environmental Quality Objective for PM<sub>2.5</sub> (particles of 2.5 microns and smaller). For PM<sub>10</sub>, the EUEQS are a long term annual average of 40 µg/m<sup>3</sup> and a short term daily average of 50 µg/m<sup>3</sup>. For PM<sub>2.5</sub> the EU Environmental Quality Objective of 25 µg/m<sup>3</sup> as a long-term annual average to be achieved by 2010 as a Target Value and by 2015 as a Limit Value.

The Applicant's predicted impact of the Installation (maximum worst case emissions for the refurbished 3 line plant) against these EQS is shown in the table below – all concentrations are shown as  $\mu\text{g}/\text{m}^3$ . The assessment assumes that **all** particulate emissions are present as  $\text{PM}_{10}$  for the  $\text{PM}_{10}$  assessment and as  $\text{PM}_{2.5}$  for the  $\text{PM}_{2.5}$  assessment.

Pollutant	EQS / EAL	Back-ground Conc	Process Contribution (PC)	PC as % of EQS / EAL
$\text{PM}_{10}$	40	17.8	0.05	0.125
Annual Mean				
$\text{PM}_{10}$ -90.4 <sup>th</sup> ile of daily means	50	17.8	0.17	0.34
$\text{PM}_{2.5}$	25	12.0	0.05	0.2

Note 1 All the above concentration figures are in  $\mu\text{g}/\text{m}^3$ . The applicant provided this data for PC's in their Air Quality Assessment in Table 5.2 (Highest ground level concentrations for 3 lines refurb.). We calculated the PC as % of EQS/EAL from the Applicant's data.

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 for total dust, whereas actual emissions from similar plant are normally in the range 1 to 5  $\text{mg}/\text{m}^3$ .
- It assumes all particulates emitted are below either 10 microns ( $\text{PM}_{10}$ ) or 2.5 microns ( $\text{PM}_{2.5}$ ), when some are expected to be larger.

The above assessment shows that the predicted process contribution for emissions of  $\text{PM}_{10}$  is below 1% of the long term EQS and below 10% of the short term EQS and so can be considered insignificant.

The above assessment shows that the predicted process contribution for emissions of  $\text{PM}_{2.5}$  is also below 1% of the EQS. Therefore in conclusion, the particulate emissions from the Installation, including emissions of  $\text{PM}_{10}$  or  $\text{PM}_{2.5}$ , will not give rise to significant pollution.

### 5.2.3 Assessment of Emission of Metals

The Applicant has assessed the impact of metal emissions to air using representative emission data from suitable reference plants. The Applicant has then used air dispersion modelling comparing the impacts against the relevant EQS / EAL in the H1 guidance.

WID sets three limits for metal emissions:

- An emission limit value of 0.05  $\text{mg}/\text{m}^3$  for mercury and its compounds.
- An aggregate emission limit value of 0.05  $\text{mg}/\text{m}^3$  for cadmium and thallium and their compounds.

- An aggregate emission limit of 0.5 mg/m<sup>3</sup> for antimony, arsenic, lead, chromium, cobalt, copper, manganese, nickel and vanadium and their compounds.

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

The Applicant's assessment finds that emissions of mercury, thallium, antimony, chromium (II and III), chromium VI, cobalt, manganese, lead, copper, and vanadium and their compounds would have a PC of less than 1% of the relevant EAL and so can be considered insignificant. For those metals not insignificant by this test which are cadmium, arsenic and nickel, the Applicant's assessment finds that the PECs of all of these metals would be below 70% of the relevant EAL.

We have reviewed the background data used in this assessment and are satisfied that they represent reasonably precautionary or representative data.

Chromium can be released in two oxidised forms: chromium (III) and chromium (VI). Since humans are more sensitive to chromium (VI), this has been considered separately. Chromium (VI) is not specifically referenced in WID, which includes only total Chromium as one of the 9 Group 3 metals, the impact of which has been assessed above. The EPAQS guidelines refer only to that portion of the metal emissions contained within PM<sub>10</sub> in ambient air. The guideline for Chromium (VI) is 0.2 ng/m<sup>3</sup>.

For Cr(VI), the consultant has used our interim guidance on the impact assessment of waste from incinerators, where emissions are based on data from existing Municipal Waste Incinerators (MWIs). The guidance contains the likely ranges of Cr(VI) as a ratio of total chromium from incinerator dust emissions and confirms that the ratio of CrVI to total chromium is no more than 2% (with an average of 0.7%). The Applicant assumed the average value of 0.7% and predicts a PC of less than 1% of the EAL for Cr (VI) from all three lines. We have checked their predictions and even conservatively assuming the highest ratio, we agree that the PC is not likely to exceed the 1% PC predicted by the Applicant.

Our detailed audit of the Applicant's modelling agrees with the Applicant's conclusions in the report which state that the impact of the increase in waste throughput is insignificant.

### **5.3 Human health risk assessment**

#### **5.3.1 Our role in preventing harm to human health**

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

## **i) Applying Statutory Controls**

The plant will be regulated under EPR. These regulations include the requirements of relevant EU Directives, notably, the waste incineration directive (WID), the waste framework directive (WFD), integrated pollution prevention and control directive (IPPCD) and air quality directive (AQD)

The main conditions in an EfW permit are based on the requirements of the IPPCD. Further specific conditions have been introduced to ensure compliance with the requirements of the WID. The aim of WID is to prevent or to limit as far as practicable negative effects on the environment, in particular pollution by emissions into air, soil, surface water and groundwater, and the resulting risks to human health, from the incineration and co-incineration of waste. WID achieves this aim by “setting stringent operational conditions, technical requirements and emission limit values”. The requirements of the IPPCD include the use of BAT, which may in some circumstances dictate tighter emission limits and controls than the WID. The assessment of BAT for this installation is detailed in section 6 of this document.

## **ii) Environmental Impact Assessment**

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

## **iii) Expert Scientific Opinion**

We take account of the views of national and international expert bodies. Following is a summary of some of the publications which we have considered (in no particular order).

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

pollution. Because current MSW incinerators are located predominantly in urban areas, effects on air quality are likely to be so small as to be undetectable in practice.”

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

**Policy Advice from Government** also points out that the minimal risk from modern incinerators. Paragraph 22 (Chapter 5) of WS2007 says that “research carried out to date has revealed no credible evidence of adverse health outcomes for those living near incinerators.” It points out that “the relevant health effects, mainly cancers, have long incubation times. But the research that is available shows an absence of symptoms relating to exposures twenty or more years ago when emissions from incinerators were much greater than is now the case.” **Paragraph 30 of PPS10** explains that “modern, appropriately located, well run and well regulated waste management facilities should pose little risk to public health.”

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

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

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

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

The **US National Research Council Committee on Health Effects of Waste Incineration (NRC) (NRC 2000)** reviewed evidence as part of a wide ranging report. The Committee view of the published evidence was summarised in a key conclusion: “Few epidemiological studies have attempted to assess whether adverse health effects have actually occurred near individual incinerators, and most of them have been unable to detect any effects. The studies of which the committee is aware that did report finding health effects had shortcomings and failed to provide convincing evidence. That result is not surprising given the small populations typically available for study and the fact that such effects, if any, might occur only infrequently or take many years to appear. Also, factors such as emissions from other pollution sources and variations in human activity patterns often decrease the likelihood of determining a relationship between small contributions of pollutants from incinerators and observed health effects. Lack of evidence of such relationships might mean that adverse health effects did not occur, but it could mean that such relationships might not be detectable using available methods and sources.”

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

to the fly ash. This fly ash is light, readily windborne and mostly of low particle size. It represents a considerable and poorly understood health hazard.”

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

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

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

From this published body of scientific opinion, we take the view stated by the HPA that “While it is not possible to rule out adverse health effects from modern, well regulated municipal waste incinerators with complete certainty, any potential damage to the health of those living close-by is likely to be very small, if detectable”. We therefore ensure that permits contain conditions which require the installation to be well-run and regulate the Installation to ensure compliance with such permit conditions.

#### **iv) Health Risk Models**

Comparing the results of air dispersion modelling as part of the H1 Environmental Impact assessment against European and national air quality standards effectively makes a health risk assessment for those pollutants for which a standard has been derived. These air quality standards have been developed primarily in order to protect human health via known intake mechanisms, such as inhalation and ingestion. Some pollutants, such as dioxins and furans, have human health impacts at lower ingestion levels than

lend themselves to setting an air quality standard to control against. For these pollutants, a different human health risk model is required which better reflects the level of dioxin intake.

**Dioxin Intake Models:** Two models are available to predict the dioxin intake for comparison with the Tolerable Daily Intake (TDI) recommended by the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment, known as COT. These are HHRAP and the HMIP model.

HHRAP has been developed by the US EPA to calculate the human body intake of a range of carcinogenic pollutants and to determine the mathematic quantitative risk in probabilistic terms. In the UK, in common with other European Countries, we consider a threshold dose below which the likelihood of an adverse effect is regarded as being very low or effectively zero. The HMIP model uses a similar approach to the HHRAP model, but does not attempt to predict probabilistic risk. Either model can however be used to make comparisons with the TDI.

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

In addition to an assessment of risk from dioxins and furans, the HHRAP model enables a risk assessment from human intake of a range of heavy metals. The HMIP report does not consider metals. In principle, the respective EQS for these metals are protective of human health. It is not therefore necessary to model the human body intake.

COMEAP developed a methodology based on the results of time series epidemiological studies which allows calculation of the public health impact of exposure to the classical air pollutants ( $\text{NO}_2$ ,  $\text{SO}_2$  and particulates) in terms of the numbers of “deaths brought forward” and the “number of hospital admissions for respiratory disease brought forward or additional”. COMEAP has issued a statement expressing some reservations about the applicability of applying its methodology to small affected areas. Those concerns generally relate to the fact that the exposure-response coefficients used in the COMEAP report derive from studies of whole urban populations where the air pollution climate may differ from that around a new industrial installation. COMEAP identified a number of factors and assumptions that would contribute to the uncertainty of the estimates. These were summarised in the Defra review as below:

- Assumption that the spatial distribution of the air pollutants considered is the same in the area under study as in those areas, usually cities or large towns, in which the studies which generated the coefficients were undertaken.



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

The use of the COMEAP methodology is not generally recommended for modelling the human health impacts of individual installations. However it may have limited applicability where emissions of NO<sub>x</sub>, SO<sub>2</sub> and particulates cannot be screened out as insignificant in an H1 Environmental Impact assessment, there are high ambient background levels of these pollutants and we are advised that its use was appropriate by our public health consultees.

Our recommended approach is therefore the use of the H1 assessment methodology comparison for most pollutants (including metals) and dioxin intake models using either the HHRA or HMIP models as described above for dioxins and furans. Where an alternative approach is adopted for dioxins, we check the predictions ourselves using the HMIP methodology.

## v) Consultations

As part of our normal procedures for the determination of a permit application, we would consult PCT (England), FSA and in some cases HPA. In this case we consulted with the PCT and the FSA, however the PCT consulted with the HPA. We also consult the local communities who may raise health related issues. All issues raised by these consultations are considered in determining the Application as described in Annex 3 of this document.

### 5.3.2 Assessment of Intake of Dioxins and Furans

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

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

The results of the Applicant's assessment of dioxin intake are detailed in the table below (worst – case results for each category are shown). The results showed that the predicted daily intake of dioxins at all receptors, resulting

from emissions from the proposed facility, were significantly below the recommended TDI levels.

The assessment is contained in Section 2 of the supplementary report. The report concludes that it can be seen that the impact of the Variation is insignificant. Even the impact of the refurbished 3 Line plant on the Hypothetical Maximally Exposed Individual (HMEI) who only consumes locally produced food and spends his or her whole life living near to the plant. The impact on the HMEI is less than 1.3% of the TDI. The incremental impact of the change in waste throughput for the current two-line plant is, at most, 0.35 fg/kg bw/day, which is less than 0.02% of the TDI. However when comparing the original permitted 3 lines against the refurbished 3 lines there is a decrease in the incremental dioxin increase – therefore this is an environmental benefit.

Note that the HMEI has been conservatively modelled as a hypothetical farmer living in the centre of Nottingham. In addition modelling the human intake in this way is highly conservative assuming a large proportion of their diet (beef, port, poultry, root vegetables, drinking water and milk) is derived from the peak ground level concentrations. The Applicant’s predictions therefore should be considered a screening assessment. The Applicant’s assessment shows that the HMEI intake is 1.26% of the TDI. However this value is well below the TDI levels established by the COT of 2 picograms I-TEQ / Kg bodyweight/ day established by the COT.

In summary our checks agree with the Applicant’s conclusions (if not their absolute numerical predictions), that the human intake is likely to be less than 1% of the TDI for the proposed increase in waste throughput.

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

<b>Receptor</b>	<b>Incremental Intake (pg TEQ/kg bodyweight/day)</b>	<b>% of COT TDI</b>
Adult resident	0.00339	0.17
Local child aged 1 – 6	0.00622	0.31
Local child aged 6 – 11	0.00602	0.30
Local child aged 11-16	0.00381	0.19
Local breast feeding infant	0.00996	0.50
HMEI	0.02527	1.26

Note 1 The Applicant provided the incremental intake data in their Supplemental Air Quality Assessment (S1054-0010-0083SMO) in fg TEQ/kg bodyweight/day. Therefore we converted this into pg I-TEQ/ kg-BW/day and calculated the % of COT TDI from the Applicant’s data.

The FSA has reported that dietary studies have shown that estimated total dietary intakes of dioxins and dioxin-like PCBs from all sources by all age groups fell by around 50% between 1997 and 2001, and are expected to continue to fall. In 2001, the average daily intake by adults in the UK from diet was 0.9 pg WHO-TEQ/kg bodyweight. The additional daily intake predicted by the modelling as shown in the table above is substantially below this figure.

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

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

Dioxin monitoring at Eastcroft is in accordance with the requirements of the WID.

### 5.3.3 Particulates smaller than 2.5 microns

The Operator will be required to monitor particulate emissions using the method set out in Tables S3.1 and S3.1a (formerly Tables 2.2.2 and 2.2.2a of the Variation and Consolidation Notice). 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  $\mu\text{m}$ , at the maximum flow rate anticipated. The filter efficiency for larger particles will be at least as high as this. This means that particulate monitoring data effectively captures everything above 0.3  $\mu\text{m}$  and much of what is smaller. It is not expected that particles smaller than 0.3  $\mu\text{m}$  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  $\mu\text{m}$  in diameter ( $\text{PM}_{0.1}$ ). Questions are often raised about the effect of nano-particles on human health, in particular on children's health, because of their high surface to volume ratio, making them more reactive, and their very small size, giving them the potential to penetrate cell walls of living organisms. The small size also means there will be a larger number of small particles for a given mass concentration. However the HPA statement (referenced below) says that due to the small effects of incinerators on local concentration of particles, it is highly unlikely that there will be detectable effects of any particular incinerator on local infant mortality.

The HPA 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<sub>10</sub> and PM<sub>2.5</sub> with effects on health derived by COMEAP and goes on to say that if these coefficients are applied to small increases in concentrations produced, locally, by incinerators, the estimated effects on health are likely to be small. 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.

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

The HPA also point out that in 2007 incinerators contributed 0.02% to ambient ground level PM<sub>10</sub> levels compared with 18% for road traffic and 22% for industry in general. The HPA note that in a sample collected in a day at a typical urban area the proportion of PM<sub>0.1</sub> is around 5-10% of PM<sub>10</sub>. It goes on to say that PM<sub>10</sub> includes and exceeds PM<sub>2.5</sub> which in turn includes and exceeds PM<sub>0.1</sub>.

This is consistent with the assessment of this application which shows emissions of PM<sub>10</sub> to air to be insignificant.

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

#### 5.3.4 Assessment of Health Effects from the Installation

We have assessed the health effects from the operation of this Installation in relation to the above (sections 5.3.1 to 5.3.3). We have applied the relevant requirements of the national and European legislation in imposing the permit conditions. We are satisfied that compliance with these conditions will ensure protection of the environment and human health.

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

In carrying out air dispersion modelling as part of the H1 Environmental Impact assessment and comparing the predicted environmental concentrations with European and national air quality standards, the Applicant has effectively made a health risk assessment for many pollutants. These air quality standards have been developed primarily in order to protect human health.

For the Applicant's assessment of impact on air quality see section 5.2.1 above.

The Environment Agency has reviewed the methodology employed by the Applicant to carry out the health impact assessment for the impact of the increased waste throughput.

We carried out check modelling and made dioxin intake predictions using empirical calculations based on both HHRAP and HMIP 1996 report. Making conservative assumptions, our checks indicate that the human intake is likely to be below 1% of the TDI due to the proposed increase in waste throughput.

We agree with the Applicants conclusion in the Air Quality Assessment report that the impact of the increased waste throughput is insignificant.

Overall, taking into account the conservative nature of the impact assessment (i.e. that it is based upon an individual exposed for a life-time to the effects of the highest predicted 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.

The Primary Care Trust (PCT) were consulted on the Application, who referred it to the Health Protection Agency (HPA). The HPA have provided us with a provisional response, subject to approval by the Nottingham PCT. The response stated that the HPA's position on municipal waste incinerators is that modern, well managed incinerators make only a small contribution to local concentrations of air pollutants. It is possible that such small additions could have an impact on health, but such effects, if they exist, are likely to be very small and not detectable. At the time of writing, we have yet to receive a formal response from Nottingham PCT.

The main emission of concern for this Variation is nitrogen dioxide. The Variation should not lead to an unacceptable deterioration in air quality. The HPA then provided a number of recommendations of issues for us to address and we have confirmed how we have addressed these issues in Annex 4 below. The Food Standards Agency was also consulted however they did not respond. Details of the response provided by Health Protection Agency (HPA) on behalf of the PCT to the consultation on this Application can be found in Annex 4.

The Environment Agency is therefore satisfied that the Applicant's conclusions presented above are soundly based and we conclude that the

potential emissions of pollutants including dioxins and furans from the proposed facility are unlikely to have an impact upon human health.

#### 5.4 Impact on Habitats sites, SSSIs, non-statutory conservation sites etc.

##### 5.4.1 Sites Considered

There are no Habitats (i.e. Special Areas of Conservation, Special Protection Areas and Ramsar) sites within 10Km of the proposed Installation.

There is only one SSSI within our screening criterion of 2km. The site known as Colwick Cutting is designated as a geological feature alone and therefore none of the habitats sites listed in Section 3 of the supplementary report need to be considered in the impact assessment.

The following 18 non-statutory local wildlife and conservation sites are located within 2Km of the Installation:

<b>Table 1 – List of Sensitive Receptors</b>			
<b>Site Name</b>	<b>Eastings</b>	<b>Northings</b>	<b>Type of Site</b>
Nottingham General Cemetery	456556	340386	Grassland
Canal Street Viaducts	457533	339504	A fragmented sequence of old railway viaducts supporting good undisturbed plant communities
Beeston Canal	455883	337366	Aquatic habitat
Tinker's Leen	456745	339218	A drain with a notable flora
Lenton Triangle	456062	338728	Excised Marsh and grassland
Trent Bridge North	458135	338341	Notable species along Trent North bank
Iremonger Pond	456925	337927	A fishing pond with good marginal and aquatic vegetation
Trentside West Bridgford	457159	337807	A sizeable mosaic of bankside ruderal and scrub communities
Wilford Disused Railway	456868	336721	A valuable wildlife corridor in a predominantly urban area, containing scattered trees, scrub and grassland
Trent Pasture West Bridgford	457323	337362	A grazed pasture with marshy areas
Greythorne Dyke	457355	336923	An urban water course retaining a

			good aquatic flora
Grantham canal (Cotgrave to River Trent)	460861	337572	An urban stretch of canal with a good aquatic plant community
Adbolton Ponds (Pinders Pond)	459893	338570	Ponds surrounded by mature woodland
Colwick Country Park	460742	339332	A good mixed habitat assemblage with notable plant communities
Colwick Racecourse Wetland	459754	339210	A pond and drain supporting notable aquatic plant, surrounded by species rich alluvial grassland
Sneinton Railway Lands	458932	339388	Land adjacent to a series of disused railway embankments supporting a typical flora and several unusual species
Colwick Wood	460066	340008	Mixed deciduous woodland of botanical interest
Adbolton Ponds	459893	338570	A good mixed habitat association including the scarce Trentside inundation community type.

#### 5.4.2 Assessment of Non-Statutory Sites

The Applicant had not assessed these in the Application, therefore a schedule 5 notice was issued requesting this information.

The conclusion of their impact assessment states that the contribution of the plant to sulphur dioxide and hydrogen fluoride levels in the atmosphere and to acid deposition rates can be screened out as insignificant, using the criteria in Technical Guidance Note H1.

Whilst the contribution of the plant to nitrogen dioxide and ammonia levels in the atmosphere, and to nitrogen deposition cannot be screened out as insignificant at all sensitive sites - it will not lead to any exceedences of critical levels at the ecological receptor locations.

For long term concentrations of oxides of nitrogen, the highest predicted contribution from the refurbished plant is 0.697ug/m<sup>3</sup> for the two line plant and 0.774ug/m<sup>3</sup> for the three line plant at Sneinton Railway Lands. These concentrations are 2.3% and 2.6% of the critical level respectively. However for the two line plant, the increase compared to the currently permitted plant is only 0.07% of the critical level and, for the three line plant, the impact of the

refurbished plant is actually less than the impact of the currently permitted plant.

For daily average concentrations of nitrogen oxides, the two line plant contributes less than 10% of the critical level at all sites. The three-line plant contributes, at most 12.5% of the critical level, but this is a slight reduction compared to the currently permitted plant. At Adbolton Ponds the contribution from the refurbished plant is slightly higher than from the currently permitted plant, but the increase is only 0.8% of the critical level.

For long term concentrations of ammonia, the highest predicted concentration from the refurbished plant is 0.035ug/m<sup>3</sup> for the two line plant and 0.039ug/m<sup>3</sup> for the three line plant for Sneinton Railway Lands. These concentrations are 1.2% and 1.3% of the critical level respectively. However, for the two line plant, the increase compared to the currently permitted plant is only <0.1% of the critical level and, for the three-line plant, the impact of the refurbished plant is actually less than the impact of the currently permitted plant.

The contribution of the plant to nitrogen deposition rates is more than 1% of the minimum Critical Load at most of the sites. Based on the Applicant's report, the highest contribution, as a percentage of the Critical Load is 5.4% for the two-line plant and 6.7% for the three-line plant, both at Colwick Wood. However the change from the currently permitted plant to the refurbished plant is no more than 0.18% of the Critical Load for the two-line plant and is a reduction for the three-line plant.

The Applicant concludes that this assessment is to support an application for a variation to the permit and the change in contribution between the currently permitted plant and the refurbished plant can be screened out as insignificant, as in cases where there will be an increase in impact upon ecological receptors, the increase is predicted to be less than 1% of the Critical Load.

We have checked the location of all non-statutory habitats sites selected by the applicant and we are satisfied they are complete and in appropriate locations.

We have carried out detailed dispersion check modelling and sensitivity analysis using the software ADMS Version 4.2. We carried out sensitivity analysis using our own meteorological data recorded at Watnall to lower surface roughness at the meteorological station and using our own terrain data.

Although we do not necessarily agree with the absolute numerical predictions given in the report, we agree with the Applicants conclusion that the impact of the increased waste throughput is insignificant. We agree that the total process contribution (PC) is not likely to be at the level indicating "adverse effect" (taking the adverse effects level to be a PC of 100% for non-statutory sites).

## 5.5 Impact of abnormal operations



WID (Article 6(3)(c)) requires that waste shall cease to be fed to the Installation whenever any of the continuous emission monitors show that an emission limit value (ELV) is exceeded due to disturbances or failures of the purification devices. Notwithstanding this, WID (Article 13(3)) allows for the continued feeding of waste under abnormal operating conditions – this is a recognition that the emissions during transient states (e.g. start-up, shut-down) are higher than during steady-state operation, and the overall environmental impact of continued operation with a limited exceedance of an ELV may be less than that of a partial shut-down and re-start. WID Article 13 sets criteria for determining what is an abnormal operation and sets some limits regarding duration and extent of the abnormal operation which aim to ensure that the overall environmental impact is so minimised.

Abnormal operations are limited to no more than a period of 4 hours continuous operation and no more than 60 hour aggregated operation in any calendar year (<1% of total operating hours). As such, abnormal operating conditions are not expected to have any significant long term environmental impact unless the background conditions were already close to, or exceeding, an EQS. For the most part therefore consideration of abnormal operations is limited to consideration of its impact on short term EQSs.

WID abnormal operations are defined as any technically unavoidable stoppages, disturbances, or failures of the abatement plant or the measurement devices, during which the concentrations in the discharges into air may exceed the normal emission limit values.

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

In making an assessment of abnormal operations the following worst case scenario has been assumed (see Air Quality Addendum: Abnormal Emissions):

- Dioxin emissions of 10 mg/m<sup>3(4)</sup> (assumes the emission is unabated emission)
- NO<sub>x</sub> emissions of 550 mg/m<sup>3</sup> (assumes the emission is unabated)
- Particulate emissions of 150 mg/m<sup>3(2)</sup> (equal to the WID backstop limit)
- SO<sub>2</sub> emissions of 280mg/m<sup>3</sup> (assumes the emission is unabated)
- HCl emissions of 600mg/m<sup>3(3)</sup> (assumes the emission is unabated)
- Metals – all metal emissions are 5 times the normal emission concentrations as it is assumed that metals are in the particulate phase.

(1) Where available, emission rates are based on measured data from a comparable facility.

(2) Taken from the Waste Incineration Directive.

(3) Supplied by the Environment Agency, and stated in a Decision Document previously issued by the Environment Agency (EPR/GP3433GH).

(4) Previously advised by the Environment Agency.

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

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

Pollutant	EQS / EAL µg/m <sup>3</sup>	Back- ground Conc	Process Contribution (PC)	PC as % of EQS / EAL	Predicted Headroom (EQS/EAL – 2 x background)	PC as a % of Head- room
NOx	200		13.310	6.66	-	-
PM10	50		2.340	4.68	-	-
S02	266		24.696	9.28	-	-
CO	10000		31.840	0.32	-	-
HCl	750	0.56	76.200	10.16	77.32	10.31
HF	160		1.040	0.65	-	-
Antimony	150		0.0352	0.02	-	-
Chromium	150		0.0352	0.02	-	-
Copper	200		0.0352	0.02	-	-
Manganese	1,500		0.0352	0.00	-	-
Mercury	7.5		0.0317	0.42	-	-

Note 1 All the above concentration figures are in µg/m<sup>3</sup>

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

Note 3 The Applicant provided the data for PC's and PC as % of EQS/EAL in Tables 3 (non metals) and Table 4 (metals) in the Air Quality Addendum: Abnormal Emissions S1054-0100-0009SMO).

Note 4 Please note – the Applicant presented the data in micrograms per cubic metre (µg/m<sup>3</sup>) for metals in Table 4 of the Air Quality Addendum: Abnormal Emissions - however these were actually nanograms per cubic metre (ng/m<sup>3</sup>). Therefore we have converted the data to µg/m<sup>3</sup> in the above table. Our detailed air quality audit confirmed that this is correct.

Note 5 We calculated the Predicted Headroom and PC as % of headroom from the Applicants data.

Note 6 Background values are taken from the Air Quality Assessment, Table 3.6.

Note 7 For S02 the Applicant did not calculate the 1 hour averaging period and the 24 hour averaging period, however our detailed audit agrees with their conclusion that abnormal operations are not likely to lead to the plant contributing significantly to any exceedences of air quality Environmental Quality Standards.

From the table above the emissions of the following substances can still be considered insignificant, in that the PC is still <10% of the short-term EQS/EAL for all parameters with the exception of HCl.

For HCl, the PC is less than 20% of the headroom and so unlikely to result in the exceedence of an air quality standard or objective.

As discussed in the health impact assessment the exposure route for dioxins and furans is primarily through ingestion, which occurs over a long period of

time. In the event that the plant was to operate abnormally for the full 60 hours per year and dioxin emissions were to be emitted at 100 times ( $10\text{ng}/\text{m}^3$  against EQS of  $0.1\text{ng}/\text{m}^3$ ) the rate under normal operation, the total mass release in a year would increase by 68%.

The assessment of abnormal emissions for the increased throughput was submitted in response to a Schedule 5 Notice request dated 10 June 2011.

We assessed the report submitted in response to the schedule 5 Notice entitled, " Waste Recycling Group Eastcroft EfW Plant Air Quality Addendum: Abnormal Emissions", Fichtner First Draft 20/06/11.

The Applicant concludes that use of the allowance for abnormal operating conditions (as detailed in Article 13 of the WID) is not predicted to give rise to unacceptable impacts on air quality or the environment.

The Applicant predicts that the total proposed plant (all 3 lines) will not result in an insignificant PC for  $\text{NO}_2$  and arsenic. Our check modelling confirms this. The Applicant predicts that the incremental increase for the proposed changes to plant operations are insignificant and we agree with this conclusion.

For dioxins under abnormal operations, the Applicant predicts the worst-case emission rate is 1.68 times the normal operation based on the WID ELV. Multiplying their predicted TDI for normal operations by this factor is reasonable as the relationships between emissions and impact are modelled to be linear. The Applicant predicts that based on the results of the human health assessment submitted in the Air Quality Assessment, that the Hypothetical Maximally Exposed Individual (HMEI) was predicted to be exposed to 1.3% (1.26% as detailed in Table in Section 5.3.2 above - rounded up) of the Tolerable Daily Intake (TDI) for dioxins. Assuming the impact of abnormal operations, it is calculated that the receptor receiving the highest maximum dose will be exposed to  $(1.3\% \times 1.6781) = 2.2\%$  of the UK TDI for dioxins). Based on the Applicant's results for an adult resident, this is predicted to increase from 0.17% of the TDI to 0.29% of the TDI and for a breast feeding infant from 0.5% of the TDI to 0.84% of the TDI.

Our checks indicate that the PC is likely to be no greater than this prediction and that the incremental increase from the proposed plant is likely to be insignificant at less than 1%.

We have undertaken detailed check modelling and sensitivity analysis. Although we do not necessarily agree with the absolute numerical predictions given in the report we agree with the Applicant's conclusions that abnormal operations are not likely to lead to the plant contributing significantly to any exceedences of air quality Environmental Quality Standards.

Table S3.1a (formerly Table 2.2.2(a) which details emission limits to air during abnormal operation - has been amended as part of the variation to update the 'monitoring standard or methods' in the final column of the Table.

## 6. Application of Best Available Techniques

This has been addressed as part of the determination of the original Application. This includes assessment of the combustion and abatement technologies applied to the two lines which are currently operational and the proposed 3<sup>rd</sup> line which is permitted but not yet operational.

The Application does not contain any proposals to change the techniques applied and the Environment Agency is satisfied that these remain BAT for the installation.

We are satisfied that none of the changes carried out as a consequence of this Variation compromise the BAT assessment carried out. As part of this determination, we are taking the opportunity to review the BAT assessment for POPs and global warming potential.

## 6.1 BAT and POPs

International action on Persistent Organic pollutants (POPs) is required under the UN's Stockholm Convention, which entered into force in 2004. The EU implemented the Convention through the POPs Regulation (850/2004), which is directly applicable in UK law. The Environment Agency is required by national POPs Regulations (SI 2007 No 3106) to give effect to Article 6(3) of the EC POPs Regulation when determining applications for environmental Permits.

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

The unintentionally-produced POPs addressed by the Convention are:

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

The UK's national implementation plan for the Stockholm Convention, published in 2007, makes explicit that the relevant controls for unintentionally-produced POPs, such as might be produced by waste incineration, are delivered through a combination of IPPC and WID requirements. That would, as required by the IPPC Directive, include an examination of BAT, with a view to preventing or minimising harmful emissions.

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.”

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

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

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

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

The release of **dioxins and furans** to air is required by the WID to be assessed against the I-TEQ (International Toxic Equivalence) limit of 0.1 ng/m<sup>3</sup>. 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. EPR requires 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 requires 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 5.3.2 of this document details the assessment of emissions to air, which includes dioxins and concludes that there will be no adverse effect on human health from either normal or abnormal operation.

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

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

[http://www.eea.europa.eu/publications/EMEPCORINAIR4/sources\\_of\\_HCB.pdf](http://www.eea.europa.eu/publications/EMEPCORINAIR4/sources_of_HCB.pdf)]

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

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

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

## 6.2 BAT and global warming potential (GWP)

Emissions of carbon dioxide (CO<sub>2</sub>) 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<sub>2</sub> is clearly a pollutant for IPPCD purposes.

The principal greenhouse gas emitted is CO<sub>2</sub>, but the plant also emits small amounts of N<sub>2</sub>O arising from the operation of secondary NO<sub>x</sub> abatement (SNCR is used for secondary NO<sub>x</sub> abatement at this site). N<sub>2</sub>O has a global warming potential 310 times that of CO<sub>2</sub>. The Applicant will therefore be required to optimise the performance of the secondary NO<sub>x</sub> abatement system to ensure its GWP impact is minimised.

The major source of greenhouse gas emissions from the installation is however CO<sub>2</sub> from the combustion of waste. There will also be CO<sub>2</sub> emissions from the burning of support fuels at start up, shut down and should it be necessary to maintain combustion temperatures. BAT for greenhouse gas emissions is to maximise energy recovery and efficiency.

The electricity which is generated by the Installation will displace emissions of CO<sub>2</sub> elsewhere in the UK, as virgin fossil fuels will not be burnt to create the same electricity.

The additional 40,000 tonnes of waste per annum will lead to increases in CO<sub>2</sub> emissions. However as mentioned above BAT for greenhouse gas emissions is to maximise energy recovery and efficiency. As discussed in section 4.3.7 of this Decision Document we are satisfied that there is sufficient capacity within the district heating system to use the energy from burning the additional 40,000 tonnes of waste per annum for the Installation to remain BAT.

### 6.3 Other Emissions to the Environment

#### 6.3.1 Emissions to sewer

This was addressed as part of the determination of the original Permit Application (see decision document EP3034SN). There is unlikely to be a significant increase in emissions to sewer as a result of this variation.

As stated in the original decision document, the ELV's in Table S3.2 (formerly Table 2.2.8) in the Permit for S1 were carried over from the IPC authorisation and are the same as in the trade effluent consent issued by Severn Trent Water Limited. We no longer replicate ELVs from the trade effluent consent in the permit unless there are particularly high risk substances present. A H1 environmental risk assessment has been carried out to assess whether there are any dangerous substances present at significant levels. The results show that there are no dangerous substances present at significant levels. Therefore the limits for S1 have been removed from Table S3.2.

There were also ELVs for monitoring point S2 in Table 2.2.8 for pH and hydrocarbons, and for suspended solids and total metals the limit stated, "To

be approved by the Agency after completion of condition 1.6.1(vii). Pre-operational condition 1.6.1(vii) has been renumbered as PO6 and the requirement has been added for the Operator to carry out a H1 assessment based on design data for the new effluent treatment plant planned for Line 3 (as per the original permit) and to submit proposed ELVs for any substances which are considered to be significant – as well as an effluent monitoring and action plan. Therefore the limits and other requirements for Table S3.2 have been removed and replaced by “To be approved by the Environment Agency in accordance with Pre-operational condition PO6”. For further details of the pre-operational condition see Annex 1 below.

### 6.3.2 Fugitive emissions

This was addressed as part of the determination of the original Permit Application (see decision document EP3034SN). There is unlikely to be a significant increase in fugitive emissions as a result of this Variation.

The original conditions have now been replaced by modern conditions in section 3.2 in the Variation notice which is entitled, “Emissions of substances not controlled by emission limits”.

Vent filters A4 – A10 (which were detailed in the original Permit in Table 2.2.1) are no longer included in the monitoring tables in the Variation notice as the vent filters are not emission points. Instead the vent filters are regulated under section 3.2 of the Variation for, ‘Emissions of substances not controlled by emission limits’.

### 6.3.3 Odour

This was addressed as part of the determination of the original Permit application (see decision document EP3034SN). There is not considered to be an odour problem at the site. Modern conditions in relation to odour have been included in section 3.4 of the Variation notice.

### 6.3.4 Noise and vibration

This was addressed as part of the determination of the original Permit application (see decision document EP3034SN). It is not considered that there will be any material difference in noise and vibration arising from the increase in capacity at the site. The Operator will be required to comply with the conditions in the Variation.

Modern conditions in relation to noise and vibration have been included in section 3.5 of the Variation notice.

## 6.4 Setting ELVs and other Permit conditions

### 6.4.1 Translating BAT into Permit conditions



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

Table S3.1 (formerly Table 2.2.2) entitled "Point source emissions to air – emission limits and monitoring requirements", in the Variation has been updated to:

- remove old monitoring requirements which were required up to a specified date – which has now passed;
- remove the requirement for bi-annual monitoring for those parameters which are monitored continuously as these are not required;
- update monitoring frequencies
- update the monitoring methods

Vent filters A4 – A10 (which were detailed in the original Permit in Table 2.2.1) are no longer included in the monitoring tables in the Variation. This is because these are not required to be monitored in the Permit - for further information see section 6.2.3 above.

Table 2.10.1 entitled, "Other monitoring requirements", has also been amended as part of the Variation to update the monitoring parameters to include Antimony for bottom ash and APC residues monitoring as this parameter is now included as part of the current permit template. The monitoring methods or the wording in this column have also been updated in accordance with the current permit template.

The reference conditions have also been updated by deleting reference condition notes from beneath the table and instead referring to conditions 2.2.1.4 (a) to (e) and 6.1.3.3. Conditions 2.2.1.4 (a) to (e) are new conditions which have been added as part of the Variation - from the new permit template.

## 6.5 Monitoring

### 6.5.1 Monitoring during normal operations

The monitoring requirements have been amended slightly to update them in accordance with the requirements of WID and the latest monitoring standards and methods from our M2 guidance entitled, "Monitoring stack emissions to air". The Variation will not lead to a significant change in emissions, therefore the emission limits remain the same. See section 5.2 above.

### 6.5.2 Monitoring under abnormal operations arising from the failure of the installed CEMs

This was addressed as part of the determination of the original Permit (see decision document EP3034SN, section 15.2).

Condition 2.1.11 and Table 2.2.2a in the original Permit have been replaced by modern condition 2.3.14(d) and Table 3.1(a) in the Variation.

In the event of abnormal operations the Operator previously had a portable CEMS to monitor CO, SO<sub>2</sub>, NO<sub>x</sub>, HCl and the following alternative techniques:

- For particulate matter, installation of a tribo-electric dust monitor and alarm set to operate when the monitor indicates exceedance of 150mg/m<sup>3</sup> ;
- For TOC, a CO reading of more than 50mg/m<sup>3</sup> (as a half hourly average) would be taken to indicate a TOC level in excess of 20mg/m<sup>3</sup>. These surrogate techniques are acceptable for a period of 4 hours operation under abnormal operating conditions.

However as part of this Variation the Operator has confirmed that they have back up CEMS, but no longer have a tribo – electric dust monitor. However they still require the alternative technique for monitoring TOC under abnormal operations. We consider that this is acceptable. Table S1.2: Operating Techniques' and table 3.1(a) (formerly 2.2.2(a): Point source emissions to air during abnormal operation of incineration plant – emission limits and monitoring requirements, have been amended to reflect this change.

### 6.5.3 Continuous emissions monitoring for dioxins and mercury

The WID specifies manual extractive sampling for mercury and dioxin monitoring. However, Article 11(13) of the WID requires that “The Commission, acting in accordance with the procedure laid down in Article 17, shall decide, as soon as appropriate measurement techniques are available within the Community, the date from which continuous measurements of the air emission limit values for heavy metals, dioxins and furans shall be carried out in accordance with Annex III”. No such decision has yet been made by the Commission.

The Environment Agency has reviewed the applicability of continuous sampling and monitoring techniques to the Installation.

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

In the case of dioxins, equipment is available for taking a sample for an extended period (several weeks), but the sample must then be analysed in the conventional way. However, the continuous sampling systems do not meet the requirements of BS EN 1948 which is the standard for dioxin analysis. BS EN 1948 requires traversing the sampler across the duct and collecting parts

of the sample at various points across the duct to ensure that all of the gas phase is sampled proportionately, in case there are variations in gas flow rate or composition resulting in a non-homogeneous gas flow. This requirement is particularly important where suspended solids are present in the gas, and dioxins are often associated with suspended solid particles. Continuous samplers are currently designed for operation at one or two fixed sampling points within the duct, and traverses are not carried out automatically. Using such samplers, more information could be obtained about the variation with time of the dioxin measurement, but the measured results could be systematically higher or lower than those obtained by the approved standard method which is the reference technique required to demonstrate compliance with the limit specified in the WID. The lack of a primary reference method (e.g. involving a reference gas of known concentration of dioxin) prohibits any one approach being considered more accurate than another. Because compliance with the WID's requirements is an essential element of EPR regulation, we have set emission limits for dioxins in the permit based on the use of BS EN 1948 and the manual sampling method remains the only acceptable way to monitor dioxins for the purpose of regulation.

For either continuous monitoring of mercury or continuous sampling of dioxins to be used for regulatory purposes, an emission limit value would need to be devised which is applicable to continuous monitoring. Such limits for mercury and dioxins have not been set by the European Commission. Use of a manual sample train is the only technique which fulfils the requirements of the 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 additionally continuous monitoring or sampling devices for these substances.

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

## 6.6 Reporting

We have specified the reporting requirements in Section 4 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 Environment Agency to ensure compliance with permit conditions and to monitor the efficiency of material use and energy recovery at the Installation.

Condition 5.1.1.7 has been added as part of the variation notice. This is a standard condition in the current permit template which reads as follows:-

5.1.1 The Operator shall notify the Agency without delay of:-

5.1.1.7 the detection of any significant adverse environmental effects.

## 7 Other legal requirements

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

### 7.1 The EPR 2010 and related Directives

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

#### 7.1.1 Schedules 1 and 7 to the EPR 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 EIA Directive is delivered in the UK through the planning system. 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.

The increase of capacity in lines 1 and 2 have not been the subject of a planning application. However, in determining the Application we have considered the following documents: -

- The Environmental Statement submitted with the planning application for Line 3 dated 6 August 2007.
- The Appeal Decision for Application ref 07/01502/PMFUL3 which grants planning permission for Line 3 on 12 February 2009.

- The planning consent of the City of Nottingham Planning and Development Control committee for the original plant ref 194/12/70.
- The response of the Environment Agency to the local planning authority in its role as consultee to the planning process in relation to the planning application for Line 3.

In the absence of a planning application for the increase in capacity no Environmental Statement has been submitted to the Local Planning Authority. However, the Local Planning Authority have been consulted on the permit variation application and have provided no comments. In addition, the matters that would be required to be included in an EIA form part of the Application made to us and so we have effectively had regard to the information that would have been obtained under the EIA Directive had an EIA been required. We have also consulted on the relevant environmental information contained in the application.

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

#### 7.1.2 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.

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

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

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

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

Article 23(1) requires the permit to specify:

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

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

These are all covered by permit conditions.

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

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

#### 7.1.3 Schedule 13 to the EPR 2010 – Waste Incineration Directive

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

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

To the extent that it might lead to a 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 the Installation are permitted. The Permit also requires material storage areas to be designed and maintained to a high standard to prevent accidental releases.

#### 7.1.5 Directive 2003/35/EC – The Public Participation Directive

Regulation 59 of the EPR 2010 requires the Environment Agency to prepare and publish a statement of its policies for complying with its public participation duties. We have published our public participation statement.

This Application is being consulted upon in line with this statement, as well as with our guidance 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 draft decision in this case has been reached following a programme of extended public consultation, both on the original Variation application and

later, separately, on the draft Variation notice 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 3.

## 7.2 National primary legislation

### 7.2.1 **Environment Act 1995**

#### (i) Section 4 (Pursuit of Sustainable Development)

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

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

In respect of regulation of industrial pollution through the EPR, the Guidance refers in particular to the objective of setting permit conditions *“in a consistent and proportionate fashion based on Best Available Techniques and taking into account all relevant matters...”*. The Environment Agency considers that it has pursued the objectives set out in the Government's guidance, where relevant, and that there are no additional conditions that should be included in this Permit to take account of the Section 4 duty.

#### (ii) Section 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.

We have considered the impact of the installation on local wildlife sites within 2Km which are not designated as either European Sites or SSSIs. We are satisfied that no additional conditions are required.

#### (iii) Section 81 (National Air Quality Strategy)

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

### 7.2.2 **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.

### **7.2.3 Countryside and Rights of Way Act 2000 (CROW 2000)**

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

### **7.2.4 Wildlife and Countryside Act 1981**

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

There is only 1 SSSI within 2km of the site which is Colwick Cutting, however this is a geological feature alone and therefore will not be affected by the activities at Eastcroft EfW Site.

### **7.2.5 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.

## **7.3 National secondary legislation**

### **7.3.1 The Conservation of Natural Habitats and Species Regulations 2010**

There are no Habitats sites within 10km of the site.

### **7.3.2 Water Framework Directive Regulations 2003**

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

### **7.3.3 The Persistent Organic Pollutants Regulations 2007**



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

#### 7.4 Other relevant legal requirements

##### 7.4.1 Duty to Involve

S23 of the Local Democracy, Economic Development and Construction Act 2009 require us where we consider it appropriate to take such steps as we consider appropriate to secure the involvement of interested persons in the exercise of our functions by providing them with information, consulting them or involving them in any other way. S24 requires us to have regard to any Secretary of State guidance as to how we should do that.

The way in which the Environment Agency has consulted with the public and other interested parties is set out in section 2 of this document. The way in which we have taken account of the representations we have received is set out in Annex 4. Our public consultation duties are also set out in the EP Regulations, and our statutory Public Participation Statement, which implement the requirements of the Public Participation Directive. In addition to meeting our consultation responsibilities, we have also taken account of our guidance in Environment Agency Guidance Note RGS6 and the Environment Agency's Building Trust with Communities toolkit.

## ANNEX 1 Pre-Operational Conditions

These were imposed as part of the determination of the original Application (see decision document EP3034SN). However amendments have been made as part of this Variation notice as follows:

None of the pre-operational conditions in Table 1.6 of the original Permit have been completed yet.

Pre-operational condition 1.6.1 (ii) in the original Permit required the Operator to provide a revised list of waste prior to the commencement of operation of Line 3. However this has now been addressed by the introduction of a standard waste list for all three lines in Schedule 6 of the variation and consolidation notice. Therefore pre-operational condition 1.6.1 (ii) has been removed and the remaining pre-operational conditions have been renumbered.

Pre-operational condition 1.6.1 (vii), renumbered to pre-operational condition PO6 has been amended to include the requirement for the Operator to carry out a H1 assessment based on design data for the new effluent treatment plant (as detailed in the original pre-operational condition PO7) and to submit proposed ELVs for any substances which are considered to be significant – as well as an effluent monitoring and action plan. PO6 reads as follows:-

*Details of the design and operation of the effluent treatment plant and the performance guarantees for the quality of effluent discharged to sewer. The Operator shall undertake an assessment of the impact on the water environment using design data. The Operator shall use the methodology prescribed in the Environment Agency's guidance 'Environmental Assessment and Appraisal of BAT' (Ref. IPPC H1) in making this assessment. The Operator shall identify substances present in the effluent that are considered significant, and submit proposed emission limit values for these substances in the form of a report. Flow rate must also be considered as part of this assessment. The report shall also include an effluent monitoring plan for any key substances identified and an action plan to reduce releases of those substances that are considered significant as part of the H1 Assessment. The Operator shall implement any improvements or measures as agreed in writing with the Environment Agency.*

*The proposals shall be implemented by the Operator from the date of approval in writing by the Environment Agency;*

Pre-operational condition PO9 (formerly condition 1.6.1(x)) has been amended by replacement with the following modern pre-operational condition relating to requirements prior to commissioning:

*PO9 - Prior to the commencement of commissioning of Line 3; the Operator shall provide a written commissioning plan, including timelines for completion, for approval by the Environment Agency. The commissioning plan shall include the expected emissions to the environment during the different stages*

*of commissioning, the expected durations of commissioning activities and the actions to be taken to protect the environment and report to the Environment Agency in the event that actual emissions exceed expected emissions. Commissioning shall be carried out in accordance with the commissioning plan as approved.*

In addition to this a new pre-operational condition PO10 which is a modern standard condition has been added to replace Improvement Condition 9 (which should have been a pre-operational condition in the original permit) relating to reviewing the options available for utilising heat from the waste incineration process. Pre-operational condition PO10 reads as follows:-

*PO10 - Prior to the commencement of commissioning of Line 3, the Operator shall send a report to the Environment Agency which will contain a comprehensive review of the options available for utilising the heat generated by the waste incineration process in order to ensure that it is recovered as far as practicable. The review shall detail any identified proposals for improving the recovery and utilisation of waste heat and shall provide a timetable for their implementation.*

## **ANNEX 2: Improvement Conditions**

These were imposed as part of the determination of the original Application (see decision document EP3034SN). It should be noted that improvement conditions 1 to 8 in table 1.4.1 of the original Permit have been completed.

Amendments have been made as part of this Variation as follows:-

Improvement conditions 9 and 10 have not yet been completed, however they have been superseded by other conditions in the Variation and therefore have been deleted. Improvement Condition 9 has been removed from Table 1.4.1 as this is a pre-operational condition.

Improvement Condition 10 has been replaced by Improvement Condition 12 (IC12) in the Variation which has the same requirements for verification of combustion conditions and demonstration of compliance with Articles 6(1) and 11(3) of the Waste Incineration Directive, however the wording had been amended for clarity. Improvement Condition 12 reads as follows:

*The Operator shall carry out checks to verify the residence time, minimum temperature and oxygen content of the exhaust gases in the furnace on Line 3 whilst operating under the anticipated most unfavourable operating conditions to demonstrate compliance with Articles 6(1) and 11(3) of the Waste Incineration Directive. The results shall be submitted in writing to the Environment Agency.*

*Timescale: Within 4 months of the completion of commissioning of Line 3.*

Improvement conditions 11 and 13 are also new improvement conditions which have been added as part of this Variation.

Improvement Condition 11 requires a report on the commissioning of Line 3 to be submitted 4 months after the completion of commissioning as this was not included in the original Permit. IC11 reads as follows:

*The Operator shall submit a written report to the Environment Agency on the commissioning of Line 3. The report shall summarise the environmental performance of the plant as installed for Line 3 against the design parameters set out in the Application. The report shall also include a review of the performance of Line 3 against the conditions of this Permit and details of procedures developed during commissioning for achieving and demonstrating compliance with permit conditions.*

*Timescale: Within 4 months of the completion of commissioning of Line 3.*

Improvement Condition 13 requires a report to confirm calibration and verification testing for the Continuous Emission Monitors on line 3 as this was not included in the original Permit. IC13 reads as follows:

*The Operator shall submit a written summary report to the Agency to confirm by the results of calibration and verification testing that the performance of Continuous Emission Monitors on line 3 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.*

*Timescale: Initial calibration report to be submitted to the Agency within 3 months of completion of commissioning of Line 3.*

*Full summary evidence compliance report to be submitted within 18 months of commissioning of line 3.*

## **ANNEX 3: Consultation Responses**

### **A) Advertising and Consultation on the Application**

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

The Application was advertised on the Environment Agency website from 16/06/11 to 15/07/11 and in the Nottingham and Long Eaton Recorder on 16/06/11. Copies of the Application were placed in the Environment Public Register at our Trentside Office, Scarrington Road, Nottingham, NG2 5FA and the Nottingham City Council Public Register at Tamar Building, East Croft Depot, London Road, Nottingham, NG2 3AH.

The following statutory and non-statutory bodies were consulted:

- *Nottingham City Council – Environmental Health Department 24/5/11*
- *Nottingham City Primary Care Trust 24/5/11*
- *Food Standards Agency 24/5/11*
- *Health and Safety Executive 24/5/11*
- *Severn Trent Water 24/5/11*
- *Nottingham City Council Planning Department 2/8/11*

### **1) Consultation Responses from Statutory and Non-Statutory Bodies**

**Response Received from the Health Protection Agency which requires confirmation from the PCT – 15 June 2011.**

**Brief summary of issues raised:**

**Summary of action taken / how this has been covered**

The HPA's position on municipal waste incinerators is that modern, well managed incinerators make only a small contribution to local concentrations of air pollutants. It is possible that such small additions could have an impact on health, but such effects, if they exist, are likely to be very small and not detectable.

The main emission of concern for this variation is nitrogen dioxide. The permit variation should not lead to an unacceptable deterioration in air quality.

The Applicant predicts no significant impact from the additional waste throughput. See section 5.2 of the Decision Document.

**Recommendations:**

The Applicant's assessments of emissions to air indicate that the plant is unlikely to lead to exceedances of health-based Air Quality Objectives. The Regulator should be satisfied that the modelling suitably considers

Modelling is based on emissions at the ELVs. These are the maximum emissions that the incinerator can operate at. We are satisfied that the Operator will still be able to meet these limits following the agreement to relax

the proposal to relax restrictions on waste streams and the variation /diversity per load.

the restrictions on waste streams and the variation /diversity per load.

The Regulator should satisfy itself that the proposed change in temperature measurement is suitably justified, i.e. that the under all load conditions the proposed configuration and limits for temperature monitoring will not show a more optimistic compliance with WID than the current configuration and limits, on an average and shorter timescale basis.

We are satisfied that the proposed change to temperature measurement is satisfactory and should not have any effect on compliance with the conditions of the permit or the requirements of WID.

The Applicant wishes to have the restriction of predominantly incinerating only municipal mixed waste lifted. Currently the waste streams are municipal waste or diluted with municipal waste. The Regulator should be satisfied that any relaxation of the current restrictions is justified in terms of the operator being able to achieve and demonstrate compliance with WID for all waste streams.

All plants that burn municipal and C&I waste are designed to accept waste with a range of CV's (typically 7-10MJ/kg). Waste is mixed within the bunker to ensure a balanced feed. The Operator is still required to meet all of the emission limits within the permit and the requirements of WID and there is no reason to consider that this will not be done.

In the assessment of heavy metal emission, the Applicant averages 19 sets of monitoring data from waste combustion plants in the UK recorded in public registers in their estimation of heavy metal composition. The Regulator should be satisfied that the applicants assessment is justified, taking into account the variance in the data averaged and the relevant design and abatement technology at each site compared to the Applicant site.

We agree with the conclusions of the Applicant's Air Quality Assessment.

In the assessment of speciation of emitted chromium, the applicant uses Regulator guidance including data from 10 municipal waste incinerators (i.e. similar waste streams to that currently permitted at Eastcroft). The Regulator should satisfy itself that the applicant's assessment of the speciation of emitted chromium is valid for both municipal and non municipal waste streams.

We are satisfied with the conclusions of the Applicant's Air Quality Assessment.

Any information arising from these recommendations should be sent to the Primary Care Trust for consideration when it becomes available. Such information could affect the comments made in this response.

No additional information arose from the recommendations that needed to be sent to the PCT. All additional information submitted in relation to the Application is available on the Public Register.

The response outlined in this representation is based on the following general assumptions:

- the permit holder shall be using 'best available techniques' in accordance with Article 2(11) of the IPPC Directive;
- comments are sought from the local authority for matters relating to impact on human health of

We consider that the Installation is operated in accordance with BAT. BAT was assessed as part of the determination of the original Application, As part of this determination, we have also taken the opportunity to review the BAT assessment for BAT and POPs and BAT and global warming potential in sections 6.1

noise, odour or dust nuisances.

and 6.2 of this Decision Document.

The Local Authority was consulted – see responses below.

**Response Received from Health and Safety Executive**

**Brief summary of issues raised:**

No comments

**Summary of action taken / how this has been covered**

No action required

**Response Received from Severn Trent Water**

**Brief summary of issues raised:**

The site has a discharge to sewer which is subject to a Trade Effluent Consent issued by Severn Trent Water Ltd. We are satisfied with the protection provided by this consent and the performance of the applicant in meeting the standards that have been applied.

**Summary of action taken / how this has been covered**

No action required.

**Response Received from Nottingham City Council Planning Department on 16/8/11**

**Brief summary of issues raised:**

No comments.

**Summary of action taken / how this has been covered**

No action required.

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

The consultation responses received were wide ranging, the issues raised are summarised below, along with our response to the points raised. 178 consultation responses were received.

A number of the issues raised were outside the Environment Agency's remit in reaching its permitting decisions. Specifically questions were raised which fall within the jurisdiction of the planning system, both on the development of planning policy and the grant of planning permission. Government guidance on the interaction between planning and pollution control is given in PPS23. It says that the planning and pollution control systems are separate but complementary. We are only able to take into account those issues, which fall within the scope of the Environmental Permitting Regulations.

Finally, we received a number of representations prior to the receipt of the application. Whilst we cannot consider these as consultation responses, we have reviewed the content of these representations and are satisfied that the concerns raised are also addressed in our responses below.

**Responses from the public consultation on the application**

The summarised comments or groups of comments are numbered and our responses are in italics below the comments.

**1) The Consultation process**



- 1.1 Some people were concerned that there was a lack of clarity whether the Application was being considered a 'substantial' variation within the meaning of the EPR. It was also claimed by some correspondents that because the Application does not itself say that it is a substantial variation, this will have caused confusion in the public mind and that the consultation should be re-started or repeated. Finally, some correspondents thought that the reasons why the Application was a substantial variation were unclear, and indeed that the criteria for a substantial change were vague and probably unlawful.

*The Application was originally submitted as a normal variation, but following discussions between the Applicant and the Environment Agency, the Application was changed to being a substantial variation and has been duly made and determined as such. All Environment Agency correspondence on the Application including consultation following the duly making of the Application has been on the basis of it being a substantial variation, and this has been clearly stated.*

*The reason why the Application is considered to be a substantial variation is that the existing activity is expanded by an amount that in itself would exceed the threshold for that activity in the Schedule 1 description. The Schedule 1 description for this Permit is Section 5.1A(1)(c) - incineration of non hazardous waste in an incineration plant with a capacity of >1 tonne/hour. The threshold is therefore 1 tonne per hour. The Application is for an increase in the capacity of the plant from 160,000 tonnes per annum to 200,000 tonnes per annum which is an increase of 40,000 tonnes per annum. 40,000 tonnes per annum divided by theoretical maximum operating hours of 8,760 hours = 4.6 tonnes per hour, which is significantly greater than the 1 tonne per hour threshold for the activity. Therefore, regardless of any further consideration of the environmental impact criteria for substantial change, this increase in capacity alone indicates that the Application is for a substantial change.*

- 1.2 Concern was expressed that consultation was carried out using an incomplete contacts list (for the extended public consultation) with important individuals and organisations not included.

*In addition to our advertising the Application and consulting the statutory consultees (see section 2), we undertook a programme of extended public consultation. We wrote letters to key stakeholders (councillors, MPs, local residents and community groups in the area). A press release was also issued on 16 June 2011.*

*There is also a local liaison group for the installation, which meets quarterly and is run by the Operator for representatives of the community at which a briefing on the variation was given.*

*Therefore we provided the information to as wide a circle of individuals and groups as possible. When we became aware that some contact*

*details had changed we provided information about the Application to the interested party and updated our contact details. See section 2 of the decision document for further information.*

- 1.3 Concern was also expressed that there was a lack of clarity on where consultation responses should be sent. Although the Environment Agency's website includes an email address for response and the Sheffield address (PSC postal address), there were no such details in the information received when the member of the public consulted the public register. The covering letter (from the Environment Agency regarding consultation) included only the Nottingham address for the Environment Agency.

*We accepted consultation responses received by PSC at the Sheffield office and at the local Environment Agency office in Nottingham.*

- 1.4 Concern was expressed that the consultation process is not easily accessible by the public. In particular that the application should be available on the Environment Agency's website. It was claimed that our request (in the covering letter regarding consultation) for objections and comments to be numbered and tabulated was too challenging for some people.

*We are currently carrying out trials of making applications available on our website for consultation purposes, to make the consultation process easier for some people. However for people who do not have access to a computer making appointments to visit their local public register may still be the most appropriate form of consultation. We accept and consider all consultation responses in whatever format they are presented – i.e. regardless of whether they are numbered or tabulated. The consultation letter aims to provide an aid to responding but it is not compulsory to use this format.*

## **2. Concerns about the determination process**

- 2.1 Concern was expressed that the determination process is a foregone conclusion. The fact that the local authorities have not made provision for alternative arrangements for disposing of their waste in the event that the incinerator requires substantial maintenance, repair, fails to comply with standards or the Operators go bankrupt etc – these are not reasons to allow the plant to continue to operate. If the plant is not able to process all the municipal waste it wants - that is a problem for the Operators. The economic efficiency of the plant should not be a factor material to the conditional granting of a licence by the Environment Agency.

The view was expressed that just because the 'annual availability' of the plant has increased this is not some kind of entitlement for the Environment Agency to accept the application. The Variation should be dependant on obtaining permissions from the Environment Agency

based on the provision of the appropriate information and demonstrating BAT.

*Determination is not a foregone conclusion. If the Operator wants to increase the waste throughput – they have to apply to us for a Variation –which they have done. The Application has been assessed in detail on its technical and environmental merits only in accordance with the legislation. We consider that the Installation will be operated in accordance with BAT. If the plant closes down for any reason it is up to the local authorities to use alternative waste management options.*

- 2.2 Why has an Environmental Impact Assessment (EIA) not been provided.

*See section 7.1.1 of Decision Document.*

### **3. Technical Issues - Energy Efficiency**

- 3.1 It was claimed that the plant is not energy efficient especially during the night and at times of low or no district heating load. Therefore when the incinerator is expanded, it was suggested that the district heating scheme is expanded to meet the energy requirements of the (Queens Medical Centre) QMC.

Concerns were also expressed that this was an expensive way to get energy from waste and highly inefficient as when the Eastcroft plant was shut down the Enviroenergy site is required to burn fossil fuels. To supply the district heating network.

Finally with improvements in the thermal efficiency of the buildings within the district heating scheme reducing demand, questions were asked whether alternative methods were being proposed for recovered energy use to make use of the energy from any extra burning of waste.

*WID requires the energy is recovered where practicable, IPPC requires that energy is used efficiently and the WFD requires that the recovery of energy takes place with a high efficiency. Our consideration of energy recovery and efficiency against these requirements is set out in 4.3.7 of the decision document.*

*Whilst we cannot require the district heating scheme to be expanded through this permit, it is considered that Enviroenergy does have the capacity to accept any additional steam produced as a result of the increased waste throughput. There is the potential to expand the district heating scheme to cover more areas across the City, and some provisions have already been made for this potential expansion.*

*Enviroenergy must meet the legitimate expectations of its customers that they will receive heat through the district heating system at the times they need it. Hence the need for Enviroenergy to have back up*

*plant in the event that the incinerator is not operating. This Variation will increase the number of operational hours of the incinerator, thus reducing the time the back up plant is in operation and thereby reducing the use of fossil fuel.*

*Currently there is spare capacity within the Enviroenergy permit to accept more steam from Eastcroft as Enviroenergy is permitted for two steam turbines and currently only one is operational. Improvement condition 9 is also included in this Variation to ensure that the site continues to be energy efficient when the third line is built. The Operators are required to undertake a comprehensive review of the potential for a full Combined Heat and Power (CHP) operation associated with line 3 in order to demonstrate that heat generated on site is recovered as far as practicable onsite and submit a report following this review. See section 4.3.7 of the Decision Document.*

- 3.2 How do we assess the high level of energy efficiency required by WFD Art.23(4).

*This is described in section 4.3.7 of the Decision Document.*

- 3.3 We were asked how the R1 efficiency factor is calculated and how the calorific value of waste is calculated.

*The R1 status is the concept of energy recovery status for MWIs which was introduced by the Waste Framework Directive. The European Commission has issued Guidance on how to apply this formula and this can be found at <http://eippcb.jrc.es/reference/wi.html> in the Waste Incineration BREF Guidance, chapter 2.4.2 and Annex 10.4.2.*

*The calculation of R1 efficiency factor is a separate matter which is not part of permit determination. However as part of the determination we do assess BAT and the efficiency of energy recovery as previously described.*

*There are three stages to the determination of the R1 efficiency factor. Stage 1, based on design data, stage 2, based on commissioning data and stage 3 based on operational data. R1 status can only be granted provisionally based on design and commissioning data. R1 status can only be confirmed through the use of operational data over a full year.*

- 3.4 We were asked how the calorific value of waste is calculated.

*All plants that burn municipal and C&I waste are designed to accept waste with a range of CVs (typically 7-10 MJ/kg). We do not specify the CV of waste for any process control or performance except that it affects the total waste input. For further information refer to the EU guidance on R1 and the BREF. In theory the best way to determine the CV of a fuel is to take a representative sample and apply standard CV measurement techniques. This works very well (and is often used) for*

*fossil fuels where the fuels are of a consistent nature. Wastes like MSW are variable in nature and hence this method is not particularly suitable. It is more reliable to measure the heat output from the incinerator and relate this to the waste input.*

- 3.5 The District Heating System heat and electric generation has consistently made a massive loss, which the residents have been paying for this for years. This is because although the waste to heat system is considered to be efficient – there is no market for all the heat produced. The heat is provided whether the customers want it or not with the remainder dumped in the canal. There are also concerns whether the heated canal water then leaks in to the aquifer – possibly causing corrosion and cavity formation.

*The London Road Heat Scheme is a separate permit with a separate operator – Enviroenergy Limited. There are limits in this permit on the temperature of the process effluent and cooling water which is discharged to the canal. The environmental impact as granting a permit with these limits has already been assessed. Other than a complete unplanned shutdown (which is very rare) by Enviroenergy (EE) there has never been a time when Eastcroft have produced too much steam for Enviroenergy. They have the capacity to take all of Eastcroft's steam 365 days of the year.*

#### **4. Technical Issues – Emissions to Water**

- 4.1 An increase in throughput will increase the times when heat is being transferred to Enviroenergy, and therefore times when heat is being dumped in the canal. The claim in at S3.2 (Supporting statement, p5) that there would be no change to emissions to water is therefore false. There will be an increased risk in hot weather of Enviroenergy breaching temperature emission limits which has not been assessed.

*There are no releases from the installation which are made directly to a watercourse. Permit condition 2.2.2.2 confirms that no emissions shall be made to water. Discharges to the Nottingham and Beeston Canal are regulated by a separate permit issued to Enviroenergy Limited for the London Road Heat Station (ref: AP3730LT with subsequent Variation Notice ref RX3030XP). There are limits in this Variation relating to the temperature of the process effluent and cooling water.*

#### **5. Concerns about the ability of the Operators and plant reliability**

- 5.1 The Operators of Eastcroft have a long history of failings, with an enforcement notice being necessary only a few months ago. Another example from 2008: an enforcement notice and formal warning were issued after unabated emissions were released to the air for a total of 18 minutes. The very major expansion that is sought is not on the basis of any new, improved technology; it is simply a great deal more of the old technology that has failed too often in the past.

*The plant and technology used is appropriate for an EfW site. The technology was assessed as being compliant with BAT as part of the determination of the original Permit. The plant underwent a programme of refurbishment in 2009 to make it more efficient. The Supporting statement says "In 2009 WasteNotts replaced the grates on each of the two incineration lines. The new grates are similar in operating concept, to the original 1970s grates and supplied by the same company, Martin Engineering, but are of an improved and updated design. WasteNotts have also replaced and refurbished various other parts of the plant over the last 2 – 3 years. The result of this investment and improvement is that the plant is more reliable and is capable of processing more than 160,000 tonnes of waste in a year".*

*See section 4.4 regarding compliance with permit conditions.*

- 5.2 The Supporting statement suggests that the incinerator was unreliable in the past, so why has it been allowed to continue to operate? How was it unreliable?

*Due to the refurbishment of the plant in 2009 as detailed above – the plant is more reliable in terms of the available operational hours which have increased, due to the fact that there is less downtime for plant maintenance or failure. Therefore the supporting statement did not mean that it was unreliable in terms of its operations or emissions.*

- 5.3 The Operator has not stated what its staff training, plant maintenance, safety and emergency procedures are. Furthermore, there is no evidence that these have regularly been independently checked for their effectiveness.

*The Operator's staff training, plant maintenance and safety and emergency procedures are part of the Site's Environmental Management Systems. The Environmental Management Systems were addressed as part of the original Application. These are required to be kept up to date throughout the life of the permit and are therefore dealt with as part of compliance with the Permit.*

- 5.4 The Operator has not been forced to list all officially reported breaches, nor those reported by the public that have been frustrated by the Operator or the EA refusing to record or investigate.

*The Operator is not required to provide a list of breaches as part of the variation application. We already have this information and it is available to the public as part of the public register. Previous breaches of permit conditions have been investigated, and where necessary actions have been taken and / measures put in place to prevent further breaches in the future.*

*We also have details of any other complaints from the public about the site on our National Incident Recording System (NIRS), and we also consult with the Local Authority about any complaints which they may have received. We have taken all of this information into account as part of the determination of this Variation.*

*For further information compliance history see section 4.4 of the Decision Document.*

- 5.5 Alternative methods of treating waste should be investigated and implemented not just revert to incineration and increasing the waste Eastcroft burns. There are other waste management techniques such as composting which lead to less emissions which are harmful to human health and the environment and are more sustainable.

*The Environment Agency is aware that a number of proposals are coming forward for other ways of dealing with waste streams such as pyrolysis and mechanical / biological treatment. At this time however, mass burn incineration at this scale can still be considered BAT, subject to the appropriate assessments being made. Anaerobic digestion is most suitable for high moisture content biodegradable wastes such as food and agricultural wastes, and can be applied where there is separate collection of these waste streams. Anaerobic digestion is not however appropriate for mixed municipal waste. Some technologies such as plasma arc gasification are currently considered not to meet the definition of 'availability' due to their very limited application. Therefore composting is not an appropriate technique for the large scale disposal of Municipal Solid Waste (MSW).*

## **6. Legislation**

- 6.1 Persistent Organic Pollutants (POPs). Article 6(3) of European Regulation 850/204 requires that, when considering proposals for a facility that would release POPs, priority consideration should be given to alternative processes, techniques or practices that would avoid the formation and release of these substances. For the additional 40,000 tpa waste which WRG wants to burn in Lines 1 and 2, what consideration has been given to alternative processes, techniques or practices? If no such consideration has been given, the Application to increase throughput should be rejected.

*Our consideration of the requirements of Article 6(3) of European Regulation 850/204 is detailed in Section 6.1 of the Decision Document. This is an Application to vary the existing Permit. This Application introduces no significant changes to the technology and operating techniques and processes - which are still BAT.*

- 6.2 We have signed up to the Stockholm Convention on Persistent Organic Pollutants, POPs. The aim of this convention is to reduce and eliminate the production of POPs. Expanding the waste burned by the Eastcroft

incinerator will increase these released into the environment therefore contravening the Convention.

*Further information on POPs is detailed in Section 6.1 of the Decision Document.*

*Our consideration of the requirements of the Stockholm Convention is detailed in Section 6.1 of the Decision Document. We are therefore satisfied that the substantive requirements of the Convention and the POPs Regulation have been addressed and complied with.*

- 6.3 The existing incineration of waste violates our human rights under the 2001 United Nations Commission on human rights so WasteNotts (Recycling) Limited proposed increased waste throughput would further violate our human rights to live in a pollution free world. In 2001 the United Nations Commission on Human Rights stated that "everyone has the right to live in a world free from toxic pollution and environmental degradation". It is unethical that people should die from the emissions from incinerators when safe alternatives are available and for this reason incineration violates Article 2 of the European Human Rights Convention, the Right to Life. The Stockholm Convention, agreed to by over 100 countries including Britain, in 2001, commits countries to eliminating persistent organic pollutants, including PCB, dioxins and furans, calling for countries to prevent not just the release of these pollutants but also their formation.

*The comment refers to Article 2 of the European Convention 'Right to Life' - the extensive consideration given to the health impacts in both the variation Decision Document and the original Permit Decision Document, and the finding that there is no significant risk to public health means that Article 2 is not engaged. The Environmental Permitting Regulations would not allow the granting of a Permit which endangered life. The UK's obligations under the Stockholm objective has been discharged - see section 6.1 of the Decision Document entitled BAT and POP's for further information.*

- 6.4 Fit and proper operators would by Common Law be expected to attempt to exceed BAT and all imposed objectives, standards and policy targets.

*The site is considered to already operate using BAT. The assessment of environmental impact is done using the assumption that the plant emits at the maximum permitted level all of the time. In practice, operating in such a manner would inevitably lead to exceedences and so emissions are lower than this. However working in this way means that the assessments are carried out on a worst case basis.*

- 6.5 "The Operator clearly states that it does not intend to make any effort to achieve target values defined in Article 2(7) of Directive 96/61/EC,



suggesting an unhealthy attitude to legislation, regulation, human health and environment”.

*Directive 96/61/EC is the old IPPC Directive which has been replaced by the 2008 Directive. The relevant reference is now Article 2(7) of Directive 2008/1/EC. Article 2(7) refers to Environmental Quality Standards (EQS) and states:*

*‘Environmental Quality Standard’ (EQS) shall mean the set of requirements which must be fulfilled at a given time by a given environment or particular thereof, as set out in Community legislation;*

The Applicant’s air quality model concludes that no exceedences of any Environmental Quality Standards (EQS) are likely as a result of emissions from the proposed changes to the permit. We agree with the Applicant’s conclusions.

## **7. Emission Limit Values (ELVs)**

### **7.1 Why are you not imposing Emission Limit Values (ELVs) which are tighter than WID based on BAT?**

*Where the environmental impact of emissions have been assessed as being insignificant, we generally consider the Applicant’s proposals to be BAT, as any further reduction would still mean the environmental impact was insignificant and the additional controls would not therefore be justified. We then consider the control measures for the emissions which were not screened out as insignificant as to whether they minimise the Installation’s environmental impact. The IPPCD requires that emissions should be prevented or minimised, so it may be possible and desirable to achieve emissions below WID limits. This assessment will include consideration of the likelihood of an EQS being exceeded. This assessment formed part of the original Permit determination.*

*We have reviewed the environmental impact of the proposed changes in this Variation and find that the overall effect will be to reduce the environmental impact.*

*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 – and this may lead to enforcement action being taken. For further information on the assessment methodology and the Air Quality Assessment, see sections 5.1 and 5.2 of the Decision Document.*

- 7.2 The assessment of impact makes no reference to BAT, especially as the Operator is fond of comparing Eastcroft to other more modern incinerators, which are technologically more advanced. This is generally where there is no data for Eastcroft, but data and comparisons are used from other plants. Therefore no EPUK comparisons should be used.

*The Variation Application does not contain any proposals to change the techniques applied and the Environment Agency is satisfied that these remain BAT for the installation. In reviewing the Application, we are taking the opportunity to update our assessment of BAT. See section 6 of the Decision Document for further information.*

*Regarding the EPUK comparisons - we have carried out check dispersion modelling of the operator's Air Quality Assessment. Where we do not agree with the operators input values of their model we have used more appropriate values in our check modelling. Although we do not agree with the absolute numerical predictions of the report, we agree with the conclusion that the impact of the increased waste throughput is insignificant.*

## **8. Concerns about additional wastes that should be recovered or recycled**

- 8.1 Concerns regarding the proposal to burn unlimited quantities of recyclable waste having regard to BAT and the Waste Framework Directive Article 4, which requires the waste hierarchy to be applied to deliver the best overall environmental outcome. WRG should therefore be required to demonstrate that for the additional 40,000 tonnes they propose to burn there is no better option for recycling, re-use or prevention. If the Variation is allowed, conditions should be applied to ensure that the requirements of Article 4 are met. There are also claims that the plant is starting to accept recyclable waste to maintain profitability and to keep the burn temperature high and to maintain profitability. There are concerns that this Variation is against policies and principles to promote and increase rates of recycling.

*The incinerator forms part of an integrated waste management strategy; any waste arriving at the facility will be residual waste arising following upstream waste segregation, recovery and waste recycling initiatives. The shape and content of this strategy is a matter for the local authority. The incinerator is one element in that strategy, and the Permit will ensure that it can be operated without giving rise to significant pollution or harm to human health. In any event Permit conditions will prohibit the burning of any separately collected or recovered waste streams, unless contaminated and recovery is not practicable (condition 2.3.3(c)). Furthermore condition 1.4.1 is included in the Variation notice from the current permit template which covers*

*the requirements of Article 4 of the Waste Framework Directive for any waste generated at the site. Therefore the addition of these conditions provide tighter control than the original Permit.*

## **9. Proximity principle and waste**

- 9.1 A number of concerns were raised regarding waste brought in from outside the local area. In particular from greater than 35 mile radius (from South Midlands, North Yorkshire and Eastern England) which it was claimed was against the proximity principle. Some people commented that the catchment area for waste should be limited to Greater Nottingham and not be shipped in from outside the local authority area, the distance should be rigidly specified and the Agency should enforce this.

*EPR only covers activities taking place within the installation boundary. Controls are applied on the types and quantities of waste that can be burnt, but not on their point of origin. The planning of waste infrastructure is a matter for the local planning authority, and should form part of their planning policies against which decisions on individual planning applications for waste treatment and disposal facilities will then be judged.*

- 9.2 Concerns regarding the City Council being faced with years of contractual obligation to provide material to feed the incinerator.

*Such questions are not relevant matters for an Environmental Permit determination.*

- 9.3 Given that mixed residual waste suitable for incineration can be expected to be progressively reduced in future years, both for household waste and for Commercial and Industrial (C&I) waste, careful consideration should be given as to whether increased capacity for such wastes is required.

*The capacity of the incinerator is primarily a matter for the Applicant designed to meet the waste disposal needs of the local authority. The proposed facility forms part of an integrated waste management strategy. For further information – see response to 8.1 above.*

## **10 Waste Types - Commercial and Industrial Waste**

- 10.1 Concerns regarding the site accepting significant quantities of C&I waste as individual loads of C&I waste are often composed mainly of specific types of waste, not well mixed and not within the incinerators operating envelope as far as calorific value is concerned. This causes problems of mixing with other wastes in the bunker, which can lead to risks of exceeding emission limits, particularly for carbon monoxide. Therefore the permitted quantity of such waste should be limited. Also

concern that the C&I waste can contain a variety of unpleasant material.

*Section 2.2 of the supporting statement submitted with the application states that the waste will be mixed in the bunker to ensure that the overall waste would be within the firing diagram for the facility – all incinerators mix waste in the bunker to get a well balanced feed.*

*The Operator will still be required to meet the same emission limits including in relation to CO in the permit (which is monitored continuously), therefore there is unlikely to be a negative impact from the removal of the limitations on commercial and industrial waste. It is also stated in the Application that they still have a long term contract to process all municipal waste from Nottingham City and so there is no potential for the plant to stop processing primarily municipal waste.*

- 10.2 Different waste types could have a serious effect on the burning temperature, airborne pollution quantity or levels and type of pollutants.

*The Operator is required to maintain combustion conditions and comply with the continuous WID emission limits for CO and TOC (plus all other emission limits in the permit). Compliance with the CO and TOC limits shows that good combustion conditions are being maintained. Breach of CO or TOC limits would lead to shut down of the plant as the WID abnormal limits (Table 3.1a) are the same as the normal limits (Table 3.1).*

- 10.3 The incinerators thermal efficiency should be the same per tonne, irrespective of throughput, except when operating at very low levels, when it could be expected to be less efficient.

The incinerator should be operated within its design parameters. All plants that burn municipal and C&I waste are designed to accept waste with a range of CVs (typically 7-10 MJ/kg), in a manner which maximises thermal efficiency - by optimising the waste throughput.

- 10.4 Due to the high variability of the waste inputs – a correlation between input waste tonnage and output emissions is likely to be extremely variable. This will be even more pronounced if the Operator is permitted to accept any kind of commercial waste it likes.

*See responses to 10.1, 10.2 and 10.3 above.*

## **11. Concerns regarding the acceptance of pelletised waste containing low level radioactive waste**

- 11.1 Concern regarding mixing and pelletising toxic waste, including potentially low level radioactive material and then incinerating them within the limits of the Permit.

*This site is only permitted to accept non hazardous waste as specified in Table 2.1.2 of the Variation notice. This Table does not include radioactive waste. The limits within the Variation notice are at a level below which emissions from the site will not cause harm to the environment or human health.*

## **12. Increased road traffic and road traffic emissions**

- 12.1 By sourcing waste from a large area due to the proposed increase in waste throughput there will be increases in road traffic pollution which will contribute to climate change.

*The number of vehicles movements to and from the site is not covered by the Variation notice and is not something that we would consider in our determination process. However, this issue is a relevant matter for the Local Planning Authority. The planning permission does not have any restrictions on the number of vehicles movements to and from the site. Emissions from traffic may affect the background air quality, however the background air quality has been taken into consideration in the air quality assessment submitted as part of this Application.*

- 12.2 Concerns regarding increased NO<sub>x</sub>, CO and particulate matter from the vehicles used to bring the additional waste in and the impact on human health and the environment. There is also concern regarding the effect the incinerator is already having on the local urban environment.

*The number of vehicles used to transport waste to the plant is a matter for the Local Planning Authority to take into account when deciding whether or not to grant planning permission. The impact of emissions from the incinerator on the local environment is taken into consideration in the Applicant's air dispersion model.*

## **13. Concern about emissions from the plant**

- 13.1 Concern about the impact on human health and the environment from the increased waste throughput which is logically perceived to lead to an increase in emissions from the site.

*The Operator submitted an air quality assessment and a human health risk assessment as part of the Variation application. The air quality assessment models the worst case scenario of emissions when all 3 lines are operating. The results actually show a slight decrease in ground level contributions compared to the 3 incineration lines which are currently permitted.*

*The Operator predicts that the 40,000 tonnes increase in throughput over the 2 lines plant which is currently operational is insignificant and we agree with this conclusion.*

- 13.2 2-3% increase in pollution per cubic metre of waste =192.1875% increase in emissions.

*This is not a 2 – 3% increase per cubic metre of waste, this is based on emissions from the plant over the appropriate monitoring period when comparing the highest ground level contributions of pollutants from the original 2 lines permitted with the refurbished 2 lines (Table 5.2 of the AQA). This increase in emissions from the additional 40,000 tonnes throughput is insignificant.*

*However when comparing the modelled worst case scenario of the original permitted 3 lines against the refurbished 3 lines - the highest ground level contributions are reduced by up to 5.9% with the exception of carbon monoxide, hydrogen fluoride and mercury. However the emissions of carbon monoxide, hydrogen fluoride and mercury can be screened out as insignificant. See section 5.2.1 of the Decision Document for further information.*

- 13.3 Concern regarding the dioxin breaches and in light of these - how can we permit the site to accept further waste. How do we know what they are really emitting?

In relation to the previous dioxin breach in 2005, a Friends of the Earth document stated that emissions from Eastcroft were already 900% above the legal limit:

“In March 2005, the Environment Agency reported that during route emissions sampling of the Eastcroft Incinerator in Nottinghamshire, the levels of dioxins released into the atmosphere were found to exceed their authorised amount by 900%. Given that dioxins are usually only measured every six months, the question arises whether emissions were nine times higher over the entire six months since the previous test”. Incineration critique, Friends of the Earth.

*These matters have been considered in section 5.3.2 of this DD.*

- 13.4 Even when the plant is operating within imposed limits there are concerns whether the current standards are adequate to protect human health and the environment in the medium to long term – with particular reference to ultra fine particulates and dioxins.

*See Section 5.2.2 of the Decision Document entitled, ‘Assessment of PM10 and PM 2.5’; Section 5.3.3 entitled, ‘Particulates smaller than 2.5 microns and Sections 5.3.1(iv) and 5.3.2 in relation to dioxins and furans.*

- 13.5 The Operator is refusing to consider continuous monitoring for furans / dioxins, citing cost reasons, startup / shutdown contamination and very low detection limits. The Operator complains a lot about the very low levels of detection, in particular for dioxins and furans. The Operator

does not seem to take seriously the fact that the effect of these substances on the human body is unknown. Instead of erring on the side of caution (using BAT and continuous monitoring within and outside the plant to deal with any human health risk) the Operator is content to rely on UK and EU limits – some of which are 10 years old.

“... spot sampling (as is used currently) has been shown in a recent study to be unrepresentative and to underestimate dioxin levels by 30-50 times. The situation is no better with heavy metals. Like dioxins, they are unmonitored for 99% of the time. Clearly, continuous dioxin monitoring is essential and without such monitoring, incinerators must be regarded as unsafe and a hazard to anyone living in the area. Continuous dioxin monitoring should be mandatory as is the case in some other European Countries.....”

See section 6.4.3 of the Decision Document entitled, “Continuous emissions monitoring for dioxins and mercury”.

13.6 Concern regarding emissions of mercury 10 times the limit in the permit.

*See section 4.4 of the Decision Document on compliance history.*

13.7 Concerns regarding climate change implications and increase in the emission of greenhouse gases. Concerns regarding the need for large scale reductions in release of greenhouse gases – by reducing re-using and recycling more. The expansion of Eastcroft contradicts these aims.

*Our requirements regarding global warming are fulfilled under section 4.3.7 of the Decision Document. Also see section 6.2 of the Decision Document entitled BAT and global warming potential (GWP) for further information.*

*Regarding reusing and recycling more - as stated previously any material arriving at the facility will be residual waste arising following upstream waste segregation, recovery and recycling initiatives. See response to 8.1 above for further information.*

13.8 As WasteNotts (Reclamation) Ltd are responsible for the operation of the plant they should be carrying out tests and research to prove that the pollutants they emit are not harming human health rather than citizens having to research to prove that they are damaging human health

*We are satisfied that the appropriate information in the Air Quality Assessment which includes the Human Health Risk Assessment (Section 2 of the Supplementary report) has been provided with the Application. The assessments conclude that the impact of the increased waste throughput are insignificant and we agree with this conclusion. Therefore there is unlikely to be a significant negative effect on the environment or human health.*

## **14. Concerns regarding emissions from Eastcroft on Habitats**

- 14.1 Concerns regarding the Hook Nature Reserve - the Hook is a Local Nature Reserve of some 15 hectares in Lady Bay, owned by Rushcliffe Borough Council and managed on their behalf by Nottinghamshire Wildlife Trust.

The Hook is very close to the Eastcroft Plant and in common with Sneinton and Colwick, particularly vulnerable to pollution from the plant given the prevailing wind patterns. The Hook LNR is a valued and heavily used community resource and is notable for its settled population of water voles, one of the most threatened British mammals and a priority species under the Nottinghamshire Biodiversity Plan as well as a wide range of other species.

The majority of the users come to the Hook regularly and are at risk of exposure not just on single occasions but on a cumulative basis.

*The Impact of the installation on sensitive habitats (Section 3 of Supplementary AQA, dated 20 May 2011) has been assessed and is described in section 5.4 of the decision document.*

## **15. Concerns about the Increased waste throughput**

- 15.1 Sneinton Tenants and Residents Association (STARA) are concerned about the increased throughput which they consider is actually 140,000 tonnes per annum if the 3<sup>rd</sup> line is included. They are also concerned about the proposed line 4 which would lead to an even greater increase in emissions due to the types of wastes likely to be accepted and the perceived problems with temperature monitoring.

*The third line is already included in the permit - therefore the proposed worst case emissions from line 3 have already been assessed. The Operator will have to apply to us for a further substantial variation if they want to add a 4<sup>th</sup> incineration line. See section 4.3.6 under the heading, "Capacity of the EfW Plant".*

## **16. Waste acceptance procedures**

- 16.1 Comments that the Operators do not pre-sort or check the waste that is accepted at the site, particularly the mixed municipal waste. Therefore there are concerns that they have no accurate way of knowing what the waste contains until it is incinerated.

*The Operator has procedures for pre-acceptance of waste, waste sampling, acceptance of waste and waste rejection procedures. We regulate the appropriateness of and compliance with these procedures. We are satisfied with the current procedures. Municipal waste collected by the local authority is pre-treated or sorted at waste transfer stations*



*prior to being accepted at the site. Furthermore the incinerator Operators will remove any obvious non conforming or hazardous wastes identified during loading wastes into the bunkers or into the combustion chamber.*

- 16.2 Household waste commonly contains hazardous waste such as batteries.

*Municipal waste will contain some items which contain hazardous waste such as batteries. The incinerator is designed to deal with these types of waste within the municipal waste accepted as this will be within the 'incineration envelope of the site', and emission limits included in the Permit and Variation notice ensure that the Operator does not take wastes that are not within the 'incineration envelope' of the site.*

- 16.3 What measures are in place in the event that someone disposes of a jar of mercury.

*The Operator has appropriate waste acceptance procedures in place. However in the unlikely event that a jar of mercury is disposed of within a load of mixed municipal waste, this is likely to lead to a short term breach of the emission limit – but this is unlikely to have a significant long term effect. Flue gas treatment and the effective removal of particulates would help to reduce emissions of heavy metals including mercury.*

- 16.5 It is admitted that clinical waste in particular contains material that can be recycled – but this is not done.

*This site is only permitted to accept non hazardous waste as specified in Table 2.1.2 of the Variation notice, and is not permitted to accept clinical waste.*

- 16.6 Insufficient information on wastes permitted to be accepted

*The permitted wastes are listed in Schedule 3 of the Variation notice.*

## **17. Technical Issues – Combustion Temperature**

- 17.1 How can the EA be sure that the temperatures will be measured correctly.

*Section 4.3.6 of the Decision Document regarding measuring combustion chamber temperature.*

- 17.2 STARA acknowledge that the measuring of temperature in the combustion chamber to be “inherently more unreliable than measurement away from the heat source”. However, they are concerned that it will allow the operator to ‘manipulate’ waste feed such

that low CV waste will be topped with high CV waste. They are also concerned that burning low calorific value wastes will cause more pollution.

*STARA themselves rightly acknowledge that “Measurement of the burner will inherently be more unreliable than measurement away from the heat source, due the difficulties of measuring in close proximity with complex convectional heat currents”, and further, “the thermocouples in the roof of the combustion chamber are likely to have a more consistent reading than any temperature measurement at the source”. However, STARA are concerned that this measurement position may allow the operator to manipulate his waste feed with low CV waste being topped with high CV waste when feeding the plant. Whilst we understand their concern, we do not think that such a scenario is credible or practicable. Firstly, all such incinerator operators mix the waste in the bunker to get a well balanced feed. Secondly the feed systems will not allow creating two layers of the waste (one low and one high CV). Thirdly, the emission limits for CO and TOC are to be complied with at all times.*

*All plants that burn municipal and C&I waste are designed to accept waste with a range of CVs (typically 7-10 MJ/kg). The purpose of bunker mixing is to achieve a balanced feed which does not lead to spikes in emissions. As we said above, continued compliance with CO and TOC in the flue gas will indicate good combustion. Wastes permitted to be burned in this plant form part of the Permit. The notion that low CV means higher pollutant emission is not scientifically sustained. In any event if combustion temperatures look like they cannot be maintained, the Operator will be required to burn fuel to maintain the temperatures – this is a permit condition – burning fuel is not in their economic interest.*

- 17.3 Measuring average temperatures will allow the Operator to ‘smuggle’ large incombustible items mixed with high CV waste and still maintain the temperature.

*All solid waste has non-combustible material. Some 25-30% of household waste is non-combustible and ends up as ash. The wastes that the Operator is permitted to burn are specified in the Variation notice and will not include “large incombustible items”. The boiler system is designed for a certain heat duty and requires appropriate thermal input. Any decrease in this thermal input would mean the boiler operating at less than the design efficiency. Which is not in the interest of the Operator.*

- 17.4 Consistent reading of temperature by the roof thermocouples cannot be taken to mean consistent temperature in the burning bed of waste.

*Control of flue gas temperatures is designed to ensure destruction of gaseous species and not the burning of solids on the grate. There is,*

*of course, a WID requirement to achieve a level of incineration such that the slag and bottom ash has a TOC of less than 3% or a Loss on Ignition of less than 5%. Compliance with this condition will ensure satisfactory combustion of solids on the grate.*

- 17.5 STARA are not convinced that temperature testing has provided robust justification for the use of roof thermocouples.

*We are content with the data provided by the operator in the CFD model and that there is a consistent correlation between the temperature recorded by the thermocouples in the roof space and that measured at the burner line.*

- 17.6 Comments state that the Operators complain that the temperature of the furnace was not correctly measured in the past – however they continued to burn waste. How can the Environment Agency be sure it will be correctly measured under the new system.

*The Operators do not state that the temperature is not being measured correctly, they state that “Measurement of the burner will inherently be more unreliable than measurement away from the heat source.....”. The temperature in the furnace is currently being measured correctly, however changing the location of the thermocouples may make the measurements more reliable.*

- 17.7 In January 2011 one of the incineration lines recorded a breach of dioxin emission limit and an investigation was started. Friends of the Earth (FoE) believes that a Variation should not be issued until a cause is known. STARA have also concerns and have proposed their own explanation of why the breach occurred. STARA suspect that high dioxin results are due to lack of proper temperature measurements in the combustion chamber, “nasties” in the waste and lack of continuous monitoring.

*See sections 13.5 above regarding continuous monitoring and section 4.4 of the Decision Document in relation to the dioxin breach in January 2011.*

## **18. Technical Issues – Residence Time**

- 18.1 STARA question the operators statement that the EA is not expecting a residence time of 2 seconds.

*We believe that the Operator’s statement reflects the fact that the plant currently has a derogation from the requirement of 2 second residence time. Since the furnace/combustion chamber has not been modified, the residence time derogation is not subject to this Variation and will continue as before. The required operating temperature for a municipal waste incinerator is 850°C. The residence time of the gas at the operating temperature is required to be 2 seconds. Where the*

*residence time is less than 2 seconds the Operator has to request a derogation under WID Article 6(4) with a justification that the operation will not lead to the production of more residues or residues with a higher content of organic pollutants than could be expected if the operation was in accordance with WID conditions. The Operator will also have to apply with all other ELVs in the permit. The Operator applied for this derogation from the requirement of the 2 second residence time for lines 1 and 2 at part of the original Permit application. For line 3 and any future additional incineration lines, this derogation will not apply.*

- 18.2 FoE are concerned that the temperature correlation between the suction pyrometer and roof thermocouples did not extend to 720°C and cannot be relied upon and may cause variation in emissions of pollutants especially when the plant is subject to derogation from residence time.

*There is no reason to believe that the correlation given for a wide range of temperatures will not be valid at 720°C. In addition, as we said above, the control point set for temperature and auxiliary burner operation will be higher than this temperature. Controlling on the thermocouples in the roof is not a derogation from the 850°C requirement which still applies.*

- 18.3 There were numerous comments and concerns about the 3<sup>rd</sup> and 4<sup>th</sup> lines and the 2 second derogation

*See section 4.3.6. of the decision document in the section entitled - Capacity of the EfW Plant.*

## **19. Air quality - Background**

- 19.1 Table 3.2 of Appendix B shows that at a number of locations around Nottingham, the AQS of 40ug/m<sup>3</sup> NO<sub>x</sub> has been exceeded – so there is clearly sensitivity to even small increases in NO<sub>x</sub> emissions. Any Variation to the incinerator Permit should therefore require reduced NO<sub>x</sub> emissions overall.

*Table 3.2 in Appendix B refers to NO<sub>2</sub>, therefore it is considered that this question should refer to NO<sub>2</sub> rather than NO<sub>x</sub>. We have assessed the impact of NO<sub>2</sub> and we are satisfied that the impact of the increase in waste throughput is insignificant. See section 5.2.1 of the Decision Document for further information.*

- 19.2 The environmental impact of these changes is unknown. There is no dedicated monitoring network or health reports covering the surrounding areas. Therefore the Operators do not have any independent, credible or verifiable data to clearly demonstrate that the present operations do not have a significant negative impact on human

beings or the environment. A credible, dedicated monitoring network in the vicinity of the plant would help the Environment Agency to assess the impact from the incinerator and to help to interpret and rule out certain causes of emissions breaches which should be paid for by the Operator.

*Our preferred method of assessing impact is to measure emissions at source. The impact of an incinerator on ambient air quality is low and so the use of ambient air quality monitoring, to assess or monitor its impact on the local environment would be unreliable, especially given background air quality in the vicinity of the site. The Operator monitors emissions from the site with the Continuous Emissions Monitoring System (CEMS) and periodic monitoring of pollutants not covered by the CEMS and in accordance with their permit and Environment Management Systems. Any breaches of emission limits are thoroughly investigated to find out their cause. There are no offsite conditions in the current Permit and we do not think that it is necessary to include any off site conditions as part of the Variation notice.*

*It is the Applicant's responsibility to establish what background is by providing appropriate data. We have reviewed the background data used in this assessment and are satisfied that they represent reasonably precautionary or representative data in most cases. The background input values used by the Applicant are considered to be conservative, where we did not agree with the Applicant's data we used more realistic values (for NO<sub>2</sub>) - see section 5.2 of the Decision Document for further information.*

*We have taken conservative background values into account in our check modelling of the operators Air Quality Assessment of the worst case emissions for when all three lines will be operating and have come to the conclusion that there is no significant risk to human health and the environment, therefore it is very unlikely that there has been significant risk to human health and the environment with the 2 lines which have been operating to date.*

- 19.5 Concerns regarding the weather station data and the uneven dispersion of pollutants over a large area due to the effects of the weather and the presence of emissions from other sources in the vicinity. There is concern that even if well dispersed at some point the pollutants will be deposited at ground level and the local area will become saturated.

*The terrain, weather conditions and background levels of pollutants are all taken into consideration in the air quality modelling. We carried out sensitivity analysis using our own meteorological data recorded at Watnall to lower surface roughness at the meteorological station and using our own terrain data. We agree with the Applicant's conclusion that the impact of emissions on human health and the environment from the increased waste throughput is insignificant.*

- 19.6 There is inadequate information about ADMS 4.2. What are the input values and assumptions and how are calculations performed. The Applicant should have used the old version of ADMS as a check. There is no indication as to what is the difference between the new and old ADMS software.

*The input files were submitted as part of the Application and therefore are available on the public register. We consider that the ADMS 4.2 model is an acceptable model to be used to model the impact of air quality emissions. ADMS 4.2 is the most up to date model and an improvement on the model used in the original application. To allow a direct comparison with the new results, the old model was run using ADMS 4.2 – see Table 5.2 in the Air Quality Assessment. We agree with the conclusions of the air quality assessment based on modelled data. We also undertook check modelling using the new version of the software for the base cases and the proposed Variation case and are satisfied that any differences are not significant.*

- 19.7 There is concern regarding the cumulative effect of emissions over the lifetime of the present incinerator.

*Comparison with EQS / EALs is considered to be protective to human health. However for dioxins and furans the impact on human health is through accumulation in the body over a prolonged period of time. However the human health risk assessment calculates the worst case dose of dioxins and furans for the local population. The predicted results were significantly below recommended levels. For further information see Section 5.3.2 of the Decision Document.*

- 19.7a There is concern that the interpretation of the purpose of the NAQS is dismissive, presumptive and likely wrong. NAQS do not appear to take into account the polluting effects of combinations of pollutants or reacting substances.

*Reacting combinations of pollutants - where pollutants are known to react, these have been taken into account in the impact assessment. The most reactive of these involves the photochemical reaction of nitrogen oxides emissions with VOCs and sunlight. These reactions have been adequately taken into account in the Application.*

- 19.8 The interpreted reduced impact of the third line on air quality is dependant on the ability of the environment to be able to breakdown the same total mass of waste, but exhausted in smaller quantities over a longer time period.

*The interpreted reduced impact of the third line on air quality is due to the fact that lines 1 and 2 have now been refurbished and so are more efficient and the design and capacity of the 3<sup>rd</sup> line is expected to be similar to lines 1 and 2. Therefore line 3 is now expected to have a significantly reduced gas flow rate calculated to be 26.9 AM3/sec*

*compared to the original case of 35.3Am3/sec - an effective reduction of 24%. The impact on the environment has been modelled based on worst case of all 3 lines operating and emitting at the WID ELVs – i.e. the maximum permitted emissions under the WID. Due to the revised flow rates in line 3, there is a predicted net reduction in impact for most pollutants.*

*Also since the refurbishment of lines 1 and 2, there is increased efficiency of the plant in terms of downtime due to maintenance requirements and breakdowns – therefore it is likely that it will be operational for more hours.*

- 19.9 The one place where both NO<sub>2</sub> and SO<sub>2</sub> ground level concentration plots show pollutant levels less than 3 – 3.5ug/m<sup>3</sup>, is right where the Nottingham monitoring station is located – just off Upper Parliament Street. This is not representative of the predicted pollution area as modelled by the Applicant.

*There is no reason why these should coincide – the purpose of the air quality monitoring stations is to give the Local Authority and others information on air quality, it is not there to monitor the impact of the incinerator.*

## **20. Monitoring of dioxins and furans**

- 20.1 Dioxin levels are not monitored during start up and shut down and can exceed the safe level set by the Environment Agency.

*The ELV does not apply during start up and shut down. The impact from dioxins is long term and start up and shut down are infrequent and do not significantly impact on the long term emission rate.*

- 20.2 The emissions monitoring at the site is not considered to be frequent enough, especially due to the recent dioxin / furan breach. As the Operator knows when the monitoring will be taking place it would be easy for them to ensure they are incinerating clean burning, high calorific waste.

*Regarding topping up with high CV waste at times of monitoring - as previously mentioned this is not likely. Regarding monitoring frequency for dioxins see 13.5 above and section 4.4 of the Decision Document.*

- 20.3 Concern following the high dioxin reading in January as to why another test was not done another test within a few days.

*The breach occurred on 24th Jan 2011 during the sites full suite of extractive monitoring and was reported officially to us when the Operator received their analytical report from the laboratory on 18 March 2011. There is no requirement for the Operator to retest a suspected breach until the analytical report has come back from the*

*laboratory. Normally the report should take 4 -6 weeks to be issued fully MCERTS by monitoring contractors. We highlighted to the company that this delay was unacceptable and they would have to deal with this with their contractor. However the Operator had been verbally told that the dioxin could be a failure by the monitoring contractors just before report was issued so they organised for a retest to be carried out on 16th and 17th March 2011. For further information see section 4.4 of the Decision Document.*

- 20.4 The Operator is not compelled to take sufficient sample in order for there to be sufficient to allow a second independent test to be made on the results.

*The samples were taken in accordance with the MCERTS requirements as required by condition 3.3.3 (2.10.9 in the original Permit). However one of the recommendations of the compliance monitoring investigations report (Compliance Monitoring Investigation at Eastcroft Unit 2 2011, Quarter 1, dated 8/06/2011) is to ensure that sample extract is retained i.e. split the extract so that there is a sample A and sample B. Only one of the samples should be analysed with the second sample retained for analysis if there is an issue. See section 4.4 of Decision Document for further details on the conclusions of the above report.*

- 20.5 The Operator suggests that could have been a lump of contamination which caused the high dioxin reading - but the whole point is to guard against this.

*See section 4.4 of Decision Document above.*

## **21. Increase in throughput**

- 21.1 It is inconceivable that a 20 – 82.5% increase in the amount of waste processed can lead to only a 2-3% difference in ground level concentration.

*The increase in the amount of waste processed is 20% (an increase of 40,000 tonnes to 200,000 tonnes for lines 1 and 2). Line 3, although it is not yet constructed or operational – it is included in the current Permit, therefore the worst case emissions from lines 1, 2 and 3 prior to this Application for the increase of 40,000 tonnes has already been assessed and agreed.*

*As a result of the refurbishment of the plant in 2009, the Applicant has stated that the gas flow rate per tonne of waste incinerated has reduced. This reduced gas flow rate has been included in the model – as a result of this, even though there is an increase in waste throughput of 40,000 tonnes per annum, the predicted worst case emissions for the three lines has reduced in comparison to the predicted worst case emissions from the three lines originally permitted.*



*Therefore we also agree with the Applicants conclusions, that the impact from the increased waste throughput will be insignificant. For further information – see sections 5.2 of the Decision Document.*

## **22. Monitoring**

- 22.1 Monitoring data should be available to the public. Real time emissions data and history should be on the internet.

*All monitoring data from the Installation is placed on the public register therefore it is available to the public. Real time continuous emissions monitoring data is however not yet available on the internet. However the continuous emissions monitoring data is reported every 3 months in accordance with Table S2 of the permit. An annual report on the performance of the Installation over the previous year is also required to be provided on an annual basis in accordance with condition 4.1.3 of the permit.*

- 22.2 There should be continuous monitoring of emissions from the incinerator.

*There is a Continuous Emissions Monitoring (CEM) system on site which monitors a range of parameters (particulates, CO, NOX, SO2, HCl, TOC, O2 and volumetric flow rate). Other parameters are monitored periodically.*

- 22.3 Hydrogen fluoride should be monitored as this is harmful to human health (and the operator doesn't know what burning).

*Table 3.1 of the Permit includes emission limit values for Hydrogen fluoride. This substance was also modelled as part of the Air Quality Assessment. Hydrogen fluoride is more reactive than Hydrogen Chloride. However If hydrogen chloride is monitored continuously (as is the case for this site) and there are no exceedences of the ELV, then hydrogen fluoride can be monitored periodically.*

- 22.4 Operator uncertainty regarding chromium (VI) levels and why is it assumed that no more than 0.7% chromium released from the facility would be chromium (VI).

*See section 5.2.3 in Decision Document.*

- 22.5 The monitoring practices must be shown to be adequate on actual performance – e.g. from trials overseen by the Environment Agency, not by modelling.

*The purpose of monitoring is to quantify releases and show compliance with ELVs. The purpose of modelling is to predict the environmental impact. We are satisfied that the monitoring requirements in the Permit*

*are appropriate and our check modelling agrees with the conclusions of the Applicant's modelling carried out as part of the air quality assessment which states that the impact of the change in waste throughput has been considered and is shown to be insignificant. We can also audit monitoring at the site if necessary.*

## **23. Waste output**

- 23.1 An increase in bottom ash and FGT residues is likely if the Operator is permitted to combust recyclables and a higher proportion of less combustible material (commercial and industrial waste).

*It is expected that processing 200,000 tonnes of waste would produce 50,000 tonnes of bottom ash and 8,750 tonnes of FGT residues - this is an increase from 40,000 tonnes of bottom ash and 7,000 tonnes of FGT residues (Section 3.3 of Supporting Document S1054 – 0100 – 0007SMO). These are typical levels for municipal waste incinerators.*

- 23.2 The Operator is selling the contaminated bottom ash, which presumably is not tested for heavy metals – for making into breeze blocks for insulation in peoples houses. Queries whether this should this be allowed and whether this material should be tested with regards to its end use.

*The subsequent disposal or recovery of incinerator bottom ash and air pollution control residues is not regulated by this Permit, but by other environmental legislation. The Permit requires the Operator to ensure that these materials are only sent to facilities which are permitted to handle them.*

## **24. Concern regarding emissions of odour, dust and noise affecting the local area.**

- 24.1 Emissions of dust

*The impact from dust emissions will be insignificant (see section 5.3.3 of this document). The Operator undertakes continuous measurement of particulate matter. Table 2.2.2 of the Variation contains emission limits for particulate matter during normal operations and Table 2.2.2a contains emission limits for particulate matter during abnormal operations.*

- 24.2 Incineration produces huge quantities of ultra fine particles which are not removed by the bag house filters.

*See section 5.3.3 in relation to particulates smaller than 2.5 microns.*

- 24.3 Pollution abatement equipment installed to reduce emissions of nitrogen oxides, may actually increase emissions of the PM2.5 particulates. With an increase in waste burnt at Eastcroft this will

increase these particles in the surrounding environment. This also leads to further concerns regarding health effects in the local community of toxic metal accumulation on the fine particulates.

*See section 5.2.2 of the decision document which relates emissions of PM10 and PM2.5.*

#### 24.4 Fugitive emissions of dust

*There is no history of complaints in relation to particulate matter which have been attributed to the site. The system for managing particulate matter will not change as a result of this Variation.*

#### 24.5 Emissions of odour

*The Variation contains condition 2.2.6 in relation to odour. There is no history of complaints in relation to odour which have been attributed to the site. The systems for managing odour will not change as a result of this Variation.*

#### 24.6 Traffic to the site will increase causing increased noise pollution on the site.

*It is not considered that there will be any material difference in noise and vibration arising from the increase in capacity at the site. See section 6.2.5 for further information.*

### 25. OPRA

There are numerous concerns from STARA regarding the OPRA spreadsheet.

*Operational risk appraisal (Opra) is a risk assessment tool. We use Opra to assess the risk to the environment from sites that we regulate with environmental permits. Opra allows us to target our resources at facilities that pose the greatest risk to the environment.*

*The Applicant is required to complete the Opra spreadsheet and submit with the Application. We check all aspects are satisfactory before duly making the Application and then again prior to issue of any Permit or Variation to check whether there have been any changes throughout the determination process. We can amend the spreadsheet or ask the Operator to amend the spreadsheet and we store this electronically and used to provide firstly the application charge and also the subsistence charge.*

*For further information on how to fill in an Opra spreadsheet and for further information about the different attributes see our guidance entitled, "Environmental Permitting Regulations, Operational Risk Appraisal Scheme (Opra for EPR)" version 3.6, April 2011.*

*We are satisfied with the information provided in the Opra spreadsheet.*

## 26. Comments regarding application forms

There were numerous comments in relation to the Application forms. Where we were not satisfied with the information provided in the application forms, we requested this information by letter on 30<sup>th</sup> March 2011 before we could duly make the application. The Applicant submitted the additional information in relation to the application forms on 7<sup>th</sup> April 2011.

Specific queries are detailed below:-

Application for an Environmental Permit part C2:

- (i) Line 3 is not specifically mentioned on page 2 however it is consistently referred to throughout the Application, therefore the throughput increase is from 160,000 to 300,000 which is an increase of 87.5%.

*Line 3 is already permitted with a maximum throughput of 100,000 tpa – see Table 2.1.2 of the permit.*

- (ii) Why has part 3 not been filled in?

*This information was requested in order to duly make the Application (by letter on 30 March 2011). The Applicant submitted this information by email on 7th April 2011.*

- (iii) Why has Appendix 1 not been completed?

*Appendix 1 is for a low impact installation permit only – which the Eastcroft EfW Site is not.*

Application for an Environmental Permit part C3:

- (i) The Application refers to line 3 which is an additional 100,000 tonnes throughput. No waste types listed and no detail of the proportion of hazardous and non hazardous waste.

*The reference to line 3 in Table 1a relates to the capacity of 12.5 tonnes per hour. Question 1b for the types of waste accepted – the response references Section 2.2 of the Supporting document. Eastcroft EfW Site is a non-hazardous waste incinerator, therefore no hazardous waste will be accepted.*

- (ii) Why has the Operator recorded no changes to the emissions.

*This is because there is no change in relation to the emission points, the monitoring parameters or the emission limits listed in the permit.*

- (iii) The Operator has recorded no changes to technical standards, but this is not correct, as it is proposing to change the method of

temperature measurement, and the method of handling the waste through new grates, and it is accepting different proportions of categories of waste.

*Yes these changes have been made, however the technical standards which the Operator is required to meet have not changed.*

- (ix) Part 4a – the response ‘no change’ for monitoring air and water point sources is not appropriate as they are not doing any monitoring anyway. In addition the EA should be considering if there is any monitoring, whether it is still appropriate for the plant or whether any improvements should be made due to new technology or weather conditions?

*The are no point source emissions to water therefore these are not monitored. There are a number of point source emissions to air (A1 to A10) as detailed in Table 2.2.1 of the permit. The Applicant is not proposing any changes that is why the response is ‘no changes’. We have assessed the appropriateness of the emission limits as part of the determination of this variation and they are in accordance with WID, however Table 2.2.2 has been amended to remove some of the bi annual monitoring and time related emission limits as they are no longer necessary.*

- (x) Why no EIA?

*The Operator was not required to provide an EIA with the original permit as this was not a requirement of the planning application for lines 1 and 2. The increase of capacity of lines 1 and 2 as part of this Variation Application have not been the subject of a planning application, therefore an EIA has not been submitted to the Local Planning Authority. Therefore the response to question 5a is considered to be correct. See section 7.1.1. of the Decision Document for further information.*

*However an EIA was submitted with the planning application for line 3 and this has been taken into consideration as part of the determination of this application. See section 7.1.1 of the decision document.*

- (xi) Answers 6d and 6e contradicts what the is stated in the supporting statements.

*Question 6d states, ‘Explain and justify the raw and other material, other substances and water that you will use’. The response from the Applicant is, ‘no changes’.*

*We agree with the Applicants response that there will be no material changes to the raw and other material, other substances and water*

*that will be used. Although there is likely to be a small increase due to the increased waste throughput.*

*Question 6e states, 'Describe how you avoid producing waste in line with Council Directive 2006/12/EC on waste'. The response from the Applicant is 'no changes'. Although there is likely to be a small increase due to the increased waste throughput.*

*We agree with the Applicants response that there will be no change to the avoidance of waste production.*

- (xii) Why have appendices 5 and 6 not been completed.

*Appendix 5 is not relevant as this refers to the hazardous and non hazardous waste recovery and disposal sector.*

*We requested completion of Appendix 6 on 30/3/11 and this was provided by the Applicant on 7<sup>th</sup> April 2011.*

#### Application form F1

- (i) Why has part 7 which is compulsory not been completed.

*The checklist in part 7 is useful for checking that the Application is complete, however we checked this anyway when duly making the Application.*

## **B) Advertising and Consultation on the Draft Decision**

This section reports on the outcome of the public consultation on our draft decision carried out between 14 May 2012 and 14 June 2012.

In some cases the issues raised in the consultation were the same as those raised previously and already reported in section A of this Annex. Where this is the case, the Environment Agency response has not been repeated and reference should be made to section A for an explanation of the particular concerns or issues.

Further representations were received from Nottingham Friends of the Earth who raised the following issues numbered 1 to 7. Please note our responses are in italics beneath each numbered point:-

- 1) The Draft Decision Notice claims that the existing 2 lines of the Eastcroft Incinerator are BAT even though they do not meet the WID standards drawn up 12 years ago. It does the Agency no credit to describe an old bit of kit operating under a derogation as 'Best Available Technology'.

*Article 6(4) of WID allows the granting of a derogation for temperature and / or residence time provided all other criteria are met. Lines 1 and 2 of the Eastcroft Incinerator have a derogation from the 2 seconds residence time. Nothing in the current application would require us to revisit that decision. Line 3 will not have the derogation from the 2 seconds residence time applied.*

- 2) This is compounded by the failure to tighten up emissions standards to ensure that the maximum permitted emissions do not rise. The proposal to permit up to 25% more pollution is unnecessary and an insult to people and the environment. This is particularly the case for NO<sub>x</sub> where the evidence is that air quality standards are already at risk of exceedance. The observation that actual emissions will be less than the maximum is not a reason for maintaining lax maximum emission levels – which are well outside current 'best available technology' performance standards.

*The amount of waste processed will increase by 25% (an increase of 40,000 tonnes to 200,000 tonnes for lines 1 and 2), however this is an increase of just over 15% of the total permitted waste throughput as the installation is currently permitted to accept 260,000 (for lines 1, 2 and 3).*

*From section 5.2.1 - the Applicant has made a comparison of the total impact of emissions to air including the increased waste throughput (as detailed in the Variation Application) with that set out in the original Permit application (as detailed in the current permit). Table 5.2 of the Air Quality Assessment predicts a reduction in the process contribution for emissions of nitrogen dioxide. (For other emissions, where there is a slight increase over the short term of ground level contributions for some substances these are not considered to be significant). Our detailed audit of the Applicant's modelling agrees with the Applicant's conclusions in the report*

*which state that the impact on emissions from the increase in waste throughput is insignificant.*

*The Applicant states that the increase in waste throughput for three lines leads to a slight decrease in ground level concentrations. This is because the impact from the third line is now expected to be slightly smaller due to the significantly reduced gas flow rate for line 3 calculated to be 26.9 AM<sup>3</sup>/sec compared to the original case of 35.3 Am<sup>3</sup>/sec - an effective reduction of 24%; and following refurbishment of lines 1 and 2. Due to the revised flow rates and amended stack configuration in line 3, there is a predicted net reduction in impact for most pollutants. This is not surprising as with a reduced overall exhaust gas flow, the theoretical maximum emission rates for each pollutant will also be reduced by the same level. In their Application report, the Applicant states "it is important to note that the third line which was modelled originally was expected to be larger than the existing lines, as it was expected to process more waste than one of the existing lines. However, the third line is now envisaged to be the same size as the existing lines and the air quality assessment has been updated to reflect this".*

*Also the modelled exhaust gas flow rates from the refurbished lines 1 and 2 show only a marginal increase from the modelled gas flow rates for lines 1 and 2 in the original application despite the increase in throughput of 20,000 tonnes per line per year.*

*Therefore taking conservative background values into account, as a PEC we cannot rule out exceedences of annual NO<sub>2</sub> due to the already existing high background pollution.*

*However the incremental increase from the proposal (increased waste throughput for lines 1 and 2) is likely to be insignificant at less than 1% of the EQS. We consider this a valid approach because line 3 is not yet operating and the existing pollution from lines 1 and 2 already contribute to background pollution.*

- 3) The capitulation to WRG's request to burn unlimited C&I waste is difficult to understand. The Draft Decision states (4.3.6, p16) that these wastes are likely to be within the design CV. Is this the case for waste plastics, wood, paper, oil and fat, wet organic wastes, etc, etc? The Agency is being remarkably complacent in accepting that mixing by a crane operator constitutes an adequate quality control of CV if there is significant C&I input.

*As stated in the draft Decision document (4.3.6) as well as mixing wastes within the bunker - continued compliance with the emission limits (in particular CO and TOC) and the bottom ash burn out quality (TOC content) will indicate good combustion and therefore if it is likely that any inappropriate wastes are being burnt.*

*The original incineration lines (1 and 2) were designed to burn waste fuel*



*with a calorific value of approximately 6-12 MJ/kg. Therefore as long as the wastes accepted at the site have a CV within this design range, are non-hazardous and also comply with the restrictions in condition 2.3.3 - this is acceptable and would include waste plastics, wood, paper, oil and fat, wet organic wastes, etc as these are on the permitted waste list in the Variation Notice (Table S2.2).*

- 4) The Agency is also being remarkably complacent in accepting 720°C as a cut-off temperature even though no temperatures below 787°C have been tested experimentally. The comment (18.2, p92) that “There is no reason to believe that the correlation given for a wide range of temperatures will not be valid at 720°C” could be turned around to say there is no reason to assume the straight line correlation will continue outside the observed range.

*We accept the positioning of the thermocouples in the roof space and the conclusion that Lines 1 and 2 shall be deemed to be operating at a temperature of at least 850°C if the average temperature reading in the roof space was 720°C. This is because:*

*(a) The Applicant has justified this using CFD and experimental data.*

*This showed that the thermocouples in the roof space consistently read, on average, 156 °C lower than the furnace temperature. The difference was irrespective of the furnace temperature – and therefore is not a linear relationship.*

*(b) The operator has no incentive to operate the furnace at low temperatures as it would adversely affect steam production.*

*(c) Furnace temperature is specified to achieve good burnout (controlled by LOI/Carbon in ash limits) and to comply with CO/TOC emission limits. We have not changed the burn out requirements or the emission limits for CO and TOC.*

- 5) The Agency’s position on POPs seems to argue that as long as an incinerator is operated within WID specifications the Article 6(3) requirement to “give priority consideration to alternative processes ...” can be ignored (6.1, p53). No consideration has been given to alternative ways of managing the additional 40,000 tpa which avoid the formation and release of POPs (such as better management of wastes to reduce residual wastes, and almost all C&I wastes can be separated for recycling) and therefore we would maintain that the legal obligation has not been satisfied. Even if the Agency were right on this, the first condition is 2 second residence time at 850degC. The Agency’s refusal to enforce the WID requirement compounds the refusal to comply with the POPs regulation.

*The Application does not contain any proposals to change the techniques applied and the Environment Agency is satisfied that these remain BAT for the installation. Permit conditions will prohibit the burning of any*

*separately collected or recovered waste streams, unless contaminated and recovery is not practicable (condition 2.3.3(c)). Furthermore condition 1.4.1 is included in the Variation notice from the current permit template which covers the requirements of Article 4 of the Waste Framework Directive for any waste generated at the site. Therefore the addition of these conditions provide tighter control than the original Permit (for further info see Annex 3, 8.1).*

*The way we deal with POP's is as detailed in Section 6.1 of the Decision Document.*

*As detailed in response to 1) above - Article 6(4) of WID allows the granting of a derogation for residence time under certain circumstances.*

- 6) For emissions of chromium VI, the assessment seems to be based on municipal waste incinerators (5.2.3, p35) with an unjustified assumption that emissions from C&I waste will be similar (even though the permitted waste list includes 04 01 08 – waste tanned leather containing chromium, and many other types of waste where chromium may be present). This is another example of why C&I waste should be limited.

*Permitted waste type 04 01 08 (waste tanned leather containing chromium) is unlikely to contribute a significant tonnage as part of the site's waste throughput. Furthermore as also stated in section 5.2.3 - the Applicant's assessment finds that emissions of chromium VI would have a PC of less than 1% of the relevant EAL and so can be considered insignificant. We have checked their predictions and we agree that the PC is not likely to exceed the 1% PC predicted by the Applicant. Our detailed audit of the Applicant's modelling agrees with the Applicant's conclusions in the report which state that the impact of the increase in waste throughput*

- 7) On the question of very small particles (5.2.2 and 5.3.3) the Agency may wish to take account of evidence given recently by Professor Vyvyan Howard to the Welsh Assembly Petitions Committee - P-04-341 Waste and Incineration, 29 May 2012.

*We have seen Professor Howard's papers that were attached to the response. We rely on the HPA to advise on health matters (see sections 5.3.1 (iii), 5.3.3 and 5.3.4 for further information). The HPA's Position Statement recognises the adverse effects of fine particles on health but points out that the incinerators only make an extremely small contribution to the background and hence their effect on health will also be small. The Applicant's assessment predicts that levels of particulate matter will be well within the relevant health-based standards - the predicted process contribution (<0.5%) for emissions of PM10 is below 1% of the long term EQS and below 10% of the short term EQS and so can be considered insignificant. The predicted process contribution (<0.5%) for emissions of PM2.5 is also below 1% of the EQS. Therefore in conclusion, the*

*particulate emissions from the Installation, including emissions of PM10 or PM2.5, will not give rise to significant pollution (section 5.2.2).*

*Regarding filtration efficiency - research by the US Environmental Protection Agency as far back as 1978 showed that the filtration efficiencies for particles of this size were around 98% for installations fitted with electrostatic precipitators and 99.5% for installations fitted with fabric filters. A recent study of ultrafine particle emissions from an EfW plant in central Italy (Buonanno, G. et.al. (2011) Chemical, dimensional and morphological ultrafine particle characterization from a waste-to-energy plant Waste Management. 31 2253–2262) shows that more than 99.99% of ultrafine particles were removed by the fabric filter.*

END OF DECISION DOCUMENT