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

Our decision document recording our decision-making process

The Permit Number is:	EPR/TP3098EU
The Variation Number is:	EPR/TP3098EU/V002
The Applicant / Operator is:	R Plevin & Sons Ltd
The Installation is located at:	Crookford Hill, Elkesley, Retford, DN22 8BT

What this document is about

This is a decision document, which accompanies a permit variation.

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

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

Preliminary information and use of terms

We gave the application the reference number EPR/TP3098EU/V002. We refer to the application as "the **Application**" in this document in order to be consistent.

The number we have given to the permit variation is EPR/TP3098EU/V002. We refer to the consolidated Permit Variation as "the **Permit**" in this document.

The Application was duly made on 9/3/2010.

The Applicant is R Plevin & Sons Limited. We refer to R Plevin & Sons Limited as "the **Applicant**" in this document. Where we are talking about what would happen after the Variation is issued (if that is our final decision), we call R Plevin & Sons Limited "the **Operator**".

R Plevin & Sons Limited's proposed facility is located at Crookford Hill, Elkesley, Retford. We refer to 'The Facility' in this document, by which we mean the Installation and the Waste operations. Where we refer to the Installation, we are specifically referring to the Installation part of the Facility and not the Waste Operations.

How this document is structured

- Glossary of acronyms
- Our proposed decision
- How we reached our decision
- The legal framework
- The Facility
    - Description of the Facility and related issues
    - The site and its protection
    - Operation of the Installation – general issues
- Minimising the installation's environmental impact
    - Assessment Methodology
    - Air Quality Assessment
    - Human health risk assessment
    - Impact on Habitats sites, SSSIs, non-statutory conservation sites etc.
    - Impact of abnormal operations
    - Other Emissions
- Application of Best Available Techniques
    - Scope of Consideration
    - BAT and emissions control
    - BAT and global warming potential
    - BAT and POPs
    - Other Emissions to the Environment
    - Setting ELVs and other Permit conditions
    - Monitoring
    - Reporting
- Other legal requirements
    - The EPR 2010 and related Directives
    - National primary legislation
    - National secondary legislation
    - Other relevant legal requirements
- Annexes
    - Application of the Waste Incineration Directive
    - Pre-Operational Conditions
    - Improvement Conditions
    - Consultation Responses

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_2 expressed as NO_2)
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 biphenyls
PXDF	Poly-halogenated di-benzo furans
RDF	Refuse derived fuel
RGS	Regulatory Guidance Series
SAC	Special Area of Conservation
SED	Solvent Emissions Directive (1999/13/EC)
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 proposed decision

We have decided to issue the Variation to the Applicant. This will allow it to operate the facility subject to the conditions in the Permit.

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

The site is currently permitted to undertake waste operations involving the treatment and storage of wood and wood based products. This Application is to operate an installation which is subject principally to the Integrated Pollution Prevention and Control Directive (IPPCD) and the Waste Incineration Directive (WID).

The Variation contains many conditions taken from our standard Environmental Permit template including the relevant Annexes. We developed these conditions in consultation with industry, having regard to the legal requirements of the Environmental Permitting Regulations and other relevant legislation. This document does not therefore include an explanation for these standard conditions. Where they are included in the permit, we have considered the Application and accepted the details are sufficient and satisfactory to make the standard condition appropriate. This document does, however, provide an explanation of our use of "tailor-made" or installation-specific conditions, or where our Permit template provides two or more options.

2 How we reached our decision

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

The Application was duly made on 9/3/2010. This means we considered it was in the correct form and contained sufficient information for us to begin our determination but not that it necessarily contained all the information we would need to complete that determination: see below.

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 Retford Times on 18/3/2010.

We placed a paper copy of the Application and all other documents relevant to our determination (see below) on our Public Register at Trentside Offices, Scarrington Road, West Bridgford, Nottingham and also sent a copy to Bassetlaw District Council for its own Public Register. Anyone wishing to see these documents could do so and arrange for copies to be made. A CD copy of the scanned images of the application package was provided to one member of the public on request.

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

Bassetlaw Primary Care Trust
Nottinghamshire Fire and Rescue Service
Health and Safety Executive
Food Standards Agency
Environmental Health – Bassetlaw District Council

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 participated in a face to face meetings in Elkesley on 5/1/2011 and 20/1/2012 with Elkesley Parish Council representatives and members of a local action group to explain our role in regulating the site's proposed operations, how the permitting process works and the issues we take into consideration in determining permit applications. A further meeting with representatives of the Elkesley Against Incineration action group was held on 1/9/2011 where again the permitting process and what we consider during permit determination was discussed. Written comments were also accepted by the Environment Agency including some 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 4. 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 information notices

on 7/2/2011 and 5/7/2011. A copy of the information notices was placed on our public register and sent to Bassetlaw District Council local authority for inclusion on its register, as were the responses when received.

In addition to our information notices, we received additional information during the determination from the Applicant by e-mails dated 25/10/2010 and 9/11/2010 regarding the air quality and noise modelling. Further information was received by e-mails dated 17/2/2011 and 24/2/2011 regarding potential WID compliance. The e-mail dated 2/9/2011 contained further information regarding the dryer emissions and the revised air quality modelling data. Corrections to the air dispersion modelling data table provided in response to the second Schedule 5 were submitted by e-mail of 30/9/2011. Confirmation of sources included in the noise modelling was provided by e-mail of 6/10/2011. Waste wood chemical analysis was submitted by e-mail of 21/10/2011. A plan showing emission points and additional information regarding backup CEMs were provided by e-mail of 1/11/2011. Further information was submitted by 2 e-mails dated 10/11/2011 relating to CHP electrical demand and APC/fly ash residue management. An e-mail dated 9/12/11 was submitted correcting the noise impact assessment details submitted in response to the Schedule 5 5/7/11. We made a copy of this information available to the public in the same way as the responses to our information notices.

Finally we have consulted on our draft decision from 09/01/12 to 06/02/12. A summary of the consultation responses and how we have taken into account all relevant representations is shown in Annex 4B.

3 The legal framework

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

- a waste co-incineration plant as described by the WID;
- operations covered by the WFD, because it processes waste; and
- subject to aspects of other relevant legislation which also have to be addressed.

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

We consider that in granting the Permit Variation, it will ensure that the operation of the Facility complies with all relevant legal requirements and that a high level of protection will be delivered for the environment and human health.

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

4 The Facility

4.1 Description of the Facility and related issues

4.1.1 The permitted activities

The Applicant already holds an environmental permit to operate a regulated facility as defined by Regulation 8 of the EPR, namely a material recycling facility undertaking the following activities with waste wood and wood based products:-

- R13: Storage of waste consisting of materials intended for submission, on this site to any of the category "R" operations authorised under this column, or elsewhere than on this site, to any of the operations listed in Part IV of Schedule 4 of the 1994 Regulations, (excluding temporary storage, pending collection, on the site where it is produced).

- D15: Storage pending, on this site any of the category "D" operations authorised under this column, or elsewhere than on this site, any of the operations listed in Part III of Schedule 4 of the 1994 Regulations, (excluding temporary storage, pending collection, on the site where it is produced).

- R3: Recycling or reclamation of organic substances which are not used as solvents

- R4: Recycling or reclamation of metals and metal compounds

- R5: Recycling or reclamation of other inorganic materials.

These activities will remain permitted after this variation.

The variation has been applied for to permit the operation of a combined heat and power (CHP) plant installation burning waste wood and wood based products in order to generate electricity and to supply heat to a new animal bedding process drying line. The wood proposed to be burnt is a portion of the non-hazardous wood waste currently accepted at the site and is of insufficient quality to find a ready market for re-use or recycling. Waste reception and storage facilities for both the materials recycling activities and the CHP are shared.

The facility is subject to the EPR because it carries out the waste activities above and an activity listed in Part 1 of Schedule 1 to the EPR:

- Section 1.1 Part A(1)(b)(iii) – burning fuel manufactured from, or comprising, any waste in an appliance with a net rated thermal input of 3 or more megawatts, but less than 50 megawatts.

As the principle aim of the CHP plant is to provide heat and power for a dedicated production process, the Environment Agency has decided that the installation falls within the definition of a co-incineration plant as described in WID. The definition of a WID "co-incineration plant" includes:

> *"This definition covers the site and the entire plant including all co-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, and ash storage, are therefore included in the listed activity description.

Neither incinerator bottom ash (IBA) nor fly ash/APC residue will be subject to treatment on site. IBA will be quenched and transported to the storage skip. Both waste streams will be taken off-site to an appropriate disposal or recovery facility.

An installation also comprises a number of "directly associated activities", which at this Installation include the generation of electricity using an Organic Rankine Cycle (ORC) turbine and the use of heat from the ORC to dry processed timber products. This is one installation, because the co-incineration plant, the ORC turbine and the dryer line are successive steps in an integrated activity.

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

4.1.2 The Site

The site is owned and occupied by R Plevin & Sons Limited, operating as a wood recycling facility and wood based products manufacturer.

The currently permitted annual limit for accepting waste wood is 100,000 tonnes, and this will remain unchanged with this variation.

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

Further information on the site is addressed below at 4.3.

4.1.3 What the Facility does

The site is already permitted under The Environmental Permitting (England and Wales) Regulations 2010 to receive, treat and keep waste wood and wood based products, and these activities will remain. This variation is to divert a proportion of the incoming waste wood for preparation and use as fuel in the proposed combined heat and power (CHP) plant. This portion will characteristically be reject board and sheet materials not suitable for recycling, which is currently used as fuel by third party biomass plants. None of the waste permitted to be accepted at the site will be hazardous as defined by the Hazardous Waste (England and Wales) Regulations 2005 (as amended) and the List of Wastes Regulations (England) 2005 (as amended).

The Applicant has described the facility as a biomass fuelled combined heat and power plant. Our view is that for the purposes of WID and EPR, the installation is a co-incinerator because the primary purpose of the new plant is to provide heat for an animal bedding production line drying shed with a modest capacity to produce electricity to supply on-site demand.

The CHP plant will consist of:-

- dedicated covered waste feedstock storage area;
- pusher dischargers and conveyors to infeed chute;
- hydraulic stoker system;
- combustion chamber;
- thermal heat exchanger coupled to ORC turbine;
- economiser;
- particulate and gas abatement systems;
- ash collection systems;
- 30m stack.

Heat will be recovered from the combustion exhaust gases by heat exchangers acting as a thermal oil boiler to transfer heat into the organic rankine cycle (ORC) system where a turbine will drive a generator to produce electricity for the site. Cooling water applied to the condenser on the ORC plant will be used to provide heat for the drying shed. The heat sink effect of this use in warming the drying shed will be required to maintain operation of the CHP plant, so that the CHP plant will not be able to operate without the drying line being operational.

The CHP plant will be fed with a prepared blend of pre-treated shredded waste wood. This preparation will enable a more consistent feedstock by homogenising the fuel and removing undesirable elements such as metals, and will be undertaken on the wood processing yard. The fuel will then be transported into the CHP plant fuel store which has a holding capacity of approximately 400m^3, enough for about 20 hours CHP plant operation.

The prepared feedstock will be conveyed into the combustion plant within its own new building. The combustion system will be a moving grate within a refractory-lined chamber. The combustion plant design will be similar to a

number of biomass CHP plants in operation at forestry and sawmill sites in the UK and Europe.

Fuel oil will be burnt to get the combustion conditions compliant with WID before the introduction of the wood fuel, and from that point combustion will be sustained by the wood alone under normal conditions. Fuel oil use will be available nonetheless at any time to maintain combustion conditions at a minimum of 850°C for 2 seconds in accordance with the requirements of WID.

Incinerator bottom ash (IBA) will be collected from below the grate by a series of chutes discharging into a water bath from where it will be conveyed and deposited into a dedicated enclosed skip located within the building. Composition analysis will be undertaken on the IBA to determine potential for recycling.

Abatement techniques will be employed to control oxides of nitrogen primarily through flue gas recirculation by injection into the secondary air ports in the furnace walls and through selective non-catalytic reduction by injecting urea into the combustion zone.

Particulate and metal abatement will be achieved by a combination of techniques including feedstock specification checks, cyclone capture in series with an electrostatic precipitator (ESP) and subsequent treatment of the exhaust gas through fabric bag filters.

Acid gas emissions will be reduced by addition of dry sodium bicarbonate to the exhaust gas after the ESP.

Organic micro-pollutants, such as dioxins, furans and polycyclic aromatic hydrocarbons, will be controlled primarily through optimisation of combustion conditions and through rapid cooling of the exhaust gases through the heat exchangers.

Activated carbon will be injected into the exhaust gas ahead of the heat exchangers to further reduce the dioxin/furan emission and also capture the volatile metals such as mercury, cadmium and thallium.

The emission to air from the CHP will be via a 30m high stack which is where the continuous emission monitoring sample points will be located.

The drying plant building will also have 3 emission points allowing dispersion of water vapour from the drying line.

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

Waste throughput, Tonnes/line	24200Tonnes /annum	3Tonnes /hour
Waste processed	Wood and wood based wastes	
Number of lines	1	
Furnace technology	Grate	

Auxiliary Fuel	Light Fuel Oil	
Acid gas abatement	Dry	Sodium bicarbonate
NOx abatement	SNCR	Urea
Reagent consumption	Auxiliary Fuel: variable te/annum Urea : 80 te/annum Sodium bicarbonate : 500 te/annum Activated carbon: 25 te/annum Lubricants: 2 te/annum	
Flue gas recirculation	Yes	
Dioxin abatement	Activated carbon	
Stack	Height, 30 m	Diameter, 1.01 m
Flue gas	Flow 8.4 Nm^3/s	Velocity, 15.1 m/s
Electricity generated	1.8 MWe	
Electricity exported	Variable but <0.6MWe	
Heat use	The main purpose for the proposed CHP is to provide heat to a drying shed producing wood based animal bedding from virgin timber. The heat supplied is approximately 7.7MW.	

4.1.4 Key Issues in the Determination

The key issues arising during this determination were

- the potential impact of gaseous and particulate pollution on local people,
- the management of surface water on the site in terms of containment and its use in dust suppression,
- the potential for noise impact on local people,

and we therefore describe how we determined these issues in most detail in this document.

4.2 The site and its protection

4.2.1 Site setting, layout and history

A Site Condition Report detailing the environmental setting of the site (including geology, hydrogeology and hydrology), pollution history and historical land use of the proposed site has been compiled by the Applicant.

The site is located approximately 700m to the west of the village of Elkesley in Nottinghamshire covering approximately 4.7 hectares. The area around the site is pre-dominantly agricultural fields to the north and east with a small number of residential and agricultural properties lying outside the immediate confines of the village. To the south and west lies wooded vegetation and the River Poulter less than 50m to the west. The A1 trunk road runs in a north-west south-east direction about 950m to the north-east of the site and north of the village of Elkesley.

The published geological map (BGS Sheet 101) indicates that the application site is located on alluvial deposits consisting of silt, sand and gravels to the north-eastern corner and the Sherwood Sandstone Group (Bunter Pebble

Beds) elsewhere on site. The site is located within a Source Protection Zone III.

There are no SSSIs within 2km of the site and there are no SPA or RAMSAR sites within 10km. However, the Birklands & Bilhaugh SSSI (Designation Ref: UK0012740) is a SAC and lies at its nearest point 6.5km from the site to the south-southwest. The following local wildlife sites also lie within 2km of the site at their closest points:-

- Poulter Valley (East);
- Poulter Valley (West);
- Bothamsall Grassland Plantation;
- Bothamsall Scrub.

The site appears to have remained undeveloped until sometime after 1921. Subsequently buildings on some of the site and an access road appear on maps by the 1940s. It is evident from old maps that buildings have been added and removed at varies times until the present layout of the site has been established. It appears that from the 1940s onward some form of wood processing was undertaken on site.

The site was granted planning permission on 19/8/2004 to demolish and construct buildings for the processing of timber and to construct surface water drainage with associated groundworks. The Environment Agency was consulted at that time and made recommendations taken up by the Planning Authority in the conditions attached to the decision. These included:-

- provision of secondary containment for oils, fuels and chemicals;
- surface water management to ensure vehicle parking are run-off went through an oil interceptor prior to discharge off-site;
- segregation of roof water from that drainage passing through the interceptor;
- scheme to identify drainage man-holes;
- surface water retention scheme to reduce run-off rates to reduce risk of flooding;
- existing ground levels not to be raised impacting on flood capacity.

The proposed development will be contained within the currently permitted site boundary. The proposal will retain buildings to the north edge of the site and install new buildings at the eastern edge to contain the flaking process, the drying process, dryer storage and the CHP plant. Waste wood processing will be undertaken on the lower north-western portion of the site.

4.2.2 Proposed site design: potentially polluting substances and prevention measures

Although small in quantity there will be materials, both raw and waste, which could pose a risk of pollution to soil and groundwater.

Some infrastructure for groundwater protection such as hardstandings, fuel storage bunding and surface water management infrastructure is already

installed on the site. The application proposes extending the standard primary and secondary containment measures currently required to mitigate the risk of pollution to soil and groundwater to the new plant to be installed.

This will be achieved through provision of bunded impermeable surface for waste treatment and storage areas, including wastes generated by the CHP such as the furnace bottom ash skip and the sealed fly ash skip. The new plant will be fully enclosed and monitored to minimize the risk of loss to ground or groundwater. All such infrastructure will be designed and constructed to the appropriate standards to meet BAT.

Based on the information in the Application, the Environment Agency is satisfied that the risk of pollution to ground and ground water will be minimised and very low.

4.2.3 Closure and decommissioning

Having considered the information submitted in the Application, we are satisfied that the appropriate measures will be in place for the closure and decommissioning of the Installation, as referred to briefly in Section 5 of the Application. Pre-operational condition PO1 requires the Operator to have an Environmental Management System in place before the Installation is operational, which would include a site closure plan.

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

4.3 Operation of the Facility – general issues

4.3.1 Administrative issues

The Applicant is the sole operator of the Facility.

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

The co-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 Facility are SWMAs and acknowledges that these are already as permitted by the Environmental Permit EAWML 100358 and will remain unchanged with this variation.

4.3.2

Management

The Applicant has stated in the response to the Schedule 5 Notice of 4/2/2011 that they will implement an Environmental Management System (EMS) prior to commissioning of the plant. A pre-operational condition (PO1) is included requiring the Operator to provide a summary of the EMS prior to commissioning of the plant and to make available for inspection all EMS documentation. The Applicant has stated that although the management system will meet the requirements of ISO14001 there is no intention at this stage to have their EMS externally accredited, but this position would be subject to review.

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

The SWMAs already permitted by Environmental permit EAWML 100358 are subject to the requirement for technical competence and are controlled by a limited management system. WAMITAB Certificates of Technical Competence are currently held by site personnel.

Pre-operational condition (PO1) will require the EMS to be in place for all the permitted activities prior to commissioning of the CHP.

4.3.3 Site security

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

4.3.4 Accident management

The Applicant has submitted an Accident Risk Assessment and Management Plan as an element of the Environmental Risk Assessment. An Accident Management Plan will form part of the Environmental Management System and must be in place prior to commissioning as required by the pre-operational condition (PO1). Having considered the information submitted in the Application and the requirements of the pre-operational condition, we are satisfied that appropriate measures will be in place to ensure that accidents that may cause pollution are prevented but that, if they should occur, their consequences are minimised.

4.3.5 Off-site conditions

As emissions from the site will be controlled at source, we do not consider that any off-site conditions are necessary.

4.3.6

Operating techniques

We have specified that the Applicant must operate the Installation in accordance with the following documents contained in the Application:

Description	Parts Included	Justification
The Application	Operating Techniques detailed in part C of application form and supporting information, as modified by the following Schedule 5 responses.	The details given in the application provide techniques for operation that are BAT.
Response to Schedule 5 Notice dated 4/2/2011	Answer to questions:- 1, 2, 3, 4, 5, 7 (as modified by response to Schedule 5 of 4/7/2011), 8, 9, 16 and 17	The questions relate to operating and management techniques
Response to Schedule 5 Notice dated 4/7/2011	Answer to questions:- 1, 2, 3, 4, 5, 9, 11 and Appendix A	The questions relate to operating and management techniques

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

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

Raw Material or Fuel	Specifications	Justification
Gas Oil	< 0.1% sulphur content	As required by Sulphur Content of Liquid Fuels Regulations.

Article 4(4) of the WID requires that the Permit must list explicitly the categories of waste which may be treated. The Application contains a list of those wastes in Part III Part C2d coded by the European Waste Catalogue (EWC) number, which the Applicant will accept in the waste streams entering the plant and which the plant is capable of burning in an environmentally acceptable way. We have specified the permitted waste types, descriptions and where appropriate quantities which can be accepted at the facility in Table S2.2.

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

(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 in 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.

We have not changed the currently permitted quantity of wastes received at the facility from 100,000 tonnes per annum. We have restricted the operation of the CHP plant by limiting the throughput of the permitted wastes to 24,200 tonnes per annum. This is based on the installation operating 7,128 hours per year at a nominal capacity of approximately 3.1 tonnes per hour but allowing for some variation in calorific value as described by the Applicant. This has been done to match the terms under which the air dispersion modelling was carried out.

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

4.3.7 Energy efficiency

(i) Consideration of energy efficiency

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

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

2. The extent to which the Installation meets the requirements of Article 6(6) of the WID, which requires that heat "*shall be recovered as far as practicable*". This issue is covered in this section.

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

(ii) Use of energy within the Installation

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

The Application cites the primary aim of the CHP is to provide heat for the purposes of drying material on the production line.

The Application details a number of measures that will be implemented at the Installation in order to increase its energy efficiency:-

- high level of heat recovery in the design;
- thermal insulation of plant and pipework;
- strict temperature control both on CHP and on dryer process;
- energy efficient lighting;
- energy efficient climate control systems.

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

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

The BREF says that it is BAT to reduce the average installation electrical demand to generally below 150 kWh/tonne of waste with an LCV of 10.4 MJ/kg. The Application states that the specific energy consumption, a measure of total energy consumed per unit of waste processed, will be 55 kWh/tonne. The installation capacity is 24,200 t/a.

The LCV in this case is expected to be 10 MJ/kg. Taking account of the difference in LCV, the specific energy consumption in the Application is in line with that set out above.

(iii) Compliance with Article 6(6) of the WID

The previous section describes our assessment of energy utilisation. Article 6(6) of the WID requires that heat "*shall be recovered as far as practicable*". The Government's guidance on the WID (WID EPR Guidance, March 2010) lists the following hierarchy of heat recovery options, with (e) as the least preferred option and the optimum being a combination of the other four options:

a) use of waste heat from boiler water cooling system
b) use of a boiler for steam generation or electricity generation
c) use of exhaust steam for process heating or CHP schemes
d) internal heat exchange for primary air heating and/or flue gas reheating
e) no heat recovery.

The CHP plant, sole heat source to the animal bedding production dryer and generating electricity for site consumption, fits the hierarchy options a) and b).

The expected calorific value of the waste wood fuel used in the CHP plant will lie in the range of 13.9MJ/kg to 15.6MJ/kg, with a mean value of 15.0MJ/kg. The maximum consumption of waste wood fuel in the CHP plant will thus lie in the range of 21,500 to 24,200 tonnes per annum, with a mean value of 22,400 tonnes.

The CHP plant will operate for a maximum of 7,128 hours per annum. The estimated outputs from the CHP plant are 55,225MWh of heat and 13,080MWh of electrical output (gross). These outputs will be derived from a total fuel input to the CHP plant of an estimated 93,425MWh, giving an expected recovery of 14% electrical and 59% thermal.

We consider that the Installation will recover heat as far as practicable, and therefore that the requirements of Article 6(6) are met, insofar as the Environment Agency's remit under the EPR is concerned.

(iv) Permit conditions concerning energy efficiency

The Operator is required to report energy usage and energy generated under condition 4.2 and Schedule 5. The following parameters are required to be reported: total electrical energy generated; electrical energy exported; total energy usage and energy exported as heat (if any). Together with the total wood waste burned per year, this will enable the Environment Agency to monitor energy efficiency at the Installation and take action if at any stage the energy efficiency is not considered acceptable.

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

4.3.8 Efficient use of raw materials

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

The Operator is required to report with respect to raw material usage under condition 4.2. and Schedule 5, including consumption of sodium bicarbonate, activated carbon and urea used per tonne of waste burned. This will enable the Environment Agency to assess whether there have been any changes in the efficiency of the air pollution control plant, and the operation of the SNCR to abate NO_x. These are the most significant raw materials that will be used at the Installation, other than the waste feed itself (addressed elsewhere). The efficiency of the use of auxiliary fuel will be tracked separately as part of the energy reporting requirement under condition 4.2.1. Optimising reagent dosage for air abatement systems and minimising the use of auxiliary fuels is further considered in the section on BAT.

The water used within the heat transfer system of the CHP plant to drying process will be closed loop and therefore will require minimal water input during normal operations. The combustion grate cooling system will be closed loop as well.

Mains water usage will be metered and subject to a usage efficiency audit after commissioning of the plant.

Site surface water is currently collected in storage tanks and a concrete lined channel for use in dust suppression on the wood processing areas in the open. This is supplemented with occasionally abstracted water from the nearby River Poulter at rates of less than $20m^3$ per day and hence exempt from the requirement of a permit to abstract.

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

This requirement addresses wastes produced at the Installation and does not apply to the waste being treated there. The principal waste streams the Installation will produce are incinerator bottom ash (IBA) and a fly ash and air pollution control residue mix.

The first objective is to avoid producing waste at all. Waste production will be avoided by achieving a high degree of burnout of the ash in the furnace, which results in a material that is both reduced in volume and in chemical reactivity. Condition 3.1.3 and associated Table S3.3 specify limits for total organic carbon (TOC) of <3% in bottom ash. Compliance with this limit will demonstrate that good combustion control and waste burnout is being achieved in the furnaces and waste generation is being avoided where practicable.

Most IBA is likely to be classified as non-hazardous waste. However, IBA is classified on the European List of Wastes as a “mirror entry”, which means IBA is a hazardous waste if it possesses a hazardous property. Monitoring of ash from the co-incinerator will be carried out to ensure it is appropriately classified and its subsequent use or disposal controlled.

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

In order to ensure that the IBA and APC residues are adequately characterised and sent to appropriate disposal or recovery facilities, pre-operational condition PO2 requires the Operator to provide a written plan for approval detailing the ash sampling protocols. Table S3.3 requires the Operator to carry out an ongoing programme of monitoring.

The Application states that metal fractions will be removed from the feedstock during the pre-treatment phase to minimise their entry into the combustion process.

The IBA will be assessed for composition and, where possible, subject to recycling as an alternative to disposal.

The fly ash/ APC residue collected separately from the IBA to maximise potential recovery of the wastes. Disposal and potential treatment options will be assessed after analysis and characterisation has been undertaken.

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

We are satisfied that waste from the Installation that cannot be recovered will be disposed of using a method that minimises any impact on the environment. Standard condition 1.4.1 will ensure that this position is maintained.

5. Minimising the Installation's environmental impact

Regulated activities can present different types of risk to the environment, 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 you need detailed air modelling
- 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 1% threshold is one hundredth of the standard and 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 10% threshold is one tenth of the standard and 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 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, should be carried out 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) which is equal to the sum of the background concentration in the absence of the Installation and the process contribution, exceeds 70% of the appropriate long term standard;
- the short term Process Contribution exceeds 20% of the headroom, which 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 modelling 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 $PEC_{long\ term}$ exceeds 70% of an EQS or the $PC_{short\ term}$ 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 exceedences are identified, we may require the Applicant to go beyond what would normally be considered BAT for the Installation in order to reduce releases from the Installation to ensure that there is no significant pollution or risk to human health. 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 SSSI, SACs or SPA). 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 have applied the H1 criteria above to the model outputs. We are satisfied that emissions at the permitted limits would ensure a high level of

protection for human health and the environment in any event. In Section 6 of this document, we explain how we have determined whether the Applicant's proposals are the Best Available Techniques for this Installation taking into consideration the above assessment.

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 v4.2 dispersion model, which is a commonly used computer model for regulatory dispersion modelling. The model used 5 years of meteorological data collected from Waddington, which we consider to be representative. The impact of the terrain surrounding the site upon plume dispersion was considered in the dispersion modelling using terrain data. The concentrations reported in the assessments were the maximum ground level concentrations predicted by the dispersion modelling packages over the 5 years of meteorological data.

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

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

The way in which the Applicant used dispersion models, its selection of input data, and the assumptions it made have been reviewed by the Environment Agency to establish the robustness of the Applicant's air impact assessment. Whilst we have raised some questions about some of the information provided in the modelling report, we agree with the Applicant's conclusions. We have also audited the air quality and human health impact assessment and similarly agree that the conclusions drawn in the reports were acceptable.

The initial modelling report used ADMS v4.1. As a result of changes to the roof height of plant buildings, questions arising from changes to some of the EQSs and apparent inaccuracies in the original submission, the information in the following tables was presented using ADMS v4.2 in response to the Schedule 5 notice dated 4/2/11 for all data except for the particulate matter figures.

The modelled results for particulate matter, both $PM_{2.5}$ and PM_{10}, were taken from the response to the Schedule 5 notice dated 4/7/11 and have been verified by us. This response also suggested marginally less impact on predicted environmental concentration for the non-particulate pollutants, but we have only verified the particulates results from this submission.

The Applicant's modelling predictions for the most affected receptor location are summarised in the tables below:

(i) Long Term

Pollutant	EQS / EAL	Back-ground Conc	Maximum Process Contribution (PC)	PC as % of EQS / EAL	Maximum Predicted Environmental Concentration (PEC)	PEC as % EQS / EAL
PM_{10}	40	17.4	2.7	6.8	20.1	50
$PM_{2.5}$	25	10.4	2.7	10.8	13.1	53
NO_2	40	13	2.83	7.1	16	40
HF	16	1	0.08	0.5	1.1	6.8
Cadmium	0.005	0.00004	0.0010	20	0.0010	21
Mercury	0.25	0.0016	0.0010	0.4	0.0026	1.05
Antimony	5	0.0017	0.0011	0.022	0.0028	0.056
Arsenic	0.003	0.00006	0.0012	40.0	0.00126	42
Chromium(total)	5	0.0004	0.0012	0.024	0.002	0.04
Chromium(VI)	0.0002	0.000009	0.00001	7.00	0.00002	11.3
Copper	10	0.001	0.0011	0.011	0.002	0.02
Lead	0.25	0.0012	0.0011	0.45	0.002	0.9
Manganese	0.15	0.0009	0.0011	0.749	0.0020	1.3
Nickel	0.02	0.0003	0.0012	5.9	0.0015	7.6
Vanadium	5	0.0003	0.0012	0.023	0.0015	0.03
Ammonia	180	3.97	0.2	0.11	4.2	2.3
Benzo(a)Pyrene	0.00025	0.00008	$5.05x10^{-6}$	2.0	0.00009	36

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

Note 2 PM_{10} has been corrected from the Applicant's submitted assessment as we believe the appropriate background concentration to be $17.4\mu g/m^3$ rather than $15.8\mu g/m^3$

Note 3 Above figures for PC of Chromium(Total), Arsenic and Nickel were those presented in the original application

Note 4 The Cr (VI) PC is derived from the assumption described in Section 5.2.3 below

(ii) Short Term

Pollutant	EQS / EAL	2x Back-ground Conc	Maximum Process Contribution (PC)	PC as % of EQS / EAL	Maximum Predicted Environmental Concentration (PEC)	PEC as % EQS / EAL
PM_{10}	50	17.4	9.3	19	26.7	53
HCl	750	0.65	9.72	1.3	10.4	1.4
HF	160	2	0.65	0.4	2.6	1.7
SO_2	266	7	31.07	12	38	14
SO_2	350	7	27.17	7.8	34	10
SO_2	125	7	18.88	15	26	21
NO_2	200	26	19.44	10	46	23
Mercury	7.5	0.0032	0.0081	0.11	0.011	0.15
Antimony	150	0.0033	0.009	0.006	0.012	0.008
Chromium(total)	150	0.0008	0.0053	0.004	0.006	0.0041
Copper	200	0.002	0.009	0.0045	0.011	0.01
Manganese	1500	0.0017	0.0057	0.0004	0.007	0.0005
Vanadium	1	0.0007	0.0057	0.57	0.006	0.6
Carbon monoxide	10,000	258	6.2	0.06	264	2.6
Ammonia	2500	7.9	1.62	0.065	9.6	0.38

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

Note 2 For the assessment of short term impacts (except PM_{10}) the PEC is determined by adding twice the long term background concentration to the short tem process contribution.

From the tables above the following emissions can be screened out as insignificant in that the process contribution is < 1% of the long term EQS/EAL and <10% of the short term EAQ/EAL.

- HCl (no long term EQS)
- HF
- Mercury
- Antimony
- Chromium (total)
- Lead (no short term EQS)
- Copper
- Manganese
- Vanadium
- Carbon monoxide (no long term EQS)
- Ammonia

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

Also from the tables above the following emissions not screened out as insignificant cannot be considered to have the potential to give rise to significant pollution in that the predicted environmental concentration (PEC) is less than 70% of the long term EQS/EAL and that the Process Contribution is less than 20% of the short term EQS/EAL headroom.

- Cadmium
- Arsenic
- Chromium (VI)
- Nickel
- Benzo(a)pyrene (no short term)
- Nitrogen dioxide
- Sulphur dioxide (no long term)
- $PM_{2.5}$

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

Finally from the table above the following emissions are considered to have the potential to give rise to significant pollution in that the Process Contribution exceeds 20% of the short term EQS/EAL headroom.

- PM_{10}

For the PM_{10} emission, the Applicant has concluded that exceedences are not likely of the relevant air quality objective and environmental assessment level. As part of our detailed audit, of the applicant's modelling assessment, we agree with the Applicant's conclusions in this respect taking modelling uncertainties into account.

In any case, with respect to PM_{10}, we have carefully scrutinised the Applicant's proposals to ensure that they are applying the Best Available Techniques to prevent and minimise emissions of these substances. This is reported in section 6 of this document.

We have also carefully considered whether additional measures are required above what would normally be considered BAT in order to prevent significant pollution. The need for additional measures to address the pollution risk from these substances is set out in the remaining parts of this section.

5.2.2 Assessment of emissions of PM_{10} and $PM_{2.5}$

The impact on air quality from particulate emissions has been assessed against EQS for PM_{10} (particles of 10 microns and smaller) and $PM_{2.5}$ (particles of 2.5 microns and smaller). For PM_{10}, the EU EQS are a long term annual average of 40 $\mu g/m^3$ and a short term daily average of 50 $\mu g/m^3$. For $PM_{2.5}$, the EU EQS of 25 $\mu g/m^3$ as a long-term annual average to be achieved by 2010 (as a Target Value and by 2015 as a Limit Value).

The Applicant's predicted impact of the Installation against these EQS is shown in the table below – all concentrations are shown as μg/m^3. The assessment assumes that all particulate emissions are present as PM_{10} for the PM_{10} assessment and as $PM_{2.5}$ for the $PM_{2.5}$ assessment.

The Applicant has modelled combined emissions for particulates from the 3 dryer vents and from the CHP stack in total as PM_{10} and $PM_{2.5}$.

Pollutant	EQS / EAL	Back-ground Conc	Process Contribution (PC)	PC as % of EQS / EAL	Predicted Environmental Concentration (PEC)	PEC as % EQS / EAL
PM_{10}	40	17.4	2.7	6.8	20.1	50
	50	17.4	9.3	19	26.7	53
$PM_{2.5}$	25	10.4	2.7	10.8	13.1	53

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

- It assumes that the CHP 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 mg/m^3.
- It assumes all particulates emitted are below either 10 microns (PM_{10}) or 2.5 microns ($PM_{2.5}$), when some are expected to be larger.

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

The above assessment shows that the predicted process contribution for emissions of PM_{10} is above 1% of long term EQS and more than 10% of the short term EQS, and so cannot be screened out as insignificant.

The Applicant predicts that there will be no exceedences of air quality standards at local human receptors as result of the plant operation. Our check modelling is in agreement. We note that the Applicant's value for the 90.4%ile of 24 hr means for the predicted environmental concentration (PEC) for PM_{10} at Three Ways is 53% of the objective (50 μg m^{-3}). However, the bulk of PM_{10} emissions are from the dryer stacks and the reported emission is as Particulate Matter, not PM_{10}. As the particulate is from flaked virgin wood, it is likely that a lot of the emission will be in the form of bulkier particles (i.e. larger than PM_{10}), and this we would expect to reduce the PM_{10} emission impact further.

The above assessment also shows that the predicted process contribution for emissions of $PM_{2.5}$ is above 1% EQS and so cannot be screened out as insignificant. Even so, from the table above, the emission is not expected to result in the EQS being exceeded due to the extremely conservative assumptions made in the prediction.

There is currently no emission limit prescribed specifically for fine particulate matter in the $PM_{2.5}$ fraction. Whilst the Environment Agency is confident that current monitoring techniques will capture the fine particle fraction ($PM_{2.5}$) for inclusion in the measurement of total particulate matter, an improvement condition, IC2, has been included that will require a full analysis of particle size distribution in the flue gas and in the dryer vents, and hence determine the ratio of fine to coarse particles. In the light of current knowledge and available data, however, the Environment Agency is satisfied that the health of the public would not be put at risk by such emissions.

5.2.3 Assessment of Emission of Metals

The Applicant has assessed the impact of metal emissions to air as for other substances by making the conservative assumption that emissions occur continuously at the WID limits; and then using air dispersion modelling comparing their impact against the relevant EQS / EAL in the H1 guidance.

WID sets three limits for metal emissions:

- An emission limit value of 0.05 mg/m^3 for mercury and its compounds.
- An aggregate emission limit value of 0.05 mg/m^3 for cadmium and thallium and their compounds.
- An aggregate emission limit of 0.5 mg/m^3 for antimony, arsenic, lead, chromium, cobalt, copper, manganese, nickel and vanadium and their compounds.

Where WID sets an aggregate limit, the Applicant's assessment assumes that for cadmium and thallium each metal is emitted individually at the aggregate limit value and for the other metals that each metal is emitted as the proportion of metals in its group (i.e. one ninth of the limit for each of the group 3 metals). Historical data for Municipal Waste Incinerators indicates that $1/9^{th}$ of the limit is an over estimate of actual emissions, and so we are satisfied that the Applicant's proposal is reasonable in this context.

The Applicant's assessment finds that emissions of Mercury, Antimony, Lead, Chromium (total), Copper, Manganese and Vanadium 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, the Applicant's assessment finds that the PEC of Cadmium, Arsenic and Nickel would be less than 70% of the EQS / EAL.

From this assessment the Applicant has concluded that exceedences of the EAL for all metals are not likely to occur. The installation has been assessed as meeting BAT for control of metal emissions to air. See section 6 of this document. The Environment Agency's experience of regulating incineration plant is that emissions of metals are in any event below the limits set in WID. We therefore agree with the Applicant's conclusions.

The 2009 report of the Expert Panel on Air Quality Standards (EPAQS) – "Guidelines for Metal and Metalloids in Ambient Air for the Protection of Human Health", sets new ambient air quality guidelines for Arsenic, Nickel

and Chromium (VI). These guidelines have been incorporated as EALs in the revised H1 Guidance issued by the Agency in 2010, and subsequent to this application being made.

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_{10} in ambient air. The new guideline for Chromium (VI) is 0.2 ng/m^3. The initial modelling undertaken by the Applicant assumed Chromium (Total) at 1/9^{th} WID limit to be emitted wholly as Chromium (VI). Although this would have been acceptable with the old EAL, the new EAL could not be met adopting this very conservative approach.

Measurement of Chromium (VI) at the levels anticipated at the stack emission points is expected to be difficult, with the likely levels being below the level of detection by the most advanced methods. We have considered the concentration of total chromium and chromium (VI) in the APC residues collected upstream of the emission point for existing Municipal Waste incinerators and have assumed these to be similar to the particulate matter released from the emission point. This data shows:

- The mean proportion of Cr(VI) to total Cr is less than 1%. There are two outliers at 2%.
- The mean total Cr emission from these plants is 0.006 mg/m^3 (max 0.03 mg/m^3).
- The mean Cr(VI) emission concentration (based on the bag dust ratio) is 3.5 * 10^{-5} mg/m^3 (max 1.3 * 10^{-4}).

Based on this data, using the highest values found in practice, we consider it remains a conservative assumption to consider that the maximum Cr (VI) emission concentration will be 0.0007 mg/m^3 – from 2.1% of the total Cr at 0.033 mg/m^3. We have used this data to model the predicted Cr (VI) impact. The PC is predicted as 7.3%, the PEC is predicted as 11.6%.

Although the application is for the co-incineration of waste wood rather than municipal solid waste, the Applicant's submitted analytical results for the waste wood proposed to be burnt demonstrated the total Chromium content was at comparable levels to that in published data for municipal solid wastes. We therefore consider the approach to assess predicted Cr (VI) impact by the method described above to be appropriate.

This assessment shows that an exceedence of the EAL for Chromium (VI) is not likely. The installation has been assessed as meeting BAT for control of metal emissions to air. See section 6 of this document.

Despite our conclusions above, but in recognition of the potential inadvertent burning of wood having been contaminated with those metals not screened out of the impact assessment above as insignificant, we have imposed improvement condition IC5 requiring the Applicant to reassess the impact of emissions to air of metals based on actual monitoring data from the first year of operation to confirm this judgement, in which case no further action is

required. We have included Chromium (VI) in this improvement condition in order to validate the above assumption, even though the above assessment suggests the impact to be 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 drafted 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 uptake 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 uptake.

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 uptake 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 millionth (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 uptake.

COMEAP developed a methodology applicable to the results of time series epidemiological studies which allows calculation of the public health impact of exposure to the classical air pollutants (NO_2, SO_2 and particulates) in terms of the numbers of “deaths brought forward” and the “number of hospital admissions for respiratory disease brought forward or additional”. COMEAP has issued a statement expressing some reservations about the applicability of applying its methodology to small affected areas. Those concerns generally relate to the fact that the exposure-response coefficients used in the COMEAP report derive from studies of whole urban populations where the air pollution climate may differ from that around a new industrial installation.

COMEAP identified a number of factors and assumptions that would contribute to the uncertainty of the estimates. These were summarised in the Defra review as below:

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

The use of the COMEAP methodology is not generally recommended for modelling the human health impacts of individual installations. However it may have limited applicability where emissions of NO_x, SO_2 and particulates cannot be screened out as insignificant in 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 the PCT, FSA and in some cases HPA (often the PCT response would incorporate HPA advice). We also consult the local communities who may raise health related issues. All issues raised by these consultations are considered in determining the application as described in Annex 4 of this document.

5.3.2 Assessment of Intake of Dioxins 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 locally 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. Given the assumptions in the impact modelling and the application of BAT for minimising dioxin emissions, it is unlikely that the TDI would be exceeded due to the proposed plant's emissions.

Receptor	adult	child	infant
Maximum Exposed Individual	0.03	0.048	0.293
Resident	0.004	0.006	0.035
Farmer	0.01	0.017	0.095
School child 6-11	-	0.005	-
School child 11-16	-	0.004	-

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

The FSA has reported that recent 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 TDI 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 assessed the impact of chlorinated compounds as representing the impact of all chlorinated, brominated and mixed dioxins / furans and dioxin like PCBs.

5.3.3 Particulates smaller than 2.5 microns

As for PM_{10} particulates above, the $PM_{2.5}$ assessment modelled total particulate emission from the CHP at WID limit and from the dryer stacks. As with PM_{10} a lot of the dryer particulate emission is likely to be larger particles, indicating that $PM_{2.5}$ as modelled is a conservative approach.

The Operator will be required to monitor particulate emissions using the method set out in Table S3.1 of Schedule 3 of the Permit. This method requires that the filter efficiency must be at least 99.5 % on a test aerosol with a mean particle diameter of 0.3 µm, at the maximum flow rate anticipated. The filter efficiency for larger particles will be at least as high as this. This means that particulate monitoring data effectively captures everything above 0.3 µm and much of what is smaller. It is not expected that particles smaller than 0.3 µm will contribute significantly to the mass release rate / concentration of particulates because of their very small mass, even if present. This means that emissions monitoring data can be relied upon to measure the true mass emission rate of particulates.

Nano-particles are considered to refer to those particulates less than 0.1 µm in diameter ($PM_{0.1}$). Questions are often raised about the effect of nano-particles on human health, in particular on children's health, because of their high surface to volume ratio, making them more reactive, and their very small size, giving them the potential to penetrate cell walls of living organisms. The small size also means there will be a larger number of small particles for a given mass concentration. However the HPA statement (referenced below) says that due to the small effects of incinerators on local concentration of particles, it is highly unlikely that there will be detectable effects of any particular incinerator on local infant mortality.

The HPA addresses the issue of the health effects of particulates in their September 2009 statement 'The Impact on Health of Emissions to Air from Municipal Incinerators'. It refers to the coefficients linking PM_{10} and $PM_{2.5}$ with effects on health derived by COMEAP and goes on to say that if these coefficients are applied to small increases in concentrations produced, locally, by incinerators, the estimated effects on health are likely to be small. 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 $PM_{2.5}$ by 1 µg/m^3 would result in an increase in life expectancy of 20 days for people born in 2008." However, "The Committee stresses the need for careful interpretation of these metrics to avoid incorrect inferences being drawn – they are valid representations of population aggregate or average effects, but they can be misleading when interpreted as reflecting the experience of individuals."

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

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.

The Applicant's assessment of the impact from HCl, HF, mercury, antimony, chromium II & III, lead, copper, manganese, vanadium, carbon monoxide and ammonia have all indicated that the Installation emissions screen out as insignificant; where the impact of emissions of cadmium, arsenic, chromium VI, nickel, benzo(a)pyrene, nitrogen dioxide, sulphur dioxide, PM_{10} and $PM_{2.5}$ have not been screened out as insignificant, the assessment still shows that the predicted environmental concentrations are well within air quality standards or environmental action levels.

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

The Applicant has carried out an assessment of the possible exposure to dioxins and furans using a model prepared for Her Majesty's Inspectorate of Pollution (HMIP) based on inhalation and deposition (to skin and into various food chain routes). The Applicant's results indicate that there will be no

exceedences of the tolerable daily dose of 2 pg TEQ/ kg BW/ day[1] as result of the plant emissions. We checked the Applicant's assessment using USEPA[2] and HMIP[3] HHRA procedures. We agree with the Applicant's conclusions that there will be no exceedences of the tolerable daily dose.

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 Bassetlaw Primary Care Trust was consulted on the Application and responded with a number of questions and recommendations, a summary of which can be found in Annex 4 along with notes on how we have considered them. Further information was forwarded to the PCT for comment, but no further comments were received. The Food Standards Agency was also consulted during the permit determination process but offered no comment.

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

5.4.1 Sites Considered

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

- Birklands & Bilhaugh SSSI and SAC
- Sherwood Forest potential SPA – see site assessment below for inclusion of this site

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

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

- Poulter Valley (East) LWS
- Poulter Valley (West) LWS
- Bothamsall Grassland Plantation LWS
- Bothamsall Scrub LWS

5.4.2 Habitats Assessment

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

[1] Statement on the Tolerable Daily Intake for Dioxins and Dioxin-like polychlorinated biphenyls, UK Committee on Toxicity of Chemicals in Food Consumer Products and the Environment, http://cot.food.gov.uk/pdfs/cot-diox-full.pdf

[2] http://www.epa.gov/epawaste/hazard/tsd/td/combust/riskvol.htm#volume1

[3] Risk Assessment of Dioxin Releases from Municipal Waste Incineration Processes, HMIP/CPR2/41/1/181, 1997

protected site(s). We advised Natural England of our conclusions and they have not disagreed with them.

In the following assessments, the stated background concentration for ammonia is the measurement in 2008 at the nearest representative rural location at Caenby in Lincolnshire some 35km away from the site. Referring to published mapped data for atmospheric ammonia on the APIS and DEFRA websites, we consider this to be a conservative approach as the figure used appears to be towards the upper end of the typical variation in atmospheric ammonia at this location.

For HF the concentration is an estimate based on EPAQS publication 'Guidelines for halogens and hydrogen halides in ambient air for protecting human health against acute irritancy effects' (2006).

The Applicant modelled impacts from the proposed Installation at the point within each of the Habitats and Local Wildlife Sites where the greatest potential ground level concentration provided a conservative approach.

Birklands & Bilhaugh SSSI and SAC

Habitat types – dry-oak dominated woodland, oak woodland, birch woodland, lowland wood pastures and parklands

The figures in the table below refer to modelled impact for Birklands & Bilhaugh.

Pollutant	EQS / EAL	Back-ground Conc	Process Contribution (PC)	PC as % of EQS / EAL	Predicted Environmental Concentration (PEC)	PEC as % EQS / EAL
NOx[(a)]	30	11.57	0.013	0.04	11.58	39
NOx[(b)]	75	23.13	0.83	1.1	23.96	32
SO_2[(a)]	20	3.83	0.0034	0.02	3.83	19
NH_3[(a)]	3	3.97	0.00067	0.02	3.97	132
HF[(b)]	5	4	0.0083	0.17	4.01	80
HF[(c)]	0.5	2	0.0018	0.36	2	400

Note 1 All the above concentration figures are in $\mu g/m^3$
(a) – highest modelled annual mean
(b) – Highest modelled levels of 24-hour mean
(c) – highest modelled level of maximum weekly mean

For all the pollutants the modelled Process Contribution impact at the SAC will be less than 1% of the long term EQS and less than 10% of the short term EQS and therefore can be considered insignificant. Although the assessment suggests the PEC for ammonia and HF are above the annual and weekly EQS/EAL respective levels, the Process Contribution is shown to be significantly below 1% of the EQS/EAL and only makes a negligible contribution towards the PEC. Given the conservative assumptions made we

are satisfied there will be no likely significant impact from the installation on the interest features of the SAC.

Despite the insignificance demonstrated above, the Applicant has modelled acid and nutrient nitrogen deposition impact on the Birklands and Bilhaugh SSSI and SAC as shown below.

The critical loads were taken from the APIS website for tall vegetation types (a), e.g. trees, and short vegetation types (b), e.g. grasses. The critical load values selected were the lowest where a range was available for a habitat type in order to present a conservative approach.

Deposition	Critical Load (CL)	Existing Deposition	Process Contribution (PC)	PC as % of CL	Predicted Env'l Conc. (PEC)	PEC as % CL
Acid (a)	1.35	2.74	0.0014	0.10	2.74	203
Acid (b)	0.7	1.64	0.0007	0.11	1.64	234

Note 1 All above deposition rates are keq/ha/year (Kilo-equivalents hydrogen ion per hectare per year)

Deposition	Critical Load (CL)	Existing Deposition	Process Contribution (PC)	PC as % of CL	Predicted Env'l Conc. (PEC)	PEC as % CL
N (a)	10	32.5	0.008	0.08	32.5	325
N (b)	10	17.9	0.005	0.05	17.9	179

Note 1 All above deposition rates are kqN/ha/year (kg nitrogen per hectare per year)

The Process Contribution is confirmed by the modelling to be considerably less than 1% of the worst case Critical Load for acid and nitrogen deposition for the habitat types identified at the SAC, and there will be no likely significant effect on the interest features of the site.

Sherwood Forest pSPA

This site was included by the Applicant for assessment on the basis that it may be subject to future consideration as a SPA , hence referred to as a potential SPA. As yet the site has not been formally designated as a potential SPA, so this assessment, although not strictly required to be included, has been as a precaution.

Habitat types – oak woodland, ash woodland, beech woodland, birch woodland, acid grassland, lowland heathland

The figures in the table below refer to modelled impact for the Sherwood Forest potential SPA.

Pollutant	EQS / EAL	Back-ground Conc	Process Contribution (PC)	PC as % of EQS / EAL	Predicted Environmental Concentration (PEC)	PEC as % EQS / EAL
NOx[(a)]	30	13.09	0.073	0.24	13.17	44
NOx[(b)]	75	24.00	3.07	4.1	27.07	36
SO_2[(a)]	20	3.45	0.018	0.09	3.47	17
NH_3[(a)]	3	3.97	0.0037	0.12	3.98	133
HF[(b)]	5	4	0.031	0.61	4.03	81
HF[(c)]	0.5	2	0.012	2.4	2.01	402

Note 1 All the above concentration figures are in $\mu g/m^3$
(a) – highest modelled annual mean
(b) – Highest modelled levels of 24-hour mean
(c) – highest modelled level of maximum weekly mean

For all the pollutants the modelled Process Contribution impact at the pSPA will be less than 1% of the long term EQS and less than 10% of the short term EQS. Although the assessment suggests the PEC for ammonia and HF are above the annual and weekly EQS/EAL respective levels, the Process Contribution is considerably below the threshold at which we usually screen a substance out as being insignificant, and the limits are exceeded by the background levels, Given the level of the PC and the various conservative assumptions we consider there will be no likely significant impact from the installation on the pSPA

Despite the insignificance demonstrated above, the Applicant has modelled acid and nutrient nitrogen deposition impact on the Sherwood potential SPA as shown below.

The critical loads were taken from the APIS website for tall vegetation types (a), e.g. trees, and short vegetation types (b), e.g. grasses. The critical load values selected were the lowest where a range was available for a habitat type in order to present a conservative approach.

Deposition	Critical Load (CL)	Existing Deposition	Process Contribution (PC)	PC as % of CL	Predicted Env'l Conc. (PEC)	PEC as % CL
Acid (a)	1.26	3.95	0.0074	0.59	3.96	314
Acid (b)	0.68	2.28	0.0040	0.59	2.28	336

Note 1 All above deposition rates are keq/ha/year (Kilo-equivalents hydrogen ion per hectare per year)

Deposition	Critical Load (CL)	Existing Deposition	Process Contribution (PC)	PC as % of CL	Predicted Env'l Conc. (PEC)	PEC as % CL
N (a)	10	49.7	0.043	0.4	49.7	497
N (b)	10	27	0.026	0.3	27	270

Note 1 All above deposition rates are kqN/ha/year (kg nitrogen per hectare per year)

The Process Contribution is confirmed by the modelling to be considerably less than 1% of the worst case Critical Load for acid and nitrogen deposition for the habitat types identified at the pSPA. Given this and the various conservative assumptions described we consider there will be no likely significant effect on the site.

5.4.3 SSSI Assessment

The Applicant identified and provided assessments for 13 other SSSIs within a 10km radius of the site. For this type of application the requirement is for the assessment of SSSIs within 2km of the site, and as none of the SSSIs fell within that radius the assessment findings are not detailed here. It is worthy of note, however, that the assessment against the same parameters as for the SAC and pSPA showed that the Process Contribution from this activity will be insignificant in all cases.

5.4.4 Assessment of Non-Statutory Sites

Habitat types:-
Bothamsall Grassland Plantation – acid grassland
Poulter Valley (West) – planted coniferous woodland, oak woodland, ash woodland, beech woodland
Poulter Valley (East) - planted coniferous woodland, oak woodland, ash woodland, beech woodland
Bothamsall Scrub – ancient/species rich hedgerows, acid grassland

For non-statutory habitats, such as local wildlife sites, the Process Contribution of the pollutants in the following tables being assessed as below 100% of the critical load (CL) or EAL we determine is acceptable.

Bothamsall Grassland Plantation

Pollutant	EAL/CL	Back-ground Conc	Process Contribution (PC)	PC as % of EAL / CL	Predicted Environmental Concentration (PEC)	PEC as % EAL / CL
NOx[(a)]	30	12.87	1.25	4.2	14.13	47
NOx[(b)]	75	25.75	41.7	55.6	67.42	90
SO_2[(a)]	20	3.55	0.31	1.6	3.86	19
NH_3[(a)]	3	3.97	0.063	2.1	4.04	135
HF[(b)]	5	4	0.42	8.3	4.42	88
HF[(c)]	0.5	2	0.21	42.9	2.21	443

Poulter Valley (West)

Pollutant	EAL/CL	Back-ground Conc	Process Contribution (PC)	PC as % of EAL/ CL	Predicted Environmental Concentration (PEC)	PEC as % EAL/CL
NOx[(a)]	30	12.87	1.23	4.1	14.10	47
NOx[(b)]	75	25.75	40.8	54.4	66.52	89
SO_2[(a)]	20	3.55	0.31	1.5	3.85	19
NH_3[(a)]	3	3.97	0.061	2.0	4.03	134
HF[(b)]	5	4	0.41	8.2	4.41	88
HF[(c)]	0.5	2	0.22	43.2	2.22	443

Poulter Valley (East)

Pollutant	EAL/CL	Back-ground Conc	Process Contribution (PC)	PC as % of EAL/CL	Predicted Environmental Concentration (PEC)	PEC as % EAL/CL
NOx[(a)]	30	12.87	1.38	4.6	14.26	48
NOx[(b)]	75	25.75	41.5	55.4	67.27	90
SO_2[(a)]	20	3.55	0.35	1.7	3.89	19
NH_3[(a)]	3	3.97	0.069	2.3	4.04	135
HF[(b)]	5	4	0.42	8.3	4.42	88
HF[(c)]	0.5	2	0.25	49.7	2.25	450

Bothamsall Scrub

Pollutant	EAL/CL	Back-ground Conc	Process Contribution (PC)	PC as % of EAL/CL	Predicted Environmental Concentration (PEC)	PEC as % EAL/CL
NOx[(a)]	30	11.84	0.092	0.31	11.93	40
NOx[(b)]	75	23.68	2.9	3.9	26.57	35
SO_2[(a)]	20	3.57	0.023	0.11	3.59	18
NH_3[(a)]	3	3.97	0.0046	0.15	3.98	133
HF[(b)]	5	4	0.029	0.58	4.03	81
HF[(c)]	0.5	2	0.012	2.4	2.01	402

Note 1 All the above concentration figures are in $\mu g/m^3$
Note 2 Background concentrations for short term levels are 2x annual level
Note 3 Background concentrations used for 24-hr HF modelling were doubled again by the Applicant, so the correct PEC would be significantly less than shown in these tables
(a) – highest modelled annual mean
(b) – Highest modelled levels of 24-hour mean
(c) – highest modelled level of maximum weekly mean

The PC in all the above cases is well below 100% CL we normally use to determine significance. As the PC for Bothamsall Scrub in particular is <1% long term and <10% short term for this location, the deposition due to proposed plant's emissions will be insignificant. The modelling predicts that for NOx, SO_2 and daily HF there will be no breach of the CLs. However, the CL appears in the modelling to be already breached for annual ammonia and weekly mean HF due to the assumed background concentration being above those levels at all the Local Wildlife Sites.

For the ammonia assessment, and as mentioned above, the background concentration appears to be a conservative figure. The PCs in the tables above represent a maximum of only approximately 1.7% of the modelled background contribution, which suggests that proposed plant is not going to be a major contributor to the impact at the LWSs. Moreover, the modelling was conducted on the basis of ammonia being emitted at WID limits, which is again a conservative approach.

For the weekly mean HF assessments, the modelled PC could not be considered insignificant as it contributes nearly half of the critical load for the location. However, the background concentration is determined by calculation method and already takes the apparent PEC significantly above the CL. The modelled PC amounts to a maximum of 12.5% of the background, and would not be a major contribution.

Again, the HF PC is based on emission at the WID limit, which is a conservative approach. Comparison of the Applicant's analytical data for the waste proposed to be burnt with published data for elemental composition of municipal solid waste, including construction and demolition type waste, demonstrates the total fluorine content of the wood waste proposed to fuel the CHP plant is of an order of magnitude less, and hence reduces the abundance of HF formation in the first place. Much of the HF in the exhaust gas, being the most reactive of the hydrogen halides, should be removed by the acid gas abatement system. It is considered therefore that the PC is very conservative.

Particularly with these sites being located quite close to the proposed Installation, the maximum impacted or nearest point within the LWS was the modelled to provide a conservative approach. We would expect the potential impact to decline with distance.

The critical loads were taken from the APIS website for tall vegetation types (a), e.g. trees, and short vegetation types (b), e.g. grasses. The critical load values selected were the lowest where a range was available for a habitat type in order to present a conservative approach.

Deposition	Critical Load (CL)	Existing Deposition	Process Contribution (PC)	PC as % of CL	Predicted Env'l Conc. (PEC)	PEC as % CL
Bothamsall Grassland Plantation						
Acid (b)	0.68	2.28	0.0694	10.2	2.35	345
N (b)	10	27	0.45	4.5	27.5	275
Poulter Valley (West)						
Acid (a)	1.26	3.95	0.1244	9.9	4.07	323
N (a)	10	49.7	0.73	7.3	50.4	504
Poulter Valley (East)						
Acid (a)	1.26	3.95	0.1403	11.1	4.09	325
N (a)	10	49.7	0.82	8.2	50.5	505
Bothamsall Scrub						
Acid (a)	1.50	2.28	0.0093	0.62	2.29	153
Acid (b)	2.06	2.28	0.0051	0.25	2.29	111
N (a)	10	49.7	0.054	0.5	49.8	498
N (b)	10	27	0.033	0.3	27	270

Note 1 All above Acid deposition rates are keq/ha/year (Kilo-equivalents hydrogen ion per hectare per year)
Note 2 All above Nutrient N deposition rates are kqN/ha/year (kg nitrogen per hectare per year)

With the exception of Bothamsall Scrub LWS, the predicted acid and nutrient nitrogen deposition from the above table cannot be screened out as insignificant, but the PC is less than 100% of the critical load/EAL we normally use to determine significance for a local wildlife site. As the modelled deposition from the proposed plant is significantly lower than the background contribution, it will not be a major contributor to the CL being exceeded. With the proposed plant operating correctly, and with BAT for abatement in place as proposed, it will be unlikely that emissions will be at the WID limits on which the modelling was based. We therefore consider the modelling approach to be conservative.

Taking account of the above we do not consider that the proposed plant will cause significant pollution of the environment at any of the local wildlife sites. However, to provide further assessment to ensure this is the case we have set improvement condition IC8 as described in section 6.6.1 below.

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. Not withstanding 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.

In making an assessment of abnormal operations the following worst case scenario has been assumed:

- NOx emissions of 400 mg/m^3 (normal) based on technology provider assuring emissions within normal WID limit even with no SNCR
- Particulate emissions of 60 mg/m^3 (90 mg/m^3 when referenced at 6% oxygen) (2 x normal) based on unlikelihood of all 3 abatement systems failing together
- Acid Gases i.e. SO_2, HCl, HF are (10 x normal) based on failure of sodium bicarbonate injection with normal removal rate of 90%
- Mercury emissions of 0.25 mg/m^3 (5 x normal) based on carbon injection failure with normal removal rate of 80%
- WID metals (2 x normal) based on association with particulate release
- Ammonia (normal) as failure of SNCR would lead to less emission not more.

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 co-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	Back-ground Conc	Process Contribution (PC)	PC as % of EQS / EAL	Predicted Environmental Concentration (PEC)	PEC as % EQS / EAL
Particulate matter (d)(f) inc. emission from dryers	50	15.8	17.7	35	33.5	67
Sulphur Dioxide(a)	266	7	205	77	212	80
Sulphur Dioxide(b)	350	7	170	49	177	51
Sulphur Dioxide(c)(f)	125	7	34.5	41.5	41.5	33
NOx (e)(g)	200	26.4	34.9	17	61.3	31
HCl	750		65	8.7		
HF	160		4.3	2.7		
Cadmium*	1.5		0.11	0.7		
Thallium*	30		0.11	0.04		
Mercury	7.5		0.027	0.04		
Antimony	150		0.012	0.01		
Arsenic*	15		0.012	0.08		
Chromium(II&III)	150		0.012	0.008		
Cobalt*	6		0.012	0.2		
Copper	200		0.012	0.006		
Manganese	1500		0.006	0.0004		
Nickel*	30		0.012	0.04		
Vanadium	1		0.006	0.6		

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

Note 2 For the assessment of short term impacts the PEC, except in the case of PM_{10}, is determined by adding twice the long term background concentration to the short tem process contribution.

Note 3 Where PC < 10% EAL/EQS, these are screened out as insignificant and PECs not calculated

* denotes metals included in modelling using H1 guidance EALs from previous version where no short term EAL is currently specified.

(a) 99.9th percentile of 15 min means
(b) 99.7th percentile of 1 hr means
(c) 99.2nd percentile of 24 hr means
(d) 90.4th percentile of 24 hr means
(e) 99.8th percentile of 1 hour means
(f) process contribution based on 4 hrs of abnormal emissions and 20 hrs normal
(g) based on assumption that 35% NOx as NO_2
(h) based on 4 hours abnormal emissions and 4 hours normal

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

- HCl, HF, Cadmium, Thallium, Mercury, Antimony, Arsenic, Chromium(II&III), Cobalt, Copper, Manganese, Nickel, Vanadium, Carbon monoxide, Ammonia.

For NOx, the PC is approximately 20% of the headroom. For these emissions we require the Applicant to apply BAT, and this is considered in section 6.

For particulate matter and for sulphur dioxide, the PC is greater than 20% of the headroom. For those pollutants whose PC is greater than 20% of the headroom, the Applicant has determined that exceedences of an EQS are not likely. We have checked these predictions in our detailed audit and agree with the Applicant's conclusions. For these emissions we require the Applicant to apply BAT, and this is considered in section 6.

For co-incineration plant, WID does not require backstop limits for particulates, CO and TOC as it does for incineration plant.

However, the Applicant has indicated that particulates from the CHP will not exceed 60 mg/m^3 (i.e. 90 mg/m3 when referenced at 6% oxygen) on the assumption that the 3-stage particulate abatement system is unlikely to have all 3 stages fail at the same time. As the modelled short term PEC for particulates detailed above indicates, there is not a great deal of headroom before the EAL would be breached should emissions rise above the modelled emission level, we therefore consider the addition of a backstop limit as BAT for this co-incineration plant to operate under abnormal conditions. To enable this we have specified that Particulate Matter from the CHP stack as a half-hourly average limit both under normal and abnormal operating conditions.

We have not assessed the impact of abnormal operations against long term EQSs for the reasons set out above. Except that if dioxin emissions were at 10 ng/m^3 for the maximum period of abnormal operation, this would result in a 70% increase in the TDI reported in section 5.3.3. In these circumstances the TDI would be 0.498 pg(I-TEQ/ kg-BW/day) for the theoretical maximum exposed individual infant, which will still not pose a risk to human health.

5.6 Noise

The Applicant submitted a noise impact assessment which used noise modelling software LIMA to predict the noise impact from the existing and proposed sources at the facility. LIMA implements the attenuation calculation scheme detailed in ISO 9613-21. The noise assessment was conducted in accordance with BS 4142 to determine whether there is an acceptable margin above existing background noise levels. Assessment was made against the day and night levels in Environment Agency guidance H3 of $50L_{Aeq}$ and $45L_{Aeq}$ respectively. For the proposed CHP and associated wood processing plant manufacturer noise data were used in the modelling.

Two noise monitoring surveys were conducted at the site to measure the noise emission from existing sources – one before the application was submitted and the other subsequently as a result of questions from the

planning authority. The initial noise monitoring results suggested an anomaly in that the day time background noise levels measured at the 3 most sensitive receptor sites were apparently higher than the night time levels. The second monitoring exercise suggested a more realistic background level.

We carried out our own indicative check modelling and sensitivity analysis using CadnaA (version 4.1). CadnaA also implements the attenuation calculation scheme detailed in ISO 9613-2. Our modelling was based on the source emissions in the Applicant's first assessment and their LIMA modelling input files.

Our check modelling predictions were consistent with the Applicant's in that they indicated no exceedences of the day and night levels in H3 (based on the emissions quoted in the assessment).

The Applicant submitted a second modelling assessment, using the revised background data, to predict noise at the 3 most sensitive receptors - Crookford Farm, Twin Oaks and Three Ways - of up to 51dBA during the day and 38dBA during the night. The night time predictions were below the guideline level of 45dB given in H3. Except for the one prediction of 51dB, the day time predictions were also below the daytime guideline level of 50dB. These predictions included a tonal penalty of 5dB – i.e. 5dB added to predicted noise levels – for the whole site noise, whereas not all the site sources of noise would exhibit tonal qualities requiring this additional penalty.

Following the 2nd noise survey, the background levels (L_{A90}) used in the BS4142 assessment were 46dB(A) for daytime and 37dB(A) for night time. The highest modelled daytime impact was at Crookford Farm, where the modelling indicated a 5dB increase over background, and hence marginal significance, when the tonal penalty was included. The highest modelled night time impact was at Three Ways were the modelling indicated a 1dB increase over background when the tonal penalty was included.

All the above noise impacts included all the site activities, proposed and existing. The majority of the noise making up the above prediction, as presented in the assessment, was from plant and machinery involved the chipping and shredding activities currently operating on site yard. Although the possibility of complaints from the combined activities on the site cannot be ruled out completely, there is no positive indication that complaints would be likely.

The Applicant concluded that the addition of the proposed CHP and wood processing plant were not seen to contribute significantly to existing noise levels and would be barely discernible at the sensitive receptors. Our view is that the predicted noise from the newly proposed plant is not likely to contribute significantly to these predictions as on their own, they do not indicate the likelihood of complaints.

Our checks predicted that night noise levels at receptors did not indicate that complaints were likely (following BS4142 methodology). This assumed, as per

the application, that the plant noise sources associated with the yard and proposed wood processing building would not be operational.

We have conducted visits to the site during normal operations under the current permit and have not perceived an issue with noise emission from current plant and equipment in use. Considering the absence of recorded complaints regarding noise from the current activities and the minimal amount of comment regarding noise in the public responses we have received following his application, it suggests that the modelling results may over-represent a worst case scenario. We discuss in section 6.5.5 below how we intend to ensure the Applicant manages noise emissions.

6. Application of Best Available Techniques

6.1 Scope of Consideration

In this section, we explain how we have determined whether the Applicant's proposals are the Best Available Techniques for this Installation.

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

- We then consider control measures for the emissions which were not screened out as insignificant in the previous section on minimising the installation's environmental impact. They are: HF, cadmium, arsenic, chromium VI, nickel, benzo(a)pyrene, nitrogen dioxide, sulphur dioxide, PM_{10} and $PM_{2.5}$

- We also have to consider the combustion efficiency and energy utilisation of different design options for the Installation, which are relevant considerations in the determination of BAT for the Installation, including the Global Warming Potential of the different options.

- Finally, the prevention and minimisation of Persistent Organic Pollutants (POPs) must be considered, as we explain below.

WID on the other hand is based on setting mandatory emission limit values. Although the WID limits are designed to be stringent, and to provide a high level of environmental protection, they do not necessarily reflect what can be achieved by new plant. As the WID itself states, its limits are "*a necessary but not sufficient condition*" for compliance with the requirements of the IPPCD, which also applies to this Installation. The IPPCD requires that emissions should be prevented or minimised, so it may be possible and desirable to achieve emissions below WID limits.

Even if the WID limits are appropriate, operational controls complement the emission limits and should generally result in emissions below the maximum allowed; whilst the limits themselves provide headroom to allow for

unavoidable process fluctuations. Actual emissions are therefore almost certain to be below emission limits in practice, because any operator who sought to operate its installation continually at the maximum permitted level would almost inevitably breach those limits regularly, simply by virtue of normal fluctuations in plant performance, resulting in enforcement action (including potentially prosecution) being taken. Assessments based on, say, WID limits is therefore a "worst-case" scenario.

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

6.1.1 Consideration of Furnace Type

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

The Waste Incineration BREF elaborates the furnace selection criteria as:

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

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

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

- nature/physical state of the waste and its variability
- proposed plant throughput which may affect the number of co-incineration lines
- preference and experience of chosen technology including plant availability

- nature and quantity/quality of residues produced.
- emissions to air – usually NOx as the furnace choice could have an effect on the amount of unabated NOx produced
- energy consumption – whole plant, waste preparation, effect on GWP
- Need, if any, for further processing of residues to comply with TOC
- Costs

Comparison of thermal treatment technologies

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

Technique	Key waste characteristics and suitability	Throughput per line	Advantages	Disadvantages / Limitations of use	Bottom Ash Quality	Cost
Rotary Kiln	Can accept liquids and pastes, solid feeds more limited than grate (owing to refractory damage) often applied to hazardous Wastes	<10 t/h	Very well proven with broad range of wastes and good burn out even of HW	Throughputs lower than grates	TOC <3 %	Higher specific cost due to reduced capacity
Fluid bed - bubbling	Only finely divided consistent wastes. Limited use for raw MSW often applied to sludges	1 to 10 t/h	Good mixing Fly ashes of good leaching quality	Careful operation required to avoid clogging bed. Higher fly ash quantities.	TOC <3 %	FGT cost may be lower. Costs of waste preparation
Fluid bed - circulating	Only finely divided consistent wastes. Limited use for raw MSW, often applied to sludges / RDF.	1 to 20 t/h most used above 10 t/h	Greater fuel flexibility than BFB Fly ashes of good leaching quality	Cyclone required to conserve bed material Higher fly ash quantities	TOC <3 %	FGT cost may be lower. Costs of preparation.
Oscillating furnace	MSW / heterogeneous wastes	1 – 10 t/h	Robust Low maintenance Long history Low NOX level Low LOI of bottom ash	-higher thermal loss than with grate furnace - LCV under 15 G/t	TOC 0.5 – 3 %	Similar to other technologies

Technique	Key waste characteristics and suitability	Throughput per line	Advantages	Disadvantages / Limitations of use	Bottom Ash Quality	Cost
Pulsed hearth	Only higher CV waste (LCV >20 GJ/t) mainly used for clinical wastes	<7 t/h	can deal with liquids and powders	bed agitation may be lower	Dependent on waste type	Higher specific cost due to reduced capacity
Stepped and static hearths	Only higher CV waste (LCV >20 GJ/t) Mainly used for clinical wastes	No information	Can deal with liquids and powders	Bed agitation may be lower	Dependent on waste type	Higher specific cost due to reduced capacity
Spreader - stoker combustor	- RDF and other particle feeds - poultry manure - wood wastes	No information	- simple grate construction - less sensitive to particle size than FB	only for well defined mono-streams	No information	No information
Gasification - fixed bed	- mixed plastic wastes other similar consistent streams gasification less widely used/proven than incineration	1 to 20 t/h	-low leaching residue - good burnout if oxygen blown - syngas available - Reduced oxidation of recyclable metals	- limited waste feed - not full combustion - high skill level - tar in raw gas - less widely proven	-Low leaching bottom ash - good burnout with oxygen	High operation/ maintenance costs

Technique	Key waste characteristics and suitability	Throughput per line	Advantages	Disadvantages / Limitations of use	Bottom Ash Quality	Cost
Gasification - entrained flow	- mixed plastic wastes - other similar consistent streams - not suited to untreated MSW - gasification less widely used/proven than incineration	To 10 t/h	- low leaching slag - reduced oxidation of recyclable metals	- limited waste feed - not full combustion - high skill level - less widely proven	low leaching slag	High operation/ maintenance costs pre-treatment costs high
Gasification - fluid bed	- mixed plastic wastes - shredded MSW - shredder residues - sludges - metal rich wastes - other similar consistent streams - less widely used/proven than incineration	5 – 20 t/h	-temperatures e.g. for Al recovery - separation of non-combustibles -can be combined with ash melting - reduced oxidation of recyclable metals	-limited waste size (<30cm) - tar in raw gas - higher UHV raw gas - less widely proven	If Combined with ash melting chamber ash is vitrified	Lower than other gasifiers
Pyrolysis	- pre-treated MSW - high metal inert streams - shredder residues/plastics - pyrolysis is less widely used/proven than incineration	~ 5 t/h (short drum) 5 – 10 t/h (medium drum)	- no oxidation of metals - no combustion - energy for metals/inert - in reactor acid neutralisation possible - syngas available	- limited wastes - process control and engineering critical - high skill req. - not widely proven - need market for syngas	- dependent on process temperature - residue produced requires further processing sometimes combustion	High pre-treatment, operation and capital costs

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

- Moving Grate Furnace
- Fluidised Bed
- Gasification

The Applicant identifies, in summary,

- Moving grate:- requires careful control of combustion airflow and fuel input rate, is very robust technology due to simplicity, widely used and proven, relatively low cost and economically viable on a scale such as for this size of application;
- Fluidised bed:- provides good control of combustion process and heat transfer, utilises lower combustion temperatures hence lower NOx, is less robust than grate firing, guarantees less control on fuel burn-out hence more risk of poor ash quality;
- Gasification:- offers higher heat recovery and cleaner air emissions, but the technology is relatively new, more complicated and less robust, is more expensive at this scale of operation.

The Applicant has proposed to use a furnace technology comprising a moving grate within an appropriately sized refractory-lined chamber, a water cooling system for the grate and flue gas recirculation all of which are identified in the tables above as being considered BAT in the BREF or TGN for this type of waste feed.

We have considered the assessments made by the Applicant and agree that the furnace technology chosen represents BAT. We believe that, based on the information gathered by the BREF process, the chosen technology will achieve the requirements of the WID for the air emission of TOC/CO and the TOC on bottom ash.

6.2 BAT and emissions control

The prime function of flue gas treatment is to reduce the concentration of pollutants in the exhaust gas as far as practicable. The techniques which are described as BAT individually are targeted to remove specific pollutants, but the BREF notes that there is benefit from considering the FGT system as a whole unit. Individual units often interact, providing a primary abatement for some pollutants and an additional effect on others.

The BREF lists the general factors requiring consideration when selecting flue-gas treatment (FGT) systems as:

- type of waste, its composition and variation
- type of combustion process, and its size
- flue-gas flow and temperature
- flue-gas content, size and rate of fluctuations in composition
- target emission limit values
- restrictions on discharge of aqueous effluents
- plume visibility requirements

- land and space availability
- availability and cost of outlets for residues accumulated/recovered
- compatibility with any existing process components (existing plants)
- availability and cost of water and other reagents
- energy supply possibilities (e.g. supply of heat from condensing scrubbers)
- reduction of emissions by primary methods
- release of noise.

The Technical Guidance Note points to a range of technologies being BAT subject to circumstances of the Installation.

The support fuel will be light fuel oil, which will be used primarily to raise the combustion chamber temperature sufficiently for the requirements of WID to be met when the waste wood is introduced. In the event of the combustion temperature moving out of the 850-890°C control range the waste feed will be stopped and the auxiliary burner employed to maintain the minimum temperature of 850°C whilst waste materials remain on the combustion grate.

6.2.1 Particulate Matter

Particulate matter				
Technique	**Advantages**	**Disadvantages**	**Optimisation**	**Defined as BAT in BREF or TGN for:**
Bag / Fabric filters (BF)	Reliable abatement of particulate matter to below 5mg/m^3	Max temp 250°C	Multiple compartments Bag burst detectors	Most plants
Wet scrubbing	May reduce acid gases simultaneously.	Not BAT on its own. Liquid effluent produced	Require reheat to prevent visible plume and dew point problems.	Where scrubbing required for other pollutants
Ceramic filters	High temperature applications Smaller plant.	May “blind” more than fabric filters		Small plant. High temperature gas cleaning required.
Electrostatic precipitators	Low pressure gradient. Use with BF may reduce the energy consumption of the induced draft fan.	Not BAT on their own.		When used with other particulate abatement plant

It is important to recognise that the emissions of particulates arise from 2 distinct parts of the proposed plant – from the exhaust gas emissions from the combustion of wood and from the animal bedding drying process. The Applicant has presented a worst case scenario by modelling particulates emissions from the combustion plant at maximum permitted limit WID limit combined with emissions from the dryer vents as all being emitted as PM_{10} and $PM_{2.5}$. Modelled emissions of particulate matter cannot be screened out as insignificant taking this approach, but as the emission from the combustion process is significantly different in character to the dryer emission, the BAT options have been appraised separately.

For the combustion plant, the Applicant proposes to use a combination of cyclone, electrostatic precipitator and fabric filters, all in series, for the abatement of particulate matter. Fabric filters alone provide reliable abatement of particulate matter to below 5 mg/m^3 and are BAT for most installations. The Applicant justifies this additional cost and energy usage, however, on the grounds of plant reliability. In this case, we agree that the Applicant's proposed technique is BAT for the installation.

For the dryer plant, the volumetric flow of the emission is particularly high, and the modelled particulate emission from the plant in total largely comes from this part. Warm air passes down through flaked wood spread evenly on a perforated conveyor belt, passes through the belt, which the Applicant describes as self abating for dust, and is drawn off at 3 points for emission to atmosphere. The Applicant states that the emission concentration of particulates will be maintained below 5 mg/m^3 under normal operating circumstances due to the design and method of operation, and therefore will meet the BAT standard without the need for additional abatement.

It is not considered that any of the alternative particulate abatement techniques offer any advantage and so, with the Applicant's proposed monitoring of these emission points and setting of an emission limit value, we agree that additional measures are not required for the installation.

6.2.2 Oxides of Nitrogen

Oxides of Nitrogen : Primary Measures				
Technique	**Advantages**	**Disadvantages**	**Optimisation**	**Defined as BAT in BREF or TGN for:**
Low NOx burners	Reduces NOx at source		Start-up, supplementary firing.	Where auxiliary burners required.
Starved air systems	Reduce CO simultaneously.			Pyrolysis, Gasification systems.
Optimise primary and secondary air injection				All plant.

Flue Gas Recirculation (FGR)	Reduces the consumption of reagents used for secondary NOx control. May increase overall energy recovery	Some applications experience corrosion problems.		All plant unless impractical in design (needs to be demonstrated)

Oxides of Nitrogen : Secondary Measures (BAT is to apply Primary Measures first)				
Technique	**Advantages**	**Disadvantages**	**Optimisation**	**Defined as BAT in BREF or TGN for:**
Selective catalytic reduction (SCR)	NOx emissions < 70mg/ m^3 Reduces CO, VOC, dioxins	Expensive. Re-heat required – reduces plant efficiency		All plant
Selective non-catalytic reduction (SNCR)	NOx emissions typically 150 - 180mg/m^3	Relies on an optimum temperature around 900 °C, and sufficient retention time for reduction May lead to Ammonia slip	Port injection location	All plant unless lower NOx release required for local environmental protection.
Reagent Type: Ammonia	Likely to be BAT Lower nitrous oxide formation	More difficult to handle Narrower temperature window		All plant
Reagent Type: Urea	Likely to be BAT			All plant

The Applicant proposes to implement the following primary measures:

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

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

SCR can reduce NO_x levels to below 70 mg/m^3 and can be applied to all plant, it is generally more expensive than SNCR and requires reheating of the waste gas stream which reduces energy efficiency, periodic replacement of the catalysts also produces a hazardous waste. SNCR can typically reduce NO_x levels to between 150 and 180 mg/m^3, it relies on an optimum temperature of around 900 deg C and sufficient retention time for reduction. SNCR is more likely to have higher levels of ammonia slip. The technique can be applied to all plant unless lower NO_x releases are required for local environmental protection. Urea or ammonia can be used as the reagent with either technique, urea is somewhat easier to handle than ammonia and has a wider operating temperature window, but tends to result in higher emissions of N_2O. Either reagent is BAT, and the use of one over the other is not normally significant in environmental terms.

The Applicant proposes to use SNCR with urea as the reagent.

Emissions of NO_x cannot be screened out as insignificant at the worst-case impacted receptor. Therefore the Applicant has carried out a cost / benefit study of the alternative techniques. The cost per tonne of NO_x abated over the projected life of the plant has been calculated based on an assumed concentration of 500 mgm^{-3} at the inlet of the abatement equipment and applying the respective abatement efficiencies to determine amounts removed for each technique. The predicted environmental concentration (PEC) for SNCR is coincident with the process contribution (PC) at the long term WID emission limit of 200 mgm^{-3} (i.e. 60% removal) as submitted for the air dispersion modelling in section 5.2 above. By correcting the modelled PC for 90% removal the PEC is calculated for comparison in the table below.

	Annual NO_x removed (tonnes)	**Cost of NO_x removal over 15 years £/tonne**	**Abatement efficiency**	**PEC (long term) [µg/m^3]**	**PEC as % EAL**
SCR	97	3,579	90%	13.47	34
SNCR	65	536	60%	16	40

Based on the removal and cost figures above, that SNCR would meet WID requirements and the EAL at the worst-case receptor would not be breached using SNCR, the Applicant considers that the additional cost of SCR over SNCR is not justified by the reduction in environmental impact. Thus SNCR is BAT for the Installation. The Applicant has justified the use of urea as the reagent on the basis of the scale of operation and the only marginally better environmental performance of ammonia compared to the downside of significant additional set-up costs and extra safety precautions required. The Environment Agency agrees with this assessment.

The amount of urea used for NO_x abatement will need to be optimised to maximise NO_x reduction and minimise NH_3 slip. Improvement condition IC4 requires the Operator to report to the Environment Agency on optimising the performance of the NO_x abatement system. The Operator is also required to monitor and report on NH_3 and N_2O emissions every 6 months.

6.2.3 Acid Gases, SO_x, HCl and HF

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

Acid gases and halogens : Secondary Measures (BAT is to apply Primary Measures first)				
Technique	**Advantages**	**Disadvantages**	**Optimisation**	**Defined as BAT in BREF or TGN for:**
Wet	High reaction rates Low solid residues production Reagent delivery may be optimised by concentration and flow rate	Large effluent disposal and water consumption if not fully treated for re-cycle Effluent treatment plant required May result in wet plume Energy required for effluent treatment and plume reheat		Plants with high acid gas and metal components in exhaust gas - HWIs
Dry	Low water use Reagent consumption may be reduced by recycling in	Higher solid residue production Reagent consumption controlled only		All plant

	plant Lower energy use Higher reliability	by input rate		
Semi-dry	Medium reaction rates Reagent delivery may be varied by concentration and input rate	Higher solid waste residues		
Reagent Type: Sodium Hydroxide	Highest removal rates Low solid waste production	Corrosive material ETP sludge for disposal		HWIs
Reagent Type: Lime	Very good removal rates Low leaching solid residue Temperature of reaction well suited to use with bag filters	Corrosive material May give greater residue volume if no in-plant recycle	Wide range of uses	MWIs, CWIs
Reagent Type: Sodium Bicarbonate	Good removal rates Easiest to handle Dry recycle systems proven	Efficient temperature range may be at upper end for use with bag filters – Leachable solid residues Bicarbonate more expensive	Not proven at large plant	CWIs

The Applicant proposes to implement the following primary measures:

- Use of low sulphur gas oil fuel for the start up and auxiliary burner
- Careful fuel selection, pre-treatment and segregation of the waste wood fuel to minimise the potential for unwanted materials, particularly plastics, to enter the combustion system.

There are three recognised techniques for secondary measures to reduce acid gases. These are wet, dry and semi-dry. Wet scrubbing produces an effluent for treatment and disposal in compliance with Article 8 of WID, it will also require reheat of the exhaust to avoid a visible plume. Wet scrubbing is unlikely to be BAT except where there are high acid gas and metal components in the exhaust gas as may be the case for some hazardous waste incinerators. In this case, the Applicant does not propose using wet scrubbing, and the Environment Agency agrees that wet scrubbing is not appropriate in this case.

The Applicant has therefore considered dry and semi-dry methods of secondary measures for acid gas abatement.

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

In both dry and semi-dry systems, the injected powdered reagent reacts with the acid gases and is removed from the gas stream by the bag filter system. The powdered materials are either lime or sodium bicarbonate. Both are effective at reducing acid gases, and dosing rates can be controlled from continuously monitoring acid gas emissions. The Applicant has proposed dry abatement on the basis of its greater resilience in this case.

The decision on which reagent to use is normally economic. Lime produces a lower leaching solid residue in the APC residues than sodium bicarbonate and the reaction temperature is well suited to back filters, it tends to be lower cost, but it is a corrosive material and can generate a greater volume of solid waste residues than sodium bicarbonate. Either reagent is BAT, and the use of one over the other is not normally significant in environmental terms.

In this case, the Applicant proposes to utilise sodium bicarbonate on the basis of cost effectiveness. The Environment Agency is satisfied that this is BAT.

6.2.4 Carbon monoxide and volatile organic compounds (VOCs)

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

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

6.2.5 Dioxins and furans (and Other POPs)

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

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

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

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

6.2.6 Metals

Metals				
Technique	**Advantages**	**Disadvantages**	**Optimisation**	**Defined as BAT in BREF or TGN for:**
Effective Particulate matter removal			Covered in section on particulate matter	All plant
Activated Carbon injection for mercury recovery	Can be combined with acid gas absorber or fed separately.	Combined feed rate usually controlled by acid gas content.		All plant. Separate feed normally BAT unless feed is constant and acid gas control also controls dioxin release.

The prevention and minimisation of metal emissions is achieved through the effective removal of particulate matter, and this has been considered in 6.2.1 above.

Unlike other metals however, mercury if present will be present in vapour phase. BAT for mercury removal is also dosing of activated carbon into the exhaust gas stream. This can be combined with the acid gas reagent or dosed separately. Where the feed is combined, the combined feed rate will be controlled the acid gas concentration in the exhaust. Therefore, separate feed of activated carbon would normally be considered BAT unless the feed was relatively constant.

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

6.3 BAT and global warming potential

This section summarises the assessment of greenhouse gas impacts which has been made in the determination of this Permit variation. Emissions of carbon dioxide (CO_2) and other greenhouse gases differ from those of other pollutants in that, except at gross levels, they have no localised environmental impact. Their impact is at a global level and in terms of climate change. Nonetheless, CO_2 is clearly a pollutant for IPPCD purposes.

The principal greenhouse gas emitted is CO_2, but the plant also emits small amounts N_2O arising from the operation of secondary NO_x abatement. N_2O has a global warming potential 310 times that of CO_2. The Applicant will therefore be required to optimise the performance of the secondary NO_x abatement system to ensure its GWP impact is minimised.

The major source of greenhouse gas emissions from the installation is however CO_2 from the combustion of waste. There will also be CO_2 emissions from the burning of support fuels at start up, shut down and should it be necessary to maintain combustion temperatures. BAT for greenhouse gas emissions is to maximise energy recovery and efficiency.

The primary purpose of the CHP Installation is to provide heat for the new animal bedding production dryer. Electricity generation is secondary, with limited scope beyond site use to export to the national Grid. The Applicant has estimated the annual CO_2 emissions from the new plant to be approximately 29,000 tonnes.

The Applicant has cited the equivalent operation of an animal bedding production dryer using oil fired heating, as natural gas is not available as a reliable supply, and the entire electricity demand of the site as being supplied from the National Grid for comparison. The annual CO_2 emissions in this case is estimated to be approximately 22,800 tonnes.

Although there would be still some residual use of fuel oil, for start-up and temperature maintenance, and a requirement to import electricity from the National Grid, both of these energy demands would be largely displaced by the heat and power derived from the burning of waste wood, which is considered carbon neutral and therefore contributes no GWP. The Applicant projects an annual saving of effectively 25,807 tonnes CO_2 emission.

Taking this into account, the net emissions of CO_2 from the installation cannot be characterised as insignificant. The Installation is not subject to the Greenhouse Gas Emissions Trading Scheme Regulations 2003; therefore it is a requirement of IPPCD to investigate how emissions of greenhouse gases emitted from the installation might be prevented or minimised.

The Applicant has considered GWP as part of their BAT options appraisal. There are a number of areas in which a difference can be made to the GWP of the Installation, e.g. The Applicant's BAT options appraisal compared SCR and SNCR methods of secondary NO_x abatement. In summary: the following factors influence the GWP of the facility:-

On the debit side

- CO_2 emissions from the burning of the waste wood;
- CO_2 emissions from burning auxiliary or supplementary fuels;
- CO_2 emissions associated with electrical energy drawn from the public supply;
- N_2O from the de-NOx process.
  Note: Ammonia has no direct GWP effect

On the credit side

- CO_2 saved from the reduced requirement for electricity from the public supply by displacement of burning of virgin fuels;
- CO_2 saved from the use of waste heat by displacement of burning of virgin fuels.

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

The differences in the GWP of the options in the BAT appraisal arise from small differences in energy recovery and in the amount of N_2O emitted.

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

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

6.4 BAT and POPs

International action on Persistent Organic pollutants (POPs) is required under the UN's Stockholm Convention, which entered into force in 2004 and has been signed by 151 nations. The EU implemented the Convention through the POPs Regulation (850/2004), which is directly applicable in UK law. The 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 co-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. This is logical, not least because high-temperature incineration is one of the prescribed methods for destroying POPs.

The unintentionally-produced POPs addressed by the Convention are:

- dioxins and furans;
- HCB (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, including potential alternative techniques, with a view to preventing or minimising harmful emissions. These have been applied as explained in this document, which explicitly addresses alternative techniques and BAT for the minimisation of emissions of dioxins.

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

> "Member States shall, when considering proposals to construct new facilities or significantly to modify existing facilities using processes that release chemicals listed in Annex III, without prejudice to Council Directive 1996/61/EC, give priority consideration to alternative processes, techniques or practices that have similar usefulness but which avoid the formation and release of substances listed in Annex III."

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

- maintaining furnace temperature of 850^oC 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^oC
- use of bag filters and the injection of activated carbon or coke to adsorb residual POPs components.

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

We believe that the Permit ensures that the formation and release of POPs will be prevented or minimised. As we explain above, high-temperature incineration is one of the prescribed methods for destroying POPs. Permit conditions are based on the use of BAT and 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^3. Further development of the understanding of the harm caused by dioxins has resulted in the World Health Organisation (WHO) producing updated factors to calculate the WHO-TEQ value. Certain **PCBs** have structures which make them behave like dioxins (dioxin-like PCBs), and these also have toxic equivalence factors defined by WHO to make them capable of being considered together with dioxins. The UK's independent health advisory committee, the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) has adopted WHO-TEQ

values for both dioxins and dioxin-like PCBs in their review of Tolerable Daily Intake (TDI) criteria. The Government is of the opinion that, in addition to the requirements of the WID, the WHO-TEQ values for both dioxins and dioxin-like PCBs should be specified for monitoring and reporting purposes, to enable evaluation of exposure to dioxins and dioxin-like PCBs to be made using the revised TDI recommended by COT. The release of dioxin-like PCBs and PAHs is expected to be low where measures have been taken to control dioxin releases. The Secretary of State has directed regulators to require monitoring of a range of PAHs and dioxin-like PCBs in waste incineration Permits at the same frequency as dioxins are monitored. [We have included a requirement to monitor and report against these WHO-TEQ values for dioxins and dioxin-like PCBs and the range of PAHs identified by Defra in the Environmental Permitting Guidance on the WID. We are confident that the measures taken to control the release of dioxins will also control the releases of dioxin-like PCBs and PAHs. Section 5.3.2 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]

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.

6.5 Other Emissions to the Environment

6.5.1 Emissions to water

The waste treatment and storage areas will be surfaced with concrete hardstanding and designed so that runoff will not leave the confines of those areas. Run-off water from non-process areas, such as vehicle parks and roofs, will be retained on site with tank storage and an open concrete storage channel to provide water supply for dust suppression measures. All CHP process areas will be under cover and liquids associated with that process contained on impermeable storage. There will be no permitted discharges from the waste treatment or storage areas or from the CHP process waters to controlled waters. The only surface water discharge will be surplus collected rainwater from non-process or treatment/storage areas.

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

6.5.2 Emissions to sewer

The only emissions to foul sewer are from domestic type sources and from the vehicle wash-down area. There are no process waters or run-off from waste treatment or storage areas directed to foul sewer.

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

6.5.3 Fugitive emissions

The WID specifies that plants must be able to demonstrate that the plant is designed in such a way as to prevent the unauthorised and accidental release of polluting substances into soil, surface water and groundwater. In addition storage requirements for contaminated water of Article 8(7) must be arranged.

Arrangements for capturing and containing water from process and non-process areas are described in 6.5.1. The site drainage from the area of the CHP plant can be diverted to 3 x 30,000 litre tanks or to a concrete lined channel providing up to 1 million litres storage capacity in the event of containment required due to fire or spillage.

The application provided details for mitigation of dusts being released from the site operations. The EMS required by condition 1.1.1 and PO1 shall provide details for the management of fugitive emissions relating to dusts arising from the waste acceptance, storage and treatment. Were it to be found that those measures failed to provide sufficient control of fugitive emissions then condition 3.2.2 could require a separate fugitive emissions plan to be agreed and implemented in addition.

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

6.5.4 Odour

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

Waste accepted at the installation would not ordinarily be expected to be a significant source of odour. However, the EMS required by condition 1.1.1 and the pre-operational condition PO1 shall provide details for the management of odours from on-site activities, wastes, process residues and water storage facilities. However, were an odour issue to arise, condition 3.3.2 could require a separate odour management plan to be agreed and implemented in addition to those measures.

6.5.5 Noise and vibration

Based upon the information in the application and our assessment as described in section 5.6 above, we are satisfied that the appropriate measures will be in place to prevent pollution from noise and vibration.

The application contained a noise impact assessment which identified local noise-sensitive receptors, potential sources of noise at the proposed plant and noise attenuation measures. Measurements were taken of the prevailing ambient noise levels to produce a baseline noise survey and an assessment was carried out in accordance with BS4142 to compare the predicted plant rating noise levels with the established background levels.

The noise assessment concluded that the potential for noise levels from all the site's activities to give rise complaints at the most impacted receptors could not be ruled out but was unlikely. However, the dominant source of the noise most likely to contribute to the levels at the receptors was concluded to be the plant and machinery operating on the yard, much of which is already employed in the current recycling operation. In the absence of a record of any recent noise complaints, it suggests the noise impact modelling may be conservative. The predicted additional noise from the operation of the CHP and dryer is not considered likely to cause complaints.

The Applicant has identified that the additional noisy plant will be located within dedicated acoustic enclosures or within acoustically insulated buildings, and that silencers will be fitted to exhaust stacks. Other mitigation proposed by the Applicant includes good plant and equipment maintenance, location of noisier external activities away from receptors, taking advantage of screening devices such as banks and buildings, restricted times of operation of noisier activities at night and consideration of quieter plant and equipment during routine replacement. These will form part of the Applicant's proposed noise management plan.

We have set a pre-operational condition, PO5, to ensure that the details of plant and building design take into account the mitigation measures identified in the application for noise impact assessment. The improvement condition IC7 will require a survey to verify the levels of noise impact during normal operations.

Condition 1.1 and pre-operational condition PO1 require that the EMS is in place prior to operation of the proposed plant, and we would normally expect the EMS to cover noise management. Condition 3.4 requires noise to be managed in such a way as to not cause pollution outside the site and, where this has not been achieved, the implementation of a separate noise management plan. We believe that the controls proposed are BAT and, along with the conditions in place in the permit, that the proposed activity is unlikely to give rise to noise complaints.

6.6 Setting ELVs and other Permit conditions

6.6.1 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.

Below we consider whether, for those emission not screened out as insignificant, different conditions are required as a result of consideration of local or other factors.

(i) Local factors

We have considered the following information:- location and proximity to nearby residents and wildlife habitats, the air quality and habitats assessments, human health risk assessment, proposed design and air pollution control systems and we are satisfied that for the CHP plant there is no justification to reduce ELVs below those established by WID.

The dryer itself is not subject to WID. We have applied an ELV for particulate matter of 5 mgm^{-3}, which is below WID level, but is equivalent to the level achieved by BAT.

Based on the assumptions made in the air impact assessment of the installation on the 3 nearby local wildlife sites, we are satisfied that the operation of the CHP plant will not likely have a significant impact. However, we have set the improvement condition IC8 to provide further assessment using real data from normal operating conditions in order to establish that this is the case.

(ii) National and European EQSs

We are satisfied that the limits imposed under the Waste Incineration Directive are appropriate for the CHP part of the installation with no further changes, apart from the ELV applied to the dryer as mentioned above.

(iii) Global Warming

CO_2 is an inevitable product of the combustion of waste. The amount of CO_2 emitted will be essentially determined by the quantity and characteristics of waste being co-incinerated, which are already subject to conditions in the Permit. It is therefore inappropriate to set an emission limit value for CO_2, which could do more than recognise what is going to be emitted. The gas is not therefore targeted as a key pollutant under the IPPC Directive or under the Waste Incineration Directive, e.g. it is not included in Annex III to the IPPCD, which lists the main polluting substances that are to be considered when setting emission limit values (ELVs) in Permits.

We have therefore considered setting equivalent parameters or technical measures for CO_2. However, provided energy is recovered efficiently (see section 4.3.7 above), there are no additional equivalent technical measures (beyond those relating to the quantity and characteristics of the waste) that can be imposed that do not run counter to the primary purpose of the plant, which is the destruction of waste. Controls in the form of restrictions on the volume and type of waste that can be accepted at the Installation and permit conditions relating to energy efficiency effectively apply equivalent technical measures to limit CO_2 emissions.

(iv) Commissioning

We have included a pre-operational condition (PO3) which requires the Applicant to submit a written commissioning plan, including timescales for completion. This condition also requires the Applicant to summarise the expected emissions to the environment during the different phases of commissioning and the actions to be taken to protect the environment.

6.7 Monitoring

6.7.1 Monitoring during normal operations

We have decided that monitoring should be carried out for the parameters listed in Schedule 3 using the methods and to the frequencies specified in those tables. These monitoring requirements have been imposed in order to demonstrate compliance with emission limit values and to enable correction of measured concentration of substances to the appropriate reference conditions; to gather information about the performance of the SNCR system; to deliver the EPR requirement that dioxin-like PCBs and PAHs should be monitored and to deliver the requirements of WID for monitoring of residues and temperature in the combustion chamber.

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

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

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

The Operator will provide a portable back-up fully certified CEMS system to the operating CEMS. These will be switched into full operation immediately in the event that there is any failure in the regular monitoring equipment. The back-up CEMS measure the same parameters as the operating CEMS. In the unlikely event that the back-up CEMS also fail Condition 2.3.10 of the permit requires that the WID abnormal operating conditions apply.

6.7.3 Other Monitoring Requirements

Monitoring requirements other than those required by WID have been set by the Environment Agency in Condition 3.5.1 and Schedule 3 of the permit. These monitoring requirements have been imposed in order to enable correction of measured concentration of substances to the appropriate reference conditions; to gather information about the performance of the SNCR system; to deliver the EPR requirement that dioxin-like PCBs and PAHs should be monitored and to deliver the requirements of WID for monitoring of residues and temperature in the combustion chamber.

In addition improvement condition IC2 requires an exercise be carried out to determine the size distribution of the particles emitted from the stacks, for both CHP plant and the dryer, to identify the fractions in the PM_{10}, $PM_{2.5}$ and $PM_{1.0}$ ranges. This reflects the latest scientific research which indicates that very fine particles have the most potential to adversely affect health. This is a standard improvement condition being imposed on all incinerators in order to gather information on the contribution of waste incineration generally to emissions of very fine particles.

6.7.4 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.

6.8 Reporting

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

7 Other legal requirements

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

7.1 The EPR 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 or variation.

- 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.

However, in this case the Applicant submitted a scoping report to the planning authority to determine whether or not an environmental impact assessment was required under Article 4. In advance of any decision being reached, the Applicant voluntarily submitted an EIA, which also formed part of the information submitted with the permit variation application. As such, we do not

believe that Article 4 applies and therefore also our duty to consider the requirements of Articles 5 to 7.

The grant or refusal of development consent is a matter for the relevant local planning authority. However, in determining this Variation Application we have considered the following documents: -

- The Environmental Statement submitted with the planning application (which also formed part of the Environmental Permit Variation Application).
- The response of the Environment Agency to the local planning authority in its role as consultee to the planning process.

We are satisfied that no additional or different permit conditions are necessary.

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

7.1.2 Schedule 9 to the EPR 2010 – **Waste Framework Directive**

As the Installation involves the treatment of waste, it is carrying out a *waste operation* for the purposes of the EPR 2010, and the requirements of Schedule 9 therefore apply. This means that we must exercise our functions so as to ensure implementation of certain articles of the WFD, as well as other specified requirements.

We must 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.

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

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

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

Article 23(1) requires the permit to specify:

(a) the types and quantities of waste that may be treated;

(b) for each type of operation permitted, the technical and any other requirements relevant to the site concerned;
(c) the safety and precautionary measures to be taken;
(d) the method to be used for each type of operation;
(e) such monitoring and control operations as may be necessary;
(f) such closure and after-care provisions as may be necessary.

These are all covered by permit conditions.

The permit does not allow the mixing of hazardous waste so Article 18(2) is not relevant.

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

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

7.1.3 Schedule 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 authorises the discharge of pollutants to groundwater (a "groundwater activity" under the EPR 2010), the Permit is subject to the requirements of Schedule 22, which delivers the requirements of EU Directives relating to pollution of groundwater. The Permit will require the taking of all necessary measures to prevent the input of any hazardous substances to groundwater, and to limit the input of non-hazardous pollutants into groundwater so as to ensure such pollutants do not cause pollution, and satisfies the requirements of Schedule 22.

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

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.

The Environment Agency has published such a document and this Application has been consulted upon in line with our public participation statement, as well as with the Environment Agency's 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 application and later, separately, on the draft permit variation 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 consultation and our consideration of them is set out in Annex 4.

7.2 National primary legislation

7.2.1 **Environment Act 1995**

(i) Section 4 (Pursuit of Sustainable Development)

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

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

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 Variation 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 / Countryside Council for Wales in relation to any permit that is likely to damage SSSIs.

We assessed the Application and concluded that the Installation will not damage the special features of any SSSI.

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**

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

We notified Natural England by means of an Appendix 11, that the operation of the Installation would not have a likely significant effect on the interest features of protected sites.

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

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 hem 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 : APPLICATION OF THE WASTE INCINERATION DIRECTIVE

WID Article	Requirement	Delivered by
4(3)	measurement techniques for emissions into the air comply with Annex III	See below on compliance with Article 11
4(4)	compliance with any applicable requirement of directives on: Urban Waste Water Treatment, the IPPC, Air Quality Framework, Dangerous Substances, Landfill.	Landfill Directive is not relevant to this installation. Relevant requirements of all other directives are delivered via EPR.
4(4)(a)	list explicitly the categories of waste that may be treated; using the European Waste Catalogue ("EWC") including information on the quantity of waste where appropriate.	Condition 2.3.3 and Table S2.2 in Schedule 3 of the Permit
4(4)(b)	Permit shall include the total waste incinerating capacity of the plant	Condition 2.3.3 and Table S2.2 in Schedule
4(4)(c)	specify the sampling and measurement procedures used to satisfy the obligations imposed for periodic measurements of each air and water pollutant.	Conditions 3.5.1 and Tables S3.1, S3.1(a) and S3.2, also compliance with Articles 10 and 11
5(1)	Take all necessary precautions concerning delivery and reception of wastes, to prevent or minimise pollution.	- EPR require prevent or minimise pollution. -Part 3 of the Application defines how this will be carried out. - conditions 2.3.1, 2.3.3, 3.2, 3.3 and 3.4
5(2)	determine the mass of each category of wastes, if possible according to the EWC, prior to accepting the waste.	Part 3 of the application describes procedures for the reception and monitoring of incoming waste
6(1)	Concerns incineration plant	
6(2)	Designed, equipped, built and operated to ensure flue gas to be raised to a temperature of 850ºC for two seconds.	(a) Conditions 3.5.1 and Table S3.3 (b) The Sch 5 dated 4/2/11 answer specifies measurement point (c) Condition 2.3.7

6(3)	automatic waste feed prevention: (a) at start up until the specified temperature has been reached or if this temperature is not maintained (b) when the CEMs show that ELVs are exceeded due to disturbances or failure of abatement.	Condition 2.3.6
6(4)	Different conditions than those in 6(3) may be authorised	No such conditions have been allowed
6(5)	emissions to air do not give rise to significant ground level pollution, in particular, through exhaust of gases through a stack	Emissions and their ground-level impacts are discussed in the body of this document,
6(6)	any heat generated from the process shall be recovered as far as practicable.	The main purpose of the plant is to provide heat to the drying production line.
6(7)	Relates to the feeding of infectious clinical waste into the furnace	No infectious clinical waste will be burnt
6(8)	management of the Installation to be in the hands of a natural person who is competent to manage it	Conditions 1.1.1 to 1.1.3 and 2.3.1 of the Permit fulfil this requirement
7(1)	incineration plants to comply with the ELVs in Annex V.	Does not apply
7(2)	Co-incineration plant to comply with ELVs determined according to, or set out, in Annex II.	Conditions 3.1.1 and 3.1.2 and Tables S3.1 and S3.1a
7(3)	measured ELVs to be standardised in accordance with Article 11.	Schedule 6 details this standardisation requirement
7(4)	Relates to co-incineration of mixed municipal waste	Not relevant
8(1) – 8(6)	All relate to conditions for water discharges from the cleaning of exhaust gases	There are no such discharges as condition 3.1.1 prohibits this.
8(7)	(a) prevention of unauthorised and accidental release of any polluting substances into soil, surface water or groundwater. (b) storage capacity for contaminated rainwater run-off from the site or for contaminated water from spillage or fire-fighting	The application explains the measures to be in place for achieving the directive requirements

9	(a) residues to be minimised in their amount and harmfulness, and recycled where appropriate (b) prevent dispersal of dry residues and dust during transport and storage (c) test residues for their physical and chemical characteristics and polluting potential including heavy metal content (soluble fraction)	(a)condition 3.5.1 (b) conditions 2.3.1 and 3.2.1 (c) Condition 3.5.1 and pre-operational condition PO2.
10(1) and 10(2)	measurement equipment shall be installed and techniques used to monitor the incineration process, and that the measurement requirements shall be laid down in Permits	condition 3.5.1, and tables S3.1 and S3.1(a), emissions to air, and table S3.2, process monitoring requirements
10(3)	Installation and functioning of CEMs for emissions to air and water to be subjected to regular control, testing and calibration	condition 3.5.3, and tables S3.1, S3.1(a), and S3.2
10(4)	Sampling points to be specified in Permits	tables s3.1 and s3.1(a), and s3.2
10(5)	periodic measurements to air and water to comply with Annex III, points 1 and 2	tables S3.1 and S3.1(a) specify the standards to be used.
11(2)	Continuous measurement of NO_x, CO, total dust, TOC, HCl, and SO_2 and periodic measurement of HF, heavy metals, dioxins and furans plus the measurement of combustion chamber temperature and concentration of O_2, pressure, temperature and water content of the exhaust gases	condition 3.5.1 and tables S3.1, S3.1(a) .
11(3)	verify the residence time and minimum temperature as well as oxygen content of exhaust gases	pre-operational condition PO6 in table S1.4.
11(4)	Periodic rather than Continuous measurement of HF if HCl is abated and limit values not exceeded	Condition 3.1.2 and table S3.1
11(6)	Conditional option of periodic measurement for HCl, HF and SO_2 instead of CEMs	Option not applied except for HF as per Article 11(4) above
11(7)	reduction in the monitoring frequency for heavy metals, dioxins and furans under certain conditions, provided the criteria in article 17 of WID are available	Not applied as no such criteria available

11(8)	sets out reference conditions for standardisation of measurements	Schedule 6 sets the same reference conditions
11(9)	recording and reporting requirements	Section 4 and Schedules 4 and 5
11(10)	Sets out criteria for compliance with ELVs in Annex V or II	conditions 3.1.2 and tables S3.1, S3.1(a)
11(11)	Specifies when ELVs apply, how averages are calculated (including the use of Annex III) and how many values can be discarded	table S3.1, note 2
11(12)	Average values for HCl, SO_2 and HF to be determined as per Articles 10(2), 10(4) and Annex III	See Articles 10(2), 10(4) and 11(11) above
11(14) to 11(16)	addresses the monitoring of waste water from the cleaning of exhaust gases	There are no such releases from the Installation.
11(17)	Competent authorities to be informed if ELVs are exceeded	Condition 4.3.1
12(2)	An annual report on plant operation and monitoring for all plants burning more than 2 tonne/hour waste.	Condition 4.2.2
13(1)	specify maximum period of unavoidable stoppages, disturbances or failures of purification or CEMs, during which air or water ELVs may be exceeded	Conditions 2.3.6 to 2.3.9
13(2)	cease the feed of waste in the event of a breakdown	condition 2.3.10
13(3)	Limits the maximum period under 13(1) above to 4 hours uninterrupted duration in any one instance, and with a maximum cumulative limit of 60 hours per year	condition 2.3.10.
13(4)	Limits on dust (150 mg/m3), CO and TOC not to be exceeded	Not required for co-incineration plant but PM limit included in condition 2.3.10 as BAT for installation

ANNEX 2: Pre-Operational Conditions

Based on the information on the Application, we consider that we do need to impose pre-operational conditions. These conditions are set out below and referred to, where applicable, in the text of the decision document. We are using these conditions to require the Operator to confirm that the details and measures proposed in the Application have been adopted or implemented prior to the operation of the Installation.

Reference	Pre-operational measures
PO1	Prior to the commencement of commissioning of activities A1, A2 and A3 referenced in schedule 1, table S1.1, the Operator shall send a summary of the site Environment Management System (EMS) to the Environment Agency and make available for inspection all documents and procedures which form part of the EMS. The EMS shall be developed in line with the requirements set out in Section 1 of How to comply with your environmental permit – Getting the basics right. The documents and procedures set out in the EMS shall form the written management system referenced in condition 1.1.1 (a) of the permit and shall cover all the activities permitted at this facility.
PO2	Prior to the commencement of commissioning of activity A1 referenced in schedule 1, table S1.1, the Operator shall submit to the Environment Agency for approval a protocol for the sampling and testing of incinerator bottom ash for the purposes of assessing its hazard status. Sampling and testing shall be carried out in accordance with the protocol as approved.
PO3	Prior to the commencement of commissioning of activities A1, A2 and A3 referenced in schedule 1, table S1.1, 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.
PO4	Prior to commencement of commissioning of activity A1 referenced in schedule 1, table S1.1, the Operator shall submit a written report to the Environment Agency detailing the waste acceptance procedures to be used at the site. The waste acceptance procedures shall include the process and systems by which wastes unsuitable for incineration at the site will be controlled. The procedure shall be implemented in accordance with the written approval from the Agency.
PO5	Prior to commencement of installation of plant and building associated with the combustion of waste and the animal bedding dryer, the operator shall submit a report to the Environment Agency detailing the design considerations relating to noise reduction of the new plant and buildings to achieve the levels of protection identified in the application.
PO6	After completion of furnace design and at least three calendar months before any furnace operation; the operator shall submit a written report to the Agency of the details of the computational fluid dynamic (CFD) modelling. The report shall demonstrate whether the design combustion conditions comply with the residence time and temperature requirements as defined by the Waste Incineration Directive.

ANNEX 3: Improvement Conditions

Based in the information in the Application we consider that we need to set improvement conditions. These conditions are set out below - justifications for these is provided at the relevant section of the decision document. We are using these conditions to require the Operator to provide the Environment Agency with details that need to be established or confirmed during and/or after commissioning.

Reference	Improvement measure	Completion date
IC1	The Operator shall submit a written report to the Environment Agency on the commissioning of the activities A1, A2 and A3 referenced in schedule 1, table S1.1. The report shall summarise the environmental performance of the plant as installed against the design parameters set out in the Application. The report shall also include a review of the performance of the facility against the conditions of this permit and details of procedures developed during commissioning for achieving and demonstrating compliance with permit conditions.	Within 4 months of the completion of commissioning.
IC2	The operator shall submit a written proposal to the Environment Agency to carry out tests to determine the size distribution of the particulate matter in the exhaust gas emissions to air from emission points A1, A2, A3 and A4, identifying the fractions within the PM10, PM2.5 and PM1.0 ranges. The proposal shall include a timetable for approval by the Environment Agency to carry out such tests and produce a report on the results. On receipt of written agreement by the Environment Agency to the proposal and the timetable, the operator shall carry out the tests and submit to the Environment Agency a report on the results.	Within 6 months of the completion of commissioning.
IC3	The Operator shall carry out checks to verify the residence time, minimum temperature and oxygen content of the exhaust gases in the furnace whilst operating under the anticipated most unfavourable operating conditions. The results shall be submitted in writing to the Environment Agency.	Within 4 months of the completion of commissioning.
IC4	The Operator shall submit a written report to the Environment Agency describing the performance and optimisation of the Selective Non Catalytic Reduction (SNCR) system and combustion settings to minimise oxides of nitrogen (NOx) emissions within the emission limit values described in this permit with the minimisation of nitrous oxide emissions. The report shall include an assessment of the level of NOx and N2O emissions that can be achieved under optimum operating conditions. The report shall also provide details of the optimisation (including dosing rates) for the control of acid gases and dioxins.	Within 4 months of the completion of commissioning.
Continued		

IC5	The Operator shall carry out an assessment of the impact of emissions to air of all the component metals subject to emission limit values, i.e. Cd, As, Cr, and Ni. The assessment shall predict the impact of each metal against the relevant EQS/EAL through the use of emissions monitoring data during the first year of operation and air dispersion modelling. A report on the assessment shall be made to the Environment Agency.	Within 15 months from commencement of operations
IC6	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 for parameters as specified in Table S3.1 and Table S3.1(a) complies with the requirements of BS EN 14181, specifically the requirements of QAL1, QAL2 and QAL3	Initial calibration report to be submitted to the Agency within 3 months of completion of commissioning. Full summary evidence compliance report to be submitted within 18 months of commissioning.
IC7	The operator shall carry out a noise monitoring survey at the facility to quantify the noise impact during normal operation against the information supplied in the application. The methodology and monitoring locations will be agreed in writing with the Environment Agency. The result of the survey shall be provided to the Environment Agency.	Within 9 months from commencement of operations.
IC8	The Operator shall carry out an assessment of the impact of emissions to air from activity A1 on local wildlife sites, Bothamsall Grassland Plantation, Poulter Valley(East) and Poulter Valley (West), using emissions monitoring data gathered during the first year of operation and air dispersion modelling. A report on the assessment, including deposition of nutrient nitrogen and acid gases, shall be made to the Environment Agency.	Within 15 months from commencement of operations.

ANNEX 4: Consultation Reponses

A) Advertising and Consultation on the Application

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

The Application was advertised on the Environment Agency website and in the Retford Times on *18 March 2010*. Copies of the Application were placed in the Environment Public Register at *Trentside Offices, Scarrington Road, West Bridgford, Nottingham* and the *Bassetlaw District Council* Public Register at West House, Hundred Acre Lane, Carlton Forest, Worksop.

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

- Bassetlaw Primary Care Trust
- Nottinghamshire Fire and Rescue Service
- Health and Safety Executive
- Food Standards Agency
- Environmental Health – Bassetlaw District Council

1) Consultation Responses from Statutory and Non-Statutory Bodies

Response Received from Bassetlaw PCT dated 20 December 2010	
Brief summary of issues raised:	Summary of action taken / how this has been covered
Concern regarding methods to verify composition and character of waste feedstock to the CHP plant and the potential to impact on the emissions and modelling.	Only the wood wastes specified in the permit can be accepted in the CHP plant. A pre-operational condition, PO4, requires the operator to use a waste acceptance procedure approved by us. The EMS will also detail the waste acceptance procedures required to ensure compliance with the permit conditions and WID. The emissions have been modelled using legally binding emission limits specified in the permit
Composition of the feedstock to the dryer needs to be controlled because of lack of monitoring	In their response to Sch 5 notice, dated 4/2/11, the Applicant confirmed that no waste materials will enter the dryer. Monitoring of particulates is required by the permit.
Competencies and training concerns	Covered by requirement for EMS. Condition 1.1.1(b) of the permit specifically requires the operator to

	use “sufficient competent persons and resources”
Off-site emissions during construction	Only those emissions relating to permitted activities will be covered by requirement for EMS
Concern over CO and VOCs controls being BAT as no specific abatement proposed.	The indicative BAT standard for minimising emissions of CO and VOCs is by achieving good control of combustion conditions. In addition, the operator has to meet the emission limit values for CO and TOC at all times.
Suggestion that monitoring frequency should be agreed prior to variation determination	Monitoring frequency is specified in permit.
Concern over stack heights being adequate to aid dispersion	Modelling based on proposed CHP stack including stack heights for the dryer shows sufficient dispersion and represents BAT.
Emission of particulates from the dryer where no abatement proposed is around 70% EAL as PM10. Query whether BAT and what the basis of the emission concentration is.	The original modelled emissions of PM10 did appear high in relation to EAL. The bulk of this was from the dryer, which we regard as a very conservative approach. However, based on data from equivalent operating dryer plants, the Applicant revised the dryer’s expected emission concentration. When modelled in combination with the CHP emission at the WID limit, the maximum predicted environmental concentration of total particulate matter was 53% of the EAL when modelled as PM10. This revised dryer emission concentration of 5 mg/m3 we will include as additional emission limits for the dryer vents. This limit is at the level we would expect a bag filter to achieve and therefore is equivalent to BAT.
Suggestion that fugitive emission plan should be in place prior to variation determination.	Covered by Permit condition 1.1.1 for an EMS. The condition 3.2.1 requires fugitive emissions to be controlled and where necessary to manage with a separate plan.
Questions regarding approach and data used during modelling	We are satisfied that the approach of modelling to worst case scenario and most impacted receptor is valid, as is use of Waddington met data as this is representative.
General question on whether	We have checked and agreed that

assessment of dioxin and furan has been undertaken with reference to latest guidance.	the modelled emission and human health impact is in line with established methods (e.g. TDI set by COT).
Concern that odour, noise and nuisance complaints have been made to local authority and that management plans should be in place for noise and odour prior to determination.	We have been made aware that dust complaints have been made to local authority rather than us. We are also aware of current dust management issues which are a compliance issue under the current permit conditions. Management plans for fugitive emissions, noise and odour will form part of the EMS which is required to be in place prior to commissioning.
Concerns over the noise modelling approach, competency of report authors and apparent discrepancies in data.	We have checked the modelling to confirm that the conclusions reached by Applicant that risk of noise complaints at the nearest receptors is most likely from plant and equipment currently employed on the yard rather than from the addition of CHP and dryer. The absence of recent actual complaints regarding noise would suggest the noise modelling is conservative. There will be a requirement for a noise management plan to minimise noise impacts as a part of the site's management system. The conclusion of the modelling assessment was based on the new plant having noise mitigation measures applied as detailed in the application, and the design for noise mitigation will be required by a pre-operational condition. An improvement condition will also require further monitoring to quantify the noise impact and assess against the information supplied in the application and from the pre-operational condition.

Response Received from **Nottinghamshire Fire and Rescue Service by email dated 22/11/2010**	
Brief summary of issues raised:	Summary of action taken / how this has been covered
No issues of concern and will make separate arrangements to visit	No action needed

No responses were received from the other consultees, and a reminder was sent to these bodies dated 14/4/2011. No response was received.

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

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

Guidance on the interaction between planning and pollution control is given in 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. The way in which we have done that is set out in section 3 below.

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

Representation was received from John Mann MP, who raised the following issue.

- requested specific examples from Europe of comparable sites the Applicant claimed were in existence during a meeting with him, and objected to our making a decision until these examples could be investigated.

In response to this point, although the Applicant has referred to various plant components, e.g. the combustion plant, the organic rankine cycle turbine and the drying plant, being already in use in Europe, the EP application itself does not rely on extant plant in the same configuration. They have adopted a conservative approach to the impact assessment based on emissions at WID limits and we concur with the conclusions in their assessments.

Representation was received from Councillor Patricia Douglas – Welbeck Ward, Bassetlaw District Council, who raised the following issues.

1) Local residents' concerns that laws are out of date, inadequately enforced and ineffective in protecting human health and environment
2) Impact on 'wood panelling' industry
3) EA role in reviewing alternative methods of dealing with waste wood and other alternative uses such as reuse and recycle
4) Setting of environmental limits for Elkesley area, and emissions impact on the local area
5) Has air pollution modelling taken into account proximity to A1, Gamston Airport, local power station and proposed incinerator at Worksop?
6) Have EA undertaken full impact study on 'proximity principle' of waste production and transport effects on the village?
7) Whitwell residents' concerns regarding lorry movements

8) Consultation human health impact assessment – consultations undertaken in order to make 'best possible' decision that the proposal will not adversely affect the heath of local residents, consultees' health impact assessment, residents' want reassurance that the proposal will not have long term adverse health impacts based in recent research, robustness of health modelling
9) With regard to 'fly ash' – EA role in reviewing handling, method to deal with it, safe guards against ash becoming airborne, disaster plan to protect residents if needed, test evidence in permit
10) Habitats Directive and nature conservation – regard taken, consultation with English Nature and Nottinghamshire Biodiversity Group, Clumber Park SSSI

In response to the above points:

1) The Environment Agency has a duty to regulate under the law Government stipulates. The Environment Agency does, however, have a robust permitting, compliance assessment and enforcement strategy underpinning its work in Environmental Protection. Conditions set within the permit are specifically applied to be protective of public health and the environment. Rigorous assessment of an operator's compliance with those conditions is undertaken to ensure protection for people and the environment. Where standards are not met we have a range of enforcement sanctions available to establish compliance and, where there are sufficient grounds, to suspend or even revoke a permit. Where conditions are found not to be sufficiently protective of health or environment, we can vary those conditions.
2) Not within our remit to consider.
3) EA would have a role reviewing waste wood leaving the site in terms of the 'waste hierarchy'. However, the material proposed to be burnt would be mostly waste wood unsuitable for reuse or recycling. The producer of any waste is the person responsible for complying with the waste hierarchy.
4) The Environment Agency does not set 'environmental limits' for the wider environment as such, but we do set limits for emissions to the environment on the basis of legal prescription or risk assessment. The approach in this application, as described more fully earlier in this document, was to assess the impact on air quality at the worst case location, i.e. the maximum ground level concentration. This projected impact takes into account established background levels of pollutants, air quality standards or environmental assessment levels and the predicted contribution of the process when operating with the maximum permissible emission rates. Where the impacts cannot be dismissed as insignificant, further assessment is made taking into account the best available techniques proposed to abate emissions to determine whether there is a likelihood of the particular air quality standard or environmental assessment level being breached. If there were to be a likelihood, further measures would be required of the operator and/or lower emission limits imposed. Section 5 above describes the emission impact assessment in more detail.

5) The air dispersion model we use does take into account other relevant emission sources within close proximity. Existing emission sources are accounted for in the background data used. The proposed Worksop co-incinerator would not be specifically included in the dispersion modelling by virtue of its distance and scale of operation. It should be noted that the proposal at Worksop underwent a similar impact assessment as outlined above.

6&7) Decisions over land use are matters for the planning system. The location of the installation is a relevant consideration for Environmental Permitting, but only in so far as its potential to have an adverse environmental impact on communities or sensitive environmental receptors. The environmental impact is assessed as part of the determination process and has been reported upon in the main body of this document. Vehicle access to the installation and traffic movements are relevant considerations for the grant of planning permission, but do not form part of the Environmental Permit decision making process except where there are established high background concentrations contributing to poor air quality and the increased level of traffic might be significant in these limited circumstances.

8) Bassetlaw PCT responded with a number of comments. Further information was sent to the PCT as a result of their stating that they had insufficient information to fully assess the health impacts. Their comments are set out at the beginning of this Annex. The human health impact assessment submitted with the air emissions impact assessment has been thoroughly checked by us using the latest standards, and our assessment is described more fully in Section 5 above.

9) Due to the modest scale of operation by comparison to the rest of the incineration sector, the amount of fly ash/air pollution control residue will be correspondingly small. However, waste arisings from the operation are covered by the Waste Framework Directive which requires the waste hierarchy to be applied in order to reduce disposal and promote recovery/recycling. On site handling will be initially in enclosed conveyors to sealed skips within an enclosure. The EMS the Applicant will have to have in place as a pre-operational condition will specify how this is managed to minimise the risk of fugitive emission, what accident management provision there needs to be and what mitigation procedures will need to be in place.

10) The information in the application initially was insufficient regarding the impact assessment on habitats sites. The Applicant was required to submit further assessment for the 1 protected site within 10km and the 4 local wildlife sites within 2km. The Applicant chose to assess for SSSIs outside the screening radius of 2km as well. We have checked the assessment and concur with the conclusions reached and these are described more fully in Section 5 above. As the impact on the SSSI/SAC was assessed to be insignificant, in line with our screening procedure agreed with Natural England, we

informed them of our findings, and they have not commented to disagree with our findings.

Representation was received from Nottinghamshire County Council conveying information they had received from a local resident in response to the planning application regarding bat activity at the site, and in particular the presence of the Leisler's bats in woods adjacent to the site. Impact of air emissions on Habitats sites and non-statutory conservation sites is discussed in Section 5.4 above. In view that there are no emissions to land or to water we consider that the proposal will have no likely significant effect on any protected species. We consider that the installation will not cause significant pollution to the environment. We also consider that the protective measures regarding lighting and noise for other bat species identified in the Environmental Statement would be appropriate for this species.

b) Representations from Community and Other Organisations

Representation was received from Elkesley Primary and Nursery School, who raised the following issues.

- Perceived health impacts are having a negative effect on pupil recruitment
- Concerns over particulate matter from wood burning
- Impact of HGV traffic

Some of these issues are the same as those raised by the Local Councillor.

Of the additional issues raised, the negative effect on pupil recruitment appears in the representation to be as a result of public perception of the potential health impacts of the proposed operation. We have considered the issues of air quality and human health impact in Section 5 above. The traffic issue is beyond our remit and might be more appropriately addressed to the Planning Authority. The particulate matter (PM) concern has also been addressed more fully in the impact assessment in Section 5 above. The modelling work undertaken does show the highest ground level concentration of PM very much closer to the site boundary than where the school is. Moreover, even with the very conservative assumptions used to model the impact of total PM as the smaller respirable fraction, it is unlikely that Air Quality Standards will be breached even at the maximum ground level concentration location.

Representation was received that dioxin and furan emission from the plant would affect locally grown crops and render them unfit for human consumption. This was echoed by representation made to Nottinghamshire County Council, as the planning authority, who forwarded it to us, that the National Farmers Union, on behalf of local growers, were concerned about not just the potential impact on local produce but on the perceived impact and resultant loss of business. Section 5.3 above describes in more detail the human health risk assessment method used to determine the acceptability, or otherwise, of the impact of dioxin/furan and metals release from the proposed plant. As is shown, even the worst case scenario of the theoretical maximum

exposed individual, their daily intake would be substantially less than the established tolerable daily intake. This assumes that emissions from the plant will be at the maximum of their legally permissible limits all of the time.

c) Representations from Individual Members of the Public

A total of 20 responses were received from individual members of the public. These raised many of the same issues as previously addressed. Only those issues additional to those already considered are listed below:

1) Suggestion of particulates monitoring at the primary school
2) Stockpiles of waste wood currently on site too high, and present fire risk to local woodland
3) Dust suppression sprays often not working and potentially combustible or explosive dust clouds from operations in contact with CHP flue
4) Fine particle PM2.5 not being assessed
5) Discharge to River Poulter, and impact on water voles in R Poulter
6) Independence of monitoring queried
7) Queries over latest research and human health impact modelling
8) Inconsistencies in environmental statement
9) Waste types and potential contaminants
10) Local weather issues re temperature inversions
11) Noise issues
12) The lack of environmental impact assessment of the electricity substation.

Of these,

1) Monitoring of the process itself is the most effective way of controlling PM impact, coupled with robust fugitive emission management to minimise risk at source.
2) Bassetlaw District Council set a height restriction on the wood pile, and as such we wouldn't seek to regulate this. The EMS, required as a pre-operational condition, will have to be robust enough so that the operator is able to demonstrate that piles can be managed so as to minimise potential impact on and beyond the boundary.
3) As with 2) above, the appropriate management of the wood piles and potential for dusts to be generated will be part of the EMS and will have to be able to be demonstrated by the operator.
4) PM2.5 impact assessment was not included in the original application but was included subsequently. Our assessment is included in Section 5 above in more detail.
5) There will be no authorised discharge to the River Poulter from the proposed CHP operation or from the waste treatment areas currently in operation. Uncontaminated surface water or roof water could drain off the site to the Poulter without issue.
6) All monitoring equipment, procedures and personnel will require to be MCERTS certified or accredited as appropriate. MCERTS is the Environment Agency's monitoring certification scheme which provides a robust and auditable approach to monitoring environment

emissions from regulated facilities. We also undertake detailed compliance audits to ensure monitoring is conducted as prescribed by the permit conditions and by WID.

7) We take advice on wider health issues as described more fully in Sections 5 and 6 above. This is routinely reviewed.
8) The Applicant voluntarily included an environmental statement for the planning application in the Permit Variation application information. Where pertinent apparent inconsistencies in the Permit Variation application have been noted these have been queried and resolved.
9) The waste types to be subjected to co-incineration are identified by individual 'List of Wastes' codes and are a relatively small range of wastes compared to most incineration installations. All wastes will be non-hazardous. The operator will have to be able to demonstrate that waste acceptance procedures are capable of identifying unsuitable waste to be subject to the combustion process, and this will form part of the EMS as a pre-operational condition.
10) 5 years of weather data were used in the modelling of the impacts, and that weather data we have assessed as being representative of the locality.
11) The submitted noise impact assessment we have assessed and can agree with the conclusions drawn. A pre-operational condition has been imposed so that the new plant and equipment design incorporates the noise reduction measures proposed. Further noise monitoring will be required by an improvement condition to ensure the reduction techniques deliver an appropriate level of protection.
12) Beyond our remit as far as environmental impact is concerned.

3) Matters on which the public may comment which may be more relevant to an application for Planning Permission

Precautionary Principle: The United Kingdom Interdepartmental Liaison Group on Risk Assessment (UK-ILGRA) state in their paper "The Precautionary Principle: Policy and Application" that the precautionary principle should be invoked when there is good reason to believe that harmful effects may occur and the level of scientific uncertainty about the consequences or likelihood of the risk is such that the best available scientific advice cannot assess the risk with sufficient confidence to inform decision making. The Health Protection Agency, (Response to British Society for Ecological Medicine Report, "The Health Effects of Waste Incinerators) say that "as there is a body of scientific evidence strongly indicating that contemporary waste management practices, including incineration, have at most a minor effect on human health and the environment, there are no grounds for adopting the 'precautionary principle' to restrict the introduction of new incinerators"

Location of the installation: Decisions over land use are matters for the planning system. The location of the installation is a relevant consideration for Environmental Permitting, but only in so far as its potential to have an adverse environmental impact on communities or sensitive environmental receptors.

The environmental impact is assessed as part of the determination process and has been reported upon in the main body of this document. The location of the installation can have an impact on the ability to recover waste heat for use in nearby residential, commercial or industrial premises and we commented on this in our consultation response to the local planning authority.

Vehicle access to the installation and traffic movements: These are relevant considerations for the grant of planning permission, but do not form part of the Environmental Permit decision making process except where there are established high background concentrations contributing to poor air quality and the increased level of traffic might be significant in these limited circumstances.

The Use of Alternate Technologies: It is argued that Incineration is not an environmentally sustainable technology and therefore almost by definition cannot be considered to be the Best Available Technique (BAT). 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.

It is important to draw a distinction between Sustainability Appraisal and Best Practicable Environmental Option (BPEO) and BAT. In Planning Policy Statement 10 (PPS10) (Planning for Sustainable Waste Management) Sustainability Appraisal forms part of the decision making process which should be applied so as to shape planning strategies that support the Government's planning objectives for waste management. Thus Sustainability Appraisal is an important part of plan formation and planning decisions are made by reference to planning policies. BPEO forms a similar function in Wales. BAT assessment is a technical appraisal that the proposed technique is the best available for the protection of the environment as a whole.

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 9/1/2012 and 6/2/2012.

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.

Also some of the consultation responses received were on matters which are outside the scope of the Environment Agency's powers under the Environmental Permitting Regulations. Our position on these matters is as described previously.

a) Consultation Responses from Statutory and Non-Statutory Bodies

Further representations were received from Bassetlaw District Council, who raised the following issues:-

1) Confirmation that their Authority had been in receipt of complaints over a number of years relating to dust and noise;
2) Re-iteration of the Public's concern that noise and dust problems could be exacerbated by the development.

Of these, we believe that both noise and dust will be adequately controlled as described in sections 5 and 6 above.

b) Representations from Local MP, Assembly Member (AM), Councillors and Parish / Town / Community Councils

Representations were received from John Mann MP, who raised the following issues:-

1) The site was too close to residential properties and a school to be increased in size and emissions, and that there is currently a significant loss of amenity due to size, noise and emissions;
2) That there have been breaches of existing permits, and the inability and unwillingness on the part of the operator to comply;
3) The technology is unproven and experimental.

Of these,

1) The scale of the proposal is a matter for the Planning Authority. We have assessed the potential impact from the emissions from the site and do not believe that there is a significant risk of air quality standards being breached nor significant risk of noise impact.
2) The operator has been required to take steps to reduce the impact of their current operation. They will continue to be required to comply with the conditions of the permit.
3) None of the proposed techniques in themselves are particularly new or experimental. The configuration of these techniques is unusual, but the

impact of the plant is still subject to the tight constraints imposed by WID.

Representations were received from Councillor Patricia Douglas – Bassetlaw District Council, who raised the following issues:-

1) That the site's alleged poor management should be taken into account in the determination citing the inability to comply with planning conditions as proof thereof;
2) That the concerns expressed by the Bassetlaw Primary Care Trust had not been addressed with regard to the human health impacts assessment.

Of these,

1) Compliance with planning conditions is a matter for the Planning Authority, and that based on past knowledge of regulating the site and based on what is in the Application we are satisfied they will comply with the permit as varied. We will ensure that permit conditions are met through our compliance monitoring work.
2) Our responses to the PCT concerns are addressed in Part A, 1 of this annex. This information was directed to the PCT with an invitation to comment further, to which we have received no reply. We believe that the Applicant has addressed the issues of concern.

Representations were received from Elkesley Parish Council, who raised the following issues:-

1) Perceived vagueness in the wording of permit conditions;
2) That our decision relies on honest recording and reporting;
3) That they have not been consulted adequately by the Applicant;
4) That the issue of ultra-fine and nano-particulates has not been addressed adequately enough;
5) Concern that there should be no 'acceptable' risk from incinerator emissions;
6) That mechanical wood treatment causes health effects as reported in press at other sites;
7) More stringent monitoring should be required.

Of these,

1) The conditions are explained in Section 1 above, but the wording is standardised for permits over a range of Agency functions and has been subject to scrutiny for legal enforceability.
2) Although the Operator is required to produce monitoring data, the monitoring undertaken has to be in accordance with the Agency's MCERTS scheme which provides a robust framework of procedures and operating requirements they have to demonstrate to us they are complying with. Whether the monitoring is undertaken by staff directly in the employ of the Operator or whether it is by 3rd party contractor, the standards applied are the same. We then check compliance and assess the accuracy of the monitoring to ensure that all the monitoring undertaken is representative of what is actually happening.

3) It is understood that the Applicant has consulted with some residents locally, but the amount and depth of that consultation is not a concern for this decision as we undertake and consider our own consultations.
4) This is covered by section 5.3 above.
5) A lot of the activities requiring regulation by us carry an inherent risk of impacting on the environment and/or human health. The purpose of the determination process is to ensure that those risks are mitigated sufficiently so as they are not likely to lead to significant harm.
6) We are aware of media reports relating to alleged health impacts in the vicinity of waste wood processing plants in other parts of the country where similar activities occur as are currently permitted at the Elkesley site. As explained in section 5 we are satisfied that there will be no significant impact on health.
7) Much of the monitoring requirement for co-incineration plant is prescribed by WID and is reflected in the permit. As mentioned above, the operator's monitoring will have to comply with our MCERTS scheme which we believe is sufficiently robust as to ensure a good standard of monitoring.

c) Representations from Community and Other Organisations

Representations were received from Elkesley Action Committee, who raised the following issues in addition to those made earlier.

1) Questioning identity of person making application;
2) Proposal for particulate abatement is not BAT citing information on ceramic filter systems;
3) Proposal for dioxin monitoring is not BAT as continuous emissions monitoring should be used;
4) Monitoring samples should be properly maintained for independent analysis and results shared with the parish council annually;
5) Concern over continued operation when emission limits are breached or when noise or odour levels are breached;
6) That the agency should take into account public health concerns at other sites involving wood waste treatment activities;
7) That the maximum amount of the waste permitted to be accepted at the site needs clarification;
8) Dust, incinerator emissions, odour and noise should be monitored at receptor locations in agreement with Elkesley Parish Council.

Of these,

1) We are satisfied that the person signing the Application had the authority to sign on behalf of the Applicant and that R Plevin & Sons Ltd is the Applicant.
2) We consider that bag filtration, particularly in addition to the cyclone and electro-static precipitator proposed, is BAT. This is considered in more detail in the section on BAT assessment.
3) Section 6.7.4 above describes our position on continuous monitoring of dioxin emissions.
4) All sampling will be subject to MCERTS as described above. Results of sampling and monitoring will be available on the public register.

5) The continued operation of the co-incinerator is permitted when normal emission limits are breached under certain conditions as prescribed by WID and defined within the permit. The impact of emissions in these circumstances has been assessed as not likely to breach air quality standards, and this is shown in section 5.5 above. Noise and odour are not controlled by specific limits, but in any case would be unlikely from the actual co-incineration plant.
6) We have assessed the potential for the addition of the co-incineration installation to impact on public health within sections 5.2 and 5.3 above. The current site operations, which would appear to be similar to the operations generating public concern elsewhere, are expected to be more robustly controlled through the proposed EMS to protect public health irrespective of those situations elsewhere.
7) We believe that the condition as it stands is clear and enforceable.
8) Improvement conditions have been set to re-assess the impact from the co-incineration plant and dryer using real data collected during the operational phase. The most suitable place to gather this data is from the emission points and model to assess the impact. Ambient air quality monitoring measures pollution from all sources, but the impact of incinerators on the environment is so low as to make this an unreliable method of monitoring that impact given normal fluctuations in background data. Noise will also be monitored and that will involve monitoring at receptor locations. Dust and odour monitoring, in whatever form, will be expected to form part of the EMS and be directed towards the site operations to minimise impact beyond the site boundary

Representations were received from the National Farmers Union, who raised the following issues:-

1) Polluting substances and dusts from the co-incineration plant could affect locally grown produce;
2) A cast iron guarantee is sought that the facility will in no way pollute crops as merely the perception of a problem could trigger the growers' customers to renege on their contracts;
3) Concern for downstream abstractions should the river be polluted by the facility;
4) That local growers should be represented on any community liaison group.

Of these,

1) The air impact assessment undertaken by the Applicant, and checked by us, as described in sections 5.2 and 5.3 above, shows that emissions from the plant even if released at the maximum allowed under WID would not be likely to breach environmental quality standards. In actuality, the emissions from the plant would be expected to be somewhat less than those WID limits. Bearing in mind this conclusion is based on the impact on the most exposed receptor, it is highly unlikely that, even under the abnormal operating conditions permitted by WID, emissions from the plant will have any discernible impact on local crops.

2) We have assessed the impact of the plant both on air quality and on deposition of pollutants. We are satisfied that the environmental impact of the plant will not result in the exceedence of an environmental quality standard for both the protection of public health and the environment including agricultural land.
3) As there are no emissions to surface water other than of uncontaminated run-off, it is highly unlikely that the operation of the co-incinerator plant will affect any abstractions downstream of the site.
4) This would be something the Area team would certainly consider in due course.

d) Representations from Individual Members of the Public

A total of 10 of responses were received from individual members of the public. These raised many of the same issues as previously addressed. Only those issues additional to those already considered are listed below:

1) Concern that operational noise from chipping machinery will be throughout the night, as would vehicular and operational noise from the delivery and processing of virgin timber and subsequent removal of animal bedding product;
2) Complaints made by members of the public over current odour, dust and noise are not being acknowledged by the Agency;
3) Dust suppression techniques should be reviewed against BAT;
4) Concern that emissions from the combustion plant will be unknown and no limits set for mercury or dioxin;
5) Lack of external accreditation of the proposed EMS;
6) How ash from the incineration process will be controlled, monitored and dealt with;
7) Concern that the Air Impact Assessment suggests because parameters have not been screened out as insignificant they must therefore be significant;
8) The decision appears to display an inappropriate predisposition to grant the application

Of these,

1) The noise impact assessment which was undertaken for the whole site specifies acoustic containment for the new noisier plant and limited hours of operation of noisy extant plant on external areas. Noise from traffic movements to or from the site is not within our remit to consider, but may be subject to planning restrictions. A noise management plan will be produced as detailed in the application.
2) We have been in receipt of various complaints mostly since October 2010. The majority of these were relating to dust emissions, a few with accompanying odour associated with them. The only noise complaints we appear to have had are from early 2008. We have taken these issues into account in the determination, and we are satisfied that the new activity will not give rise to additional complaints. Where improvements on the current activities are required, these will be rigorously pursued through our compliance work.

3) The operator has undertaken a BAT assessment and stated how they intend to control dust emissions. Those techniques will be assessed for effectiveness, and where improvements are required these will be rigorously pursed.
4) The exact composition of pollutants in the emission to air will be determined during operation, but emission limits based on knowledge of incinerator emissions are prescribed by WID, and these include mercury and dioxins.
5) We have no legal means of forcing an operator to have an externally accredited EMS, but there is a financial incentive in our subsistence fees and charges scheme. However, for some operators the cost of gaining and maintaining external accreditation is not economically beneficial, but we would expect no less in terms of compliance and environmental protection in any case. Assessment of and compliance with the EMS will be part of our ongoing regulation of the site.
6) The techniques for controlling ash are described in the Application, and effective control and containment would be required under the EMS. Monitoring will be undertaken to establish characterisation prior to determining suitability for recovery or recycling. Any off-site recovery or disposal route entails the duty of care requirement to adequately describe the material, in addition to the sampling and testing required by the permit. Whether going for recovery or disposal, the fate of any of the wastes leaving the site will be expected to be reviewed regularly in response to changes in waste treatment techniques elsewhere to ensure that the waste is treated in accordance with the waste hierarchy.
7) The insignificance test is our means by which further assessment need not be required of the Applicant to avoid unnecessary modelling work for a given pollutant. Just because it doesn't screen out as insignificant by application of our methodology, it doesn't mean that it is automatically significant in terms of potential impact. The application of our methodology is described in section 5.1.1 above.
8) We have a legal duty to consider applications for Environmental Permits, which are permits to undertake potentially polluting activities as prescribed by law. We will only grant a permit if the Applicant has demonstrated that the proposed facility meets the requirements of the Environmental Permitting Regulations and uses Best Available Techniques in its design and operation, the proposed design, construction and operational standards meet or exceed stringent controls and we have consulted members of the local community, the local authority and the health authority for their views on the potential effect on the environment and public health. In this case we believe all these conditions are met.