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

Decision document recording our decision-making process

The application number is:	EPR/DP3137EG/A001
The Permit Number is:	EPR/DP3137EG
The Applicant / Operator is:	Margam Green Energy Limited
The Installation is located at:	Margam Green Energy Plant, Land off Longlands Lane (Heol Cae'r Bont), Margam, Port Talbot.

What this document is about

This is a decision document, which accompanies a permit.

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

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

Preliminary information and use of terms

We gave the application the reference number EPR/DP3137EG/A001. We refer to the application as "the **Application**" in this document in order to be consistent.

The number we have given to the permit is EPR/DP3137EG. We refer to the permit as "the **Permit**" in this document.

The Application was duly made on 10th April 2014.

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

Margam Green Energy Limited's proposed facility is located at Margam Green Energy Plant, Land off Longlands Lane (Heol Cae'r Bont), Margam, Port Talbot. We refer to this as "the **Installation**" in this document.

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Glossary of acronyms used in this document

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

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 Pollutants
CROW	Countryside and rights of way Act 2000
CV	Calorific value
CW	Clinical waste
CWI	Clinical waste incinerator
DAA	Directly associated activity – Additional activities necessary to be carried out to allow the principal activity to be carried out
DD	Decision document
EAL	Environmental assessment level
EIAD	Environmental Impact Assessment Directive (85/337/EEC)
ELV	Emission limit value
EMAS	EU Eco Management and Audit Scheme
EMS	Environmental Management System
EPR	Environmental Permitting (England and Wales) Regulations 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
IED	Industrial Emissions Directive (2010/75/EU)
IPPCD	Integrated Pollution Prevention and Control Directive (2008/1/EC) – now superseded by IED
I-TEF	Toxic Equivalent Factors set out in Annex VI Part 2 of IED
I-TEQ	Toxic Equivalent Quotient calculated using I-TEF
LCPD	Large Combustion Plant Directive (2001/80/EC) – now superseded by IED
LCV	Lower calorific value – also termed net calorific value
LfD	Landfill Directive (1999/31/EC)
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
PHE	Public Health England
POP(s)	Persistent organic pollutant(s)
PPS	Public participation statement
PR	Public register
PXDD	Poly-halogenated di-benzo-p-dioxins
PXB	Poly-halogenated biphenyls
PXDF	Poly-halogenated di-benzo furans
RDF	Refuse derived fuel
RGS	Regulatory Guidance Series
SAC	Special Area of Conservation
SED	Solvent Emissions Directive (1999/13/EC) – now superseded by IED
SCR	Selective catalytic reduction

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

1 Our decision

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

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

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

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

2 How we reached our decision

2.1 Receipt of Application

The Application was duly made on 10th April 2014. This means we considered it was in the correct form and contained sufficient information for us to begin our determination, but not that it necessarily contained all the information we would need to complete that determination.

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

2.2 Consultation on the Application

We carried out consultation on the Application in accordance with the EPR, our statutory PPS and the Environment Agency RGS Note 6 for Determinations involving Sites of High Public Interest. We consider that this process satisfies the requirements of the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, which are directly incorporated into the IED, which applies to the Installation and the Application. We have also taken into account our obligations under the Local Democracy, Economic Development and Construction Act 2009 (particularly Section 23). This requires us, where we consider it appropriate, to take such steps as we consider appropriate to secure the involvement of representatives of interested persons in the exercise of our

functions, by providing them with information, consulting them or involving them in any other way. In this case, our consultation already satisfies the Act's requirements.

We advertised the Application by a notice placed on our website, which contained all the information required by the IED, including telling people where and when they could see a copy of the Application. We also placed an advertisement in the South Wales Evening Post and issued a press release about the application on 20th May 2014.

We placed a copy of the Application and all other documents relevant to our determination (see below) on our electronic Public Register. Anyone wishing to see these documents could do so and arrange for copies to be made.

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

- Neath Port Talbot County Borough Council (Environmental Protection Department)
- Neath Port Talbot County Borough Council (Planning Department)
- Bridgend County Borough Council (Environmental Protection Department)
- Dŵr Cymru Welsh Water
- Food Standards Agency
- Health and Safety Executive
- Abertawe Bro Morgannwg University Health Board
- Public Health Wales
- Mid and West Wales Fire and Rescue Service
- National Grid

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

Further details along with a summary of consultation comments and our response to the representations we received can be found in Annex 4. We have taken all relevant representations into consideration in reaching our determination.

2.3 Requests for Further Information

Although we were able to consider the Application duly made, we did in fact need more information in order to determine it, and issued a Schedule 5 Notice – Notice requiring further information on 15th July 2014. A copy of the information notice was placed on our public register as was the response when received.

In addition to our information notices, we received additional information during the determination from Fichtner Consulting Engineers Ltd by email on 22nd September 2014. The additional information provided clarification on the point

source emissions at the installation, which was supported by an updated site plan. In addition, some minor changes to surface water drainage arrangements were described. We made a copy of this information available to the public in the same way as the response to our information notice.

3 The legal framework

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

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

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

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

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

4 The Installation

4.1 Description of the Installation and related issues

4.1.1 The permitted activities

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

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

The IED definition of "waste incineration plants" and "waste co-incineration plants" says that it includes:

> *"all incineration lines or co-incineration lines, waste reception, storage, on-site pre-treatment facilities, waste, fuel and air supply systems, boilers, facilities for the treatment of waste gases, on-site facilities for treatment or storage of residues and waste water, stacks, devices for controlling incineration or co-*

incineration operations, recording and monitoring incineration or co-incineration conditions."

Many activities which would normally be categorised as "directly associated activities" for EPR purposes (see below), such as air pollution control plant and the ash storage bunker, are therefore included in the listed activity description.

There is no on-site treatment of ash associated with this installation.

An installation may also comprise "directly associated activities", which at this Installation includes the generation of electricity using a steam turbine and a back-up electricity generator for emergencies. These activities comprise one installation, because the incineration plant and the steam turbine are successive steps in an integrated activity.

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

4.1.2 The Site

The installation is located off Longlands Lane (Heol Cae'r Bont), Margam, Port Talbot at NGR SS790863. The installation is located on greenfield land adjacent to the existing Western Bioenergy facility. The installation footprint is bound by Longlands Lane to the south, the A48 (Margam Road) and the M4 to the east and Margam Moors, the Tata Steelworks and the London to Swansea railway line approximately 370m to the west and the A4241 to the north. The installation occupies an area of approximately 3.98 hectares.

There are a number of ecologically sensitive sites within the distance criteria including the Kenfig and Glaswelltiroedd Cefn SACs and Margam Moors and Eglwys Nunydd Reservoir SSSIs. The closest designated site to the facility is Eglwys Nunydd Reservoir SSSI, which is located approximately 900m to the south of the installation.

The location of the installation is material to our determination of the permit application to the extent that it has implications for the following matters:

- The impact of emissions on local communities and sensitive environmental receptors;
- The question of whether or not the recovery of waste or process heat is a Best Available Technique (BAT) for the Installation; and
- The nature and scale of pollution prevention measures necessary to minimise the risk to the environment and human health.

These matters are all addressed in this decision document.

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

Further information on the site is addressed below at 4.3.

4.1.3 What the Installation does

The Applicant has described the facility as a green energy plant fuelled by waste wood biomass. Our view is that for the purposes of IED (in particular Chapter IV) and EPR, the installation is a waste co-incineration plant because notwithstanding the fact that waste will be thermally treated by the process; the process is never the less 'co-incineration' because it is considered that main purpose of this plant is the generation of energy. The objective of the installation is to convert non-hazardous waste wood biomass fuel into electricity using conventional steam cycle technology.

The installation has a design thermal fuel input capacity of approximately 125 MWth through a single co-incineration line. The installation is permitted to accept 335,000 tonnes per annum (tpa) of non-hazardous waste wood, which is burned on a moving grate to produce steam. The steam passes to a steam turbine which drives an electricity generator to produce approximately 41.8 MWe of electricity.

The biomass fuel comprises waste wood sourced from commercial, industrial, construction and demolition waste streams. The biomass fuel arrives on site in the form of pre-processed wood chips. The woodchips are delivered to site by road and unloaded into a fuel storage area which is in an enclosed building.

The fuel is transferred from the fuel storage facility into the moving grate combustion unit. Hot gases from the waste combustion are then passed through a boiler to raise steam, which in turn is passed to a steam turbine to generate electricity for export to the National Grid. Exhaust steam from the turbine is condensed in an air cooled condenser and the condensate is recycled to the boiler. The plant will use Liquefied Petroleum Gas (LPG) and gas oil for start-up purposes and combustion stabilisation where required.

The facility has been designed to be "CHP ready". This means that when, for example, a district heating market or industrial user becomes available, the provision of a heat off-take to supply a network will be possible without any modifications to the installed system.

Emissions of nitrogen oxides will be controlled by the injection of an ammonia based SNCR reagent into the combustion chamber. The combustion gases will be cleaned in a flue gas treatment plant. This will include the injection of carbon, primarily to control dioxin emissions, the injection of lime to control acid gas emissions and the use a of fabric filter to remove dust. The cleaned exhaust gases are then released to air via a 65 metre stack.

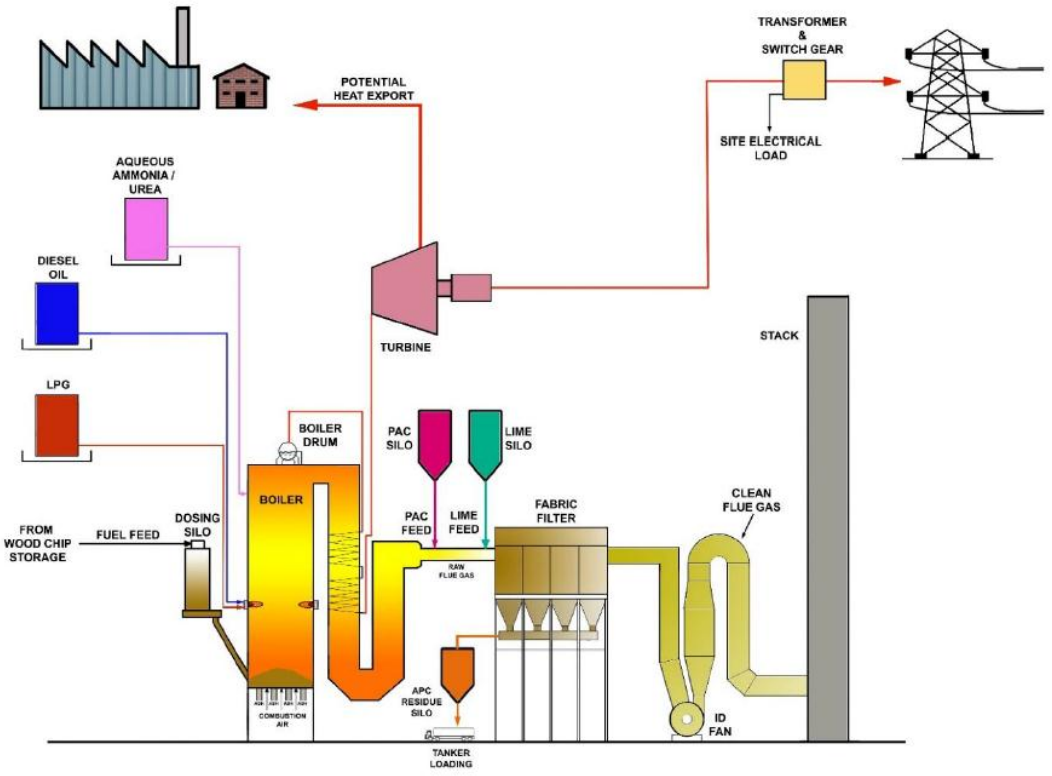
Main waste streams include the boiler blowdown to sewer and ash residues from the boiler and flue gas cleaning. Bottom ash (burnt-out residue from the combustion process) and boiler ash (ash collected at the bottom of the boiler passes) will be removed by a wet ash conveyor designed to cool and moisten

the ash to limit particulate emissions. From here the ash passes into an ash storage pit designed for 3 – 4 days storage, prior to being transferred off-site to a suitably licenced waste management facility for recovery or disposal. Residues from the air pollution control equipment is extracted from the hopper of the bag filter unit and conveyed to a fully enclosed storage silo with a 3 – 4 day operating capacity, prior to being transferred off site to a suitably licensed waste management facility for recovery or disposal.

Surface water run-off will drain into a balancing pond, which controls the flow into an unnamed ditch which in turn, flows into the Upper Mother Ditch. All surface water run-off from roadways, car parks and vehicle movement areas will pass through an interceptor prior to discharge into the balancing pond.

Process Flow Diagram

The process is illustrated in the following simplified diagram:



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

Waste throughput, Tonnes/line	278,000 tonnes / annum (assuming a CV of 13.1 MJ/Kg)	34.4 tonnes /hour
Waste processed	Wood	
Number of lines	1	
Typical Operating Hours	8,060 hours / annum	
Furnace technology	Moving Grate	
Auxiliary Fuel	Gas Oil and / or Liquefied Petroleum Gas (LPG)	
Acid gas abatement	Dry	Hydrated lime
NOx abatement	SNCR	Ammonia or urea – to be confirmed via Pre-operational condition PO10
Estimated Reagent consumption	Auxiliary Fuel 2,000 te/annum Ammonia/Urea: 2,400 te/annum Lime: 1,900 te/annum Activated carbon: 75 te/annum Process water: 48,360 m^3/annum	
Flue gas recirculation	The use of this technology is being considered, but has not yet been confirmed. The operator is required to confirm this via pre-operational condition PO7.	
Dioxin abatement	Activated carbon	
Stack	Grid Reference 278906, 186366	
	Height, 65 m	Diameter, 2.3 m
Flue gas	Flow, 45.3 Nm^3/s	Velocity, 17.8 m/s
	Temperature 141°C	
Electricity generated	41.8 MWe	337,000 MWh based on nominal fuel capacity for the installation of 278,000 tonnes of fuel.
Electricity exported	38 MWe	307,000 MWh based on nominal fuel capacity for the installation of 278,000 tonnes of fuel.
Steam conditions (bled from the two final turbine extractions)	Temperature, 140 °C and 100°C respectively	Pressure, 3.5 bara and 1 bara respectively
Steam exported	Currently 0 tonnes/hour	Currently 0 MWh
	Temperature, as above	
Waste heat use	Four potential heat networks identified, but further analysis is required to confirm the heat loads and associated costs. This is addressed by permit conditions 1.2.2 and 1.2.3.	

4.1.4 Key Issues in the Determination

The key issues arising during this determination were:

- Emissions to air. The discharge from emission point A1 required careful consideration of the potential impacts on human health and nature conservation sites in the context of the Emission Limit Values (ELVs) set by the Industrial Emissions Directive (IED). The applicant used air dispersion modelling to establish the predicted impact of the installation on air quality and made comparisons against Environmental Quality Standards (EQS) for the protection of human health and standards for the protection of habitats provided in the Environment Agency's H1 Environmental Risk Assessment guidance.

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

4.2 The site and its protection

4.2.1 Site setting, layout and history

The installation site is a greenfield site comprising semi-improved marshy grassland which has formed over time from reclaimed salt marshes. The installation is bound by Longlands Lane to the south, the A48 (Margam Road) and the M4 to the east and Margam Moors, the Tata Steelworks and the London to Swansea railway line approximately 370m to the west and the A4241 to the north.

The edge of the urban area of Margam is located approximately 600m to the north of the site. The town of Neath is located approximately 10km along the coast to the North West.

The installation occupies an area of approximately 3.98 hectares. The land is gently sloping from east to west and is surrounded to north, south and west by a wooded area, with scrub land to the east.

To the west, an extended area of marshy grassland abuts further dense scrub and woodland and a major drainage watercourse called the Upper Mother Ditch.

To the eastern boundary of the site is a private residential property (Tyn-y-Caeau). To the south of this property is an area of raised ground, which continues to the current site access.

The site layout is shown on the site plan in Schedule 7 of the permit.

4.2.2 Proposed site design: potentially polluting substances and prevention measures

There are no releases to land or groundwater associated with the installation.

The operator has identified the hazards associated with the installation, which could present a risk to the environment in the event of an accident. The risks have been evaluated in Annex 4 of the permit application and the operator has described the procedural and physical control measures which are being developed to mitigate them.

All process areas, loading / unloading areas, materials handling areas and roadways will be covered in concrete and / or tarmac hardstanding. The external areas of hardstanding will be provided with kerbed containment, where appropriate, to prevent any potential spills causing pollution of the ground / groundwater and surface water.

All chemicals will be stored in an appropriate manner incorporating the use of bunding and other measures (such as acid and alkali resistant coatings) to ensure appropriate containment. In addition, spillage absorbent materials will be made available on site at easily accessible locations where liquids are stored. Tanker off-loading of chemicals will take place within areas of concrete hardstanding with falls to a gully and / or sump.

Storage tanks will be bunded at 110% of the tank capacity and the offloading point will be fully contained with the appropriate capacity to contain any spills during fuel or reagent delivery.

Surface water run-off from car parks, roadways and vehicle movement areas will pass through oil interceptors prior to entry into a balancing pond before emission point W1. Site drainage for external areas will also be fitted with a shut off alarm, linked to the fire detection systems to contain any contaminated water from fire-fighting from external areas.

The operator intends to operate the site in accordance with ISO 14001, which will incorporate staff competence training and an accident management plan. There will also be a regime of routine inspection and maintenance for key plant items, such as containment bunds.

We are satisfied that the pollution risk associated with the installation is low based on the use of appropriate surfacing, satisfactory containment, inspection measures and the operating procedures which will be put in place as part of the ISO 14001 environmental management system.

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

The baseline report is an important reference document in the assessment of contamination that might arise during the operational lifetime of the installation and at cessation of activities at the installation.

The Applicant has submitted a site condition report which includes a report on the baseline conditions as required by Article 22. We have reviewed that report and consider that it adequately describes the condition of the soil and groundwater prior to the start of operations. However we have added pre-operational condition PO3 which requires information supplementary to that already provided in the application site report, which is needed to meet the information requirements of Article 22(2) of IED. Specifically, any relevant hazardous substances which are used, produced or released by the installation need to be identified and additional baseline monitoring undertaken if relevant hazardous substances are associated with the installation.

In addition, we have set pre-operational condition PO4 which requires the operator to provide a detailed summary of the site's hydrogeology, including groundwater flow direction and a brief description of aquifer properties (for example porosity and permeability), as these were not adequately addressed in the application site condition report. The response to the pre-operational condition shall also include a detailed site drain plan for the site as built. This is necessary because the site has not yet been constructed, so no drainage plan was available at the time of permit application.

In respect of the protection of the soil and groundwater and the monitoring regime to demonstrate continued protection, pre-operational condition PO6 has been included in the Permit requiring the Operator to submit a written protocol to Natural Resources Wales that shall demonstrate how the Operator will meet the requirements of Articles 14(1)b, 14(1)e and 16(2) of the IED. The protocol shall be implemented in accordance with the written agreement from Natural Resources Wales.

4.2.3 Closure and decommissioning

Having considered the information submitted in the Application, we are satisfied that the appropriate measures will be in place for the closure and decommissioning of the Installation, as referred to in section 2.9 of the supporting information document within the permit application. Permit condition 1.1.1a requires the Operator to have a written management system in place which identifies and minimises risks of pollution including those arising from closure.

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

4.3 Operation of the Installation – general issues

4.3.1 Administrative issues

The Applicant is the sole Operator of the Installation.

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

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

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

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

4.3.2 Management

The Applicant has stated in the Application that they will implement an Environmental Management System (EMS) that will be certified under ISO14001. Natural Resources Wales recognises that certification of the EMS cannot take place until the Installation is operational. An improvement condition (IC1) is included requiring the Operator to report progress towards gaining accreditation of its EMS.

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

4.3.3 Site security

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

4.3.4 Accident management

The Applicant has not submitted an Accident Management Plan, but has committed to developing one as part of their environmental management system. However, having considered the other information submitted in the Application, we are satisfied that appropriate measures will be in place to ensure that accidents that may cause pollution are prevented but that, if they should occur, their consequences are minimised. In order to ensure that the

management system proposed by the Applicant sufficiently manages the residual risk of accidents, permit condition 1.1.1a requires the implementation of a written management system which addresses the pollution risks associated with, amongst other things, accidents.

4.3.5 Off-site conditions

We do not consider that any off-site conditions are necessary.

4.3.6 Operating techniques

We have specified that the installation must be operated in accordance with the techniques set out in Table S1.2 of the Permit. The details referred to in that table describe the techniques that will be used for the operation of the Installation that have been assessed by Natural Resources Wales 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 45(1) of the IED requires that the Permit must include a list of all types of waste which may be treated using at least the types of waste set out in the European Waste List established by Decision 2005/532/EC, EC, if possible, and containing information on the quantity of each type of waste, where appropriate. The Application contains a list of those wastes coded by the European Waste Catalogue (EWC) number, which the Applicant will accept in the waste streams entering the plant and which the plant is capable of burning in an environmentally acceptable way. We have specified the permitted waste types, descriptions and where appropriate quantities which can be accepted at the installation in Table S2.2.

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 within the design calorific value (CV) range for the plant;
(iii) these wastes are unlikely to contain harmful components that cannot be safely processed at the Installation.

The applicant is permitted to accept up to 335,000 tonnes of waste wood at the facility per annum. The nominal design capacity of the plant is 278,000 tonnes of waste wood per annum, based on the installation operating 8,060 hours per

year at a nominal capacity of 34.4 tonnes per hour, using fuel with a net calorific value of 13.1 MJ/kg. The difference between the total waste quantity to be accepted on site and the nominal design capacity provides for:

(i) variations in the net calorific value of the fuels being combusted. Net calorific value is expected to range between 10.8 MJ/kg to 15.4MJ/kg; and
(ii) any availability exceeding the predicted 8,060 hours.

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

4.3.7 Energy efficiency

(i) Consideration of energy efficiency

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

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

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

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

(ii) Use of energy within the Installation

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

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

(i) Use of high efficiency motors;
(ii) High standards of cladding and insulation;
(iii) The boilers will be equipped with economisers and superheaters to optimise thermal cycle efficiency;
(iv) Unnecessary releases of steam and hot water will be avoided to avoid the loss of boiler water treatment chemical and the heat contained within the steam and water;
(v) Low grade heat will be extracted from the turbine and used to preheat combustion air in order to improve the efficiency of the thermal cycle;
(vi) Steady operation will be maintained where necessary by using auxiliary fuel firing; and
(vii) Boiler heat exchange surfaces will be cleaned on a regular basis to ensure efficient heat recovery.

The Application states that the specific energy consumption, a measure of total energy consumed per unit of waste processed, will be 110 kWh/tonne. This is based on the nominal design capacity of 278,000 t/a.

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 LCV in this case is expected to be 13.1 MJ/kg. Taking account of the difference in LCV, the specific energy consumption in the Application is in line with that set out above.

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

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

The Environment Agency's CHP Ready Guidance (February 2013) considers that BAT for energy efficiency for Energy from Waste (EfW) plant is the use of

CHP in circumstances where there are technically and economically viable opportunities for the supply of heat from the outset.

The term CHP in this context represents a plant which also provides a supply of heat from the electrical power generation process to either a district heating network or to an industrial / commercial building or process. However, it is recognised that opportunities for the supply of heat do not always exist from the outset (i.e. when a plant is first consented, constructed and commissioned).

In cases where there are no immediate opportunities for the supply of heat from the outset, Natural Resources Wales considers that BAT is to build the plant to be CHP Ready (CHP-R) to a degree which is dictated by the likely future opportunities which are technically viable and which may, in time, also become economically viable.

The BREF says that where a plant generates electricity only, it is BAT to recover 0.4 – 0.65 MWh/ tonne of waste (based on LCV of 10.4 MJ/kg). Our technical guidance note, SGN EPR S5.01, states that where electricity only is generated, 5-9 MW of electricity should be recoverable per 100,000 tonnes/annum of waste (which equates to 0.4 – 0.72 MWh/tonne of waste).

The Installation will generate electricity only at present, but has been designed with the potential to export approximately 9 MWth of heat to local heat users. Based on the current mode of operation, where the installation is generating electricity only, the Sankey diagram in section 2.6.2 of the supporting information within the Application shows 41.8 MW of electricity produced for an annual burn of 278,000 tonnes, which represents 13.7 MW per 100,000 tonnes/yr of waste burned (1.21 MWh/tonne of waste). The Installation therefore meets BAT in this respect.

The SGN and Chapter IV of the IED both require that, as well as maximising the primary use of heat to generate electricity; waste heat should be recovered as far as practicable.

The location of the Installation largely determines the extent to which waste heat can be utilised, and this is a matter for the planning authority. The Applicant carried out a feasibility study, which showed there was potential to provide district heating to local businesses; suitable opportunities are being explored, though there are no firm commitments at this stage. There is provision within the design of the steam turbine to extract low-grade steam for a district heating scheme. Establishing a district heating network to supply local users would involve significant technical, financial and planning challenges such that this is not seen as a practicable proposition at present. However, the installation has been designed to be “CHP ready”. When a district heating market becomes available, the provision of a heat off-take to supply a network will be possible without any modifications to the installed system.

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

(iv) R1 Calculation

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

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

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

(v) Choice of Cooling System

Steam will be cooled using an air-cooled condenser in which the low pressure exhaust steam from the turbine is condensed by blowing ambient air over heat exchangers from large diameter, slow speed axial fans. The condensed steam is returned as feed water in a closed circuit pipework system to the boiler.

The two main alternatives to an air cooled condenser are a water cooled condenser or an evaporative condenser. The former uses a recirculating water supply to condense the steam and the latter uses water which is evaporated directly from the condenser surface and lost to the atmosphere to provide the required cooling.

Water cooled systems require significant volumes of water and a receiving watercourse for the off-site discharge of the cooling water. There is not a readily available supply of water for cooling or a receiving watercourse for any discharge. On this basis, we agree with the applicant's conclusion that water cooled systems are not an available technology to the installation and an air cooled condenser therefore represents BAT for the installation.

(vi) Permit conditions concerning energy efficiency

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

The Operator is required to report energy usage and energy generated under condition 4.2 and Schedule 4. The following parameters are required to be reported: electrical energy generated; electrical energy exported; electrical energy used on installation, thermal energy produced (e.g. steam), thermal energy exported and thermal energy used on installation. Together with the total waste wood co-incinerated per year, this will enable Natural Resources Wales to monitor energy recovery efficiency at the Installation and take action if at any stage the energy recovery efficiency is less than proposed.

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

4.3.8 Efficient use of raw materials

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

The Operator is required to report with respect to raw material usage under condition 4.2. and Schedule 4, including consumption of ammonia / urea, activated carbon and lime used per tonne of waste burned. This will enable Natural Resources Wales 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 4.2.2. Optimising reagent dosage for air abatement systems and minimising the use of auxiliary fuels is further considered in the section on BAT.

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

This requirement addresses wastes produced at the Installation and does not apply to the waste being treated there. The principal waste streams the Installation will produce are bottom ash, boiler ash, air pollution control residues and recovered metals.

The first objective is to avoid producing waste at all. Waste production will be minimised 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 S3.5 specify limits for total organic carbon (TOC) of <3% in bottom ash. Compliance with this limit will demonstrate that good combustion control and waste burnout is being achieved in the furnaces and waste generation is being avoided where practicable.

Incinerator bottom ash (IBA) will normally be classified as non-hazardous waste. However, IBA is classified on the European List of Wastes as a "mirror entry", which means IBA is a hazardous waste if it possesses a hazardous property relating to the content of dangerous substances. Monitoring of incinerator ash will be carried out in accordance with the requirements of Article 53(3) of IED. Classification of IBA for its subsequent use or disposal is controlled by other legislation and so is not duplicated within the permit.

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

waste treatment. The amount of APC residues is minimised through optimising the performance of the air emissions abatement plant.

In order to ensure that the IBA and APC residues are adequately characterised, pre-operational condition PO11 requires the Operator to provide a written plan for approval detailing the ash sampling protocols. Table S3.5 requires the Operator to carry out an ongoing programme of monitoring.

The Application states that where possible, bottom ash will be transported to a suitable recycling facility, as it can be recycled in the construction industry in the manufacture of blocks. The Applicant is currently investigating options for the recovery of bottom ash at facilities in the local area.

Having considered the information submitted in the Application, we are satisfied that the waste hierarchy referred to in Article 4 of the WFD will be applied to the generation of waste and that any waste generated will be treated in accordance with this Article.

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

5. Minimising the Installation's environmental impact

Regulated activities can present different types of risk to the environment, these include odour, noise and vibration; accidents, fugitive emissions to air and water; as well as point source releases to air, discharges to ground or groundwater, global warming potential and generation of waste. Consideration may also have to be given to the effect of emissions being subsequently deposited onto land (where there are ecological receptors). All these factors are discussed in this and other sections of this document.

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

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

5.1 Assessment Methodology

5.1.1 Application of Environment Agency 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 the Environment Agency Horizontal Guidance Note H1 and has the following steps:

- Describe emissions and receptors

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

5.1.2 Use of Air Dispersion Modelling

For incineration applications, we normally require the Applicant to submit a full air dispersion model as part of their application. Air dispersion modelling enables the process contribution to be predicted at any environmental receptor that might be impacted by the plant.

Once short-term and long-term PCs have been calculated in this way, they are compared with Environmental 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, the Environment Agency 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. In a very small number of cases, e.g. for emissions of Lead, the National EQS is more stringent than the EU EQS. In such cases, we use the National EQS standard for our assessment.

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.

PCs are considered **Insignificant** if:

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

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

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

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

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

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

Where an emission is screened out in this way, we would normally consider the Applicant's proposals for the prevention and control of the emission to be BAT. That is because if the impact of the emission is already insignificant, it follows that any further reduction in this emission will also be insignificant.

However, where an emission cannot be screened out as insignificant, it does not mean it will necessarily be significant.

For those pollutants which do not screen out as insignificant, we determine whether exceedances of the relevant EQS are likely. This is done through detailed audit and review of the Applicant's air dispersion modelling taking background concentrations and modelling uncertainties into account. Where an exceedance of an EU EQS is identified, we may require the Applicant to go beyond what would normally be considered BAT for the Installation or we may refuse the application if the applicant is unable to provide suitable alternative proposals. Whether or not exceedances are considered likely, the application is subject to the requirement to operate in accordance with BAT.

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

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

5.2 Assessment of Impact on Air Quality

The Applicant's assessment of the impact of air quality is set out in Annexes 4 and 5 of the Application. The assessment comprises:

- An H1 screening assessment of emissions to air from the operation of the incinerator.
- Dispersion modelling of emissions to air from the operation of the incinerator.
- A study of the impact of emissions on nearby sensitive habitat / conservation sites.

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

The Applicant has assessed the Installation's potential emissions to air against the relevant air quality standards, and the potential impact upon local conservation and habitat sites and human health. These assessments predict the potential effects on local air quality from the Installation's stack emissions using the ADMS 5.0 dispersion model, which is a commonly used computer model for regulatory dispersion modelling. The model used 5 years of meteorological data collected from the weather station at Mumbles Head between 2009 and 2013. Mumbles Head is located approximately 16 km to the west of the facility. The impact of the terrain surrounding the site upon plume dispersion was considered in the dispersion modelling.

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

- First, they assumed that the ELVs in the Permit would be the maximum permitted by Article 46(2) of the IED, converted from 11% to 6% oxygen where appropriate to reflect the fact that the installation is a co-incineration plant . These substances are:
    - Oxides of nitrogen (NO_x), expressed as NO_2
    - Total dust
    - Sulphur dioxide (SO_2)
    - Hydrogen chloride (HCl)
    - Hydrogen fluoride (HF)
    - Metals (Mercury, Antimony, Arsenic, Lead, Chromium, Cobalt, Copper, Manganese, Nickel and Vanadium)
    - Polychlorinated dibenzo-para-dioxins and polychlorinated dibenzo furans (referred to as dioxins and furans)
    - Gaseous and vaporous organic substances, expressed as Total Organic Carbon (TOC)

  For carbon monoxide (CO) where the applicant used an emission concentration of 15 mg/m^3, which is below the IED emission limit of 75 mg/m^3 (at 6% oxygen). However, our own check modelling assessed the CO emission at the IED emission limit concentration.
  For cadmium and thallium, the applicant based their modelling firstly on the assumption that cadmium comprises 50% of the aggregate emission limit for cadmium and thallium. They have also used data from the Wilton 10 biomass plant (which uses the same feedstock as the installation). This data indicates that combined concentrations of cadmium and thallium are a maximum of about 14% to the aggregate emission limit. On this basis, the applicant has assumed that the entire 14% is comprised of cadmium and

have therefore modelled cadmium at 14% of the emission limit. Our own check modelling assessed the cadmium emission at 100% of the aggregate IED emission limit. Our own check modelling of cadmium is explained in more detail in section 5.2.3 of this document.

- Second, they assumed that the Installation operates continuously at the relevant long-term or short-term emission limit values, i.e. the maximum permitted emission rate
- Third, the model also considered emissions of pollutants not covered by Annex VI of IED, specifically ammonia (NH_3), Polycyclic Aromatic Hydrocarbons (PAH) and PCB's.

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

The applicant has assessed data on background concentrations of pollutants from a number of available sources. These include monitoring undertaken by Neath Port Talbot County Borough Council at a number of locations across the borough, the closest of which is located approximately 1km to the north of the site. The applicant has also drawn information from Background Air Pollution maps published by DEFRA.

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

The way in which the Applicant used dispersion models, its selection of input data, use of background data and the assumptions it made have been reviewed by Natural Resources Wales modelling specialists to establish the robustness of the Applicant's air impact assessment. The output from the model has then been used to inform further assessment of health impacts and impact on habitats and conservation sites.

Our review of the Applicant's assessment leads us to agree with the Applicant's conclusions. We have also audited the air quality and human health impact assessment and similarly agree that the conclusions drawn in the reports were acceptable.

The Applicant's modelling predictions are summarised in the following sections.

5.2.1 Assessment of Air Dispersion Modelling Outputs

The Applicant's modelling predictions are summarised in the tables below. The figures shown indicate the predicted peak ground level exposure to pollutants in ambient air.

Predicted Long Term Impacts

Pollutant	EQS/ EAL ($\mu g/m^3$)	PC ($\mu g/m^3$)	PC as % of EQS/ EAL	Background conc ($\mu g/m^3$)	PEC ($\mu g/m^3$)	PEC as % EQS/ EAL
NO_2	40	4.53	11.33	20.62	25.15	62.86
PM_{10}	40	0.32	0.81	16.58	16.9	42.26
$PM_{2.5}$	25	0.32	1.29	11.22	11.54	46.17
HF	16	0.03	0.20	2.35	2.38	14.89
Ammonia	180	0.32	0.18	0.83	1.15	0.64
VOC (as benzene)	5	0.32	6.46	0.28	0.60	12.06
VOC (as 1, 3-butadiene)	2.25	0.32	14.36	0.12	0.44	19.69
Mercury	0.25	0.00108	0.43	0.00192	0.003	1.2
Cadmium[1]	0.005	0.00054	10.77	0.0005	0.00104	20.77
Dioxins	-	0.00000000215	-	0.00000004144	0.00000004359	-
PCBs	0.2	0.00016	0.08	0.00006	0.00023	0.11
PAHs	0.00025	0.00000646	2.58	0.0004	0.00040646	162.58
Arsenic	0.003	0.01077	358.93	0.00072	0.01149	382.93
Antimony	5	0.01077	0.22	-	-	-
Chromium	5	0.01077	0.22	0.00434	0.01511	0.3
Chromium VI	0.0002	0.01077	5384	0.00087	0.01164	5818
Cobalt	-	0.01077	-	0.0002	0.01097	-
Copper	10	0.01077	0.11	0.00864	0.01941	0.19
Lead	0.25	0.01077	4.31	0.0156	0.02637	10.55
Manganese	0.15	0.01077	7.18	0.0604	0.07117	47.45
Nickel	0.02	0.01077	53.84	0.0017	0.01247	62.34
Vanadium	5	0.01077	0.22	0.00271	0.01348	0.27

[1]Our check modelling for cadmium at 100% of the EQS gave a PC of 21.6% and a PEC of 40% at the maximum point on the grid.

Predicted Short Term Impacts

Pollutant	EQS/ EAL ($\mu g/m^3$)	PC ($\mu g/m^3$)	PC as % of EQS/ EAL	Background conc ($\mu g/m^3$)	PEC ($\mu g/m^3$)	PEC as % EQS/ EAL
NO_2	200	21.77	10.88	41.24	63.01	31.5
SO_2 (15 min)	266	16.6	6.24	10.84	27.44	10.32
SO_2 (1 hr)	350	15.34	4.38	10.84	26.18	7.48
SO_2 (24 hr)	125	11.7	9.36	10.84	22.54	18.03
PM_{10}	50	0.99	1.99	33.16	34.15	68.31
CO (8hr)[1]	10000	14.61	0.15	680	694.61	6.95
HCl (1 hr)	750	9.57	1.28	1.5	11.07	1.48
HF	160	0.96	0.6	4.7	5.66	3.54
Ammonia	2500	9.57	0.38	1.66	11.23	0.45
Mercury	7.5	0.03191	0.43	0.00384	0.03575	0.48
Cadmium	-	0.01596	-	0.001	0.01696	-
PCBs	6	0.00479	0.08	0.00013	0.00491	0.08
Arsenic	-	0.3191	-	0.00144	0.32054	-
Antimony	150	0.3191	0.21	-	-	-
Chromium	150	0.3191	0.21	0.00868	0.32778	0.22
Chromium VI	-	0.3191	-	0.00174	0.32084	-
Cobalt	-	0.3191	-	0.0004	0.31950	-
Copper	200	0.3191	0.16	0.01728	0.33638	0.17
Lead	-	0.3191	-	0.0312	0.35030	-
Manganese	1500	0.3191	0.02	0.1208	0.43990	0.03
Nickel	-	0.3191	-	0.0034	0.32250	-
Vanadium	1	0.3191	31.91	0.00542	0.32452	32.45

[1]Our check modelling for CO at the IED emission limit of $75mg/m^3$ gave a PC of $30.28\mu g/m^3$, which equates to 0.3% of the EQS.

(i) Screening out emissions which are insignificant

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

- In respect of long term impacts: PM_{10}, HF, NH_3, Hg, PCBs, Sb, Cr, Cu and V.
- In respect of short term impacts: SO_2 (15 min, 1 hour and 24 hour), PM_{10}, CO, HCl, HF, NH_3, Hg, PCBs, Sb, Cr, Cu and Mn.

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

(ii) Emissions unlikely to give rise to significant pollution

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

- In respect of long term impacts: NO_2, $PM_{2.5}$, VOC (as benzene), VOC (as 1,3-butadiene), Cd, Pb, Mn and Ni.
- In respect of short term impacts: NO_2 and V.

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

(iii) Emissions requiring further assessment

All short term emissions either screen out as insignificant or where they do not screen out as insignificant are considered unlikely to give rise to significant pollution.

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

- PAHs, Arsenic and Chromium VI

PAHs are discussed in more detail in section 5.2.2(iv) below.

Arsenic and Chromium VI are discussed in more detail in Section 5.2.3 below.

5.2.2 Consideration of key pollutants

(i) Nitrogen dioxide (NO_2)

The impact on air quality from NO_2 emissions has been assessed against the EU EQS of 40 $\mu g/m^3$ as a long term annual average and a short term hourly average of 200 $\mu g/m^3$. The model assumes a 70% NO_x to NO_2 conversion for the long term and 35% for the short term assessment in line with Environment Agency guidance on the use of air dispersion modelling.

The above tables show that the peak long term PC is greater than 1% of the EUEQS and therefore cannot be screened out as insignificant. Even so, from the table above, the emission is not expected to result in the EUEQS being exceeded. The peak short term PC is marginally above the level we would consider insignificant (>10% of the EUEQS). However it is not expected to result in the EUEQS being exceeded.

(ii) Particulate matter PM_{10} and $PM_{2.5}$

The impact on air quality from particulate emissions has been assessed against the 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 EUEQS 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 EUEQS of 25 $\mu g/m^3$ as a long-term annual average to be achieved by 2010 as a Target Value and by 2015 as a Limit Value has been used.

The Applicant's predicted impact of the Installation against these EQSs is shown in the tables above. The assessment assumes that **all** particulate emissions are present as PM_{10} for the PM_{10} assessment and that **all** particulate emissions are present as $PM_{2.5}$ for the $PM_{2.5}$ assessment.

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

- It assumes that the plant emits particulates continuously at the IED Annex VI limit for total dust, whereas actual emissions from similar plant are normally lower.
- It assumes all particulates emitted are below either 10 microns (PM_{10}) or 2.5 microns ($PM_{2.5}$), when some are expected to be larger.

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

The above assessment shows that the predicted process contribution for emissions of PM_{10} is below 1% of the long term EQS and below 10% of the short term EQS and so can be considered insignificant. Therefore, generally, we consider the Applicant's proposals for preventing and minimising the emissions of particulates to be BAT for the Installation.

The above assessment shows that the predicted process contribution for emissions of $PM_{2.5}$ is slightly above 1% EQS and so cannot be considered insignificant. However, the assessment is based very much on a worst case scenario, and in reality the process contribution is expected to be <1% of the EQS. Even so, from the table above, the emission is not expected to result in the EQS being exceeded.

There is currently no emission limit prescribed nor any continuous emissions monitor for particulate matter specifically in the PM_{10} or $PM_{2.5}$ fraction. Whilst Natural Resources Wales is confident that current monitoring techniques will capture the fine particle fraction ($PM_{2.5}$) for inclusion in the measurement of total particulate matter, an improvement condition (IC2), has been included that will require a full analysis of particle size distribution in the flue gas, and hence determine the ratio of fine to coarse particles. In the light of current knowledge and available data however Natural Resources Wales is satisfied that the health of the public would not be put at risk by such emissions, as explained in section 5.3.3.

(iii) Acid gases, SO_2, HCl and HF

From the tables above, emissions of HCl and HF can be screened out as insignificant in that the process contribution is <10% of the short term EQS/EAL. There is no long term EQS/EAL for HCl. HF has 2 assessment criteria – a 1-hr EAL and a monthly EAL – the process contribution is <1% of the monthly EAL and so the emission is insignificant if the monthly EAL is interpreted as representing a long term EAL.

There is no long term EAL for SO_2 for the protection of human health. Protection of ecological receptors from SO_2 for which there is a long term EAL is considered in section 5.4.

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

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

The above tables show that for VOC emissions, the peak long term PC is greater than 1% of the EAL/EQS and therefore cannot be screened out as insignificant. Even so, from the table above, the emission is not expected to result in the EQS being exceeded. Our check modelling indicates that the peak short term PC for CO is less than 10% of the EAL/EQS and so can be screened out as insignificant.

The Applicant has used the EQSs for both benzene and 1,3 butadiene for their assessment of the impact of VOC. 1,3 butadiene has the lowest EQS of organic species likely to be present in VOC (other than PAH, PCBs, dioxins and furans) and therefore represents the most precautionary assessment of VOCs in the tables above. The Applicant has also used the EQS for benzo[a]pyrene (BaP) for their assessment of the impact of PAH. We agree that the use of the BaP EQS is sufficiently precautionary.

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

From the tables above all the other emissions can be screened out as insignificant in that the process contribution is < 1% of the long term EQS/EAL and <10% of the short term EQS/EAL, except for VOC (1,3 butadiene) and PAH where the PCs are 14.36% and 2.58% respectively of the long term EQS/EAL. However, from the table above, the VOC (1,3 butadiene) emission is not expected to result in the EAL being exceeded.

The long term Process Contribution (PC) for PAH is 2.58% of the Air Quality Objective (AQO). Therefore the PC does not on its own cause a breach of the

AQO. The existing background for PAHs is already exceeding the AQO at 160%. Therefore the additional contribution of the installation is very small in comparison to existing background levels.

In addition, we are satisfied that the applicant's modelling predictions are conservative because they assume that:

- The plant is operating at the long term emission limit for an entire year;
- The entire PAH emission consists only of benzo(a)pyrene, and
- The assessment is based on the point of maximum impact, whereas the impact at sensitive receptors will be less.

The assumption that the entire PAH emission consists only of benzo(a)pyrene is a worst case assumption. In reality, actual emissions would consist of a wider range of PAHs with a lesser impact.

As well as the point of maximum impact, the applicant has also identified 10 sensitive receptors. The PC (as a % of AQO) is less below 1% for all receptors except, Tyn-Y-Caeau and Heol Cae'r Bont, where the PC is 1.1% and 1.7% respectively. However, this again assumes that the entire PAH emission is benzo(a)pyrene and we agree with the operator's conclusion that once the actual speciation of PAHs is taken into account it is likely that the long term PC could be screened out as insignificant.

Whilst all emissions cannot be screened out as insignificant, the Applicant's modelling shows that the installation will not result in a breach of the EAL. The Applicant is required to prevent, minimise and control PAH and VOC emissions using the best available techniques, this is considered further in Section 6. We are satisfied that PAH and VOC emissions will not result in significant pollution.

The ammonia emission is based on a release concentration of 15 mg/m^3. We are satisfied that this level of emission is consistent with the operation of a well controlled SNCR NO_x abatement system.

In summary for the above emissions to air, 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. Therefore, generally, we consider the Applicant's proposals for preventing and minimising the emissions of CO, NH_3, PAHs and PCBs to be BAT for the Installation. Dioxins and furans are considered further in section 5.3.2.

5.2.3 Assessment of Emission of Metals

The Applicant has assessed the impact of metal emissions to air, as previously described.

Annex VI of IED sets three limits for metal emissions:

- An emission limit value of 0.05 mg/m^3 for mercury and its compounds (formerly WID group 1 metal).

- An aggregate emission limit value of 0.05 mg/m^3 for cadmium and thallium and their compounds (formerly WID group 2 metals).
- An aggregate emission limit of 0.5 mg/m^3 for antimony, arsenic, lead, chromium, cobalt, copper, manganese, nickel and vanadium and their compounds (formerly WID group 3 metals).

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

For the group 2 metals, our check modelling has assumed that Cadmium is emitted at 100% of the aggregate emission limit. (There is no EQS / EAL for thallium). On this basis, the maximum PC on the modelling grid is 21.6% of the cadmium EQS, so cannot be screened out as insignificant. However, when the existing background concentrations are taken into account, the PEC is 40% of the EQS. We are therefore satisfied that significant pollution will not be caused. However, we have set improvement condition IC8 which requires the operator to compare emissions monitoring data obtained during the first year of operation with those assumed in the impact assessment submitted with the application. The emissions monitoring data must also be compared against the relevant EQS/EAL. Where the assessment shows that an EQS/EAL can be exceeded, the operator must include proposals in their response for investigative work to determine whether emissions of these metals from the site can be further reduced. This improvement condition applies to all metals whose emissions have not screened out as insignificant.

The applicant has used the three stage screening methodology outlined in the Environment Agency guidance document "Guidance to Applicants on Impact Assessment for Group 3 Metals Stack Releases" – V.3 September 2012, for their assessment of releases of group 3 metals. This guidance is a stepwise method for impact assessment of Group 3 metals from Municipal Waste Incinerators (MWIs). The guidance document contains measured emissions data from operational MWIs between 2007 and 2009. The guidance states that: "Metals assessment from other plant subject to the Waste Incineration Directive may use the method in this guidance if they can justify the data as representative".

The applicant has used data from the APC residues of Wilton 10 biomass facility between 2008 and 2010 to demonstrate that the Environment Agency method and data is representative for the installation. They state that the Wilton 10 facility processes a similar feedstock and employs a similar flue gas treatment system. They have assumed that the proportion of each metal in the APC residues is the same as that released from the stack. The Cr data from Wilton 10 is within the ranges contained within the Environment Agency guidance.

Using the Environment Agency methodology for the group 3 metals, the first step of the Applicant's assessment assumes that each metal is emitted individually at the relevant aggregate emission limit value. This is a something

which can never actually occur in practice as it would inevitably result in a breach of the said limit, and so represents a very much worst case scenario.

The second stage of the applicant's assessment assumes that each metal is emitted as a 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 1/9th 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.

In section 5.2.1 above, the following emissions of metals were screened out as insignificant:

- In respect of long term impacts: Hg, Sb, Cr, Cu and V.
- In respect of short term impacts: Hg, Sb, Cr, Cu and Mn.

Also in section 5.2.1, the following emissions of metals whilst not screened out as insignificant were assessed as being unlikely to give rise to significant pollution:

- In respect of long term impacts: Cd, Pb, Mn and Ni.
- In respect of short term impacts: V.

This left long term emissions of arsenic and chromium VI requiring further assessment. This means that for emissions of these metals, the assessment predicts that an exceedance of the relevant EAL could occur. For all other metals, the Applicant has concluded that exceedances of the EAL for all metals are not likely to occur.

Arsenic

There is a single emission limit for the nine group 3 metals (arsenic, antimony, chromium, cobalt, copper, lead, manganese, nickel and vanadium). The applicant assessed the impact of these metals using the three stage screening methodology outlined in the Environment Agency guidance document "Guidance to applicants on Impact Assessment for Group 3 Metals Stack Releases" – V.3 September 2012.

The long term PC and PEC shown in the table above represent the outcome of step 1 of the screening assessment where it is assumed that each of the nine metals is emitted at 100% of the emission limit. This is a worst case scenario because in reality emissions of all nine metals could not all occur at 100% of the ELV 100% of the time, without causing a permit breach.

Step 2 of the screening assessment is to consider a worst case scenario based on currently operating plant. This is a more realistic approach in that it assumes that each of the nine metals comprises 11% of the total group (i.e. a process contribution of 0.01077 µg/m^3 apportioned equally across the nine metals). Using the second stage screening methodology, the long term PC for arsenic is still expected to be >1% of the long term EAL at 39.88%. However, after taking background concentrations into account, the PEC is 63.88%. As the

PEC is well below 100% of the EAL, we are satisfied that an exceedance of the EAL is unlikely and that significant pollution is unlikely to be caused.

Chromium VI

The 2009 report of the Expert Panel on Air Quality Standards (EPAQS) – "Guidelines for Metal and Metalloids in Ambient Air for the Protection of Human Health", sets non statutory 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 Environment Agency in 2010.

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

- Measurement of Chromium (VI) at the levels anticipated at the stack emission points is expected to be difficult, with the likely levels being below the level of detection by the most advanced methods. We have considered the 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 that 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, we consider it remains a conservative assumption for the Applicant to consider that the Cr(VI) emission concentration will be $1.95 * 10^{-4}$ mg/m^3.

There is little data available on the background levels of Cr(VI); so we have assumed this to be 20% of the total Cr background level, 20% is the typical value of Cr(VI) in total Cr reported in the environment in the EPAQS Guidelines.

The Applicant has used the above data to model the predicted Cr(VI) impact. The PC is predicted as 5384%, the PEC is predicted as 5818%. These predictions reflect the outcome of step one of the three step screening approach described in the section on Arsenic above. Step one assumes that each of the nine metals is emitted at 100% of the emission limit. This is a worst case scenario because in reality emissions of all nine metals could not all occur at 100% of the ELV 100% of the time, without causing a permit breach.

Step 2 of the screening assessment is to consider a worst case scenario based on currently operating plant. This is a more realistic approach in that it assumes that each of the nine metals comprises 11% of the total group (i.e. a process contribution of 0.01077 µg/m^3 apportioned equally across the nine metals). Using the second stage screening methodology, the long term PC for arsenic is still expected to be >1% of the long term EAL at 598.22%. After taking

background concentrations into account, the PEC is 1032.22%. On this basis Chromium VI has been progressed to the third stage of assessment.

The third stage of the assessment considers site specific assumptions, where percentages of the nine group three metals are lower than 11% each of the IED ELV. The installation will incorporate a flue gas treatment system to remove heavy metals from the gas stream. This flue gas treatment system is similar to that in use at other UK waste biomass combustion facilities and as such, the performance of the proposed flue gas treatment system should be as effective in removing heavy metals as the same system employed at a typical facility.

Wilton 10 biomass facility processes a similar feedstock to that proposed at the installation. Monitoring of metals within the APC residues is undertaken at Wilton 10 as a condition of the Environmental Permit. This data is provided as a proportion composition of each monitored metal to the total metals within the APC residue. The total metals emission concentration has been multiplied by the proportion of each metal in the APC residue to estimate each individual metal release concentration as a proportion of the total metals ELV.

For the Wilton 10 biomass facility, this approach shows that the total Chromium emission is a maximum of 3.57% of the total metals ELV. This is well below the 11% estimation in Step 2 of the screening assessment. Chromium VI will account for some percentage of this total chromium emission.

Speciation of chromium to chromium VI is not undertaken at Wilton 10 biomass facility. In lieu of any monitoring from the Wilton 10 facility, the applicant has reviewed the analysis of monitoring of metal emissions from 10 Municipal Waste Incinerators in England and Wales as presented in Appendix B of "Guidance to applicants on Impact Assessment for Group 3 Metals Stack Releases – V.3 September 2012". This includes analysis of chromium VI in APC residues. The analysis shows that maximum chromium VI emissions are very low at 0.026% of the total group 3 metal ELV. This translates to a mean total chromium concentration as a proportion of the ELV of 2.2%. This is similar to the Wilton 10 biomass analysis, which shows a mean total chromium concentration of 1.87%. The combustion mechanism for chromium and chromium VI are similar, therefore it is anticipated that that as the chromium concentrations are similar, so too would be the chromium VI contribution.

The third stage assessment therefore shows that the likely PC for Chromium VI (based on the maximum monitored concentrations of chromium at the Wilton 10 biomass facility and the chromium VI speciation from the Environment Agency) is 2.06% of the EAL and PEC is 436.06% of the EAL. It is also noted that the PEC for chromium VI is based on the worst case assumption that background chromium VI concentrations are 20% of the total background chromium.

There is no monitoring of the separate species of chromium in the UK. The Expert Panel on Air Quality Standards document Metals and Metalloids (2009) states that the ratio of chromium to chromium VI is variable and dependent upon the source of chromium. It is noted that in the UK it is likely that less than

20% of the emissions are chromium VI and that those emissions with higher proportions of chromium VI are from chromium using industries. The Expert Panel continues to quote data by Rowbotham et al (2000) suggesting that chromium VI constitutes between 3% and 8% of the total airborne chromium.

Using this assumption, the PC is less than 1% at the point of maximum impact for the minimum and mean effective chromium VI emission concentrations. The annual mean chromium VI concentration at the most impacted sensitive receptor, using the assumption that chromium VI is released at the maximum as monitored by the Environment Agency for a municipal waste incinerator has been modelled to give a PC of 0.91% of the EAL. Therefore the applicant concluded that the PC is less than 1% of the EAL at all identified sensitive receptors.

Our own modelling checks show that the maximum PC on the modelling grid is 1.4% of the EAL and 1.1% at the most impacted receptor. However, we are satisfied that the modelling is precautionary because it assumes that the plant is operating at the long term emission limit for an entire year, which would be unlikely in practice.

However, we have set improvement condition IC8 which requires the operator to assess the actual impact of chromium releases using emissions monitoring data obtained during the first year of operation. This will compare actual releases with the above modelling predictions. In addition, if the assessment of monitoring data shows that an EQS/EAL can be exceeded, the operator shall include proposals for further investigative work to determine whether emissions from the site can be further reduced.

5.2.4 Consideration of Local Factors

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

Neath Port Talbot County Borough Council has declared an Air Quality Management Area (AQMA) with respect to Particulate Matter (PM_{10}) expressed as a 24-hour mean. This is located as follows:

- Neath Port Talbot AQMA Taibach / Margam

The AQMA covers the majority of the land and properties between the Tata steelworks and M4 motorway and it is located approximately 450 metres to the north of the installation.

Monitoring data collected by Neath Port Talbot County Borough Council shows that the short term air quality objective for PM_{10} has been met every year since 2009 for the two monitoring stations closest to the installation, specifically Duffryn School and Twll-yn-y-Wal Park.

From the Applicants model, the process contribution at all points within the AQMA is predicted to be below 10% of the short term EUEQS at 1.99% and can therefore be considered insignificant.

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

5.3 Human health risk assessment

5.3.1 Our role in preventing harm to human health

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

i) Applying Statutory Controls

The plant will be regulated under EPR. These regulations include the requirements of relevant EU Directives, notably, the Industrial Emissions Directive (IED), the Waste Framework Directive (WFD), and ambient air directive (AAD).

The main conditions in an EfW permit are based on the requirements of the IED. Specific conditions have been introduced to specifically ensure compliance with the requirements of Chapter IV. The aim of the IED is to prevent or, where that is not practicable, to reduce emissions to air, water and land and prevent the generation of waste, in order to achieve a high level of protection of the environment taken as a whole. IED achieves this aim by setting operational conditions, technical requirements and emission limit values to meet the requirements set out in Articles 11 and 18 of the IED. These requirements include the application of BAT, which may in some circumstances dictate tighter emission limits and controls than those set out in Chapter IV of IED on waste incineration and co-incineration plants. The assessment of BAT for this installation is detailed in section 6 of this document.

ii) Environmental Impact Assessment

Industrial activities can give rise to odour, noise and vibration, accidents, fugitive emissions to air and water, releases to air (including the impact on Photochemical Ozone Creation Potential (POCP)), discharges to ground or groundwater, global warming potential and generation of waste. For an installation of this kind, the principal environmental effects are through emissions to air, although we also consider all of the other impacts listed. 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."

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

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

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

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

The **Food Safety Authority of Ireland (FSAI) (2003)** investigated possible implications on health associated with food contamination from waste incineration and concluded: "In relation to the possible impact of introduction of

waste incineration in Ireland, as part of a national waste management strategy, on this currently largely satisfactory situation, the FSAI considers that such incineration facilities, if properly managed, will not contribute to dioxin levels in the food supply to any significant extent. The risks to health and sustainable development presented by the continued dependency on landfill as a method of waste disposal far outweigh any possible effects on food safety and quality."

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

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

The **British Society for Ecological Medicine (BSEM) published a report in 2005** on the health effects associated with incineration and concluded that "Large studies have shown higher rates of adult and childhood cancer and also birth defects around municipal waste incinerators: the results are consistent with the associations being causal. A number of smaller epidemiological studies support this interpretation and suggest that the range of illnesses produced by incinerators may be much wider. Incinerator emissions are a major source of

fine particulates, of toxic metals and of more than 200 organic chemicals, including known carcinogens, mutagens, and hormone disrupters. Emissions also contain other unidentified compounds whose potential for harm is as yet unknown, as was once the case with dioxins. Abatement equipment in modern incinerators merely transfers the toxic load, notably that of dioxins and heavy metals, from airborne emissions to the fly ash. This fly ash is light, readily windborne and mostly of low particle size. It represents a considerable and poorly understood health hazard."

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

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

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

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

iv) Health Risk Models

Comparing the results of air dispersion modelling as part of the H1 Environmental Impact assessment against European and national air quality standards effectively makes a health risk assessment for those pollutants for which a standard has been derived. These air quality standards have been developed primarily in order to protect human health via known intake mechanisms, such as inhalation and ingestion. Some pollutants, such as dioxins, furans and dioxin like PCB's, have human health impacts at lower ingestion levels than lend themselves to setting an air quality standard to control against. For these pollutants, a different human health risk model is required which better reflects the level of dioxin intake.

Models are available to predict the dioxin, furan and dioxin like PCB's intake for comparison with the Tolerable Daily Intake (TDI) recommended by the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment, known as COT. These include HHRAP and the HMIP model.

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

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

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

COMEAP developed a methodology based on the results of time series epidemiological studies which allows calculation of the public health impact of exposure to the classical air pollutants (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 model using the HHRAP model as described above for dioxins and furans. Where an alternative approach is adopted for dioxins, we check the predictions ourselves.

v) Consultations

As part of our normal procedures for the determination of a permit application, we would consult Public Health Wales, LHB (Wales), FSA and in some cases HPA (now Public Health England). In this case we consulted with Public Health Wales, Abertawe Bro Morgannwg University Health Board and the Food Standards Agency. The local health board also consulted with Public Health England. 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 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 show that the predicted daily intake of dioxins at all receptors, resulting from emissions from the proposed facility (the PC), will be significantly below the recommended TDI levels. The Maximum Daily Intake as a percentage of the TDI is shown as PEC in the table below, as this figure represents the total overall intake of dioxins from both the process contribution from the installation and the existing levels of dioxins in the environment.

Receptor	Adult			Child		
	PC	PC (% of TDI)	PEC (% of TDI)	PC	PC (% of TDI)	PEC (% of TDI)
Resident	0.00080	0.04	35.04	0.00170	0.09	90.09
Farmer	0.04266	2.13	37.13	0.06169	3.08	93.08
Fisher	0.00674	0.34	35.34	0.00588	0.29	90.29

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

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

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

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

5.3.3 Particulates smaller than 2.5 microns

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

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

The HPA 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."

PHE (formerly 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 $PM_{0.1}$.

This application shows emissions of PM_{10} to air to be insignificant. The applicant has used a worst-case scenario when modelling $PM_{2.5}$ emissions, in that they have assumed that 100% of particulate matter emissions are comprised of $PM_{2.5}$. For this reason, the $PM_{2.5}$ PC is the same as the PM_{10}. However because the long term $PM_{2.5}$ EAL is lower than the PM_{10} EQS (25 $\mu g/m^3$ compared to 40 $\mu g/m^3$), the predicted PC of 1.29% does not screen out as insignificant. When the $PM_{2.5}$ PC is added to the existing background concentrations, the PEC is 46.17%. On this basis, we are satisfied that the installation will not cause the $PM_{2.5}$ EAL to be exceeded and that the predicted PC is likely to be over-precautionary. This is because (as described in the previous paragraph), $PM_{2.5}$ emissions are likely to be less than PM_{10} emissions in practice.

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 (now PHE) that "While it is not possible to rule out adverse health effects from modern, well regulated municipal waste incinerators with complete certainty, any potential damage to the health of those living close-by is likely to be very small, if detectable."

In carrying out air dispersion modelling as part of the 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 PM_{10}, SO_2, CO, HF, HCl, NH_3, Hg, PCBs, Sb, Cr Cu, V (long term) and Mn (short term) have all indicated that the Installation emissions screen out as insignificant; where the impact of emissions of NO_2, $PM_{2.5}$, VOC (as benzene), VOC (as 1, 3-butadiene), Cd, Pb, Mn (long term), Ni and V (short term) 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. Emissions of PAHs, Arsenic and Chromium VI cannot be screened out using the H1 screening criteria. However, we consider that the predictions in the air quality modelling report are conservative, in that they assume emissions will be at the IED emission limits 100% of the time. We are satisfied that this

would not be the case in practice and that short term emissions will be lower than the IED limits to allow the long term ELVs for PAH's, Arsenic and Chromium VI to be met. The screening procedure and conclusions drawn for these three pollutants are explained in more detail in sections 5.2.2 and 5.2.3 above.

Natural Resources Wales has reviewed the methodology employed by the Applicant to carry out the health impact assessment. The applicant used the modelling software (IRAP-H) to make their human intake predictions. This software is commonly used for this purpose and incorporates the USEPA HHRAP equations.

Natural Resources Wales have conducted our own check modelling and screening using IRAP-H and the Environment Agency HHRA Tool (version 3). Our screening checks gave lower predicted PCs than the applicant for dioxin and furans and dioxin-like PCBs. This is likely due to the Environment Agency HHRA tool using lower particle-bound deposition velocities than the H1 – Annex F screening value assumed by the applicant. Although we do not agree with the applicant's precise predictions, we do agree that the PCs are likely to be well below the COT TDI, with PCs less than 1% at the most sensitive receptor.

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.

Public Health Wales and Abertawe Bro Morgannwg University Health Board were consulted on the Application and concluded that there is limited potential for risk to public health from the proposed installation. Furthermore, in the local area of the proposed development, there are no obvious population level health concerns if the process is managed properly and meets strict emission and operational standards. The Food Standards Agency was also consulted during the permit determination process. However no response to this has been received. We have therefore concluded that it is unlikely that there will be any unacceptable effects on the human food chain as a result of the operations at the Installation. Details of the responses provided by the consultees on this application can be found in Annex 2.

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

5.4 Impact on Habitats sites, SSSIs, 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:

- Kenfig SAC
- Glaswelltiroedd Cefn SAC

The following Sites of Special Scientific Interest are located within 2Km of the Installation:

- Margam Moors
- Eglwys Nunydd

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

- 6 x Ancient Woodland Plantations

In addition, our Environment Agency habitats screening report identified a protected reedbed habitat. Although the Environment Agency Easimap screening reports identify protected habitats, we do not currently consider the impact of air emissions on these habitats. Our own GIS colleagues within Natural Resources Wales have performed an additional search and confirmed that no protected species have been identified.

5.4.2 Habitats Assessment

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

A comparison of pollutant concentrations at European Sites as percentages of relevant critical levels for the protection of vegetation and ecosystems is shown in Table 1 below. All long term pollutant concentrations are substantially below the significance threshold of 1% of the critical level. All short term concentrations are substantially below the significance threshold of 10% of the critical level.

Table 1. Pollutant concentrations attributable to the proposed installation (i.e. existing background not included) at European sites as percentages of the relevant critical levels.

	NO_x Annual Mean	NO_x Daily Mean	SO_2 Annual Mean	HF Weekly Mean	HF Daily Mean	Ammonia Annual Mean
Critical Level µg/m^3	30	75	20	0.5	5	3
Kenfig / Cynffig	0.6%	2.9%	0.2%	1.0%	0.2%	0.3%
Glaswelltiroedd Cefn	0.2%	1.0%	0.1%	0.2%	0.1%	0.1%

For nitrogen deposition, the impact upon habitats identified in APIS within both of the above SACs is less than 1% of the minimum critical load. For acid deposition, the impact upon habitats identified in APIS within Glaswelltiroedd Cefn SAC is less than 1% of the minimum critical load. However, for Kenfig SAC, the process contribution is 1.08% of the minimum critical load, so does not screen out.

On this basis we proceeded to stage 3 of the habitats assessment process and conducted an appropriate assessment for acid deposition at the Kenfig SAC. The appropriate assessment gave further consideration to the PC in combination with background levels, which gives the Predicted Environmental Concentration (PEC). The PEC at Kenfig SAC is 106.5% of the minimum critical load. Hence it can be concluded that the existing background is already exceeding the minimum critical load at 105.42%. The PC and PECs are however well below the maximum critical loads at 0.27% and 26.06% respectively. These figures are also a worst case scenario because they are based on the proposed installation being operational 100% of the time and the worst meteorological conditions in the last 5 years.

The effect of these emissions on the SAC was assessed against the site's Conservation Objectives, the most pertinent of which is for the underlying dune features of the site, as below;

4.1 Conservation Objective for Feature 1 and 2: 2190 Humid dune slacks and. 2170 Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*)

NB The division between 'humid dunes' and 'dunes with *Salix repens* ssp. *argentea* is unclear and difficult to define. The humid dune slack habitat includes both successionally young and mature slacks, which equate to NVC communities SD13-16. The dunes with *Salix repens* spp. *Argentea* equate to drier areas of mature dune slack, and the low hummocks found around dune slacks which support *Salix repens*. These are sometimes known as hedgehog dunes. Because of the difficulties in separating these two habitats, for the purposes of monitoring these features are considered together.

Vision for feature 1

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- Dunes with *Salix repens* and humid dune slacks will occur as part of the dune system, their location will be determined by natural processes and appropriate grazing management
- A range of successional stages will be found in both features
- Factors affecting the features will be under control

In order to further assess the predicted PC for acid deposition at Kenfig SAC, the applicant presented the PC as a percentage of the minimum critical load using the 5 years of meteorological data used in the assessment. This is shown in Table 2 below.

Table 2. Annual Analysis of Acid Deposition Impacts – Kenfig SAC.

	Process Contribution as % of lower Critical Load for coastal sand dunes
Weather Data	100% operational availability
2009	0.60%
2010	1.08%
2011	0.49%
2012	0.43%
2013	0.55%
Average	0.63%

The table shows that there is significant variability between years with impacts predicted using the weather data from 2010 much greater than all other years. If the average over the 5 years of weather data is used, the maximum PC is well below 1% of the critical load for acid deposition at 0.63%.

Background concentrations for acid deposition at Kenfig SAC currently exceed the minimum critical load at 105.42%. The predicted PC of 1.08% from the proposed installation represents an extremely small additional contribution to this, but when considered as a PEC cannot be considered to be insignificant. However, it is reiterated that the predicted PC of 1.08% is conservative because it is based on 100% operational availability and the most pessimistic year of 5 years of meteorological data. However, due to the rigours of the test that are required to satisfy the requirements of the Regulation 61 of the Conservation of Habitats and Species Regulations 2010, worst-case scenarios are used, within the bounds of what is reasonable. As such, a 5 year mean of the meteorological conditions expected within the area, is considered a reasonable scenario under which to test the effects of the project, against the site's Conservation Objectives.

We expect that background levels of NOx and SOx are set to fall over the medium to long term due to legislative changes that will lead to a significant reduction in exhaust gases released from power station and other major emitters. Therefore adverse effects will be avoided / mitigated by these legal

requirements and the relatively small contribution to site eutrophication, from this emission. This is further underlined by the emission representing less than 1% of the critical load, using an average of the met data over 5 years.

We therefore concluded that the installation will not undermine the conservation objectives for the Kenfig SAC and that the operation of the installation will not adversely affect the integrity of the SAC either alone or in combination. We have consulted with the conservation body in Wales on this assessment and they are in agreement with our conclusions.

5.4.3 SSSI Assessment

The Applicant's assessment of SSSIs was reviewed by Natural Resources Wales technical specialists for air quality modelling and the conservation body in Wales, who agreed with the assessment's conclusions, that the proposal does not damage the special features of the SSSI(s).

For SSSIs, our assessment considers whether emissions from the installation are likely to damage any of the features of the habitats site. We do this by assessing PCs and PECs against the critical loads set for each habitat feature to establish the likelihood of an exceedance of these critical loads.

Eglwys Nunydd SSSI is a reservoir and as such does not have any associated critical loads set. Therefore an assessment was only required for Margam Moors SSSI. This results of this assessment are summarised below.

For nitrogen deposition, the maximum modelled Process Contribution (PC) as a percentage of any of the lower critical loads is 2.14%. The maximum modelled PC as a percentage of any of the upper critical loads is 1.43%.

Further consideration has been given to the PC in combination with background levels (Predicted Environmental Concentration (PEC)). The maximum modelled PEC expressed as a percentage of the lower critical loads for the Margam Moors SSSI is 108.54%. However, when compared against the upper critical loads for the different habitat features, the maximum modelled PEC is 72.36%. Therefore it can be concluded that an exceedance of the upper critical load as a result of the additional contribution from the installation is unlikely. The modelled predictions can also be considered to be conservative because they are based on the proposed installation being operational 100% of the time.

For acid deposition, the maximum modelled Process Contribution (PC) as a percentage of any of the lower critical loads is 1.96%. The maximum modelled PC as a percentage of any of the upper critical loads is 0.91%.

Further consideration has been given to the PC in combination with background levels (Predicted Environmental Concentration (PEC)). The maximum modelled PEC expressed as a percentage of the lower critical loads for the Margam Moors SSSI is 46.78%. When compared against the upper critical loads for the different habitat features, the maximum modelled PEC is 21.83%. Therefore it can be concluded that an exceedance of both the lower and upper

critical loads as a result of the additional contribution from the installation is unlikely. The modelled predictions can also be considered to be conservative because they are based on the proposed installation being operational 100% of the time.

On this basis, we have concluded that emissions from the installation are unlikely to damage any of the special interest features of the SSSI. We have consulted with the conservation body in Wales on this assessment and they are in agreement with our conclusions.

5.4.4 Assessment of Non-Statutory Sites

For non-statutory sites, Natural Resources Wales impact assessment criteria considers whether or not an installation can cause significant pollution. If the process contribution from an installation is less than 100% of the critical level or load for a site, we consider that no significant pollution will be caused.

The applicant has modelled the predicted process contributions at the six ancient woodlands. We are satisfied that none of the critical levels for the protection of vegetation and ecosystems will be exceeded at any of the six ancient woodlands sites. The predicted PCs range from 0.7% (SO_2) to 14.5% (oxides of nitrogen) of the annual AQOs and 0.7% (HF) to 32.5% (oxides of nitrogen) of the short term AQOs.

The applicant has also assessed nutrient nitrogen and acid deposition against representative critical loads and critical load functions at the non-statutory ancient woodland sites. For nutrient nitrogen deposition, their predicted PCs are between 3% and 25% of the lower nutrient nitrogen critical load. For acid deposition, the applicant's predicted PCs are between 2.5% and 19% of the minimum critical load function.

Our check modelling is in agreement with the applicant, the nutrient nitrogen and acid deposition PCs are likely to be well below 100% of the nutrient nitrogen critical loads and acid critical load functions at all the ancient woodlands.

We therefore agree with the applicant's conclusion that significant pollution will not be caused at the non-statutory sites.

5.5 Impact of abnormal operations

Article 50(4)(c) of IED requires that waste incineration and co-incineration plants shall operate an automatic system to prevent waste feed whenever any of the continuous emission monitors show that an emission limit value (ELV) is exceeded due to disturbances or failures of the purification devices. Notwithstanding this, Article 46(6) allows for the continued incineration and co-incineration of waste under such conditions provided that this period does not (in any circumstances) exceed 4 hours uninterrupted continuous operation or the cumulative period of operation does not exceed 60 hours in a calendar year. This is a recognition that the emissions during transient states (e.g. start-up and shut-down) are higher than during steady-state operation, and the overall

environmental impact of continued operation with a limited exceedance of an ELV may be less than that of a partial shut-down and re-start.

Article 45(1)(f) requires that the permit shall specify the maximum permissible period of any technically unavoidable stoppages, disturbances, or failures of the purification devices or the measurement devices, during which the concentrations in the discharges into the air may exceed the prescribed emission limit values. In this case we have decided to set the time limit at 4 hours, which is the maximum period prescribed by Article 46(6).

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

In making an assessment of abnormal operations the following emission levels have been assumed based on plausible abnormal emission levels based primarily on the data obtained from other modern plants. Where actual data is not available, worst case conservative assumptions have been made.

- Dioxin emissions of 10 ng/m^3 (100 x normal)
- Mercury emissions are 15 times those of the IED emission 0.05mg/m^3 emission concentration
- NO_x emissions of 825 mg/m^3 (1.375 x normal half hourly average ELV)
- Particulate emissions of 225 mg/m^3 (5 x normal half hourly average ELV)
- Metal emissions other than mercury are 15 times those of normal operation
- SO_2 emissions of 675 mg/m^3 (2.25 x normal half hourly average ELV)
- HCl emissions of 160 mg/m^3 (1.78 x normal half hourly average ELV)

This is a worst case scenario in that these abnormal conditions include a number of different equipment failures not all of which will necessarily result in an adverse impact on the environment (e.g. a failure of a monitoring instrument does not necessarily mean that the incinerator or abatement plant is malfunctioning).

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

Effect of abnormal operation on short term environmental impact

Pollutant	EQS/ EAL (µg/m^3)	Abnormal PC (µg/m^3)	Abnormal PC as % of EQS/ EAL	Background conc (µg/m^3)	PEC (µg/m^3)	PEC as % EQS/ EAL
Nitrogen dioxide	200	59.86	29.93	41.24	101.1	50.55
Particulate Matter (PM_{10})	50	14.90	29.80	33.16	48.06	96.12
Sulphur dioxide (daily)	125	32.17	25.74	10.84	43.01	34.41
Sulphur dioxide (1-hour)	350	230.09	65.74	10.84	240.93	68.84
Sulphur dioxide (15-min)	266	149.43	56.18	10.84	160.27	60.25
Hydrogen chloride	750	102.11	13.61	1.50	103.61	13.81
Hydrogen fluoride	160	86.16	53.85	4.70	90.86	56.79
Mercury	7.5	0.47865	6.38	0.00384	0.48249	6.4
Antimony	150	0.53183	0.355	-	-	-
Chromium	150	0.17095	0.114	0.00868	0.17963	0.12
Copper	200	0.24023	0.120	0.01728	0.25751	0.13
Manganese	1500	1.35635	0.090	0.1208	1.47715	0.1
Vanadium	1	0.00844	0.844	0.00542	0.01386	1.39

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. The insignificant emissions are: mercury, antimony, chromium, copper, manganese and vanadium.

Also from the table above emissions of the following substances (which were not screened out as insignificant) have been assessed as being unlikely to give rise to significant pollution in that the predicted environmental concentration is less than 100% of short term EQS/EAL. The substances are: nitrogen dioxide, particulate matter (PM_{10}), sulphur dioxide (daily, 24-hour and 1-hour), hydrogen chloride and hydrogen fluoride.

We are therefore satisfied that it is not necessary to further constrain the conditions and duration of the periods of abnormal operation beyond those permitted under Chapter IV of the IED.

We have not assessed the impact of abnormal operations against long term 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 an increase of approximately 70% in the TDI reported in section 5.3.3. In these circumstances the TDI would be 0.5% of the COT TDI. At this level, emissions of dioxins will still not pose a risk to human health.

6. Application of Best Available Techniques

6.1 Scope of Consideration

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

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

- We then consider in particular control measures for the emissions which were not screened out as insignificant in the previous section on minimising the installation's environmental impact.

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

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

Chapter IV of the IED specifies a set of maximum emission limit values. Although these limits are designed to be stringent, and to provide a high level of environmental protection, they do not necessarily reflect what can be achieved by new plant. Article 14(3) of the IED says that BAT conclusions shall be the reference for setting the permit conditions, so it may be possible and desirable to achieve emissions below the limits referenced in Chapter IV.

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

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

6.1.1 Consideration of Furnace Type

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

The 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 retains the waste within the combustion chamber (e.g. grate bar spacing) to allow its complete combustion.

The BREF also provides a comparison of combustion and thermal treatment technologies and factors affecting their applicability and operational suitability used in 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 below would be considered as BAT provided the Applicant has justified it in terms of:

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

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

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

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 GJ/t	TOC 0.5 – 3 %	Similar to other technologies

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

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 e.g. combustion	High pre-treatment, operation and capital costs

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

- Moving Grate Furnace
- Rotary Kiln
- Fluidised Bed

The review considers that the lower power production of rotary kilns results in significantly higher annualised costs when compared to the other two solutions. Furthermore, the capacity of a rotary kiln unit is limited to 8 tonnes per hour, so multiple streams would be required to achieve the design throughput. On this basis, the rotary kiln is not considered to represent BAT for the installation.

Both the moving grate and fluidised bed will produce similar quantities of ash, although the fluidised bed produces more fly ash. Overall the lower annualised costs associated with a grate system outweighs the additional material costs and higher ammonia consumption. On this basis, a grate system is considered to represent BAT for this facility.

We agree with the applicant that of the options considered, a liquid cooled moving grate furnace represents BAT for the installation.

The Applicant has proposed to use a furnace technology comprising a moving grate which is identified in the tables above as being considered BAT in the BREF or TGN for this type of waste feed.

The Applicant proposes to use Liquefied Petroleum Gas (LPG) and gasoil as support fuel for start-up, shut down and for the auxiliary burners. The choice of support fuel is based on availability of supply. Natural gas cannot be used as a support fuel because there is no high pressure gas main within the site or in the local area. On this basis we agree that the use of these support fuels represents BAT for the installation.

Boiler Design

In accordance with our Technical Guidance Note, S5.01, the Applicant has confirmed that the boiler design will include the following features to minimise the potential for reformation of dioxins within the de-novo synthesis range:

- ensuring that the steam/metal heat transfer surface temperature is a minimum where the exhaust gases are within the de-novo synthesis range;
- design of the boilers using CFD to ensure no pockets of stagnant or low velocity gas;
- boiler passes are progressively decreased in volume so that the gas velocity increases through the boiler; and
- Design of boiler surfaces to prevent boundary layers of slow moving gas.

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 Chapter IV of the IED for the air emission of TOC/CO and the TOC on bottom ash.

6.2 BAT and emissions control

The prime function of flue gas treatment is to reduce the concentration of pollutants in the exhaust gas as far as practicable. The techniques which are described as BAT individually are targeted to remove specific pollutants, but the BREF notes that there is benefit from considering the 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.

Taking these factors into account the Technical Guidance Note points to a range of technologies being BAT subject to circumstances of the Installation.

6.2.1 Particulate Matter

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

The Applicant proposes to use fabric filters for the abatement of particulate matter. Fabric filters provide reliable abatement of particulate matter to below 5 mg/m^3 and are BAT for most installations. The Applicant proposes to use multiple compartment filters. Leaks will be detected from these filters by a drop in pressure loss over the filter compartment. More specifically, the fabric filter plant will be comprised of four filter compartments. However the applicant has confirmed that the fabric filter plant can operate on three filter compartments in the event that a potential bag failure needs to be investigated in the fourth compartment.

Emissions of PM_{10} have previously been assessed as insignificant for long and short term impacts (section 5.2.1 above). The long term impact for $PM_{2.5}$ is however marginally above the threshold of insignificance with a PC of 1.29%. Therefore emissions of particulate matter cannot be screened out as insignificant. Natural Resources Wales has therefore considered whether other available techniques should be considered:

- Wet Scrubbing – this technique has the advantage of also simultaneously reducing acid gas concentration. However the technique is not considered BAT by itself in that it produces an effluent for further

treatment in compliance with Article 46(3) of IED and requires reheat of the exhaust to prevent visible plumes.

- Ceramic Filters – this technique can be used at higher flue gas temperatures than fabric filters, but filters are more likely to blind. This technique can be BAT for smaller plant or where high temperature gas cleaning is needed.
- Electrostatic Precipitators – this technique is not BAT by itself, but can be used in combination with bag filters to reduce the energy consumption of the induced draft fan, which might be overall beneficial.

In this case, it is not considered that any of the alternate techniques offer any advantage in comparison with the Applicant's preferred option of fabric filters and so agrees that the Applicant's proposed technique is BAT for the installation.

6.2.2 Oxides of Nitrogen

Comparison of abatement techniques

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	More difficult to handle		All plant

	Lower nitrous oxide formation	Narrower temperature window		
Reagent Type: Urea	Likely to be BAT			All plant

The Applicant proposes to implement the following primary measures:

- Low NO_x burners – this technique reduces NO_x at source and is defined as BAT where auxiliary burners are required.
- Optimise primary and secondary air injection – this technique is BAT for all plant.

The applicant has explained that flue gas recirculation (FGR) will included in the design if the selected technology provider has an established track record of using this technique and can demonstrate the benefits, in terms of energy efficiency and environmental performance of applying it to this particular technology. It is also noted that suppliers which do not include FGR in their design can meet the emission limits for NO_x by using SNCR only. We have set pre-operational condition PO7 which requires the operator to confirm whether FGR has been included in the final design of the installation.

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℃ 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 either ammonia or urea as the reagent.

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

	Cost of NO_x removal £/tonne	PC (long term)	PEC (long term)
SCR	£5012	1.59	22.21
SNCR	£3073	4.53	25.15
SNCR + FGR	£4653	4.53	25.15

Based on the figures above the Applicant considers that the additional cost of SCR over SNCR is not justified by the reduction in environmental impact. Thus SCR is not BAT in this case, and SNCR is BAT for the Installation. The applicant will select the use of either urea or ammonia as the reagent for the SNCR abatement system when a technology provider has been appointed. On this basis, we have set pre-operational condition PO10, which requires the operator to confirm which reagent has been selected two months before the commencement of commissioning. The pre-operational condition also requires the operator to include details of the procedures in place for the safe handling and management of the chosen reagent.

The amount of urea / ammonia used for NO_x abatement will need to be optimised to maximise NO_x reduction and minimise NH_3 slip. Improvement condition IC5 requires the Operator to report to Natural Resources Wales 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 on a quarterly basis.

6.2.3 Acid Gases, SO_x, HCl and HF

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

Acid gases and halogens : Secondary Measures (BAT is to apply Primary Measures first)				
Technique	**Advantages**	**Disadvantages**	**Optimisation**	**Defined as BAT in BREF or TGN for:**
Wet	High reaction rates	Large effluent disposal and water consumption		Plants with high acid gas and metal components

	Low solid residues production Reagent delivery may be optimised by concentration and flow rate	if not fully treated for re-cycle Effluent treatment plant required May result in wet plume Energy required for effluent treatment and plume reheat		in exhaust gas – HWIs
Dry	Low water use Reagent consumption may be reduced by recycling in plant Lower energy use Higher reliability	Higher solid residue production Reagent consumption controlled only by input rate		All plant
Semi-dry	Medium reaction rates Reagent delivery may be varied by concentration and input rate	Higher solid waste residues		All plant

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

The Applicant proposes to implement the following primary measures:

- Use of low sulphur fuels for start-up and auxiliary burners (i.e. <0.1%S); this will reduce SO_x at source. The Applicant has justified its choice of LPG and gasoil as the support fuels on the basis that alternatives are not available and we agree with that assessment.

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

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

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

In both dry and semi-dry systems, the injected powdered reagent reacts with the acid gases and is removed from the gas stream by the bag filter system. The powdered materials are either lime or sodium bicarbonate. Both are effective at reducing acid gases, and dosing rates can be controlled from continuously monitoring acid gas emissions. The decision on which reagent to use is normally economic. Lime produces a lower leaching solid residue in the APC residues than sodium bicarbonate and the reaction temperature is well suited to bag filters, it tends to be lower cost, but it is a corrosive material and can generate a greater volume of solid waste residues than sodium bicarbonate. Either reagent is BAT, and the use of one over the other is not significant in environmental terms in this case.

In this case, the Applicant proposes to use a dry acid gas abatement system with hydrated lime as the reagent. Natural Resources Wales is satisfied that this is BAT.

With regard to the optimisation of lime usage, the applicant has stated that use will be minimised by trimming reagent dosing to accurately match the acid load using fast response upstream acid gas monitoring. Lime dosing rates will be rapidly and precisely varied to match the acid load. In addition, the plant preventative maintenance regime will include regular checks and calibration of the lime dosing system to ensure optimum operation.

6.2.4 Carbon monoxide and volatile organic compounds (VOCs)

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

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

6.2.5 Dioxins and furans (and Other POPs)

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

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

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

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

6.2.6 Metals

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

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

Unlike other metals however, mercury if present will be in the vapour phase. 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 by the acid gas concentration in the exhaust. Therefore, separate feed of activated carbon would normally be considered BAT unless the feed was relatively constant.

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

6.3 BAT and global warming potential

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

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

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

The electricity that is generated by the Installation will displace emissions of CO_2 elsewhere in the UK, as virgin fossil fuels will not be burnt to create the same electricity. The Applicant has therefore included within its GWP calculations a CO_2 offset for the net amount of electricity exported from the Installation.

Taking this into account, the net emissions of CO_2 from the installation are estimated at 12,700 tonnes per annum. At this level emissions cannot be characterised as insignificant. The Installation is not subject to the Greenhouse Gas Emissions Trading Scheme Regulations 2003; therefore it is a requirement of IED to investigate how emissions of greenhouse gases emitted from the installation might be prevented or minimised.

The Applicant has considered GWP as part of its 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 (however wood is considered to be a renewable fuel and with a GWP of zero in accordance with the Environment Agency guidance H1, Annex H);
- CO_2 emissions from burning auxiliary or supplementary fuels;
- CO_2 emissions associated with electrical energy used;
- N_2O from the de-NOx process.

On the credit side

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

Note: avoidance of methane which would be formed if the waste was landfilled has not been included in this assessment. If it were included due to its avoidance it would be included on the credit side. Ammonia has no direct GWP effect.

The Applicant's assessment shows that the GWP of the plant is dominated by the emissions of carbon dioxide that are released 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 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.

Natural Resources Wales agrees with this assessment and that the chosen option is BAT for the installation.

6.4 BAT and POPs

International action on Persistent Organic pollutants (POPs) is required under the UN's Stockholm Convention, which entered into force in 2004. The EU implemented the Convention through the POPs Regulation (850/2004), which is directly applicable in UK law. Natural Resources Wales 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, as in fact high-temperature incineration is one of the prescribed methods for destroying POPs.

The unintentionally-produced POPs addressed by the Convention are:

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

The UK's national implementation plan for the Stockholm Convention, published in 2007, makes explicit that the relevant controls for unintentionally-produced POPs, such as might be produced by waste incineration, are delivered through the requirements of IED. That would include an examination of BAT, including potential alternative techniques, with a view to preventing or minimising harmful emissions. These have been applied as explained in this document, which explicitly addresses alternative techniques and BAT for the minimisation of emissions of dioxins.

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

> "Member States shall, when considering proposals to construct new facilities or 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^{o}C and a combustion gas residence time of at least 2 seconds
- rapid cooling of flue gases to avoid the *de novo* reformation temperature range of 250-450^{o}C
- use of bag filters and the injection of activated carbon or coke to adsorb residual POPs components.

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

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

The release of **dioxins and furans** to air is required by the IED to be assessed against the I-TEQ (International Toxic Equivalence) limit of 0.1 ng/m^3. Further development of the understanding of the harm caused by dioxins has resulted in the World Health Organisation (WHO) producing updated factors to calculate the WHO-TEQ value. Certain **PCBs** have structures which make them behave like dioxins (dioxin-like PCBs), and these also have toxic equivalence factors defined by WHO to make them capable of being considered together with dioxins. The UK's independent health advisory committee, the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) has adopted WHO-TEQ values for both dioxins and dioxin-like PCBs in their review of Tolerable Daily Intake (TDI) criteria. In support of the requirements of the IED, the WHO-TEQ values for both dioxins and dioxin-like PCBs have been specified for monitoring and reporting purposes, to enable an 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. We specify 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 their previous 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 5.2 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]

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

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

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

6.5 Other Emissions to the Environment

6.5.1 Emissions to water

The only point source emission to water is clean uncontaminated surface water run-off from areas of external hardstanding and building roofs.

Surface water run-off will drain into a balancing pond within the installation boundary, which in turn controls the flow from emission point W1 into an unnamed ditch. This drainage ditch flows into the Upper Mother Ditch. All surface water run-off from roadways, car parks and vehicle movement areas will pass through an interceptor prior to discharge into the balancing pond. The applicant has confirmed that site drainage for external areas will also be fitted with a shut-off alarm, linked to the fire detection systems to contain any contaminated water from fire fighting from external areas.

There are no releases to land or groundwater associated with the installation.

We are satisfied that the pollution risk associated with the installation is low based on the use of appropriate surfacing, satisfactory containment, inspection measures and the operating procedures which will be put in place as part of the ISO 14001 environmental management system.

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 installation will give rise to process effluent in the form of boiler blowdown and regeneration effluent from the water treatment plant. A small quantity of this process effluent will be recirculated through the ash quench system. All excess process effluents, which cannot be recirculated, will be collected in a sedimentation basin, prior to discharge to sewer at emission point S1 in accordance with a trade effluent consent from the local sewerage undertaker, Dŵr Cymru Welsh Water. It then receives further treatment at a waste water treatment works operated by the sewerage undertaker.

We are satisfied that the environmental risk associated with the release of process effluent to sewer is not significant. This is based on the fact that there is no aqueous effluent associated with any of the air abatement plant and on the relatively low volumes of effluent which will be produced. The effluent will also be treated at a Dŵr Cymru Welsh Water waste water treatment works, prior to discharge into the aquatic environment. The discharge to sewer must also comply with the terms of the trade effluent consent which will be issued by Dŵr Cymru Welsh Water.

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

6.5.3 Fugitive emissions

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

Fugitive releases to air can potentially arise from refilling of raw material storage tanks such as fuel oil. These will be vented to the tanker during refilling. In addition, storage tanks will be fitted with high level controls and alarms.

Lime and APCR silos will be filled by bulk tanker and offloaded pneumatically into the silos with displaced air vented through a reverse pulse jet filter. Silos will be fitted with high-level control and alarm. Silos will be equipped with a vent fitted at the top with a fabric filter. Filter residues will be returned to the silo. Cleaning of the filter is done automatically with compressed air after the filling operation. The filter will be inspected regularly for leaks.

Fugitive dust emissions will be controlled via the following measures:

- Biomass material will be delivered as wood chip in covered vehicles
- Material will normally be stored in an A-Frame storage building
- Conveyors for the transfer of biomass will be covered
- Ground surface damping will be used to prevent vehicle movements producing yard dust problems and mobile “mist air” water based dust suppression is used to supress material movement generated dust. This is typically only necessary in summer months or during extremely dry periods. However, the applicant has stated that if necessary, foam / water can be added to the material at the point it is transferred into the fuel reception, which is the stage at which the most dust is produced).

External areas of hardstanding will be provided with kerbed containment, where appropriate to prevent any potential spills from entering the ground / groundwater and surface water.

All chemicals will be stored in an appropriate manner incorporating the use of bunding and other measures (such as acid and alkali resistant coatings) to ensure appropriate containment. The potential for accidents and associated environmental impacts is therefore limited.

Tanker off-loading of chemicals will take place within areas of concrete hardstanding with falls to a gully and/or a sump.

Storage tanks will be bunded at 110% of the tank capacity and the offloading point will be fully contained with the appropriate capacity to contain any spills during fuel or reagent delivery.

Process drains within the installation will drain to the sedimentation basin, which in turn, drains to sewer.

Site drainage for external areas will be fitted with a shut-off alarm, linked to the fire detection systems to contain any contaminated water from fire fighting from external areas.

Containment bunds and areas of hardstanding will be subject to regular inspection as part of the on-site preventative maintenance programme.

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

6.5.4 Odour

The waste wood fuel which will be accepted at the installation is inherently non-odorous. Waste accepted at the installation will be delivered in covered vehicles or within containers and bulk storage of waste will only occur in the installation's fuel storage building. No fuel will be stored in external areas.

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

6.5.5 Noise and vibration

The applicant's initial noise assessment which was submitted as part of the permit application could not be considered complete for the following reasons:

- A BS4142 assessment was not completed. BS4142 provides a method for rating industrial noise affecting mixed residential and industrial areas by linking the difference between the rating level from a source and the background LA_{90} at sensitive receptors to the likelihood of complaints. For EPR applications such as this, a BS4142 assessment is the expected approach for noise impact assessment.
- The baseline noise survey in the original noise assessment consisted of noise measurements being taken at 3 locations on a single day and night for only one to two hours. This did not give sufficient data to be able to derive typical background values (as required for BS4142 assessment).

Based on the above, a schedule 5 request for further information was issued on 15th July 2014 with a request for a revised noise impact assessment. The revised assessment was received on 11th August 2014.

The installation is located in an area within existing industry and road networks nearby. Existing noise levels are therefore likely to be dominated by road traffic (from the A48 and M4 motorway) and existing industry. For this reason, noise levels can potentially vary from hour to hour and day to day.

The revised noise impact assessment 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 applicant's BS4142 assessment concludes that operational noise from the installation is unlikely to result in complaints, with less than marginal significance predicted at the closest noise sensitive receptor.

Our own check modelling is generally in agreement with the applicant's predictions. However, the applicant's BS4142 assessment used background data that was measured over a limited short-term period (1 to 2 hours). Because the wider area contains existing road traffic and industrial noise, background noise is likely to vary depending on times of the day and days of the week that measurements are taken. Therefore we cannot rule out the potential for background noise levels to be lower than the levels used in the assessment. In addition, the applicant's assessment does not include mobile plant such as on-site lorry movements and loading / unloading activities. Based on these two issues we cannot agree with the applicant's predictions and conclusions at this time.

However, as construction and commissioning of the installation has not yet commenced, we consider that more representative baseline data can be collected and assessed as part of a pre-operational condition. This will allow the applicant's BS4142 conclusions described above to be verified using the more representative background data as a reference point. Furthermore the assessment will be more realistic as it will be based on noise sources from the plant as built. (It is noted that a technology provider was not appointed when the application stage noise assessments were carried out).

As such pre-operational condition PO1 requires the applicant to submit to Natural Resources Wales for approval a written proposal for reassessing the potential noise impact of the site. This is required to be submitted within 1 month of permit issue. The written proposal shall include the following requirements:

"The proposed noise impact assessment shall use the BS4142:2014 standard and shall have regard to the Welsh Government Noise Action Plan 2013 – 2018. The assessment shall be based on the manufacturers stated sound power level for all fixed and mobile noise sources from the plant as built. On site traffic movements and loading / unloading activities shall be included as noise sources in the impact assessment.

The background noise measurements ($L_{A90,T}$) and residual noise level ($L_{AEQ,\ T}$) (including tonal noise) shall be measured over a time period that is sufficiently long enough to obtain typical background noise levels which are representative of the area in which the installation is located. Typical background noise levels shall be obtained for all times when the installation will be operational, including day time and night time for both week days and weekends".

Following Natural Resources Wales approval of the operator's written proposal, pre-operational condition PO2 requires the operator to measure the background noise level ($L_{A90,T}$) and residual noise level ($L_{AEQ,\ T}$) (including tonal noise) in order to obtain representative data for the area in which the installation is located. The results of this monitoring shall be submitted to Natural Resources Wales for approval at least 1 month prior to the commencement of construction. This timescale is to ensure that the measurements are not influenced by noise from construction activities when the installation is being built. It will also allow any existing tonal noise in the locality to be identified prior to the installation being constructed.

We have also set pre-operational condition PO5, which follows on from PO1 and PO2. PO5 requires the operator to conduct the noise impact assessment (approved as part of PO1 completion) using the background, residual and tonal noise level data collected in response to PO2 and submit the findings in the form of a written report and electronic modelling files for approval by Natural Resources Wales. PO5 must be completed at least 12 months prior to the commencement of commissioning. This timescale will allow for any required noise mitigation to be implemented before commissioning begins.

We have also set improvement condition (IC7) which will apply when the installation is operational. IC7 requires further monitoring to be undertaken following successful commissioning and establishment of routine steady operation. The purpose of IC7 is to ensure that noise from the installation (when operational) is validated against the predictions set out in the report which will be produced in response to PO5. This will give a comparison of the actual operational noise levels against predicted performance. In addition, the operator is required to provide an assessment of suitable abatement techniques, together with an estimate of the cost and proposed timetable for installation if noise at levels likely to cause complaints at sensitive receptors is detected.

In addition, the permit also contains the standard conditions for noise (3.4.1 and 3.4.2). We consider that these will be sufficiently protective.

6.6 Setting ELVs and other Permit conditions

6.6.1 Translating BAT into Permit conditions

Article 14(3) of IED states that BAT conclusions shall be the reference for permit conditions. Article 15(3) further requires that under normal operating conditions; emissions do not exceed the emission levels associated with the best available techniques as laid down in the decisions on BAT conclusions.

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

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

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

(i) Local factors

We have considered the impact on local receptors and habitat conservation sites for those emissions not screened out as insignificant and do not consider

it necessary to impose further conditions, or set more stringent emission limits than those specified in the IED.

(ii) National and European EQSs

As detailed in section 5.1, the environmental impact of the installation has been assessed against relevant EQSs, at the level of performance required by IED. The installation will not result in the breach of any EQSs. We accept that the applicant's proposals are BAT and that there is no justification to reduce ELVs below IED levels in these circumstances.

(iii) Global Warming

CO_2 is an inevitable product of the combustion of waste. The amount of CO_2 emitted will be essentially determined by the quantity and characteristics of waste being incinerated, which are already subject to conditions in the Permit. It is therefore inappropriate to set an emission limit value for CO_2, which could do no more than recognise what is going to be emitted. The gas is not therefore targeted as a key pollutant under Annex II of IED, which lists the main polluting substances that are to be considered when setting emission limit values (ELVs) in Permits.

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

(iv) Commissioning

Before the plant can become fully operational, it will be necessary for it to be commissioned. Before commissioning is allowed to start, the operator is required by pre-operational condition PO9 to submit a commissioning plan to Natural Resources Wales for approval. The commissioning plan will address the expected emissions to the environment associated with the different stages of commissioning and the duration and timelines for completion of each stage. The purpose of this pre-operational condition is to ensure that the risks to the environment continue to be minimised throughout the commissioning process. As such, the operator is required to describe the actions that will be taken to protect the environment and also to inform Natural Resources Wales in the event of actual emissions exceeding expected emissions. The operator will be required to carry out commissioning in line with the commissioning plan, once it is approved by Natural Resources Wales.

We have also set improvement condition (IC3) which is required to be completed within 4 months of the completion of commissioning. IC3 requires

the operator to submit a written report for approval on the commissioning of the installation. The purpose of this condition is to provide a comparison of the environmental performance of the plant as installed against the original design parameters which were set out in the application. The report shall also review the performance of the installation against the permit conditions and shall include details of any procedures developed during commissioning for achieving and demonstrating compliance with permit conditions. This will provide an accurate picture of the plant's performance in its "as built" state and the response to this improvement condition will be incorporated into Table S1.2 of the permit as an operating technique.

In addition, it is recognised that certain information presented in the application was based on design data, or data from comparable equipment and the commissioning phase is the earliest opportunity to verify much of this information. The following improvement conditions have been included in the permit so that appropriate verifications will be determined by the applicant:

- Verification of furnace residence time, temperature and oxygen content (IC4);
- Abatement plant optimisation details (IC5); and
- Calibration of the CEMs in accordance with BS EN 14181 (IC6).

6.7 Monitoring

6.7.1 Monitoring during normal operations

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

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

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

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

The applicant has confirmed that they wish to take advantage of the IED Article 45(1)(f) allowance which allows abnormal operation of the plant under certain circumstances when the CEM for releases to air have failed. The applicant has confirmed that a standby probe and standby CEMs will be available in the event of primary CEMs failure. In the unlikely event that the back-up CEMS also fail Condition 2.3.10 of the permit requires that the abnormal operating conditions apply.

The Operator has stated that they will provide back-up CEMS working in parallel to the operating CEMS. These will be switched into full operation immediately in the event that there is any failure in the regular monitoring equipment. The back-up CEMS measure the same parameters as the operating CEMS.

6.7.3 Continuous emissions monitoring for dioxins and heavy metals

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

Natural Resources Wales 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 IED. 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 IED'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 IED. 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.

6.8 Reporting

We have specified the reporting requirements in Schedule 5 of the Permit either to meet the reporting requirements set out in the IED, or to ensure data is reported to enable timely review by Natural Resources Wales 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 – **IED Directive**

We address the requirements of the IED in the body of this document above and the specific requirements of Chapter IV in Annex 1 of this document.

There is one requirement not addressed above, which is that contained in Article 5(3) IED. Article 5(3) requires that "In the case of a new installation or a substantial change where Article 4 of Directive 85/337/EC (the EIA Directive) applies, any relevant information obtained or conclusion arrived at pursuant to articles 5, 6 and 7 of that Directive shall be examined and used for the purposes of granting the permit."

- Article 5 of EIA Directive relates to the obligation on developers to supply the information set out in Annex IV of the Directive when making an application for development consent.
- Article 6(1) requires Member States to ensure that the authorities likely to be concerned by a development by reason of their specific environmental responsibilities are consulted on the Environmental Statement and the request for development consent.
- Article 6(2)-6(6) makes provision for public consultation on applications for development consent.
- Article 7 relates to projects with transboundary effects and consequential obligations to consult with affected Member States.

The grant or refusal of development consent is a matter for the relevant local planning authority. Natural Resources Wales obligation is therefore to examine and use any relevant information obtained or conclusion arrived at by the local planning authorities pursuant to those EIA Directive articles.

Natural Resources Wales has also carried out its own consultation on the Environmental Permitting Application. 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.

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

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

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

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

Article 23(1) requires the permit to specify:

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

These are all covered by permit conditions.

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

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

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

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

To the extent that it might lead to a discharge of pollutants to groundwater (a "groundwater activity" under the EPR 2010), the Permit is subject to the requirements of Schedule 22, which delivers the requirements of EU Directives relating to pollution of groundwater. The Permit will require the taking of all

necessary measures to prevent the input of any hazardous substances to groundwater, and to limit the input of non-hazardous pollutants into groundwater so as to ensure such pollutants do not cause pollution, and satisfies the requirements of Schedule 22.

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

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

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

This Application has been consulted upon in line with this statement, as well as with the Environment Agency guidance RGS6 on Sites of High Public Interest, which addresses specifically extended consultation arrangements for determinations where public interest is particularly high. This satisfies the requirements of the Public Participation Directive.

Our decision in this case has been reached following a programme of public consultation, on the original application. The way in which this has been done is set out in Section 2.2. A summary of the responses received to our consultations and our consideration of them is set out in Annex 2.

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…*". Natural Resources Wales considers that it has pursued the objectives set out in the Government's guidance, where relevant, and that there are no additional conditions that should be included in this Permit to take account of the Section 4 duty.

(ii) Section 7 (Pursuit of Conservation Objectives)

We considered whether we should impose any additional or different requirements in terms of our duty to have regard to the various conservation objectives set out in Section 7, but concluded that we should not.

We consider the impact of the installation on local wildlife sites within 2 Km which are not designated as either European Sites or SSSIs. No local wildlife sites were identified within 2km of the installation. 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 Natural Resources Wales 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 Natural Resources Wales 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 Natural Resources Wales has a duty to consult the conservation bodes in England and 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. This was recorded on a CROW Appendix 4 form, which we used to consult the conservation body in Wales, who agreed with our conclusion.

The CROW assessment is summarised in greater detail in section 5.4.3 of this document. A copy of the full Appendix 4 Assessment can be found on the public register.

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 the conservation bodies in England and Wales and concluded that there will be no likely significant effect on any European Site.

We consulted the conservation body in Wales by means of an Appendix 11 and 12 assessment, and they agreed with our conclusion, that the operation of the Installation would not adversely affect the integrity of the interest features of protected sites either alone or in combination.

The habitat assessment is summarised in greater detail in section 5.4.2 of this document. A copy of the full Appendix 11 and 12 Assessments 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 Natural Resources Wales duty under regulation 3 to secure the requirements of the Water Framework Directive through (inter alia) EP permits, but it is felt that existing conditions are sufficient in this regard and no other appropriate requirements have been identified.

7.3.3 **The Persistent Organic Pollutants Regulations 2007**

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

7.4 Other relevant legal requirements

7.4.1 Duty to Involve

S23 of the Local Democracy, Economic Development and Construction Act 2009 require us where we consider it appropriate to take such steps as we consider appropriate to secure the involvement of interested persons in the exercise of our functions by providing them with information, consulting them or

involving them in any other way. S24 requires us to have regard to any Secretary of State guidance as to how we should do that.

The way in which Natural Resources Wales 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 the Environment Agency Guidance Note RGS6 on Sites of High Public Interest.

ANNEX 1: APPLICATION OF CHAPTER IV OF THE INDUSTRIAL EMISSIONS DIRECTIVE

IED Article	Requirement	Delivered by
45(1)(a)	The permit shall include a list of all types of waste which may be treated using at least the types of waste set out in the European Waste List established by Decision 2000/532/EC, if possible, and containing information on the quantity of each type of waste, where appropriate.	Condition 2.3.3 and Table S2.2 in Schedule 2 of the Permit
45(1)(b)	The permit shall include the total waste incinerating or co-incinerating capacity of the plant.	Condition 2.3.3 and Table S2.2 in Schedule 2
45(1)(c)	The permit shall include the limit values for emissions into air and water.	Condition 3.1.1 and 3.1.2 and Tables S3.1, S3.2 and S3.3 in Schedule 3 of the permit.
45(1)(d)	The permit shall include the requirements for pH, temperature and flow of waste water discharges.	Condition 3.1.1 and 3.1.2 and Tables S3.2 and S3.3 in Schedule 3 of the permit. No requirements have been set because process water is discharged to sewer and there is no aqueous discharge associated with the abatement plant.
45(1)(e)	The permit shall include the sampling and measurement procedures and frequencies to be used to comply with the conditions set for emissions monitoring.	Conditions 3.5.1 and Tables S3.1, S3.2, S3.3, S3.4 and S3.5
45(1)(f)	The permit shall include the maximum permissible period of unavoidable stoppages, disturbances or failures of the purification devices or the measurement devices, during which the emissions into the air and the discharges of waste water may exceed the prescribed emission limit values.	Conditions 2.3.10 and 2.3.11
46(1)	Waste gases shall be discharged in a controlled way by means of a	Emissions and their ground-level impacts

IED Article	Requirement	Delivered by
	stack the height of which is calculated in such a way as to safeguard human health and the environment.	are discussed in the body of this document.
46(2)	Emission into air shall not exceed the emission limit values set out in parts 4 or determined in accordance with part 4 of Annex VI.	Conditions 3.1.1 and 3.1.2 and Table S3.1.
46(3)	Relates to conditions for water discharges from the cleaning of exhaust gases.	There are no such discharges as condition 3.1.1 prohibits this.
46(4)	Relates to conditions for water discharges from the cleaning of exhaust gases.	There are no such discharges as condition 3.1.1 prohibits this.
46(5)	Prevention of unauthorised and accidental release of any polluting substances into soil, surface water or groundwater. Adequate storage capacity for contaminated rainwater run-off from the site or for contaminated water from spillage or fire-fighting.	The application explains the measures to be in place for achieving the directive requirements.
46(6)	Limits the maximum period of operation when an ELV is exceeded to 4 hours uninterrupted duration in any one instance, and with a maximum cumulative limit of 60 hours per year.	condition 2.3.10 and 2.3.11
47	In the event of breakdown, reduce or close down operations as soon as practicable.	condition 2.3.10
48(1)	Monitoring of emissions is carried out in accordance with Parts 6 and 7 of Annex VI.	Conditions 3.5.1 to 3.5.5 Reference conditions are defined in Schedule 6
48(2)	Installation and functioning of the automated measurement systems shall be subject to control and to annual surveillance tests as set out in point 1 of Part 6 of Annex VI.	condition 3.5.3, and tables S3.1 and S3.4
48(3)	The competent authority shall determine the location of sampling or measurement points to be used for monitoring of emissions.	tables S3.1 and S3.4

IED Article	Requirement	Delivered by
48(4)	All monitoring results shall be recorded, processed and presented in such a way as to enable the competent authority to verify compliance with the operating conditions and emission limit values which are included in the permit.	Conditions 4.1.1 and 4.1.2
49	The emission limit values for air and water shall be regarded as being complied with if the conditions described in Part 8 of Annex VI are fulfilled.	Condition 3.5.5 (a) to (e)
50(1)	Slag and bottom ash to have Total Organic Carbon (TOC) < 3% or loss on ignition (LOI) < 5%.	Condition 3.5.1 and Table S3.5
50(2)	Flue gas to be raised to a temperature of 850ºC for two seconds, as measured at representative point of the combustion chamber.	Pre-operational condition PO8. The application specifies measurement point
50(3)	At least one auxiliary burner which must not be fed with fuels which can cause higher emissions than those resulting from the burning of gas oil liquefied gas or natural gas.	Condition 2.3.7
50(4)(a)	Automatic shut to prevent waste feed if at start up until the specified temperature has been reached.	Condition 2.3.6
50(4)(b)	Automatic shut to prevent waste feed if the combustion temperature is not maintained.	Condition 2.3.6
50(4)(c)	Automatic shut to prevent waste feed if the CEMs show that ELVs are exceeded due to disturbances or failure of waste cleaning devices.	Condition 2.3.6
50(5)	Any heat generated from the process shall be recovered as far as practicable.	(a) The plant will generate electricity (b)Operator to review the available heat recovery options every 2 years (Condition 1.2. 3)
50(6)	Relates to the feeding of infectious clinical waste into the furnace.	No infectious clinical waste will be burnt
50(7)	Management of the Installation to be in the hands of a natural person who is competent to manage it.	Conditions 1.1.1 to 1.1.3 and 2.3.1 of the

IED Article	Requirement	Delivered by
		Permit fulfil this requirement
51(1)	Different conditions than those laid down in Article 50(1), (2) and (3) and, as regards the temperature Article 50(4) may be authorised, provided the other requirements of this chapter are met.	No such conditions have been allowed
51(3)	Changes in operating conditions shall include emission limit values for CO and TOC set out in Part 3 of Annex VI.	No such conditions have been allowed
52(1)	Take all necessary precautions concerning delivery and reception of Wastes, to prevent or minimise pollution.	- EPR requires prevent or minimise pollution. -The Application supporting information defines how this will be carried out. - conditions 2.3.1, 2.3.3, 3.2, 3.3 and 3.4
52(2)	Determine the mass of each category of wastes, if possible according to the EWC, prior to accepting the waste.	The application supporting information describes procedures for the reception and monitoring of incoming waste. Also PO12.
53(1)	Residues to be minimised in their amount and harmfulness, and recycled where appropriate.	conditions 1.4.1 and 2.3.12
53(2)	Prevent dispersal of dry residues and dust during transport and storage.	conditions 1.4.1 2.3.1 and 3.2.1
53(3)	Test residues for their physical and chemical characteristics and polluting potential including heavy metal content (soluble fraction).	Condition 3.5.1, Table S3.5 and pre-operational condition PO11.
55(1)	Application, decision and permit to be publicly available.	All documents are accessible from the Natural Resources Wales Public Register
55(2)	An annual report on plant operation and monitoring for all plants burning more than 2 tonne/hour waste.	Condition 4.2.2 and 4.2.3

ANNEX 2: Pre-Operational Conditions

Based on the information 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	Within 1 month of permit issue, the Operator shall submit to Natural Resources Wales for approval, a written proposal for reassessing the potential noise impact of the site. The proposed noise impact assessment shall use the BS4142:2014 standard and shall have regard to the Welsh Government Noise Action Plan 2013 – 2018. The assessment shall be based on the manufacturers stated sound power level for all fixed and mobile noise sources from the plant as built. On site traffic movements and loading / unloading activities shall be included as noise sources in the impact assessment. The background noise measurements ($L_{A90,T}$) and residual noise level ($L_{Aeq,T}$) (including tonal noise) shall be measured over a time period that is sufficiently long enough to obtain typical background noise levels which are representative of the area in which the installation is located. Typical background noise levels shall be obtained for all times when the installation will be operational, including day time and night time for both week days and weekends.
PO2	Following Natural Resources Wales approval of the written proposal provided in response to PO1 and at least 1 month prior to the commencement of construction, the Operator shall measure the background noise level ($L_{A90,T}$) and residual noise level ($L_{Aeq,T}$) (including tonal noise) in order to obtain typical background noise levels which are representative of the area in which the installation is located. The results of this exercise shall be submitted in the form of a written report for approval to Natural Resources Wales.
PO3	At least 5 months prior to the commencement of commissioning, the Operator shall submit a report on the baseline conditions of soil and groundwater at the installation. The report shall contain the information necessary to determine the state of soil and groundwater contamination so as to make a quantified comparison with the state upon definitive cessation of activities provided for in Article 22(3) of the IED. The report shall contain information, supplementary to that already provided in the application Site Condition Report, needed to meet the information requirements of Article 22(2) of the IED.
PO4	At least 5 months prior to the commencement of commissioning, the Operator shall submit a written report to Natural Resources Wales which provides a detailed summary of the site's hydrogeology, including groundwater flow direction and a brief description of aquifer properties (for example porosity and permeability). The report shall also include a detailed site drainage plan as built.
PO5	Following Natural Resources Wales approval of the written proposal provided in response to PO1 and at least 12 months prior to the commencement of commissioning, the Operator shall conduct the noise impact assessment using the background, residual and tonal noise level data collected in response to PO2 and submit the findings in the form of a written report and electronic modelling files for approval by Natural Resources Wales.

Reference	Pre-operational measures
PO6	At least 4 months prior to the commencement of commissioning, The Operator shall submit the written protocol referenced in condition 3.1.4 for the monitoring of soil and groundwater for approval by Natural Resources Wales. The protocol shall demonstrate how the Operator will meet the requirements of Articles 14(1)(b), 14(1)(e) and 16(2) of the IED. The procedure shall be implemented in accordance with the written approval from Natural Resources Wales.
PO7	At least 3 months prior to the commencement of commissioning, the Operator shall submit a written report to Natural Resources Wales which confirms whether Flue Gas Recirculation (FGR) has been included within the final design of the installation. The report shall demonstrate how the chosen design will minimise the impact on the environment (including waste generated / raw material usage).
PO8	After completion of furnace design and at least three calendar months before any furnace operation; the operator shall submit a written report to Natural Resources Wales 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.
PO9	At least 2 months prior to the commencement of commissioning; the Operator shall provide a written commissioning plan, including timelines for completion, for approval by Natural Resources Wales. 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 Natural Resources Wales in the event that actual emissions exceed expected emissions. Commissioning shall be carried out in accordance with the commissioning plan as approved.
PO10	At least 2 months prior to the commencement of commissioning, the Operator shall submit a written report to Natural Resources Wales which confirms and justifies the selection of the reagent to be used within the SNCR system. The report shall also include details of the procedures in place for the safe handling and management of the reagent.
P011	At least 1 month prior to the commencement of commissioning, the Operator shall submit to Natural Resources Wales for approval a protocol for the sampling and testing of co-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.
PO12	At least 1 month prior to the commencement of commissioning, the Operator shall submit a written report to Natural Resources Wales detailing the waste acceptance procedure to be used at the site. The waste acceptance procedure 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 Natural Resources Wales.

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 are provided at the relevant section of the decision document. We are using these conditions to require the Operator to provide Natural Resources Wales 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 Natural Resources Wales on the implementation of its Environmental Management System and the progress made in the certification of the system by an external body or if appropriate submit a schedule by which the EMS will be certified.	12 months from commencement of operations
IC2	The Operator shall submit a written proposal to Natural Resources Wales to carry out tests to determine the size distribution of the particulate matter in the exhaust gas emissions to air from emission point A1, identifying the fractions within the PM_{10}, and $PM_{2.5}$ ranges. The proposal shall include a timetable for approval by Natural Resources Wales to carry out such tests and produce a report on the results. On receipt of written agreement by Natural Resources Wales to the proposal and the timetable, the Operator shall carry out the tests and submit to Natural Resources Wales a report on the results.	Within 6 months of the completion of commissioning.
IC3	The Operator shall submit a written report to Natural Resources Wales on the commissioning of the installation. The report shall summarise the environmental performance of the plant as installed against the design parameters set out in the Application. The report shall also include a review of the performance of the facility against the conditions of this permit and details of procedures developed during commissioning for achieving and demonstrating compliance with permit conditions.	Within 4 months of the completion of commissioning.
IC4	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 Natural Resources Wales.	Within 4 months of the completion of commissioning.

Reference	Improvement measure	Completion date
IC5	The Operator shall submit a written report to Natural Resources Wales describing the performance and optimisation of the Selective Non Catalytic Reduction (SNCR) system and combustion settings to minimise oxides of nitrogen (NO_x) 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 NO_x and N_2O 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.
IC6	The Operator shall submit a written summary report to Natural Resources Wales 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 complies with the requirements of BS EN 14181, specifically the requirements of QAL1, QAL2 and QAL3.	Initial calibration report to be submitted to Natural Resources Wales within 3 months of completion of commissioning. Full summary evidence compliance report to be submitted within 18 months of commissioning.
IC7	Following successful commissioning and establishment of routine steady operation, the Operator shall undertake noise monitoring at the nearest local receptors. This shall include: • A full noise monitoring survey and assessment meeting the BS4142:2014 standard • 1/3rd octave and narrow band (FFT) measurements to identify any tonal elements or low frequency noise • Reference to the World Health Organisation guidelines for community noise Upon completion of the work, a written report shall be submitted to Natural Resources Wales. The report shall make reference to the predictions in the report produced in accordance with PO5. If rating levels likely to cause complaints at sensitive receptors are detected, the report shall include an assessment of the most suitable abatement techniques, an estimate of the cost and a proposed timetable for their installation.	6 months from commencement of operations

Reference	Improvement measure	Completion date
IC8	The Operator shall carry out an assessment of the impact of emissions to air of all the following component metals subject to emission limit values: Cd, Tl, As, Pb, Cr, Mn, Ni and V. A report on the assessment shall be made to Natural Resources Wales. Emissions monitoring data obtained during the first year of operation shall be used to compare the actual emissions with those assumed in the impact assessment submitted with the Application. An assessment shall be made of the impact of each metal against the relevant EQS/EAL. In the event that the assessment shows that an EQS/EAL can be exceeded, the report shall include proposals for further investigative work to determine whether the emissions of these metals from the site can be further reduced.	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 Natural Resources Wales 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 Natural Resources Wales public registers.

The Application was advertised on the Natural Resources Wales website from 20th May 2014 to 24th June 2014 and in the South Wales Evening Post on 20th May 2014. Copies of the Application were placed on our Public Register at Natural Resources Wales, Maes Newydd, Llandarcy, Port Talbot, SA10 6QJ.

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

- Neath Port Talbot County Borough Council (Environmental Protection Department)
- Neath Port Talbot County Borough Council (Planning Department)
- Bridgend County Borough Council (Environmental Protection Department)
- Dŵr Cymru Welsh Water
- Food Standards Agency
- Health and Safety Executive
- Abertawe Bro Morgannwg University Health Board
- Public Health Wales
- Mid and West Wales Fire and Rescue Service
- National Grid

1) Consultation Responses from Statutory and Non-Statutory Bodies

Response Received from Neath Port Talbot County Borough Council (Planning Department)	
Brief summary of issues raised:	**Summary of action taken / how this has been covered**
Neath Port Talbot County Borough Council confirmed the noise conditions attached to the grant of planning consent for the installation, specifically: **(i)** Prior to the commencement of development a scheme for the monitoring and mitigation of construction	Margam Green Energy Plant is a new build installation with no history of noise complaints. As construction work has not yet started at the site of the installation, we have set pre-operational condition PO1, which requires the operator to submit a written proposal to Natural Resources Wales for

and operational noise shall be submitted to and approved in writing by the local planning authority. The scheme shall be implemented as approved. **(ii)** Operational noise from the site shall not be greater than the following levels at the specified locations: - Longlands House; 48dbA Leq 1 hour during the day and Leq 5 minutes at night. - Abbots Close; 48dbA Leq 1 hour during the day and Leq 5 minutes at night. - 10 Acre Wood; 48dbA Leq 1 hour during the day and Leq 5 minutes at night. All measurements shall be taken in accordance with BS4142 (1997). **(iii)** Within 3 months of commencement of operation of the plant a noise assessment using the original monitoring locations as identified in the Environmental Statement, shall be submitted to and approved in writing by the local planning authority. The assessment shall include measures, including appropriate timescales, to address any noise issues identified. These shall be implemented as approved within the timescales agreed. Neath Port Talbot County Council confirmed that no complaints, enforcement or monitoring in relation to noise related planning conditions has taken place at the installation within the past three years.	reassessing the potential noise impact of the site. Pre-operational condition PO2 has been set with the purpose of requiring more representative baseline data to be collected and assessed. Pre-operational condition PO5 requires the operator to conduct the noise impact assessment (approved following completion of PO1), using the background data collected as part of PO2. This assessment will allow the applicant's BS4142 conclusions described in their response to the Schedule 5 notice to be verified using more representative background data as a reference point. Furthermore the assessment will be more realistic as it will be based on noise sources from the plant as built. (It is noted that a technology provider was not appointed when the application stage noise assessments were carried out). Pre-operational conditions PO1, PO2 and PO5 are discussed in more detail in section 6.5.5 of this decision document. These pre-operational conditions will be followed by an improvement condition (IC7) which requires the operator to complete noise monitoring at the nearest local receptors when the installation is operational. The purpose of this improvement condition is to verify the predictions made in response to pre-operational conditions PO5, when the site is operating. If rating levels likely to cause complaints at sensitive receptors are detected at this stage, the operator is required to include an assessment of the most suitable abatement techniques, including an estimate of the cost and the proposed timetable for their installation.

Neath Port Talbot County Council also confirmed that there are no noise sensitive developments for which planning consent has been granted or any areas zoned for noise sensitive developments that are likely to be adversely affected by noise from the installation. Neath Port Talbot County Council confirmed that there have been no noise complaints or action taken in response to noise complaints in the past three years.	The pre-operational conditions and improvement condition reflect items **(i)** and **(iii)** quoted in this section. However, it must be noted that the environmental permit controls operational noise only. Noise from construction activities is controlled under the planning regime. With regard to item **(ii)** quoted in this section, it must be noted that we do not normally stipulate specific noise levels to be achieved in EPR permits. However, our permit template does include the standard noise conditions (3.4.1 and 3.4.2), which we consider are sufficiently protective. Condition 3.4.1 stipulates that "emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site…". This condition applies 24 hours /day and is intended to ensure that noise is not emitted at levels where complaints (i.e. pollution) would occur. Condition 3.4.2 is used for all permits unless an approved noise and vibration management plan has been incorporated as part of the installation's operating techniques. The applicant does not have a noise and vibration management plan. Therefore we have added this condition to the permit to ensure the provision exists for a noise and vibration management plan to be developed and implemented if noise ever becomes an issue in the future.

Response Received from Bridgend County Borough Council (Environmental Protection Department)	
Brief summary of issues raised:	**Summary of action taken / how this has been covered**
No issues raised	None required

Response Received from Health and Safety Executive	
Brief summary of issues raised:	**Summary of action taken / how this has been covered**
No issues raised	None required

Response Received from Abertawe Bro Morgannwg University Health Board	
Brief summary of issues raised:	**Summary of action taken / how this has been covered**
Abertawe Bro Morgannwg University Health Board consulted with their technical advisors in Public Health Wales as well as PHE-CRCE – Wales. Their response to the consultation can therefore be considered to be a joint response from Abertawe Bro Morgannwg University Health Board and Public Health Wales. The response concluded that there is limited potential for risk to public health from the proposed installation. Furthermore, in the local area of the proposed development, there are no obvious population level health concerns if the process is managed properly and meets strict emission and operational standards. However the following recommendations were made: (i) Applicant to agree a timetable for seeking external accreditation to ISO 14001. (ii) The air quality assessment and human health risk assessment rely on assumptions based on the operation of the Wilton 10 biomass plant. Therefore the regulator should be satisfied that the applicant's comparison between the installation and the Wilton 10 facility is appropriate and	The recommendations in the report have been addressed as follows: (i) Permit condition 1.1.1 requires the operator to have a written management system in place. The applicant has stated that the O&M contractor will be required to implement an ISO 14001 environmental management system at the site. Improvement condition IC1 requires the operator to report progress on the implementation of the EMS and progress made in certification of the system. (ii) The applicant has stated that the Wilton 10 facility processes a similar feedstock and employs a similar flue gas treatment system. In addition, the Cr data from Wilton 10 is within the ranges contained in the Environment Agency's Group 3 Metals guidance. We are therefore satisfied that this comparison is appropriate. The air quality assessment and its conclusions are discussed in detail in section 5.2 of this decision document.

	comparable to the proposal at Margam and that variables including fuel composition and process are similar.		
(iii)	The regulator should be satisfied that traffic movements associated with plant operation will not give rise to worsening of air quality in areas occupied by relevant receptors.	(iii)	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.
(iv)	The proposed facility is close to an existing local air quality management area and the impacts on local air quality from this facility and associated traffic will need careful consideration by the regulator before granting a permit.	(iv)	Section 5.2.4 of this document discusses the impact of the installation on a nearby AQMA. The potential impact has been assessed and has screened out as insignificant.
(v)	There is the potential for fugitive dust emissions; it is important that these are adequately controlled so that they do not adversely impact on human health.	(v)	Fugitive emissions are addressed in section 6.5.3 of this document. The control measures for preventing /minimising fugitive emissions of dust are described in this section and we are satisfied that these measures are appropriate. In addition, permit conditions 3.2.1 and 3.2.2 are in place and have been set to ensure that emissions of substances not controlled by emission limits (excluding odour) shall not cause pollution.
(vi)	The applicant should agree to undertake stack emission testing to confirm the parameters assumed in the emission dispersion modelling assessment to validate the impact to local receptors.	(vi)	Emissions to air from the process will be released through a single 65m stack at emission point A1. We
(vii)	The regulator should be satisfied that the odour management plan is suitable to ensure that there will be no discernible odour from on-site activities. This is especially important given the perceived association		

between odour and ill health. (viii) The regulator is satisfied that all on site storage of liquids is suitably bunded in compliance with guidance. Similarly that all waste storage facilities are in line with Regulator's guidance.	have set emission limits in Table S3.1 of the permit to ensure that all releases are compliant with Annex VI of the Industrial Emissions Directive. Permit condition 3.5.1 requires the operator to monitor emissions from A1 in line with the parameters, methods and frequencies specified in Table S3.1. Improvement condition IC8 requires the operator to carry out an assessment of the impact of emissions to air of any metals which did not screen out as insignificant at the application stage. Emissions monitoring data obtained during the first year of operation will be used to compare actual emissions with those assumed in the impact assessment submitted with the application. If the assessment using actual data shows that an EQS/EAL can be exceeded, the operator shall include proposals for further investigative work to determine whether emissions of these metals from the site can be further reduced. (vii) The operator has not drafted an odour management plan, because the waste wood fuel which will be accepted at the installation is inherently non-odorous. Furthermore waste accepted at the installation will be delivered in covered vehicles or within containers and bulk

	storage of waste will only occur in the installation's fuel storage building. No fuel will be stored in external areas. We are satisfied with this and the proposed control measures. Permit conditions 3.3.1 and 3.3.2 have been set with the purpose of ensuring that emissions from the activity will be free from odour at levels likely to cause pollution outside the site in the future. (viii) Bunding arrangements are described in section 4.2.2 of this document and waste storage is described in section 4.1.3. We are satisfied that the applicant's proposals are appropriate. Permit condition 3.2.3 requires that all liquids in containers which could potentially cause pollution are provided with secondary containment. Permit conditions 1.4.1, 2.3.1, 2.3.12 and 3.2.1 are applicable to the management of waste on site.

Response Received from Public Health Wales	
Brief summary of issues raised:	**Summary of action taken / how this has been covered**
See Abertawe Bro Morgannwg University Health Board Response above, which incorporates Public Health Wales recommendations.	See Abertawe Bro Morgannwg University Health Board Response above.

Response Received from Mid and West Wales Fire and Rescue Service	
Brief summary of issues raised:	**Summary of action taken / how this has been covered**
No formal comment on the consultation.	None required.

Response Received from National Grid	
Brief summary of issues raised:	**Summary of action taken / how this has been covered**
No issues raised	None required

No responses received from	Neath Port Talbot County Borough Council (Environmental Protection Department) Dŵr Cymru Welsh Water Food Standards Agency

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

A number of the issues were raised in the consultation response which are outside Natural Resources Wales 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 / Planning Policy Wales 2002. It says that the planning and pollution control systems are separate but complementary. We are only able to take into account those issues, which fall within the scope of the Environmental Permitting Regulations.

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

The following representation was received from Bethan Jenkins, (Welsh Assembly Member for South Wales West), who raised a number of concerns:

- **Transport of timber**, as well as **storage and handling** can all present environmental disadvantages;
- The Port Talbot area is facing yet another heavy industrial planning application in the shape of this 38MW power station, when the area is already blighted by steel works, power generation and other heavy industry;
- Several issues already identified in relation to the site including potential landslips, faults and a possibly high susceptibility to **groundwater flooding**. Also aware of previous coal-mining activity, historical surface ground work, compressible ground deposits and running sand – the latter two underneath the proposed site outline.
- Another polluting industry in Port Talbot which consistently has the worst air quality in Wales.

The **transportation of timber** including 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. The predicted impact of the proposed installation on the nearby air quality management area has been assessed and screened out as insignificant. Therefore this concern is outside the remit of the environmental permitting process for this particular application.

The control measures which will be in place for the **storage and handling of timber** are described in section 6.5.3 of this document. This aspect of the activity is also controlled by permit conditions 2.3.1 (operating techniques), 2.3.3 (waste acceptance), 3.2 (Emissions of Substances Not Controlled by Emission Limits), 3.3 (Odour) and 3.4 (noise and vibration).

The feedstock for the installation will be pre-chipped waste wood rather than virgin timber. No chipping operations will take place at the installation and Table S2.2 of the permit specifies the quantities and types of waste wood that can be accepted. We are satisfied that the waste wood chips are inherently non-odorous.

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.

Flood Risk: Natural Resources Wales provides advice and guidance to the local planning authority on flood risk in our consultation response to the local planning authority. Our advice on these matters is normally accepted by both Applicant and Planning Authority. When making permitting decisions, flood risk is still a relevant consideration, but only in so far as it is taken into account in the accident management plan and that appropriate measures are in place to prevent pollution in the event of a credible flooding incident.

b) Representations from Community and Other Organisations

There were no representations from Community and Other Organisations.

c) Representations from Individual Members of the Public

There were no responses received from individual members of the public.