Cyfoeth Naturiol Cymru
Natural Resources Wales

Natural Resources Wales permitting decisions

Biomass UK No.2 Limited
Barry Energy Production Facility

Decision Document

Contents

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
COT	Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment
CROW	Countryside and rights of way Act 2000
CV	Calorific value
CW	Clinical waste
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
ELV	Emission limit value
EMAS	EU Eco Management and Audit Scheme
EMS	Environmental Management System
EPR	Environmental Permitting (England and Wales) Regulations 2016
EQS	Environmental quality standard
EU-EQS	European Union Environmental Quality Standard
FSA	Food Standards Agency
GWP	Global Warming Potential
HHRAP	Human Health Risk Assessment Protocol
HW	Hazardous waste
HPA	Health Protection Agency
IBA	Incinerator Bottom Ash
IED	Industrial Emissions Directive (2010/75/EU)
I-TEF	Toxic Equivalent Factors set out in Annex VI Part 2 of IED

I-TEQ	Toxic Equivalent Quotient calculated using I-TEF
LCV	Lower calorific value – also termed net calorific value
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
PEC	Predicted Environmental Concentration
PHW	Public Health Wales
POP(s)	Persistent organic pollutant(s)
EU POPS regulations	REGULATION (EC) No 850/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC
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
SCR	Selective catalytic reduction
SGN	Sector guidance note
SHPI(s)	Site(s) of High Public Interest
SNCR	Selective non-catalytic reduction
SPA(s)	Special Protection Area(s)
SS	Sewage sludge
SSSI(s)	Site(s) of Special Scientific Interest
TDI	Tolerable daily intake

TEF	Toxic Equivalent Factors
TGN	Technical guidance note
TOC	Total Organic Carbon
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)
WID	Waste Incineration Directive
WHO	World Health Organisation

1. Our decision

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

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

This Application is to operate an Installation which is subject principally to the Environmental Permitting Regulations 2016 ('EPR') and is subject to the requirements of the Industrial Emissions Directive ('IED').

The Permit contains many conditions taken from our Environmental Permit template conditions, including the relevant Annexes. We developed these conditions in consultation with industry, having regard to the legal requirements of the EPR and other relevant legislation. This document does not therefore include an explanation for these template conditions. Where they are included in the Permit, we have considered the Application and accepted the details are sufficient and satisfactory to make the template condition appropriate.

2. How we reached our draft decision

2.1 Receipt of Application

The application was duly made on 21st November 2016. This means we considered it was in the correct form and contained sufficient information for us to begin our determination but not that it necessarily contained all the information we would need to complete that determination: see below.

The applicant made a claim for commercial confidentiality with regards to the Computational Fluid Dynamics outputs, however this was withdrawn by the Applicant. 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 Environmental Permitting Regulations 2016 ('EPR'), the Industrial Emissions Directive ('IED'), our statutory Public Participation Statement ('PPS') and our Regulatory Guidance Note RGN6 for Determinations involving Sites of High Public Interest. We have also considered our obligations under the Public Participation Directive ('PPD').

We advertised receipt of the Application by a notice placed on our website, which contained all the information required by the EPR and IED, including telling people where and when they could see a copy of the Application. This first phase of the consultation ran for 4 weeks from 5th December 2016 to 2nd January 2017. We placed copies of the application on our Public Register and anyone wishing to see these documents could do so.

At the same time, we sent copies of the Application to the following bodies, which includes those with whom we have "Working Together Agreements".

- Vale of Glamorgan Council (Environmental Protection Department)
- Vale of Glamorgan Council (Planning Department)
- Cardiff and Vale University Health Board
- Food Standards Agency
- Public Health Wales
- South Wales Fire and Rescue Service
- Dŵr Cymru Welsh Water
- Health and Safety Executive

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

We ran a second phase of consultation for 12 weeks from the 21st February 2017 to 8th May 2017. In addition to the measures put in place for the first phase consultation, we also arranged for paper copies of the application to be made available for public viewing at our offices:

- Natural Resources Wales, Cambria House, 29 Newport Road, Cardiff, CF24 0TP; and
- Natural Resources Wales, Rivers House, St. Mellons Business Park, St. Mellons, Cardiff, CF3 0EY.

We also made copies of the application available to view at the following locations:

- Barry Library, The County Library, King Square, Barry, Vale of Glamorgan, CF63 4RW; and
- Barry Town Council, 7 Gladstone Road, Barry, Vale of Glamorgan, CF62 8NA.

On 31st July 2017, we opened a supplementary third phase consultation on further information that we received from the applicant. Members of the public could access this information and provide comment to us on it via the same routes as described above for the consultations on the Application. We also made the information available for download from our website. This third phase consultation ran for 6 weeks and closed on 10th September 2017.

We also sent copies of the further information to the following bodies:

- Vale of Glamorgan Council (Environmental Protection Department)
- Public Health Wales
- South Wales Fire and Rescue Service

On 27th November 2017, we issued a 'minded to grant' decision accompanied by a draft permit for a fourth period of consultation. That fourth phase consultation ran for eight weeks and closed on 22nd January 2018.

We also sent letters to the statutory consultees listed above, informing them of our 'minded to grant' decision.

In total, we ran four phases of consultation over a period beginning on 5th December 2016 and ending on 22nd January 2018. The consultation phases provided a total of 29 weeks for interested parties to prepare and participate effectively in this decision process.

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 final determination. Where representations were duplicated, we have grouped representations by issue and addressed that issue.

2.3 Requests for further information

The application was submitted on 25th October 2016 and was duly made on 21st November 2016. As is common with these types of application, further information was required to enable final determination of it. We issued three 'Notices requiring further information' (Schedule 5 Notice) on 15th December 2016, 24th January 2017 and 11th May 2017. Copies of these notices were placed on our Public Register as were the responses when received.

The Applicant submitted an amended version of the noise and air quality impact assessment reports on the 17th July 2017 with their response to the third Schedule 5 Notice. The amended assessment reports corrected minor typographical errors but did not alter the findings and conclusions of the assessment. Updated versions of the Fire Management Plan, Site Condition Report, and BAT assessment were also submitted as part of the third Schedule 5 submission which corrected errors in the original version.

On assessing the response to the third Schedule 5 notice, there were aspects that needed clarification. Clarification was sought by email on the 5th October 2017. The applicant submitted their responses on the 19th, 20th and 23rd October 2017, all questions were answered to a satisfactory standard.

3. The Legal Framework

The Permit application was determined and granted in accordance with the EPR.

We address some of the specific legal requirements directly within the relevant sections of this document and have included an overview of the relevant legislation in section 7.

The summary list of relevant legislation and regulations includes:

- Environmental Permitting Regulations 2016 ('EPR')
- The Industrial Emissions Directive 2010 ('IED')
- The Waste Framework Directive 2008 ('WFD')
- The Water Framework Directive 2000 ('WrFD')
- The Habitats Directive 1992 ('HD')
- The Energy Efficiency Directive ('EEF')
- The Ambient Air Directive ('AAD')
- The Conservation of Habitats and Species Regulations 2010 ('Habs Regs')
- The Persistent Organic Pollutants Regulations 2007
- The Environment (Wales) Act 2016 ('EWA')
- The Human Rights Act 1998 ('HRA')
- The Countryside and Rights of Way Act 2000 ('CRoW')
- The Wildlife and Countryside Act 1981 ('WCA')
- The Well-being of Future Generations (Wales) Act 2015 ('WFG')
- The Natural Resources Body for Wales (Establishment) Order 2012
- The Natural Resources Body for Wales (Functions) Order 2013
- The Equalities Act 2010 ('EqA')

We consider that the Permit 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.

4. The Installation

4.1 Description of the Installation and related issues

4.1.1 The permitted activities

Regulation 8 EPR defines the categories of 'regulated facility' and provides that a regulated facility of some categories may be carried on as part of the operation of a regulated facility of another category.

For the purpose of regulation 8 EPR, NRW has concluded that the regulated facility is an 'Installation' within which a 'waste operation' is conducted.

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 exceeding 3 tonnes per hour.

The EPR definition of "waste incineration plants" and "waste co-incineration plants" says;

"waste co-incineration plant" means a stationary or mobile technical unit whose main purpose is the generation of energy or production of material products and which uses waste as a regular or additional fuel or in which waste is thermally treated for the purpose of disposal through the incineration by oxidation of waste as well as other thermal treatment processes, such as pyrolysis, gasification or plasma process, if the substances resulting from the treatment are subsequently incinerated;"

Ash is used within the process as bed material, however, there is no on-site treatment of ash associated with this Installation.

The plant is waste co-incineration plant because the main purpose of the plant is the generation of energy.

Schedule 1 EPR defines ‘Installation to include ‘directly associated activities’ (‘DAA’). At this Installation, the DAA includes the generation of electricity using a steam turbine, fuel reception & storage, an air-cooled condenser for the recovery of water, residue handling & storage, water treatment of make-up water and air pollution control system. Some of these are ‘waste operations’ for the purposes of regulation 8 EPR and in accordance with that regulation have been included within the Installation.

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

4.1.2 The site

The Installation is located off Woodham Road, Barry, Vale of Glamorgan at NGR ST 12605 67691. The Installation is located within the docks area of Barry on brownfield land immediately adjacent to industrial units on Woodham Road to the south west and Viaduct Road to the north east.

The Installation footprint is bound by David Davies Road to the south and Ffordd y Mileniwm to the north. The eastern extent of the Barry Waterfront development is located approximately 200m to the west of the Installation and Dow Corning Chemical Works complex is located approximately 1km to the north east. The Installation occupies an area of approximately 0.74 hectares.

There are several ecologically sensitive sites located within the relevant screening distances of the Installation, these screening distances are set-out by our policies and guidance.

These include two Sites of Special Scientific Interest (SSSIs), four Local Wildlife Sites and two Ancient Woodlands within 2km of the site boundary, and one Special Area of Conservation (SAC)/Special Protection Area (SPA)/Ramsar within 10km of the site boundary.

The SAC is the only site that is subject to the Habitats Directive. We have assessed the impact of the Installation on all these habitats, except for the two SSSIs: we have not included these in our assessment because they are designated for geological features only and therefore there is no mechanism by which the Installation can impact upon these features.

The location of the Installation is determined by planning consent, however it 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 nature and scale of pollution prevention measures necessary to minimise the risk to the environment and human health, and;
- The extent to which the Installation is consistent with the objective of promoting the achievement of the principles of sustainable management of natural resources and contributing to the achievement of the well-being goals.

These matters are addressed in the relevant sections of this decision document.

The applicant submitted a site plan which we consider is satisfactory, showing the site of the Installation, its extent, and emission points. The site plan is included in Schedule 7 to the permit, and the operator is required to carry on the permitted activities within the site boundary.

4.1.3 What the Installation does

The Applicant has described the facility as a high efficiency energy generation plant that utilises advanced thermal technology, namely gasification, as a cost-effective means of processing mixed waste wood feedstocks to produce a synthesis gas which will be used to raise steam and generate energy.

Our view is that for the purposes of IED (Chapter IV) and EPR, the Installation is a waste co-incineration plant because notwithstanding the fact that waste will be subjected to gasification by the process; the process is never-the-less 'co-incineration' because the main purpose of this plant is the generation of energy and it uses waste as a regular or additional fuel.

The Installation has a design thermal fuel rated input of approximately 43MWth through a single gasification line. The Installation is permitted to accept 86,400 tonnes per annum (tpa) of non-hazardous waste wood.

The fuel comprises waste wood. The fuel arrives on site in the form of pre-processed shredded wood. The shredded wood is delivered to site by road and unloaded into a fuel storage area which is in an enclosed building. The fuel storage building will be equipped with a push floor which provides intermediate storage and transport of the waste wood chip. The hydraulic actuators will pull the fuel to the end of the conveyors where the fuel will drop on to a transport system and onto conveyors. The conveyor system has ferrous and non-ferrous metal separators to remove any metals contained within the feedstock materials. Metals will be separated using a magnet and placed into dedicated containers.

The wood chips travel over a screen where oversize feedstock parts that are too large to fall through the screen are collected in a separate container. Smaller feedstock parts fall through onto a chain conveyor, which transports the wood towards the gasifier metering bins and into the gasifier chamber.

Fuel is fed via the augers into the gasification unit, where it is distributed onto a fluidised bed located at the bottom of the unit. The fluidised bed heat treats the fuel to produce a synthetic gas which is then combusted to produce a high temperature flue-gas. A steam boiler will recover the heat from the flue-gas through the conversion of water to superheated steam. The superheated steam passes through a steam turbine which drives an electricity generator to produce approximately 10MWe of electricity for export to the National Grid.

The plant will use diesel 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.

Detailed Computational Fluid Dynamic modelling (CFD) of the subsequent combustion process has been carried out to ensure complete combustion of the syngas under varying conditions, and guarantees the 2 seconds’ minimum combustion gas retention time above 850ºC stipulated by Chapter IV of the IED.

The relatively low and uniform operating temperature of the fluidised bed means that generation of oxides of nitrogen (NO_x) is low relative to other incineration and co-incineration technologies. Emissions of NO_x that are generated will be controlled by the injection of an ammonia based Selective Non-Catalytic Reduction (SNCR) reagent (Urea) into the combustion chamber. Selective Catalytic Reduction (SCR) also uses Urea and is used to provide further NO_x reduction and control Ammonia slip.

Further abatement includes the injection of activated carbon, primarily for absorption and removal of heavy metals and dioxins. Anhydrous Lime will be injected to control acid gas emissions and a fabric filter will be used to remove dust. The plant also employs flue gas recirculation to reduce emissions to atmosphere. The cleaned exhaust gases are then released to air via a 43-metre stack.

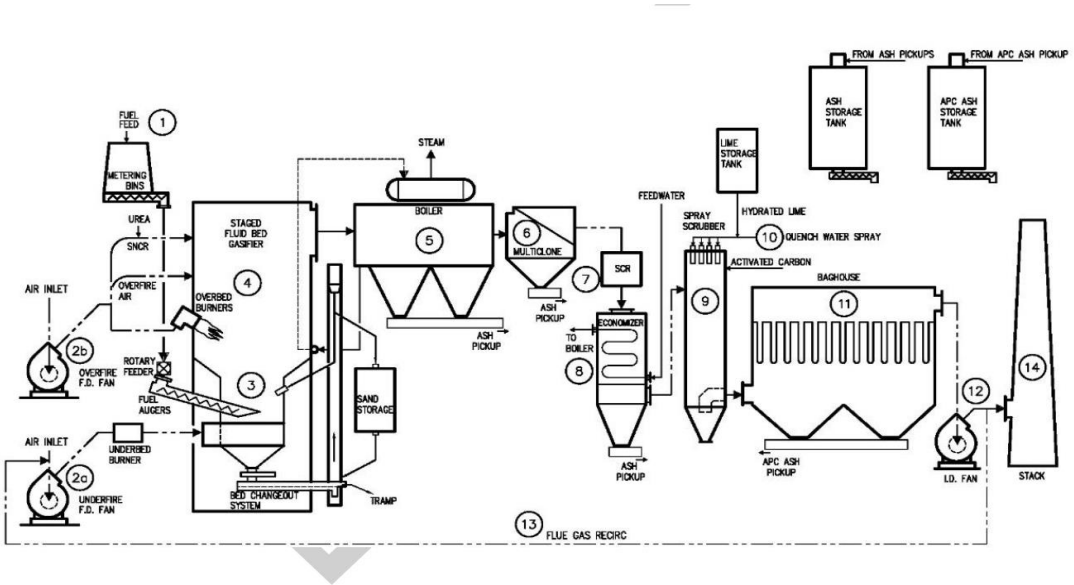
Main waste streams include the boiler blowdown to sewer under trade effluent discharge consent from the sewerage undertaker and ash residues from the gasifier beds, boiler passes and flue gas cleaning. Bottom ash will be recirculated within the gasifier as bed material before being removed from the beds as particulate entrained within the syngas stream.

The beds will need to be periodically changed. All Air Pollution Control (APC) residue from flue-gas cleaning, will be stored within a dedicated collection hopper and exported off-site. All ash collection and transfer will be via dedicated covered vehicles. There will be no direct process emissions to surface water from the Installation.

Uncontaminated rainwater runoff arising from the roof drainage will be collected through a Syphonic rainwater collection system and discharged to surface water drain via an attenuation tank. Rainwater which falls onto the roads and hardstanding (excluding operational areas) will be captured via the surface water drainage system and will be discharged to surface water drain via the attenuation tank.

4.1.4 Process Flow Diagram

The process is illustrated in the following simplified diagram:



4.1.5 Key Issues in the Determination

The key issues arising during this determination were

- Emissions to air
- Fire Prevention Plan
- Waste Acceptance & Storage
- Noise

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

4.2 The Site and its protection

4.2.1 Site setting, layout and history

The site setting, layout and history of the site is described by the Applicant in section 2.1.1 of the revised Site Condition Report supplied in response to the third Schedule 5 Notice.

4.2.2 Proposed site design: potentially polluting substances and prevention measures

The operator has provided a description of the condition of the site. We consider this description is satisfactory. The decision was taken in accordance with our guidance on Site Condition Report's – guidance and templates (H5). Article 22(2) of the IED requires the Applicant 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.

Waste wood chip for the Installation will be delivered pre-prepared to site in covered vehicles from the supplier, directly into main fuel storage area.

The fuel storage building is of sealed construction, fitted with roller shutter doors. Air is extracted from the building to maintain dusts at below occupational exposure levels. The fuel storage area has the capacity to store 2,000 m^3 of wood chip fuel. There will be no chipping of waste wood within the Installation. The doors to the fuel store will be closed between deliveries to minimise fugitive dust emissions and potential exposure of the fuel to intermittent rainfall that may occur in the area.

The Applicant has submitted a Site Condition Report which includes a report on the baseline conditions as required by Article 22.

The Installation isn't located within a Groundwater Protection Zone. The locations of the boreholes and trial pits were situated to provide site wide coverage and specifically target areas where the railway and historical builders yard/ engineering works had been present.

The Applicant carried out a suite of chemical analyses which were based on the potential contaminants of concern for the Installation from historical activities, such as engineering works, railway workings and demolition of buildings, the preliminary site model is included in the Site Condition Report. In addition to this the Applicant also included potential contaminants from the proposed operation. Soil samples were taken and submitted to an accredited laboratory where the Applicant tested for pH, metals, sulphate, speciated Polyaromatic Hydrocarbons (PAHs), Total Petroleum Hydrocarbon (TPH), Benzene, Toluene, Ethylbenzene, Xylene (BTEX), Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), Polychlorinated Biphenyl (PCBs), mineral oils, Waste Acceptance Criteria (WAC) testing, asbestos, petroleum hydrocarbons from fuel and lubrication oils and heavy metals. In addition, the Applicant took groundwater samples and submitted these to a lab for analysis. They tested a broad range of contaminants including metals, sulphate, PAH, TPH, VOCs and SVOCs.

The site is capped with concrete and the site will benefit from a sealed drainage system. Furthermore, all tanks are to be served with secondary and tertiary containment, therefore the likelihood of discharges to land are low.

There are no releases to land or groundwater associated with the Installation. In addition, there are no point source releases of process effluents to controlled waters from site, as all process effluents are discharged to the Dŵr Cymru/ Welsh Water sewer system.

The Applicant has confirmed that all relevant elements of the Installation will be designed in accordance with recognised standards, methodologies and practices. The buildings on-site are all provided with both secondary and tertiary containment and we are satisfied that any spillages, leaks or incidents arising within the process areas will be effectively contained and captured within the footprint of the main building. The Applicant has also confirmed that all the storage tanks on-site will be fitted with secondary containment and are designed to comply with current guidelines. Further to this, all storage tanks will be fitted with level gauges, alarms and hardwired into the plant's online SCADA monitoring system. All above ground drainage shall be designed in accordance with BS EN 12056. Site drains can be isolated in the event of an emergency to prevent any release of fire water or contamination to surface waters. The surface water drainage attenuation tank is fitted with an actuated penstock to isolate the surface water drainage system in the event of a fire. More specifically, all fire-fighting water will enter the drainage system and flow into the attenuation tank, from which point the contaminated water will be tankered away to a suitable water treatment facility. There will be no releases of fire-fighting water to surface water. We are satisfied with the Applicant's proposed control measures and consider permit condition 3.2.1 is sufficiently protective.

There are no internal surface water drains located within the building interiors that would allow contaminated water to enter the surface water drainage system. Any spillages of a contaminating nature within the main building will be stored within the building and treated accordingly.

In the event of a spillage, no materials will be able to escape the process. The Installation will have an adequate supply of emergency spill kits to deal with spillages of oils and chemicals. These will be situated throughout the site and placed in locations associated with bulk and temporary storage, site drainage and storage of waste liquids. To prevent accidental damage to tanks, all fixed storage and mobile storage tanks will be located away from areas where vehicle movements are carried out. The Applicant's Accident Management Plan (AMP) has been incorporated into the Permit's operating techniques table. The AMP is to be implemented and maintained at the site as part of the company's Environmental Management System and will ensure the site and all operatives within are fully prepared for such incidents. We are satisfied with the procedures in place to minimise pollution to the environment.

We have reviewed the Applicant's baseline Site Condition Report and consider that it adequately describes the condition of the soil and groundwater prior to the start of operations.

4.2.3 Closure and decommissioning

Having considered the information submitted in the permit application, we are satisfied that the appropriate measures will be in place for the closure and decommissioning of the Installation. 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 must satisfy us that the necessary measures have been taken so that the entire Installation ceases to pose a risk to soil or groundwater, considering both the baseline conditions and the site's current or approved future use. To do this, the Operator must apply to us for surrender, which we will not grant unless and until we are satisfied that these requirements have been met. Pre-operational condition PO1 in the permit requires a soil and groundwater monitoring plan be submitted to Natural Resources Wales for approval.

This plan will set out how the Operator will monitor soil and groundwater going forward. The results from this testing will be used at permit surrender to assess the condition of the site against the baseline established prior to commencement of activities.

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 to comply with the conditions included in the environmental Permit.

We are satisfied that the Applicant's submitted Operator Performance Risk Appraisal ('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 Relevant convictions

Our Enforcement Database has been checked to ensure that all relevant convictions have been declared. No relevant convictions were found. The operator satisfies the criteria in RGN 5 on Operator Competence.

4.3.3 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.

Improvement Condition IC6 in the permit requires the Applicant to report progress towards gaining accreditation of its EMS. A pre-operational condition (PO2), is included requiring the Operator to provide a summary of the EMS prior to commissioning of the plant and to make available for inspection all EMS documentation. We are therefore 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.

4.3.4 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.

4.3.5 Accident Management

The Applicant has submitted an Accident Management Plan with the Application. Considering this with other information submitted, we are satisfied that appropriate measures will be in place to ensure that accidents that have the potential to cause pollution are prevented, but that if they should occur their consequences are sufficiently minimised.

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.

4.3.6 Off-site conditions

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

4.3.7 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 condition 2.3.1 and Table S1.2 in the Permit schedules.

Articles 45(1), (2) and (4) of the IED make requirements as to the content of the Permit. The Application contains the information necessary for NRW to ensure compliance with those parts of article 45 IED. 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 and are capable of being safely incinerated at the Installation;
(ii) these wastes are likely to be within the design calorific value (CV) range for the plant; and
(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 86,400 tonnes of waste wood at the facility per annum, this differs from the planning permission figure, the difference is because of the moisture content in the wood, one limit is for wet and one is for dry wood. The nominal design capacity of the plant is 94,590 tonnes of waste per annum, based on the Installation operating 8,760 hours per year at a nominal capacity of 10.79 tonnes per hour, using fuel with an average calorific value of 14.3 MJ/kg.

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

Each vehicle arriving at the Installation will follow a strict waste acceptance procedure. Section 3 of document BUK-E01 “Pre-acceptance” shows a flow diagram with the fuel acceptance procedure for all fuel entering the Installation. This has been incorporated into the operating techniques table of the Permit. Before the waste wood is accepted on-site, visual checks will be performed to check for signs of contamination, if the quality checks are passed then the wood chip will be delivered directly to the fuel storage area in the main building where it will be temporarily stored prior to transfer to the feeder for the incinerator. A full procedure will be kept within the sites EMS which will be accredited to ISO 14001 once the site is operational.

4.3.8 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 standard aspects of all EPR permit determinations. The 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 different options. This aspect is covered in the BAT assessment section later in the document.

(ii) Use of energy within the Installation

Having considered the information submitted with the Application and further information submitted in response to the third Schedule 5 Notice, we are satisfied that appropriate measures will be in place to ensure that energy is used efficiently within the Installation. For example, all pipes and thermal processes are lagged and insulated to ensure that heat loss is minimised and prevented, all fans and motors have high efficiency electrical motors and variable speed drives and waste heat is used for internal uses where possible i.e. preheating combustion air etc.

The specific energy consumption of the plant is a measure of total energy consumed per unit of waste processed. For this Installation, the figure is 130 kWh/tonne. This is based on the permitted annual volume of waste to be accepted of 86,400 tonnes. 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 14.275 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) IED requires that *"the heat generated during the incineration and co-incineration process is recovered as far as practicable*". The Environment Agency's Sector Guidance Note EPR 5.01 "How to Comply with your Environmental Permit: Additional Guidance for the Incineration of Waste" states that indicative BAT includes the use of steam from boilers in on-site or off-site applications. Natural Resources Wales have adopted this guidance.

Natural Resources Wales' "CHP Ready Guidance for Combustion and Energy from Waste Power Plants v2 September 2014" 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 Installation only generates electricity; however, it is CHP-ready and therefore meets BAT in this case.

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). The Environment Agency's 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).

Using a pro-rata calculation for waste with a LCV of 14.28 MJ/kg, BAT for the process is defined as being between 0.55 to 0.989 MWh/tonne, with energy generation of between 6.865 and 12.357MWe. Based on the current mode of operation, where the Installation is generating electricity only, the Sankey diagram supplied with the Application shows 10.23 MW of electricity produced for an annual gasification of 86,400 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 proximity of the Installation to suitable users of excess heat is a determining factor in establishing the extent to which waste heat can be utilised. There is provision within the design of the steam turbine to extract low-grade steam for a district heating scheme should a future opportunity for such a scheme arise. 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. Heat recovery will mainly be from condensing of steam for recirculation to the boiler and will be used for internal uses where possible i.e. preheating of combustion air. We consider the requirements of Article 50(5) to be met.

(iv) R1 Calculation

The R1 calculation does not form part of the matters relevant to our determination. Even though the Applicant meets the efficiency targets of R1, classification of an Installation as R1 under Waste Framework Directive only applies to municipal waste incinerators.

Therefore, the Applicant is not entitled to claim this. We 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.

There will be no cooling towers required; therefore, there will be no use of biocides in any cooling water systems and no release to land.

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. On this basis, we agree with the applicant's conclusion that an air-cooled condenser represents BAT for the Installation.

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

The Applicant has carried out an assessment of the potential for operating the Installation as a high-efficiency cogeneration Installation which satisfies Schedule 24 EPR. The assessment concluded that cogeneration will not be practicable because there are no potential recipients for the supply of waste heat identified within 15 km of the Installation. This is fully explained in the application and NRW is satisfied with the assessment.

(vii) 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) and thermal energy used on Installation. Together with the total waste wood co-incinerated per year, this information will enable NRW to monitor energy recovery efficiency at the Installation and appropriately apply its enforcement and sanctions policy as necessary.

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

4.3.9 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 within the Installation.

The operator is required to report raw material usage under condition 4.2 and Schedule 4, including consumption of urea/ammonia, activated carbon and lime used per tonne of waste burned.

The raw material usage which is reported, will enable NRW to assess whether there have been any changes in the efficiency of the air pollution control plant, and the operation of the SNCR and SCR to abate NO_x. These are the most significant raw materials that will be used at the Installation, other than the waste feed itself.

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.

4.3.10 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 imported for treatment. The principal waste streams produced by the Installation 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 combustion chamber, 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 (including boiler ash). Compliance with this limit will demonstrate that good combustion control and waste burnout is being achieved in the combustion chamber and waste generation is being avoided where practicable.

Incinerator bottom ash (IBA) will normally be classified as non-hazardous waste. IBA is a hazardous waste if it possesses a hazardous property relating to the content of dangerous substances. Monitoring of co-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.

To ensure that the IBA and APC residues are adequately characterised, pre-operational condition PO4 in the permit 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 larger metal fractions will be recovered from the bottom ash using a magnetic separator and sent for recycling. The Application also, proposes that, where possible, bottom ash will be transported to a suitable recycling facility, where it could be re-used in the construction industry as secondary aggregates.

The Applicant has stated that once a contractor has been identified, a market for the non-hazardous ash will be examined with a view to further reducing the environmental impacts of the wastes generated. Having considered the information submitted in the application, we are satisfied that the waste hierarchy referred to in Article 4 of the Waste Framework Directive 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. Permit condition 1.4.1 will ensure that this position is maintained.

4.3.11 Fire Prevention Plan

The Applicant has submitted a Fire Prevention Plan (FPP) as part of their application in line with NRW's Fire prevention and mitigation plan guidance – Version 1, May 2016. This guidance was current and applicable at the date of the Application. Any subsequent guidance will be used for permit review purposes when and where appropriate.

We received the original FPP with the Application. However, following assessment of this document and the consultation response from South Wales Fire and Rescue Service (SWFRS) on the 20th February 2017, we determined that there were deficiencies in the report.

The main issues raised were that the FPP referred to Fire prevention plans TGN 7.01 in the beginning of the document. Both NRW & Environment Agency (EA) Guidance supersede TGN 7.01, however later in the document it refers to NRW guidance. SWFRS also noted issues surrounding the storage sizes quoted within the plan, fire detection and suppression systems and volumes of water on site. Based on the issues that were identified a list of questions were drafted.

SWFRS further responded to our consultation on the 28th February. A Schedule 5 Request for Further Information was sent to the Applicant on the 11th May 2017 highlighting the issues with the FPP.

The Applicant re-submitted their FPP on the 14th July 2017 and referenced the 2016 version of Fire Prevention guidance. Answers to several specific questions regarding the FPP were also submitted by the Applicant. Relevant issues raised by SWFRS in the 2 previous consultation responses were addressed by the applicant in the updated FPP submitted July 2017.

The updated Fire Prevention Plan addressed many of the original issues and was assessed against the correct guidance (as mentioned above). However, there remained issues that required clarification.

Following the submission of the updated FPP, Capita on behalf of Barry Town Council assessed the FPP and submitted a report. This report summarised that the FPP was in fact of a reasonable standard but recommended some actions.

SWFRS were also provided with the latest Schedule 5 response and the Capita report. Based on the questions raised by the reports and our own assessment, an email was sent to the Applicant on the 5th October 2017 requesting clarification on several points relating to the FPP.

The Applicant responded to these questions on the 19th and 23rd October 2017.

In the FPP, the document referred to no more than 3.5 days' worth of fuel being stored on the site at any one time, and stated that the 'rapid turnover' would significantly reduce the risk of self-heating. We required clarification from the Applicant and enquired about the quantity of fuel required for 3.5 days' and whether that quantity was within the 2,000m^3 storage capacity of the building.

The applicant responded as follows;

"The plant will process 10 tonnes per hour of waste wood at a density of 400kg/m^3. Therefore, 3.5 days of waste wood equals 2,100m^3 so in essence, the 2,000m^3 does correspond to the 3.5 days stated within the FPP. However, 3.5 days was stated as a precaution as it equates to a 'long bank holiday weekend' scenario. Under normal operation, all fuel will be rotated through the plant every two days. During this time, all material within the building will have been transferred to the combustor and all areas of the fuel store will have been cleared before accepting any additional waste.

Only during periods of extended bank holidays will it be necessary to store material for any period greater than 2.5 days, so if required by NRW the Applicant would be happy to accept conditions that reflect this".

This is acceptable and represents the worst-case scenario for fuel storage, the building size is adequate to contain the wood, however, the applicant will not store more than 2000m^3 of wood at any one time on-site.
This is listed as a limit in Schedule 1, Table S1.1 of the Permit where it is stated that total storage capacity of incoming waste wood is 2000m^3. This is a prescribed limit in the Permit.

Section 3.2.2 of the Fire Prevention Plan states that temperature monitoring was not required ‘as the material will be cool before it is stored’. However, our view is that there is potential that the material may contain residual heat from pre-storage, treatment and transport at/from other yards before arriving at site.

We enquired as to how the Applicant intended to ensure that all the wood received on-site is cool. The Applicant again responded and confirmed that all wood being received on site would be subject to temperature monitoring using a hand temperature probe as part of the site’s acceptance procedures.

Any waste recorded over 50^{o}C is to be loaded back onto the delivery vehicle and returned to the supplier. This will ensure that all waste wood received on site is at an appropriately low temperature for storage.

The temperature monitoring will take place as soon as the delivery lorry has unloaded the waste into the Fuel Storage Building, this allows the waste to be easily loaded back onto the lorry in the unlikely event that the temperature exceeds 50^{o}C. This response satisfies the requirement to monitor waste wood and we are therefore satisfied with the procedures put in place to minimise the risk of fire.

In Section 3.3.1 of the Fire Prevention Plan the Applicant stated that the building did not need to comply with the storage and pile size stipulations as stated in the NRW Fire Prevention and Mitigation plan guidance – May 2016 guidance. However, the NRW Fire Prevention and Mitigation plan guidance – May 2016 guidance applies to any facility where waste is stored regardless of whether that waste is to be used as a fuel. We therefore requested that the Applicant provide clarification of how their proposals provide the same or greater levels of mitigation as that shown in the guidance.

The Applicant stated that *"the Fuel Storage Building is a purpose-built fuel storage hall with a purpose designed fuel storage bunker. The pile size stipulations stated within the FPP Guidance cannot be applied to this aspect of the plant. As such the storage within the building is required to deviate from the dimensions stated within the FPP Guidance. However, the very rapid turnaround of the fuel at the site ensures that the risks of self-combustion and thermal runaway condition are prevented."*

The Applicant has also committed to installing a thermal imaging camera, as well as the existing detection and suppression systems as mentioned in the updated FPP. This will immediately identify any rising temperatures within the waste pile. In the unlikely event that a hot spot did occur, it would be immediately detected via the buildings fire detection systems. The waste would then either be spread out within the Fuel Storage Building so that it cools, or if the temperature is too high for manual intervention, the sprinkler system would be activated.

The FPP forms part of the operating techniques in Table S1.2 of the Permit and is therefore enforceable.

The site has an independent fire main as well as a fire water storage tank, resulting in the fire water supplies on site exceeding the requirements stated within the NRW's Fire Prevention and Mitigation plan guidance – May 2016.

The above measures effectively minimise any risk of combustion at the site and provide a level of protection more than the minimum requirements stipulated by the FPP guidance. This explanation is satisfactory and provides mitigation for not exceeding the pile size stipulations in the guidance. This is further re-enforced by comments from SWFRS that also state that due to rapid turnaround the risk of self-combustion and deep-seated hot spots are unlikely.

In Section 3.5 of the Fire Prevention Plan, the Applicant discusses the need for a quarantine area on the site should there be an incident.

The Applicant has stated in the FPP that they do not feel it is appropriate, and refer to the detection and suppression systems. We requested additional information from the Applicant and for them to provide evidence that there is no need for a quarantine area. The Applicant demonstrated that if hot spots are detected by the current detection and suppression system the waste would be spread out in the building, meaning no external quarantine area is needed. The Applicant has previously committed to installing a thermal imaging camera that would act as an early warning for hot spots. If temperatures are shown to rise, then the wood would be spread out by loading shovel to remove the hotspot.

In the event of a fire on-site the plant would shut down, deliveries would be halted and fire-fighting measures would be employed. We agree with the Applicant that the current procedures are sufficient and an external quarantine area for fire purposes is not required.

We also required clarification as to where any fire damaged wood would be stored and whether a quarantine area for this material would be available.

The Applicant responded and explained that all fire damaged material would be stored in the fuel storage building, which has sufficient capacity and as such there is no need for external storage areas. However, the plant does have a quarantine area for off-specification wood, which could be utilised if necessary. We agree with the proposal put forward by the Applicant.

In Section 3.11 of the Fire Prevention Plan, the Applicant refers to the underground attenuation tank on site where fire water run-off will be stored.

In the plans in Annex B, the only reference to an attenuation tank is made on drawing BARRY_01_DWG_20131D, where it states "*Attenuation size & form TBC".*

As there was limited information available, we asked the Applicant to provide full details to show the tank is of appropriate scale and volume, and constructed in line with current guidelines, also that it is fully sealed and will prevent any escape of fire water, other than via an authorised disposal.

The Applicant responded on the 23rd October 2017 and provided drawings for the attenuation tank, pump and electronic set-up and confirmed the size of attenuation capacity on-site. The Applicant also stated that the tank can be totally isolated to prevent fire water entering the surface water system and that any potentially contaminating water will be isolated in the tank and removed from site by tanker to be disposed of in a suitable facility.

An issue raised by both NRW and Capita was the quantity and achievable pressure of water from the fire main and how the volumes/pressures of fire-fighting water are adequate to meet the demands of an incident.

The Applicant provided a table outlining the pertinent information. The fire-fighting water[1] storage tank can deliver 6,625 litres/minute which equates to 840,000 litres of water. There is a suitably sized (180mm OD/150mm ID) fire main (11.5 bar pressure) delivering 2,100 litres/min. This shows that there are adequate volumes and pressures of fire-fighting water[1] available to the Installation if needed.

We understand that the Applicant is seeking planning consent for the on-site water storage tank. However, this tank is not a requirement of the FPP due to the supply of mains water available to the site, If the water tank does not get planning permission, we would expect the applicant to formalise tanker arrangements with Dŵr Cymru Welsh Water to supply any additional water needed. Based on these items put in place the applicant would comply with the guidance. The Installation or not of this tank and the lack of existing planning consent for it does not alter our decision.

[1] 'Fire-fighting water' is clean water ready to be used for fire extinguishing purposes.
[2] 'Firewater' is water that has been used to extinguish a fire and is therefore polluted.

In Section 3.11 of the Fire Prevention Plan, the Applicant stated that *'the discharge pumps would be interlocked to ensure that all firewater[2] is contained within the attenuation storage tank. The firewater is then treated before draining to the ABP surface water discharge system'.*

Based on the contaminated nature of firewater run-off, it is not suitable to be discharged to surface water and should be tankered away. The Applicant responded that this statement was made in error and that in the event of a fire, the tank would be isolated and any fire water run-off would be tankered off-site for disposal at a suitable facility.

Finally, in the third Schedule 5 response the Applicant stated that;

'In the unlikely event that a hot spot did occur, it would be detected via the detection systems. This would in turn trigger the sprinkler system resulting in any hotspot being extinguished'.

We required full details of how the fixed fire suppression system would immediately identify the hotspot in the wood pile and trigger the automatic sprinkler system.

The Applicant responded that;

"the fire detection system has been updated to include thermal imaging cameras within the Fuel Storage Building. In the event of elevated temperatures within the wood pile, an alarm would sound. This would then alert the site and a site operative would spread out the waste to cool it. The building is also equipped with quartzoid bulbs which will activate the sprinkler system. The system is compliant with ACE and NFPA13. The quartzoid bulbs have a trigger temperature of 68^{o}C".

This approach is compliant and we are satisfied that the appropriate methods are being taken to prevent, detect and mitigate against the risk of fire.

The Applicant has also shown that the fire-fighting strategy is sufficient, there is an adequate supply of water available and that fire-fighting water run-off can be contained and removed from site effectively.

SWFRS also responded to our consultation on the 18th October 2017 and responded to the questions raised by Capita. Issues Capita previously raised regarding monitoring and storage of waste wood have been satisfied by the Applicant's response stating the amount of wood stored on-site.

SWFRS confirmed that due to the limited storage time, self-combustion and deep seated hotspots would not be an issue and that the thermal imagining camera in situ will detect the surface properties of a fire. Also as the site is manned on a 24-hr basis, there will be indications of any issues within the wood stack.

The response received by the Applicant on the 19th October 2017 also confirms the use of a thermal camera. Therefore, based on the responses, we are satisfied and no further assessment is required.

Capita also raised questions regarding fire-fighting strategy. However, SWFRS stated that:

"The exact firefighting strategy implemented by the fire service will be dependent on the situation at a given time. The dynamic risk assessment carried out at the time of a fire incident will determine the initial response and attack strategy. This strategy will of course change as needed throughout the duration of the incident. The fire service will work with onsite personnel and machinery to look at the best option to bring the incident to a successful conclusion. It is essential that on-site personnel and machinery are available to help assist with the removal of woodchip. This will help prevent unwanted fire spread and help reduce the amount of water run-off at the incident. As part of our Site-Specific Risk Inspections visits will be carried out at the site to help develop an appropriate initial appliance response."

As the strategy for tackling a fire lies with the fire service, this response is satisfactory.

Based on comments made by Capita, SWFRS suggested that “the size of the water main, flow rates and pressure for the site are provided, the attenuation tank size be confirmed and the availability of fire service connections available on the tank are provided.

Finally, SWFRS requested what the estimated refill time for the tank was, so that sprinkler times are achieved, however the Applicant has shown that there is adequate water supply on-site.

The Applicant provided this information in the response received on the 19th October 2017. The information demonstrated that there is adequate water available for tackling a fire, detailing both mains water and tank volumes.

The availability of connections on the tank and estimated fill time is outside of the remit of environmental permitting and therefore this is an area that SWFRS need to communicate with the Applicant.

Finally, based on comments by Capita, SWFRS recommended that the size of the underground storage tank be confirmed for contaminated firewater containment as well as what measures are proposed for the removal of fire-fighting water run-off. The response received by the Applicant on the 19th and 23rd October 2017 answers this question directly and is sufficient.

Based on the updated FPP, additional comments provided by the Applicant and consultation with SWFRS, we are satisfied that the FPP submitted by the Applicant is of a satisfactory standard and complies with the NRW guidance.

The new guidance dated August 2017 will apply post permit issue and will be applied during compliance and permit review. This aspect does not affect our assessment of the fire risk associated with the site.

The updated FPP as provided by the applicant in July 2017 and corresponding answers in October 2017 have been incorporated into the operating techniques in the Permit.

4.3.12 Computational Fluid Dynamics (CFD) Modelling

The Applicant submitted CFD modelling as part of the Application to demonstrate the burn temperature within the combustion chamber. We have assessed this report which is based on the pre-commissioning design.

Chapter IV Article 50 IED states that waste incineration plants shall be designed, equipped, built and operated in such a way that the gas resulting from the incineration of waste is raised, after the last injection of combustion air, in a controlled and homogeneous fashion and even under the most unfavourable conditions, to a temperature of at least 850 °C for at least two seconds.

Overall the report provided sufficient confidence that the IED Chapter IV process requirements are achieved by the plant design.

It will be necessary to verify that the operating conditions required are being achieved by undertaking temperature profiling and residence time distribution checks in the Qualifying Secondary Combustion Zone (QSCZ) during commissioning. This is satisfied by pre-operational condition PO6 in the Permit, requiring the Operator to submit a report stating how this work will be carried out during commissioning and then Improvement Condition IC2 requires that this work is carried out.

The CFD analysis confirmed that the boiler meets the IED operational requirement of 2 seconds' residence time above 850^{o}C, this is the amount of time that the gases are above the threshold temperature required by the IED.

5. Environmental Risk Assessment

Minimising the Installations environmental impact

Regulated activities present a variety of 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). These factors are discussed in 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 an appropriately high level of protection.

5.1 Assessment Methodology

5.1.1 Application of Environment Agency H1 Guidance

Assessment Methodology - Application of Environment Agency guidance ‘risk assessments for your environmental permit’. NRW has adopted this guidance.

A methodology for risk assessment of point source emissions to air, which we use to assess the risk of applications we receive for permits, is set out in our guidance 'Air emissions risk assessment for your environmental permit’ and has the following steps;

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

The methodology uses a concept of “process contribution (PC)”, which is the estimated concentration of emitted substances after dispersion into the receiving environmental media at the point where the magnitude of the concentration is greatest.

The methodology provides a simple method of calculating PC primarily for screening purposes and for estimating process contributions where environmental consequences are relatively low. It is based on using dispersion factors.

These factors assume worst case dispersion conditions with no allowance made for thermal or momentum plume rise and so the process contributions calculated are likely to be an overestimate of the actual maximum concentrations.

More accurate calculation of process contributions can be achieved by mathematical dispersion models, which consider 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 Standards (ES). Where an Ambient Air Directive (AAD) Limit Value exists, the relevant standard is the AAD Limit Value.

Where an AAD Limit Value does not exist, AAD target values, UK Air Quality Strategy (AQS) Objectives or Environmental Assessment Levels (EALs) are used. Our web guide sets out EALs which have been derived to provide a similar level of protection to Human Health and the Environment as the AAD limit values, AAD target and AQS objectives.

In a very small number of cases, e.g. for emissions of lead, the AQS objective is more stringent that the AAD target values, AQS objectives and EALs do not have the same legal status as AAD limit values, and there is no explicit requirement to impose stricter conditions than BAT to comply with them.

However, they are a standard for harm and any significant contribution to a breach is likely to be unacceptable.

PCs are 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 threshold provides a substantial safety margin to protect health and the environment.

Where an emission is screened out in this way, we would normally consider that the Applicant's proposals for the prevention and control of the emission to be BAT. That is because if the impact of the emission is already insignificant, it follows that any further reduction in this emission will also be insignificant. **However, where an emission cannot be screened out as insignificant, it does not mean it will necessarily be significant.**

For those pollutants, which do not screen out as insignificant, we determine whether exceedances of the relevant ES are likely.

This is done through detailed audit and review of the Applicant's air dispersion modelling taking background concentrations and modelling uncertainties into account.

Where an exceedance of an AAD limit value is identified, we may require the Applicant to go beyond what would normally be considered BAT for the Installation or we may refuse the application if the applicant is unable to provide suitable proposals.

Whether 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 consider 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, because 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 on air quality is set out in the Air Quality Assessment sections of the application. The assessment comprises:

- Dispersion modelling of emissions to air from the operation of the co-incinerator; and
- A study of the impact of emissions on nearby sensitive receptors, including human receptors and habitat/conservation sites.

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

The Applicant has assessed the Installation's potential emissions to air against the relevant air quality standards, and the potential impact upon conservation and habitat sites and human health.

These assessments predict the potential effects on local air quality from the Installation's stack emissions using both the AERMOD and ADMS dispersion models, which are commonly and widely used computer models for regulatory dispersion modelling. These are the most suitable models to use to assess the impact of emissions to air in Barry, the use of an alternative model 'Calpuff' has been suggested in a consultation representation. However, Calpuff is mainly used for assessing long range transport of pollutants and this model predicts aerial impacts over a larger distance.

The distance required in the case of Barry Biomass is over a much shorter range (the location of predicted maximum impact is less than 1 km) and therefore Calpuff is not a suitable model to use.

The model used 5 years of meteorological data collected from the Met Office's weather station at Cardiff Airport between 2009 and 2013.

Cardiff Airport is located approximately 6 km to the west of the facility. The impact of the terrain surrounding the site upon plume dispersion was considered in the dispersion modelling, we also used Met Office high resolution NWP met data extracted at the proposed facility.

A Schedule 5 Notice requiring further information was issued to the Applicant on the 18th May 2017.

In this Notice, we asked;

"As the proposed Installation is located close to the coast, the potential coastal effects on plume dispersion inland under some meteorological conditions and its potential impact on relevant sensitive receptors should be considered in the modelling risk assessment." However, the potential coastal effects were not mentioned in the submitted Schedule 5 response. We then wrote to the Applicant on the 5th October 2017 requesting this information was submitted. The Applicant then submitted the assessment of coastal effect by using ADMS Coastline Module in their revised Air Quality Assessment report (v7).

We agree that the studied coastal effect on the predicted concentrations due to the emissions from the proposed Installation will not be significant.

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

IED emission limits were assumed for the purposes of the modelling assessment and the plant was assumed to be operating at full load, continually throughout the year. Stack emission parameters (flow rate, temperature etc.) were provided by the technology provider.

For the Group 3 trace metal predictions, the Applicant assumed in accordance with the Environment Agency's (EA) metals guidance 7, that each of the metals is emitted at the maximum IED ELV (0.5 mg/Nm^3) as a worst case.

The same approach has also been adopted for the Group I and II metals. Where the screening criteria set out in the guidance were not met, an emission concentration equal to half of the ELV for Group (I) metals and 1/9th of the ELV for Group (III) metals has been assumed. If the screening criteria are still not met, typical emission concentrations for energy from waste plants have been used, as specified in the guidance. It is anticipated that the process will not result in significant emissions of polychlorinated biphenyls (PCBs) or polycyclic aromatic hydrocarbons (PAHs).

However, emission limits of 0.005 mg/m^3 and 0.001 mg/m^3 respectively, have been assumed based on measurements at European waste incineration facilities as specified in the IPPC Reference Document on BAT for Waste Incineration August 2006.

Section 3.7 of the submitted air quality assessment report stated that *"The proposed stack height of 43m is based on the stack height screening assessment that has been undertaken for the proposed facility".*

However, the model input parameters used in the stack height assessment report, i.e., stack location & diameter, exit temperature & velocity, buildings location & dimension, were evolved and therefore different to those used in the submitted air quality assessment report.

An explanation should have been provided why the stack height assessment report was still valid. At NRW's request, the applicant submitted a stack height explanation, this justification is acceptable to NRW. We were satisfied with the applicant's explanation and the stack height assessment is sufficient.

The Air Quality Assessment considered the following substances;

- Oxides of Nitrogen (NO_x), expressed as NO_2
- Carbon Monoxide (CO)
- Total Dust (as PM_{10} and $PM_{2.5}$)
- Gaseous and vaporous organic substances, expressed as Total Organic Carbon;
- Sulphur Dioxide (SO_2)
- Hydrogen Chloride (HCl)
- Hydrogen Fluoride (HF)
- Metals (Cadmium, Thallium, Mercury, Antimony, Arsenic, Lead, Chromium, Cobalt, Copper, Manganese, Nickel and Vanadium)
- Polychlorinated dibenzo-para-dioxins and polychlorinated dibenzo furans (referred to as dioxins and furans)
- Polycyclic Aromatic Hydrocarbons (PAH, as Benzo[a]pyrene)
- Polychlorinated Biphenyls (PCBs).

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

The Applicant has assessed data on background concentrations of pollutants from several available sources. These include monitoring undertaken by Vale of Glamorgan Council at several locations across the borough, the closest of which is located approximately 4.5km to south-east of the site.

The Applicant has also drawn information from Background Air Pollution maps published by Defra. This data is summarised in the Application and has been used by the Applicant to establish the background (or existing) air quality against which to measure the potential impact of the co-incinerator.

As well as calculating the maximum off-site ground level concentration, the Applicant has modelled the concentration of key pollutants at several 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 NRW's modelling specialists to establish the robustness of the Applicant's air impact assessment. The output from the model has then been used to inform further assessment of health impacts and impact on habitats and conservation sites. The Applicant's modelling predictions are summarised in the following sections.

5.2.1 Consideration of Key Air Pollutants

(i) Nitrogen Dioxide - NO_2

The impact on air quality from NO_2 emissions has been assessed against the European Union Environmental Quality Standard (EUEQS) of 40 µg/m^3 as a long term annual average and a short term hourly average of 200 µg/m^3.

The model assumes a 70% NO_x to NO_2 conversion for the long term and 35% for the short-term assessment in line with Natural Resources Wales guidance on the use of air dispersion modelling.

The maximum off-site long term Process Contribution (PC) is modelled at 1.8 µg/m^3.

At 4.5% of the 40 µg/m^3 EUEQS, this is greater than 1% of the EUEQS H1 screening threshold and therefore cannot be screened out as insignificant.

However, when existing NO_2 background concentrations are added to the annual mean PC to give the Predicted Environmental Concentration (PEC), the PEC is 54.5% of the annual EUEQS.

Annual average EUEQS is unlikely to be exceeded at any off-site location. The maximum off-site predicted short-term PC was modelled at less than 10% of the short term hourly average EQS of 200 µg/m^3. This is below the threshold for short-term impact and therefore the effects at off-site locations are insignificant.

(ii) Particulate Matter – PM_{10} & $PM_{2.5}$

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 µg/m^3 and a short term daily average of 50 µg/m^3. For $PM_{2.5}$ the EUEQS of 25 µg/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 modelling assessment assumes that **all** particulate emissions are present at 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 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 plants are normally lower.
- It assumes all particulates emitted are below either 10 microns (PM_{10}) or 2.5 microns ($PM_{2.5}$), when some are expected to be larger.

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

The modelling assessment shows that the predicted maximum ground level concentrations (PC) of particulates (PM_{10}) are less than 1% and 10% of the long and short-term EQSs respectively and so can be considered insignificant. Therefore, we consider the Applicant's proposals for preventing and minimising the emissions of particulates to be BAT for the Installation.

The modelling assessment also shows that the maximum predicted annual mean PC for emissions of $PM_{2.5}$ is less than 1% of the EQS. Therefore, we conclude that particulate emissions from the Installation, including emissions of PM_{10} or $PM_{2.5}$, will not give rise to significant pollution.

There is currently no emission limit prescribed nor any continuous emissions monitor for particulate matter specifically in the PM_{10} or $PM_{2.5}$ fraction.

Whilst NRW is confident that current monitoring techniques will capture the fine particle fraction ($PM_{2.5}$) for inclusion in the measurement of total particulate matter, improvement condition IC5 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.

(iii) Acid gases, SO_2, HCl and HF

The Applicant's modelling shows that the predicted maximum 1-hour mean off-site ground level HCl PCs are less than 10% of the Expert Panel on Air Quality Standards (EPAQS) guideline value for protection from irritant and respiratory effects at all the identified receptor locations. Therefore, the impact of the predicted PC is insignificant. There is no long term EQS/EAL for HCl.

HF has 2 assessment criteria – a 1-hr EAL and a monthly EAL - The maximum predicted ground level monthly mean and 1-hour mean HF PCs are less than 1% and 10% of the long and short-term EPAQS guideline values respectively.

More specifically, the PC 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 the **Biodiversity, Heritage, Landscape and Nature Conservation** section below.

The applicant has shown that the maximum predicted ground level SO_2 PCs are all less than 10% of each of the three-short term EUEQS values. Therefore 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 Applicant has modelled the maximum predicted 8-hourly PCs for CO. The PC are less than 10% of the EQS and so can be screened out as insignificant.

The Applicant has used the EQS for Benzene for their assessment of the impact of VOC. We are satisfied with this as it represents a worst-case.

The Applicant has modelled the predicted maximum ground level PC for Benzene. This is potentially significant at 2.7% of the annual mean EUEQS which is 5µg/m^3. However, when the existing background level is taken into consideration, the PEC is 9.7% of the EUEQS so the release is not expected to result in the EQS being exceeded. The modelling also shows that the short-term PCs are less than 10% of the EAL and are therefore insignificant.

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. This issue is considered in more detail in the **Human Health Risk Assessment** section below.

To model the impact of PAHs the Applicant has chosen to model the impact using benzo[a]Pyrene. Monitoring of benzo(a)pyrene (B[a]P) is currently carried out by DEFRA at several locations in the UK, meaning a background is established.

The choice of this pollutant is appropriately precautionary to monitor PAHs. The modelling assessment shows that the maximum predicted off-site annual mean ground level PCs of B[a]P are 13.3% of the EU Target Value, of 1.0ng/m^3 as an annual mean and cannot be screened out as insignificant. However, when the existing background level of this substance is added to the PC, the PEC is 46%. We therefore consider that releases from the Installation are unlikely to result in a breach of the EU Target Value.

The modelling further shows that the maximum predicted ground level annual mean and 1-hour mean PCB PCs are less than 1% and 10% of the long and short-term EALs, therefore the predicted emissions are screened out as insignificant.

The ammonia emission is based on a release concentration of 5 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. Furthermore, the modelling assessment shows that the maximum predicted ground level annual mean and 1-hour mean NH_3 PCs are less than 1% and 10% of the long (180ng/m^3) and short-term (2500ng/m^3) EALs, so therefore the impact of the emission screens out as insignificant.

The Applicant is required to prevent, minimise and control PAH and VOC emissions using the best available techniques, which is considered further in the **Application of Best Available Techniques** section below. We are satisfied that PAH and VOC emissions will not result in significant pollution.

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 the **Application of the Best Available Techniques** section below. 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 the **Human Health Risk Assessment** section below.

5.2.2 Assessment of emissions of metals

The Applicant has assessed the impact of metal emissions to air, using the assumptions 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.

Where Annex VI of the IED sets an aggregate limit, the Applicant's assessment assumes that for cadmium and thallium each metal is emitted individually at the aggregate limit value and for the other metals, that each metal is emitted as the proportion of metals in its group (i.e. one ninth of the limit for each of the group 3 metals).

Historical data for Municipal Waste Incinerators indicates that 1/9th 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.

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 step by step 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".

Group 1

The following emissions of metals were screened out as insignificant as they are predicted to be <1% and <10% of the long and short term EALs respectively:

- In respect of long term impacts: Mercury
- In respect of short term impacts: Mercury

Group 2

The following emissions of metals were screened out as insignificant as they are predicted to be <1% and <10% of the long and short term EALs respectively:

- In respect of long term impacts: Thallium
- In respect of short term impacts: Thallium

Cadmium did not screen out as insignificant, however it has been assessed as being unlikely to give rise to significant pollution based on the long-term PEC of 17.1% which is less than the 100% threshold. This percentage shows that an exceedance of the EAL is unlikely.

However, we have set improvement condition IC7 which requires the operator to compare emissions monitoring data for Cadmium, Chromium (VI) and Arsenic 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.

Group 3

The following emissions of metals were screened out as insignificant as they are predicted to be <1% and <10% of the long and short term EALs respectively:

- In respect of long term impacts: Antimony, Chromium, Cobalt, Copper, Lead, Manganese, Nickel, Vanadium.
- In respect of short term impacts: Antimony, Chromium, Chromium (VI), Cobalt, Copper, Vanadium.

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

Maximum predicted concentrations of Arsenic were presented in the assessment for emissions at 11% of the maximum IED limits (1/9th of ELV). In this instance Arsenic had a PEC less than 100% of the EAL (20.6%) and therefore did not require any further assessment.

Regarding metallic pollutant concentrations in ambient air, the target values of Arsenic are set out in the 4th Air Quality Daughter Directive (2004/107/EC) under the Air Quality Framework Directive (1996/62/EC):

- Arsenic - 6 ng/m3

These are the figures used by the Environment Agency in their Environment Assessment Levels.

Chromium

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 refers 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.

Maximum predicted concentrations of Chromium (VI) were presented in the assessment for emissions at 11% of the maximum IED limits (1/9th of ELV). The Chromium (VI) long-term PC was 126% and exceeded the screening threshold and further assessment was necessary.

Measurement of Chromium (VI) at the levels anticipated at the stack emission point is expected to be difficult, with the likely levels being below the level of detection by the most advanced methods.

The Environment Agency 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 like 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 $3.5x10^{-5}$ mg/m^3 (max $1.3x10^{-4}$ mg/m^3).

Based on this data, we consider it remains a precautionary assumption for the Applicant to consider that the Cr(VI) emission concentration will be $1.3x10^{-4}$ mg/m^3

The Applicant assumed that the existing background concentration is equal to the average measured at urban sites for Chromium (VI) in-line with Environment Agency's metals guidance. Based on this predicted exceedance of Cr(VI) the Applicant compared the results with the Environment Agency's metals guidance.

This guidance shows a range of emission concentrations (corresponding fractions of the total Group III emission) measured at twenty municipal waste incineration facilities in the UK. This data suggests that, on average, total chromium comprises 2.2% of the total Group 3 emission.

The guidance also provides a maximum chromium Cr(VI) emission based on the analysis of total chromium residues of 1.3×10^{-4} mg/Nm^3. When this is considered, the assessment shows that for maximum typical operational emissions, the maximum predicted annual mean Cr (VI) PCs off-site and at the identified receptors are less than 1% of the EAL and considered insignificant. We agree with the applicant's conclusions.

However as stated previously in this section, we have set improvement condition IC7 which requires the operator to compare emissions monitoring data for Cadmium, Chromium (VI) and Arsenic obtained during the first year of operation with those assumed in the impact assessment submitted with the application.

5.2.3 Consideration of Local Factors

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

No Air Quality Management Areas (AQMAs) have been declared within an area likely to be affected by emissions from the co-incinerator.

The Applicant is required to prevent, minimise and control emissions using the Best Available Techniques; this is considered further in the **Application of Best Available Techniques** section below.

5.3 Human Health Risk Assessment

5.3.1 Our role in preventing harm to human health

Natural Resources Wales has a statutory role in the protection of the environment and human health from the processes and activities it regulates.

The plant will be regulated under the EPR. These regulations include the requirements of relevant EU Directives, notably the IED, the WFD and the AAD.

The main conditions in an Energy from Waste (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 to prevent the generation of waste, 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 the IED on waste incineration and co-incineration plants. The assessment of BAT for this Installation is detailed in Section 6 of this document.

Comparing the results of the 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 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 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 models.

The Human Health Risk Assessment Protocol (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 relation to probability.

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 HHRAP model, but does not attempt to predict risk using probabilities. 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 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 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 therefore not necessary to model the human body intake.

As stated above, the former HMIP method does not have the capability to consider dioxin-like PCBs and the US EPA HHRAP method is limited in this respect. The HHRAP method does not contain physical properties or exposure parameters for individual dioxin-like PCBs but does provide information for two dioxin-like PCB mixtures (Aroclor 1016 and Aroclor 1254).

Therefore, the Applicant has considered that for these two substances typical emissions for dioxin-like PCBs have been included in the IRAP model and these have been assumed to comprise entirely of Aroclor 1016 or Aroclor 1254 depending on which substance gives rise to the highest exposure. This is the model widely used and accepted by NRW for HHRA.

The air quality assessment for the facility provides a comparison of predicted concentrations for pollutant emissions at off-site locations with existing background air quality and air quality standards and guidelines for the protection of human health.

The air quality assessment assumes the theoretical position that the maximum permissible emission limit values (ELVs) stipulated for compliant thermal treatment of waste plants are emitted during all times of operation. This position is considered unlikely to be a realistic operating scenario.

Therefore, for this human health risk assessment (HHRA), emissions are based on typical emissions associated with this type of facility.

The substances which have been considered in the assessment are referred to as the Compounds of Potential Concern (COPCs) and include the seventeen polychlorinated dibenzo-p-dioxins and dibenzofurans PCDD/F congeners that are known to be toxic. In addition, the IRAP model includes two dioxin-like PCBs (Aroclor 1016 and Aroclor 1254).

It is assumed in the assessment that PCDD/F emissions are at 10% of the IED emission limit (0.01 ng I-TEQ/Nm^3). There is limited information on PCDD/F emissions from energy from waste facilities burning Syngas.

The report (WR 0608 Emissions from Waste Management Facilities, ERM Report on Behalf of Defra (July 2011)) indicates that gasification plants emit dioxins and furans at 2% of the IED emission limit. Based on this, the assumption of 10% made by the applicant is precautionary.

The air quality assessment has relied upon the use of AERMOD to estimate ground level concentrations of pollutants. The HHRA model has been designed to accept output files from the US EPA ISC. (ISC3 is a steady-state Gaussian plume model which can be used to assess pollutant concentrations from a wide variety of sources associated with an industrial complex) or AERMOD dispersion models, reflecting its North American origins and its need to follow the US EPA risk assessment protocol.

The use of AERMOD is consistent with the air quality assessment undertaken for the facility and the emissions data and model set up are identical to that carried out for the air quality assessment.

The Food Standards Agency (FSA) has reported that dietary studies have shown that estimated total dietary intakes of dioxins and dioxin-like PCBs from all sources by all age groups fell by around 50% between 1997 and 2001, and are expected to continue to fall.

In 2001, the average daily intake by adults in the UK from diet was 0.9 pg WHO-TEQ/kg bodyweight. The additional daily intake predicted by the modelling as shown in the table above is substantially below this figure.

In 2010, FSA studied the levels of chlorinated, brominated and mixed (chlorinated-brominated) dioxins and dioxin-like PCBs in fish, shellfish, meat and eggs consumed in UK. It asked COT to consider the results and to advise on whether the measured levels of these PXDDs, PXDFs and PXBs indicated a health concern ('X' means a halogen).

COT issued a statement in December 2010 and concluded that:

"The major contribution to the total dioxin toxic activity in the foods measured came from chlorinated compounds. Brominated compounds made a much smaller contribution, and mixed halogenated compounds contributed even less (1% or less of TDI). Measured levels of PXDDs, PXDFs and dioxin-like PXBs do not indicate a health concern".

COT recognised the lack of quantified TEFs for these compounds but said that "even if the TEFs for PXDDs, PXDFs and dioxin-like PXBs were up to four-fold higher than assumed, their contribution to the total TEQ in the diet would still be small. Thus, further research on PXDDs, PXDFs and dioxin-like PXBs is not considered a priority."

In the light of this statement, we assess the impact of chlorinated compounds as representing the impact of all chlorinated, brominated and mixed dioxins / furans and dioxin like PCBs. The Applicant has assessed the possible impacts on human health arising from dioxins and furans (PCDD/F) and dioxin-like PCBs emitted from the Biomass gasification plant.

The inclusion of all food groups in the applicant's assessment conservatively assumed that both arable and pasture land are present near the predicted maximum annual average ground level concentration.

However unlikely this may be the applicant has included it in the model to ensure a high degree of precaution in the assessment and, reduce the risk of exposures being underestimated.

The use of a fisherman and ingestion of fish hasn't been used as a worst-case scenario in this instance as a review of local fisheries by the applicant indicated that there is no evidence of any fisheries within 3 km where edible fish (e.g. trout or salmon) may be taken. Therefore, the ingestion of locally caught fish has not been considered, as consumption rates are likely to be very small.

This worst-case scenario assumed by the applicant is that an individual will be exposed for a lifetime to the effects of the highest airborne concentrations and consuming mostly locally grown food. This means a hypothetical farmer consuming food grown on a farm, situated at the closest proximity to the proposed facility. Where there are no active farming areas near the Installation, the Applicant has used a residential receptor, and assumed that the occupier consumes locally grown vegetables.

The Applicant as part of the modelling has identified and considered the most likely pathways of exposure for the individuals screened. Deposition and subsequent ingestion of the compounds of potential concern (COPCs) into the food chain is likely to be the more numerically significant pathway over direct inhalation.

The results of the Applicant's assessment of dioxin intake are detailed in the table below (worst – case results for each category are shown). The results showed that the predicted daily intake of dioxins at all receptors over their lifetime, resulting from emissions from the proposed facility, were significantly below the recommended TDI levels.

Receptor	adult	child
Farmer East 1	0.013	0.018
Farmer East 2	0.0095	0.014
Farmer East 3	0.012	0.017
Farmer West 1	0.00036	0.00052
Farmer West 2	0.00048	0.00070
Farmer West 3	0.00066	0.00098
Residential Barry 1	0.000039	0.00012
Residential Barry 2	0.000086	0.00027
Residential Barry 3	0.00012	0.00036
Residential Barry Island 1	0.00018	0.00057
Residential Barry Island 2	0.00013	0.00042
Residential Docks North 1	0.00029	0.00092
Residential Docks North 2	0.00033	0.0010
Residential Docks North 3	0.00038	0.0012
Residential Docks North 4	0.00020	0.00062
Residential Docks South 1	0.00085	0.0027
Residential Docks South 2	0.00074	0.0023
Residential Docks South 3	0.00076	0.0024
Residential Gibbonsdown 1	0.000042	0.00013
Residential Gibbonsdown 2	0.000019	0.000058
Residential Gibbonsdown 3	0.000041	0.00013
Residential Gibbonsdown 4	0.000053	0.00016
Residential Palmerstown 1	0.000045	0.00014
Residential Palmerstown 2	0.000043	0.00013
Residential Palmerstown 3	0.000074	0.00023
Residential Palmerstown 4	0.000081	0.00025
Residential Sully 1	0.000086	0.00027
Residential Sully 2	0.000083	0.00026

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

The modelling has shown that the maximum contribution of the facility to the COT TDI is 0.9% for the farmer receptors and 0.1% for the residential receptors. However, it should be noted that for the farmer, this assumes a worst-case scenario that the receptors are located at the closest farming area to the facility and all their food is reared and grown at this location.

In summary, we are satisfied that the impact of emissions on local sensitive receptors is not significant.

The risk assessment methodology used in this assessment has been structured to create worst case estimates of risk.

Several features in the methodology give rise to this degree of precaution. It has been demonstrated that for the maximally exposed individual, exposure to dioxins, furans and dioxin-like PCBs is not significant.

5.3.2 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, (both adults and children), because of a) their high surface to volume ratio, making them more reactive, and b) 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.

The Health Protection Agency (HPA) statement 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 $\mu g/m^3$ would result in an increase in life expectancy of 20 days for people born in 2008."

However,

"The Committee stresses the need for careful interpretation of these metrics to avoid incorrect inferences being drawn – they are valid representations of population aggregate or average effects, but they can be misleading when interpreted as reflecting the experience of individuals."

This is consistent with the assessment of this application which shows emissions of PM_{10} to air to be insignificant. We take the view, based on the foregoing evidence, that techniques which control the release of particulates to levels which will not cause harm to human health will also control the release of fine particulate matter to a level which will not cause harm to human health.

5.3.3 Assessment of Health Effects from the Installation

We have assessed the health effects from the operation of this Installation above. 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.

Considering all the expert opinion and evidence available, we agree with the conclusion reached by the HPA that:

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

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

The Applicant's assessment of the impact from the pollutants listed above have all indicated that the Installation emissions screen out as insignificant; where the impact of emissions 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.

NRW has reviewed the methodology employed by the Applicant to carry out the health impact assessment.

Overall, considering the precautionary 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 Cardiff & the Vale Health Board were consulted on the Application and concluded that they had no significant concerns regarding the risk to the health of humans from the Installation. Despite extensive and wide consultation no evidence of either a) the presence of specific groups possessing protected characteristics for EqA purposes or b) of how such groups may be detrimentally affected as compared to groups not possessing protected characteristics was available to NRW.

The Food Standards Agency was also consulted during the permit determination process however no response was received. Details of the responses provided by Cardiff & the Vale Health Board and Public Health Wales to the consultation on this Application can be found in Annex 4.

NRW 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 Biodiversity, Heritage, Landscape and Nature Conservation

5.4.1 Sites Considered

The Applicant's Habitats assessment was reviewed by NRW for modelling, air quality, conservation and ecology.

Specialists within NRWs agreed with the assessment's conclusions, that there would be no likely significant effect on the interest feature(s) of the protected site(s).

The Installation is within the relevant screening distance criteria of a protected habitat. A full assessment of the Application and its potential to affect the designated site has been carried out as part of the permitting process.

We consider that the Application will not affect the features of the designated sites listed below. The following European protected sites (i.e. Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar) are located within 10km of the Installation:

- Severn Estuary SAC (England and Wales)
- Severn Estuary SPA / Ramsar (Wales)

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

- Barry Island
- Hayes Point to Bendrick Rock

The following non-statutory Local Wildlife Sites (LWS), National Nature Reserves (NNR), Local Nature Reserves (LNR) and Ancient Woodlands are located within 2km of the Installation:

- Cadoxton River LWS
- Cadoxton Wetlands LWS
- Fields at Merthyr Dyfan LWS
- Nell's Point East LWS
- 2 x Restored Ancient Woodlands

We have also checked our records for the presence of European Protected Species (EPS), as defined by the Habitats Directive, within the locality of the Installation. We have no records of any EPS being present in the locality outside the boundaries of the designated sites described above.

The SSSI's within the screening distance are designated for geological purposes and therefore are not effected by aerial emissions, so were not considered further.

5.4.2 Habitats Assessment

The Applicant has modelled the predicted maximum ground level concentrations of NO_x, SO_2, HF and NH_3 at all the European protected sites listed above and compared them with the relevant long and short term critical levels (CL) and background concentrations which were obtained from APIS.

The Applicant predicted that there were no predicted exceedances of the long or short term critical levels for NOx, SO_2 or HF at any of the modelled sensitive sites. The Process Contributions (PCs) are less than 1% and 10% of the long-term and short-term critical level for all pollutants and therefore screen out as insignificant.

Predicted Airborne NO_x, Concentrations as a Percentage of the Critical Level (µg/m^3)

Habitat Site	**Annual Mean**		**Daily Mean**	
	PC	**PEC (a)**	**PC**	**PEC (b)**
Severn Estuary Ramsar	0.51%	48.7%	1.2%	24.1%
Severn Estuary SPA	0.22%	48.7%	0.60%	23.6%
Severn Estuary SAC	0.22%	48.7%	0.60%	23.6%
Critical Level	**30**		**75**	

(a) Includes annual mean NOx backgrounds obtained from APIS
(b) Includes 24-hour mean NOx background concentration (annual mean x 2 x 0.59, in accordance with the EA guidance).

Predicted Annual Mean SO_x, Concentrations as a Percentage of the Critical Level ($\mu g/m^3$)

Habitat Site	Critical Level	PC	PEC
Severn Estuary Ramsar	20	0.19%	8.7%
Severn Estuary SPA		0.081%	8.6%
Severn Estuary SAC		0.081%	8.6%

Predicted HF Concentrations as a Percentage of the Critical Level ($\mu g/m^3$)

Habitat Site	Daily Mean		Weekly Mean	
	PC	PEC (a)	PC	PEC (b)
Severn Estuary Ramsar	0.092%	11.9%	0.3%	n/a
Severn Estuary SPA	0.047%	11.8%	0.10%	n/a
Severn Estuary SAC	0.047%	11.8%	0.10%	n/a
Critical Level	**5**		**0.5**	

(a) Includes 24-hour mean HF background concentration (annual mean x 2 x 0.59, in accordance with the EA guidance).
(b) It is not possible to predict weekly concentrations using the dispersion model, therefore the monthly mean concentrations have been compared with the CL.
(c) There is no current guidance available regarding calculating a monthly mean background concentration from the annual mean.

Predicted Annual Mean NH_3 Concentrations as a Percentage of the Critical Level ($\mu g/m^3$)

Habitat Site	PC	PEC
Severn Estuary Ramsar	0.13%	22.0%
Severn Estuary SPA	0.054%	22.0%
Severn Estuary SAC	0.054%	22.0%
Critical Level	**3**	

The Applicant has modelled the predicted maximum nutrient nitrogen deposition rates and compared them with the critical loads obtained from APIS. The predicted PC's are less than 1% for all European designated sites and therefore screen out as insignificant.

Habitat Site	PC (as a %age of CL)	PEC (as a %age of CL)
Severn Estuary Ramsar	0.21%	50.7%
Severn Estuary SPA	0.089%	50.6%
Severn Estuary Ramsar SAC	0.089%	50.6%
Critical Level	**20**	

5.4.3 Non – Statutory sites

For non-statutory sites the short-term and long-term PC's are less than 100% of the relevant critical levels/loads and therefore do not cause significant pollution.

Predicted Airborne NO_x, Concentrations as a Percentage of the Critical Level (µg/m^3)

Habitat Site	Annual Mean		Daily Mean	
	PC	PEC (a)	PC	PEC (b)
Cadoxton River SINC	5.6%	48.2%	9.7%	32.3%
Cadoxton Wetlands SINC	1.8%	48.0%	8.5%	31.1%
Fields at Merthyr Dyfan SINC	0.42%	48.0%	1.7%	24.3
Friars Point SINC	0.89%	48.0%	3.0%	25.6%
Gladstone Road Pond SINC	1.0%	48.0%	6.1%	28.8%
Nells Point East SINC	1.5%	48.0%	6.7%	29.3%
North of North Road SINC	0.64%	48.0%	2.4%	25.1%
Cadoxton Ponds Wildlife Trust Reserve	1.8%	48.0%	8.5%	31.1%
Ancient Woodland (Hayes Lane)	3.2%	48.1%	6.1%	28.7%
Critical Level	**30**		**75**	
(a) Includes annual mean NOx backgrounds obtained from APIS (b) Includes 24-hour mean NOx background concentration (annual mean x 2 x 0.59, in accordance with the EA guidance).				

Predicted Annual Mean SO_x, Concentrations as a Percentage of the Critical Level ($\mu g/m^3$)

Habitat Site	Critical Level	PC	PEC
Cadoxton River SINC	20	2.1%	13.2%
Cadoxton Wetlands SINC		0.68%	11.7%
Fields at Merthyr Dyfan SINC		0.16%	11.2%
Friars Point SINC		0.33%	11.4%
Gladstone Road Pond SINC		0.39%	11.4%
Nells Point East SINC		0.55%	11.6%
North of North Road SINC		0.24%	11.3%
Cadoxton Ponds Wildlife Trust Reserve		0.68%	11.7%
Ancient Woodland (Hayes Lane)		1.2%	8.6%

Predicted HF Concentrations as a Percentage of the Critical Level ($\mu g/m^3$)

Habitat Site	Annual Mean		Daily Mean	
	PC	PEC (a)	PC	PEC (b)
Cadoxton River SINC	0.85%	12.7%	3.0%	n/a
Cadoxton Wetlands SINC	0.64%	12.4%	1.3%	n/a
Fields at Merthyr Dyfan SINC	0.23%	12.0%	0.25%	n/a
Friars Point SINC	0.28%	12.1%	0.69%	n/a
Gladstone Road Pond SINC	0.47%	12.3%	0.73%	n/a
Nells Point East SINC	0.50%	12.3%	0.74%	n/a
North of North Road SINC	0.20%	12.0%	0.39%	n/a
Cadoxton Ponds Wildlife Trust Reserve	0.64%	12.4%	1.3%	n/a
Ancient Woodland (Hayes Lane)	0.48%	11.8%	0.10%	n/a
Critical Level	**30**		**75**	

(a) Includes 24-hour mean HF background concentration (annual mean x 2 x 0.59, in accordance with the EA guidance).
(b) It is not possible to predict weekly concentrations using the dispersion model, therefore the monthly mean concentrations have been compared with the CL.
(c) There is no current guidance available regarding calculating a monthly mean background concentration from the annual mean.

Predicted Annual Mean NH_3 Concentrations as a Percentage of the Critical Level ($\mu g/m^3$)

Habitat Site	Critical Level	PC	PEC
Cadoxton River SINC	3	1.4%	33.0%
Cadoxton Wetlands SINC		0.45%	33.0%
Fields at Merthyr Dyfan SINC		0.11%	33.0%
Friars Point SINC		0.22%	33.0%
Gladstone Road Pond SINC		0.26%	33.0%
Nells Point East SINC		0.36%	33.0%
North of North Road SINC		0.16%	33.0%
Cadoxton Ponds Wildlife Trust Reserve		0.45%	33.0%
Ancient Woodland (Hayes Lane)		0.79%	33.0%

The Applicant has modelled the predicted maximum nutrient nitrogen deposition rates and compared them with the critical loads obtained from APIS. The predicted PC's are less than 100% and screen out as not likely to cause significant pollution.

Habitat Site	Critical Load (CL)	PC (as a %age of CL)	PEC (as a %age of CL)
Cadoxton River SINC	15	3.1%	83.4%
Cadoxton Wetlands SINC	15	0.99%	81.3%
Fields at Merthyr Dyfan SINC	20	0.17%	60.4%
Friars Point SINC	20	0.36%	60.6%
Gladstone Road Pond SINC	N/A	N/A	N/A
Nells Point East SINC	20	0.6%	60.8%
North of North Road SINC	15	0.35%	80.6%
Cadoxton Ponds Wildlife Trust Reserve	15	0.99%	81.3%
Ancient Woodland (Hayes Lane)	10	4.6%	219%

The Applicant has modelled the predicted nitrogen and sulphur acidification rates and compared them with the relevant critical loads and background acidification rates from APIS. The maximum predicted acidification rates are less than 100% of the Critical Load Functions for the locally designated sites and are therefore not likely to cause significant pollution.

Habitat Site	**PC (%age of the Critical Load Function)**	**PEC (as a %age of the Critical Load Function)**
Fields at Merthyr Dyfan SINC	0.16%	22.3%
Friars Point SINC	0.34%	22.6%
Nells Point East SNIC	0.56%	22.9%
Ancient Woodland (Hayes Lane)	3.6%	60.5%

5.4.4 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 if 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.

The Applicant has not requested abnormal operation allowable under IED. Therefore, the ELV's for TOC, CO and particulate matter as stated by IED in Table S3.1 of the Permit will apply when the Installation is operating.

The applicant will immediately stop feeding waste/shut down for each type of scenario that would otherwise allow abnormal operation.

The Applicant has stated that in the unlikely event of CEMs failure, backup CEMS will be available. In the case of long term CEMs breakdowns, replacement units will be provided. The operator will have a CEMs on-site and installed within 24 hours.

The plant control systems continuously monitor the urea and lime injection systems and the volumes stored within the bulk storage containers. The control systems will not allow the plant to continue operating without there being adequate supplies of urea or lime reagent available.

Once the critical 'low level' reagent alarm is activated, the plant will automatically shut down without any loss of performance. It is therefore considered that emissions would not occur in the event of failure of the Urea Injection System or Lime Dosing Operation.

The reagent injection systems operate across the gasification plant, all of which have been designed with duty and standby pumps. Therefore, Table S1.1 of the Permit, specifies that abnormal operation is not permitted. There are controls in place if an exceedance of an emission limit is detected or if the 850^{o}C temperature is not maintained, in this instance waste will cease to fed and the plant will shut down.

6. Application of the 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 (BAT) for this Installation.

1. First we address the fundamental choice of incineration technology. There are a number of alternatives, and the Applicant has explained why this particular technology has been chosen for this Installation.
2. We also must 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.
3. Finally, the prevention and minimisation of Persistent Organic Pollutants (POP's) 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 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 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 setting appropriately lower ELV’s.

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

The BREF also provides a comparison of combustion and thermal treatment technologies and factors affecting their applicability and operational suitability used in EU and for all types of wastes. There is also some information on the comparative costs. The table below has been extracted from the BREF tables. This table is also in line with the Environment Agency 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 NO_x as the furnace choice could influence the amount of unabated NO_x 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 Installation	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 proposed to use a furnace technology comprising gasification with fluidised bed and a secondary combustion chamber, which is identified in the tables above as being considered BAT in the BREF or TGN for this type of waste feed. More specifically, the Applicant has proposed to use updraft fluidised bed technology by comparing the different gasification technologies and has determined that this is BAT for this site.

The chosen plant has been optimised to handle approximately 11 tonnes per hour and in turn generate 10MW of electrical energy that is exported to the grid. The plant has been designed to run at optimum capacity using a single line, the waste wood being used in the process allows for the design to be used. By using a single optimised line allows a lower degree of thermal losses ensuring increased efficiency. We are satisfied that this is BAT for the furnace.

The Applicant first assessed the waste that will be used within the furnace. The wood by nature will be homogeneous and the degree of variability in the waste will be minimal.

The technology represents BAT as the furnace is highly responsive to load change within the chamber and can maintain stable control with the varying degree of moisture content in the wood. All the ancillary systems that feed the fuel into the chamber are proven technology and are effective with a wide range of fuels. The level of control with this technology in respect to the fuel input means that the plant can run within a very strict range of parameters. The Applicant has also shown that the plant is within the energy consumption ranges for the sector as described by the sector BREF note. Further to this, as the process of gasification ensures total burnout of fuel, further processing of the ash to achieve the IED TOC or LOI requirements is not needed.

By being able to control the temperature of the furnace zone at above 850^{o}C, the Applicant can prevent high levels of NO_x and dioxins from being produced. By using catalytic abatement equipment, the levels of NO_x formation can be kept at a minimum and within the IED levels, the catalytic process also prevents as far as possible Ammonia slip which is a common issue in co-incineration plants.

The Applicant proposes to use diesel as support fuel for start-up, shut down and for the auxiliary burners. This technology represents BAT.

6.1.2 Boiler Design

In accordance with the Environment Agency Technical Guidance Note S5.01, the Applicant has confirmed within their BAT Assessment that the boiler design will minimise the potential for reformation of dioxins within the de-Novo synthesis range by;

- 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.

However, the main driver preventing the formation of dioxins is the Applicant's choice in furnace technology and the control of temperature, as described above.

By achieving the IED requirement of a burn temperature of 850^{o}C for at least 2 seconds, the risk of dioxin/furan formation is greatly reduced. The boilers design also means that as gases pass through the boiler they are rapidly cooled, treated and filtered to remove any particulates. This in turn further removes any possibility of dioxin formation in the combustion gases. The shell boiler, connecting duct work and economiser are designed to minimise the residence time of gases in the chamber.

We have considered the assessment made by the Applicant in their BAT document and agree that the furnace technology 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 emissions of TOC/CO and TOC on bottom ash.

6.2 BAT and emissions control

The prime function of Flue Gas Treatment (FGT) is to reduce the concentration of pollutants in the exhaust gas as far as practicable. The techniques that 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 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 has proposed a fabric filter plant with multiple compartments, and compartments can be isolated whilst the plant is still running to allow maintenance and repairs. Table S3.4 of the permit contains a requirement to carry out pressure drop monitoring; this is the control measure which is used to minimise the risk of increased particulate emissions in the event of a bag rupture. Emissions of particulate matter have been previously assessed as insignificant, and so Natural Resources Wales agrees that the Applicant’s proposed technique is BAT for the Installation.

6.2.2 Oxides of Nitrogen (NO_x)

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

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

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

The Applicant proposes to implement the following primary measures:

Low NO_x fuel oil burners: the auxiliary burners will be used for plant start up to achieve the required temperature of 850^{o}C in the combustion zone and to ensure the furnace is above 850^{o}C. Diesel is used as a back-up fuel.

Starved air systems are BAT for gasification plant. This is an inherent part of the gasification process; the applicant confirms that the combustion chamber design is IED compliant and represents BAT in this respect.

The optimisation of primary and secondary air injection is achieved through plant design and the plant is equipped with automated air control at the point of combustion, through a dilution air valve.

The Installation also employs Flue Gas Recirculation for primary NO_x control. This provides a means of NO_x prevention by replacing a portion of secondary air with re-circulated flue gases. It has the additional benefit of reducing the consumption of reagents for secondary NO_x control, and may increase overall energy recovery by retaining heat from stack gases.

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 Ammonia or Urea 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^{o}C and sufficient retention time for reduction. SNCR is more likely to have higher levels of ammonia slip. The technique can be applied to all plant unless lower NO_x releases are required for local environmental protection.

Urea or ammonia can be used as the reagent with either technique, urea is somewhat easier to handle than ammonia and has a wider operating temperature window, but tends to result in higher emissions of N_2O. Either reagent is BAT, and the use of one over the other is not normally significant in environmental terms.

Emissions of NO_x cannot be screened out as insignificant. Therefore, the Applicant has chosen to use Selective Non-Catalytic Reduction (SNCR) with Urea and Selective Catalytic Reduction (SCR). SCR is also being used as this will assist in reducing Ammonia slip.

The Applicant has chosen to use urea as the reagent. NRW agrees with this assessment and considers that the use of SNCR and SCR is beyond BAT for the Installation. The amount of urea used for NO_x abatement will need to be optimised to maximise NO_x reduction and minimise Ammonia slip. Improvement condition IC3 requires the Operator to report to NRW on optimising the performance of the NO_x abatement system. The Operator is also required to monitor and report on NH_3 and N_2O emissions every quarter.

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 SOx at source		Start-up, supplementary firing.	Where auxiliary fuel required.
Management of waste streams	Disperses sources of acid gases (e.g. PVC) through feed.	Requires closer control of waste management		All plant with heterogeneous waste feed

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

	Higher reliability			
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 measure:

The applicant has a detailed waste acceptance and management procedure. The waste stream is constant and homogeneous and therefore represent BAT for the Installation.

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 NRW 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 what reagent to use is usually economic; Lime produces a lower leaching solid residue in the APC residues than Sodium Bicarbonate and the reaction temperature is well suited to the bag filters. It tends to be a lower cost but is a corrosive material and can generate a larger volume of solid waste residues than sodium bicarbonate. Both reagents are considered BAT and the use of one over the other is not significant in environmental terms in this case.

The Applicant has chosen to use hydrated Lime as the reagent in the dry acid gas abatement system, as outlined above, we agree that this is BAT. Improvement Condition 3 requires optimisation of reagent use for acid gases.

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 (& 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 by the Applicant during the CFD modelling.
- Avoidance of de-novo synthesis, (which has been covered in this section under boiler design).
- The effective removal of particulate matter, which has also been considered in the BAT section regarding particulates earlier on in this document, whereby the use of a fabric filter is considered BAT. The 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. The applicant has proposed to feed the activated carbon as a separate feed in the dry scrubber (see Acid Gases, SO_x, HCl and HF Section above) which we consider 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, as discussed in Section 6.2.1.

Unlike other metals, Mercury if present, will be in the vapour state. 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. As above the applicant proposes to feed activated carbon separately to the acid gas reagent, so we consider this BAT.

6.3 BAT and Persistent Organic Pollutants (POPs)

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

However, 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. The intentionally produced POPs are not relevant for waste incineration because high-temperature incineration is one of the prescribed methods for destroying POPs.

The unintentionally produced POPs addressed by the Convention are:

- Dioxins and Furans
- HCB (Hexachlorobenzene)
- PCBs (polychlorobiphenyls) and;
- PeCB (Pentachlorobenzene)

The UK's national implementation plan for the Stockholm Convention, published in 2007, makes explicit that the relevant controls for un-intentionally 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 addressed alternative techniques and BAT for the minimisation of emissions of Dioxins.

NRW's legal obligation, under Regulation 4(1)(b) of the POPs Regulation is, when considering an application for an environmental permit, to comply with Article 6(3) of REGULATION (EC) No 850/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC (the 'EC 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 POPs should be controlled by imposing emission limits and using BAT for incineration.

The 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.

NRW considers that the Permit ensures that the formation and release of POPs will be prevented or minimised.

As explained above, high temperature incineration is one of the prescribed methods for destroying POPs. Permit conditions are based on the use of BAT and Chapter IV of the 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 International Toxic Equivalence (I-TEQ) limit of 0.1ng/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.

The permit contains 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 Waste Incineration Directive.

NRW is confident that the measures taken to control the release of Dioxins will also control the releases of Dioxin-like PCBs and PAHs. The Installation's impact to air has been discussed previously in this document, in the Air Quality Assessment and Human Health Risk Assessment section, this concluded that there will be no adverse effect on human health from operations.

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), who advise that;

"Due to comparatively low levels in emissions for most (combustion) processes, special measures for HCB control are not usually 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."

Pentachlorobenzene (PeCB) is another on the POPs list to be considered under incineration. PeCB has been used as a fungicide and 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 metallurgical processes and combustion plants providing energy. As discussed previously, the control techniques described by the UN-ECE BAT guidance and included in the permit are effective at controlling the emissions of all relevant POPs including PeCB.

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

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

6.4 BAT and global warming potential

This section summarises the assessment of greenhouse gas impacts which has been made in the determination of this Permit. Emissions of carbon dioxide (CO_2) and other greenhouse gases differ from those of other pollutants in that, except at gross levels, they have no localised environmental impact. Their impact is at a global level and in terms of climate change. Nonetheless, CO_2 is clearly a pollutant for 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 NOx abatement system to ensure its GWP impact is minimised. Improvement Condition 3 requires the Operator to optimise the Secondary abatement.

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

The electricity that is generated by the Installation will displace emissions of CO_2 elsewhere in the UK, as virgin fossil fuels will not be burnt to create the same electricity. The Installation is not subject to the Greenhouse Gas Emissions Trading Scheme Regulations 2012 therefore it is a requirement of IED to investigate how emissions of greenhouse gases emitted from the Installation might be prevented or minimised. Factors influencing GWP and CO_2 emissions from the Installation are:

On the debit side

- CO_2 emissions from the burning of the waste;
- CO_2 emissions from burning auxiliary or supplementary fuels;
- CO_2 emissions associated with electrical energy used;
- N_2O from the de-NOx process.

On the credit side;

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

The GWP of the plant will be dominated by the emissions of carbon dioxide that are released because of waste combustion. This is constant for all options considered in the BAT assessment. Any differences in the GWP of the options in the BAT appraisal will therefore arise from small differences in energy recovery and in the amount of N_2O emitted.

The Applicant considered energy efficiency and compared SCR to SNCR in its BAT assessment.

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

Taking all these factors into account, the Applicant's assessment shows their preferred option is best in terms of GWP. In accordance with the H1 methodology the Global Warming Potential (GWP) is -32,644 (tonnes CO_2 equivalent per annum). We agree with this assessment and that the chosen option is BAT for the Installation.

6.5 Efficient Use of Raw Materials, Water and Energy

The Installation has many processes and controls in place that maximises the efficiencies in relation to raw materials, water and energy.

The Installation has ash recycling whereby ash that is removed from site can be used in other industries.

The proposed plant also features a bed recycle system. This system allows continuous operation of the process while removing inert material from the bed. This "on-line" cleaning system allows used bed material to move down between the fluidising nozzles and air distribution manifolds and be removed from the active region of the bed. Further along the process a vibrating screen with a specially designed plate separates waste material from the reusable bed material.

The waste material is placed into a designated hopper for disposal and the recycled bed material is diverted to a bucket elevator and returned to a sealed vessel containing the bed material. This saves time and energy as the plant doesn't have to stop whilst material is being changed.

Variable speed drives on motors, pumps and fans means that equipment is not always running at full speed and can be set based on the demand of the plant, thus saving energy in the process.

The Installation also employs under and overbed burners, this equipment ensures a consistent temperature is maintained in the furnace zone and therefore minimises hot/cold starts. The Installation also uses on-line monitoring of the plant conditions, by using the SCADA monitoring equipment, operators can continuously monitor the plant condition & operation thus ensuring optimal running conditions are maintained.

Within the cooling water system, a closed loop system is used, this saves energy as the same water is used in circulation to provide cooling. Water is also recycled on the stream turbine by passing it through an air-cooled condenser. By reusing the water, fresh make-up water is minimised. The net water usage at the Installation meets the sector average (250 – 1100kg per tonne of material processed), as stated in Sector Guidance Note IPPC S5.01.

The plant also employs flue gas recirculation; this is carried out for 2 reasons - mainly for the reduction of NO_x from the process and secondly to recover any residual heat. This both saves energy in the form of recovered heat but also assists the abatement plant by reducing NO_x formation and in turn reducing raw material use in the abatement equipment.

The applicant has proposed to use SCNR and SCR for emission abatement, by using SCR as a final treatment stage the use of Urea in the SCNR is reduced. Further to this, one of the abatement systems uses hydrated lime as emission control, the plant has the capacity to recycle and re-use the lime, therefore reducing overall consumption.

6.6 Handling and Storage of Air Pollution Control residue (APCr) and bottom ash

Bottom Ash

There are 2 types of ash that are dealt with at the Installation and both streams are handled and stored separately.

The furnace bottom ash is removed from the process and is transported for storage in an enclosed silo via enclosed water-cooled conveyors. Bottom ash from other parts of the process (e.g. boiler ash from boiler passes) is also transported in this way.

The silo holds 100 tonnes of bottom ash is emptied approximately every 2 weeks. The silo is sealed and therefore fugitive emissions to atmosphere are reduced. The ash in this silo can either be removed via skip or powder lorry and is transported off site to be disposed of in the appropriate manner. This represents BAT for the sector and ash handling, as stated in Sector Guidance Note IPPC S5.01.

APCr

APCr also known as fly ash, is the solid output of the flue gas treatment equipment installed at the Installation. It comprises the fly ash from incineration together with the reagents used in the flue gas treatment.

The APCr is removed from the process in much the same way as the bottom ash and is kept separate and stored in a dedicated silo. The silo can hold approximately 70 tonnes of APCr and will be emptied approximately once a fortnight.

From here the ash is deposited in 1 tonne sealed bags and removed from site by lorry. As the APCr is categorised as hazardous under EPR, the ash will be transported for disposal at an appropriate hazardous waste landfill.

6.7 Other emissions to the Environment

6.7.1 Emissions to Surface Water

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

There are to be no releases of process effluent to surface water associated with the operation of the Installation.

The only point source emission to water is clean, un-contaminated surface water run-off from areas of external hardstanding and building roofs. More specifically un-contaminated rainwater run-off from the roof drainage will be collected through a syphonic rainwater collection system, this will in turn will be routed to an attenuation tank before being discharged to surface water.

Rainwater from road areas will be captured via the surface water drainage system and routed to the attenuation tank via oil interceptors prior to discharge to surface water.

The attenuation tank has a shut-off valve that means the tank can be isolated if needed and any contaminated run-off cannot be discharged to surface water. This is an authorised emission point and is listed in the permit as W1, the applicant has also committed to carrying out periodic visual and check compliance monitoring of the discharge to ensure the quality of the water.

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.

6.7.2 Emissions to Sewer

The Installation will give rise to process effluent in the form of boiler blowdown and water treatment plant discharges. The effluent will be discharged to sewer via emission point S1 in accordance with a trade effluent consent from the local sewerage undertaker, Dŵr Cymru Welsh Water.

The Installation has a design capacity discharge of approximately 3921 litres per hour of waste water to sewer, however a realistic actual discharge volume is <36.6m^3 per day.

The Applicant has applied to Dŵr Cymru Welsh Water for a trade effluent discharge consent and pre-operational condition PO5 in the Permit requires the Operator to provide proof of the trade effluent discharge consent prior to operating the plant.

We are satisfied that the environmental risk associated with the release of process effluent to sewer is not significant, since there is no aqueous effluent associated with any of the air abatement plant. The effluent will be treated at a Dŵr Cymru Welsh Water waste water treatment works prior to discharge to the aquatic environment.

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.

6.7.3 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 air, soil, surface water and groundwater. In addition, storage requirements for waste and for contaminated water of Article 46(5) must be arranged.

Fugitive dust emissions will be controlled by ensuring that the waste wood delivered to site will be by a covered vehicle. Waste wood will be stored in a dedicated building, conveyors to move the fuel will be covered and there will be a dust suppression system in place on-site.

The site will be situated on a concrete surface. As mentioned above external areas (roof water and un-contaminated surface water run-off) are connected to the surface water system that is served by an attenuation tank with control valve, with the option to isolate the tank.

The process areas have a sealed drainage system. This will ensure that potentially polluting liquids from the process areas don’t enter the soil or surface water. Any off-loading of materials will also take place on this concrete surface to further minimise the potential for pollution to enter the soil or 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 minimised.

All storage tanks will be bunded at 110% of the tank capacity and will be placed on concrete hardstanding. These areas and tanks will be subject to a regular maintenance inspection as part of the site's EMS.

6.7.4 Odour

We consider that the applicant's proposals represent the appropriate measures to prevent/minimise odour from the permitted activities. 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, where doors will be always kept shut when there are no deliveries. There will be no waste wood fuel stored outside.

The waste storage building is a sealed building with electrically operated roller shutter doors. The building also benefits from an air and dust extraction system.

As we are satisfied that appropriate measures will be in place to prevent or, where that is not practicable to minimise odour and prevent pollution from odour, we consider that no odour management plan is needed and permit conditions 3.3.1 and 3.3.2 are sufficiently protective, However the applicant has committed to daily monitoring of odour at designated points around the site boundary, which will be recorded in the site logbook. This has been incorporated into Table S1.2 as an operating technique.

6.7.5 Noise

The applicant provided a revised noise impact assessment in July 2017, which was submitted by Sol Acoustics Ltd. in response to a Schedule 5 notice requesting further information. This replaced the original noise impact assessment submitted by Entran Ltd.

The assessment addressed predicted noise impacts from equipment and activities associated with the operation of the proposed facility. These were assessed at three locations, (specifically two existing residential properties and the site of a proposed residential development), for both daytime and night time operating scenarios, excluding “emergency only” plant.

The Installation is located on an industrial area of Barry Docks with occupied industrial units immediately to the south west and residential properties within 250m to the north west of the Installation boundary. Planning consent exists for a residential development and amenity area within 150m to the south west of the Installation. These have been represented in the submitted report by a single receptor.

British Standard 4142:2014 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 LA90 at sensitive receptors to the likely effects of sound on people in a residential dwelling or premises. For EPR applications, such as this, a BS4142 assessment is the expected approach for noise impact assessment.

Assessment of the applicant’s submitted modelling and our own check modelling include a +3dB penalty as defined in BS 4142:2014 for “other sound characteristics…readily distinctive against the residual acoustic environment”.

BS 4142:2014 assesses the likelihood of significant adverse impact by subtracting the measured background noise level from the rating level:

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact.
- A difference of around +5 dB is likely to be an indication of an adverse impact.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

The applicant's assessment indicated that, during daytime hours, noise originating from the plant is unlikely to have an adverse impact at any of the receptors as it is predicted to range between -7 dB and -1 dB below background.

During night time hours, the submitted report indicates a low likelihood of adverse impacts at receptors with impacts ranging between +2dB to +4dB above background. Our check modelling results agree with the applicant's results.

Our modelling indicated daytime impacts between -9dB to -1dB below background. Night time impacts range between +1dB to +5dB above background, with the highest impact predicted at the site of the proposed residential development. Impact is less at occupied premises.

While this is indicative of a possible adverse impact at this receptor, Phase 5 of the proposed residential development has outline planning permission only, for which construction work has not yet commenced.

The Phase 5 area as mentioned above is also unoccupied during both day and night time periods and is therefore not a sensitive receptor for the purposes of this assessment.

The proposed residential development is not currently a noise sensitive location based on the definition provided in H3 Appendix 1 Glossary of terms. Despite the outline planning permission, there is no certainty that the site will be developed. H3 guidance further indicates that commercial premises are not noise sensitive receptors in relation to this assessment.

Whilst Appendix E of the submitted report does indicate possible tonality for the fresh lime conveying blower, NRW check modelling indicates that this is unlikely to be a significant contributor at any receptor location and would not necessarily warrant addition of a penalty to the overall rating.

The applicant conducted a background noise survey at three locations - two adjacent to the nearest residential areas and one located in the proposed residential development area.

The surveys were carried out over a twelve-day period between the 25th May and 5th June 2017 accounting for both weekday and weekend background sources. The survey results presented in the applicant's report did not comment on the main sources contributing to the residual sound making it difficult to establish the existing context of the background noise environment.

Improvement Condition 4, requires the Operator to carry out a full assessment of noise when the plant is operational to confirm predictions made in the Application.

The applicant's noise impact assessment used CadnaA noise modelling software with the ISO 9613-2 methodology, to predict the noise rating level at sensitive receptors. In assessing the predicted impact of external noise, the applicant has followed the methodology detailed in BS 4142:2014 and met the reporting requirements of Section 12 of the standard.

The applicant's report stated that the total reverberant sound pressure level within each building was calculated using the assessment methodology provided within BS EN 12354-4:2004. Reverberation times and diffusivity factors for each building used in the applicant's calculations were assumed.

Suitable terrain was included in the model and played a significant role as the local topography ~200m to the north west of the site experiences an abrupt elevation change from ~10m to ~30m with residential properties located at the higher elevation.

We carried out our own check modelling of the noise impact using CadnaA noise modelling software version 2017 (build: 157.4702) using the ISO 9613-2 methodology and the applicant's CadnaA modelling files. Reverberant sound pressure levels within each building used the default method described in the CadnaA 2017 reference guide which automatically calculates the internal reverberant sound pressure level based on entered sound power levels of internal sources and the surface area of the enclosure.

The applicants included a receptor of a proposed residential development on Cory Way where the highest impacts from the proposed facility are predicted. While construction of these residential properties has not yet commenced, it is worth noting that the receptor included in the submitted report does not represent the location of the nearest potential property to the facility.

Overall, impacts of external free field noise at sensitive receptors resulting from equipment and activities associated with the proposed development have been reviewed in accordance with the assessment criteria of BS 4142:2014. However, where a new development is to be assessed, BS 4142:2014 Section 4 requires an understanding of the sound a new industrial source would introduce.

Our check modelling results indicate that overall, predicted noise impacts due to the activities associated with the Installation are not likely to exceed the level at which adverse impacts at receptors are likely, based on the LA90, 15 min average indicated in the submitted report.

Our check modelling prediction assumes that final performance of all plant, mitigation measures and enclosures meet or exceed those indicated in the submitted report or the submitted CadnaA modelling file, whichever results in the lowest rating level at the receptors.

Whilst the applicant has indicated that no site activities or plant items exhibit intermittency, tonality or impulsivity characteristics sufficient to warrant a rating penalty, several processes (fuel unloading, transport via conveyor etc.) and plant (motors, fans, compressors etc.) may be expected to exhibit such characteristics.

The applicant has confirmed that the proposed plant incorporates suitable mitigation measures to avoid tonality at receptors, full details of noise mitigation measures are listed in Appendix E of the Applicants noise assessment.

In addition, the applicant has stated that acoustic testing will be carried out during commissioning and should acoustic features originating from any item of plant be identified at receptors, additional mitigation measures based on BAT will be explored.

Improvement Condition IC4 has been included in the environmental permit that requires the applicant to carry out as-built noise modelling and confirm the predictions in the model. Permit conditions 3.4.1 and 3.4.2 are sufficiently protective.

Based on the applicant's noise impact assessment and our own check modelling, we are satisfied that the impact from noise and vibration are not likely to cause an adverse effect at occupied sensitive receptors and that appropriate measures will be in place to prevent, or where that is not practicable, to minimise noise and vibration and to prevent pollution from noise and vibration outside the site.

6.8 Setting ELV's and other permit conditions

6.8.1 Translating BAT into permit conditions

Article 14(3) of the 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 the IED limits are used to assess impact and these emissions are insignificant then we accept that the Applicant's proposals are BAT, and that there is no justification to reduce ELVs below the Chapter IV limits in these circumstances.

Below we consider whether, for those emissions not screened out as insignificant, different conditions are required because 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 from 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.

(ii) National and European EQSs - As detailed in the Environmental Risk Assessment section above, 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 determined by the quantity and characteristics of the waste being incinerated. These are already controlled by conditions in the Permit. Accordingly, emission limits for CO_2 are unnecessary as they are already controlled. 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.

Provided energy is recovered efficiently, as described in Section 4.3.8, there are no additional equivalent technical measures (beyond those relating to quantity and characteristics of the waste) that can be imposed which do not run counter to the primary purpose of the Installation, namely the recovery of energy from waste.

We consider that the permit conditions controlling the volume and type of wastes that can be accepted at the Installation and energy efficiency apply equivalent technical measures to limit CO_2 emissions.

(iv) Commissioning – before the plant can become fully operational, it will be need to be commissioned. Before commissioning can begin, the operator is required by Pre-operational condition PO3 in the permit 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 the 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 to also inform NRW in the event of actual emissions exceeding expected emissions. The operator will be required to carry out the commissioning in-line with the commissioning plan once it has been approved by NRW.

We have also set an Improvement Condition IC1 which is required to be completed within 4 months of completion of commissioning. This Improvement Condition 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 that 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 plants performance in its ‘as built’ state and the response to this improvement condition will be incorporated in Table S1.2 of the permit as an operating technique.

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 (IC2);
· Abatement plant optimisation details (IC3); and
· Calibration of the CEMs in accordance with BS EN 14181 (IC8).

6.9 Monitoring

6.9.1 Monitoring during normal operations

We have decided that monitoring should be carried out for the parameters listed in Schedule 3 of the permit 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 PCB's and PAHs from the incineration process; and

- to deliver the requirements of Chapter IV of the 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 Guidance M2 for the monitoring of stack emissions to air. NRW has adopted this guidance.

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

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

The Applicant has stated that they will provide a back-up CEMS within 24 hours of the failure of the operating CEMS. The back-up CEMS will measure the same parameters as the operating CEMS.

The applicant hasn't requested abnormal emission limits as allowed by Article 45(1)(f) of IED and therefore normal IED ELV's apply. Please refer to Section 5.4.4 for more details.

6.9.3 Continuous emissions monitoring for dioxins and heavy metals

IED sets out monitoring requirements for various substances. Article 48(5) of the IED states that the European Commission shall set dates from which continuous measurements of emissions to air of heavy metals, dioxins and furans are to be carried out as soon as appropriate techniques are available within the European Union. Such techniques have not yet been identified and consequently the Commission has not set a compliance date for continuous monitoring.

NRW 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 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 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.

In accordance with its legal requirement to do so, NRW reviews the development of new methods and standards and their performance in industrial applications.

NRW considers continuous sampling systems for dioxins to have promise as a potential means of improving process control and obtaining more accurate mass emission estimates.

6.10 Reporting

We have specified the reporting requirements in Schedule 4 of the permit. These meet the reporting requirement set out in the IED and ensure data is reported to enable timely review by NRW.

7. Other Legal Requirements

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

7.1 The EPR 2016 and related Directives

The EPR delivers the requirements of a number of European and National laws

7.2 EPR 2016 IED requirements

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

Schedules 7 and 13 EPR both require NRW to exercise its relevant functions so as to ensure compliance with Article 5(1) and (3) IED. Article 5(3) requires that *'In the case of a new Installation if 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.'*

The Environmental Impact Assessment Directive ('EIA') is implemented in Wales by The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017. It places requirements on local planning authorities, Welsh Ministers and Inspectors with regard to environmental impact assessments for applications for planning consent.

Determination of planning consent applications is a matter for the relevant local planning authority. In this context, NRW's obligation is to examine and use any relevant information obtained or conclusion arrived at during the planning consent process pursuant to the relevant EIA articles.

The planning authority concluded that an environment impact assessment was not required for this development and Welsh Ministers concluded that a screening direction was not necessary.

NRW carried out an assessment of environmental impacts as detailed in this decision document and conducted its own consultation on the Application.

7.3 Schedule 9 to the EPR 2016 – Waste Framework Directive

A *waste operation* is being conducted as a directly associated activity of the Installation's main purpose. 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. NRW must exercise its relevant functions for the purposes of ensuring that the waste hierarchy referred to in Article 4 of the WFD is applied to the generation of waste and that any waste generated is treated in accordance with Article 4 of the WFD.

The conditions of the permit ensure that waste generation from the facility is minimised. Where 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.

NRW must also exercise its relevant functions for the purposes of;

implementing Article 13 of the WFD;

ensuring that the requirements in the second paragraph of Article 23(1) of the WFD are met; and

ensuring compliance with Articles 18(2) (b), 18(2) (c), 23(3), 23(4) and 35(1) of the WFD.

Article 13 relates to the protection of human health and the environment. These objectives are addressed elsewhere in this decision document. Article 23(1) requires the permit to specify;

- The types and quantities of waste that may be treated;
- for each type of operation permitted, the technical and any other requirements relevant to the site concerned;
- the safety and precautionary measures to be taken;
- the method to be used for each type of operation
- such monitoring and control operation as may be necessary; and
- such closure and after-care provisions as may be necessary

These are all covered by permit conditions. The permit does not allow mixing of hazardous wastes 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 decision documents but we consider the conditions of the permit ensure that the recovery of energy takes place at 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.

7.4 Schedule 22 to the EPR 2016 – Groundwater, Water Framework Directive and Groundwater Daughter Directives.

To the extent that it might lead to a discharge of pollutants to groundwater (a groundwater activity under EPR 2016), the permit is subject to the requirements of Schedule 22 EPR, 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 release 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.

To the extent that there could be relevant discharges to inland freshwaters, coastal waters or relevant territorial waters, Schedule 21 EPR applies. No such discharges have been permitted.

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

Regulation 59 of the EPR 2016 requires NRW 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 that statement. This satisfies the requirements of the Public Participation Directive. Our decision in this case has been reached following an extensive programme of public consultation on the application. The way in which this has been carried out was explained earlier in this document.

The way in which NRW has consulted with the public and other interested parties is set out at the beginning of this document.

7.6 National Welsh Legislation – Environment (Wales) Act 2016,

Well-being and Future Generations (Wales) Act 2015,

Environment (Wales) Act 2016,

The Natural Resources Body for Wales (Establishment) Order 2012,

The Natural Resources Body For Wales (Functions) Order 2013,

(together 'the Welsh Legislation').

NRW has taken full account of its duties under the Welsh Legislation.

NRW is satisfied that this decision is consistent with its general purpose of pursuing the sustainable management of natural resources in relation to Wales, and applying the principles of sustainable management of natural resources.

In particular, NRW acknowledges that the principles of sustainable management include: making appropriate arrangements for public participation in decision making, taking account of all relevant evidence and gathering evidence in respect of uncertainties, taking account of the short, medium and long term consequences of actions and taking account of the resilience of ecosystems.

NRW further acknowledges that is it an objective of sustainable management to maintain and enhance the resilience of ecosystems and the benefits they provide and, in so doing meet the needs of present generations of people without compromising the ability of future generations to meet their needs, and contribute to the achievement of the well-being goals in section 4 of the Well-being of Future Generations (Wales) Act 2015.

NRW is satisfied that on the evidence the short, medium and long term consequences of granting a permit for the operation of this Installation will not affect the resilience of ecosystems and is consistent with the well-being goals.

In coming to this view, NRW gives significant weight to the measures proposed to control emissions to air from the Installation which NRW is satisfied are likely to be effective, and notes that it has no powers or duties with regard to traffic volume or movements outside of the permit boundary.

It further notes the contribution the operation of the Installation can make, in particular, to the achievement of the goal of a prosperous Wales by, for example, assisting the creation of a productive and low carbon society by using resources efficiently and proportionately.

NRW considers that it has set permit conditions in a consistent and proportionate fashion based on Best Available Techniques and considering all relevant matters.

NRW considers that it has pursued the objectives set out in the Welsh Legislation, where relevant, and that there are no additional conditions that should be included in this permit for those purposes.

We considered the impact of the Installation on local wildlife sites within 2km that are not otherwise protected by designation as either European Sites or SSSIs. These sites were not affected by the Installation as the impact from aerial emissions was screened as insignificant. We are satisfied that no additional controls are required for the purposes of the Welsh Legislation.

7.7 Human Rights Act 1998

We have considered potential interference with the rights protected 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 the Conventions rights are engaged in relation to this permit determination.

7.8 Countryside and Rights of Way Act 2000 (CRoW 2000)

Section 85 of this Act imposes a duty on NRW to have regard to the purpose of conserving and enhancing the natural beauty of the area of outstanding natural beauty (AONB). Impact on areas of outstanding natural beauty ('AONBs') are insignificant.

7.9 Wildlife and Countryside Act 1981

Under Section 28G of the Wildlife and Countryside Act 1981, NRW has a duty in exercising its functions, so far as their exercise is likely to affect the flora, fauna or geological or physiographical features by reason of which a SSSI is of special interest, to take reasonable steps to further the conservation and enhancement of those flora, fauna or geological or physiographical features by reason of which a site is of Special Scientific Interest.

Under Sections 27AA and 28I NRW has a duty to notify its nature conservation function and the strategic conservation panel for the strategic planning area in relation to any proposed operation that is likely to damage a SSSI.

We assessed the application and concluded that there are 2 SSSIs within the 2km screening distance of the site.

However, the reasons for which both sites were designated relate to geological features, which are not affected by any of the potential emissions from the site. There is therefore no impact from the Installation on the SSSIs. No notification was therefore required.

7.10 National Secondary Legislation - 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 with our Air Quality Modelling and Risk Assessment Team (AQMRAT) and they agreed with the applicant's conclusion that the Installation is not likely to have any significant effect on any habitat sites within the screening distance.

A habitats assessment (FORM 1) was completed and our conclusions noted.

7.11 Water Framework Directive Regulations 2017

Consideration has been given to whether any additional requirements should be imposed in terms of NRW's duty under Regulation 3 to secure the requirements of the WFD, EQSD and GWD through (inter alia) EPR permits, but it is considered that existing conditions are sufficient in this regard and no other appropriate requirements have been identified.

The Water Framework Directive Regulations 2003 have been revoked and replaced with Water Framework Directive Regulations 2017

7.12 The Persistent Organic Pollutants Regulations 2007

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

ANNEX 1: Application of Chapter IV of the Industrial Emissions Directive (IED)

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 waste type, 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 incinerated 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	Condition 3.1.1 and 3.1.2 and Tables S3.2 and S3.3 of the permit. No requirements have been set as the process water is discharged to sewer and there is no aqueous discharge associated with abatement plant
45 (1)(e)	The permit shall include the sampling and measurement procedure 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 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 stack the height of which is calculated in such a way as to safeguard human health and the environment	Emissions and their ground-level impacts are discussed in the body of this document
46 (2)	Emissions into air shall not exceed the emission limit values set out in parts 4 or determined in accordance with Part 4 of Annex VI	Conditions 3.1.1 and 3.1.2 and Tables S3.1
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 substance into soil, surface water or groundwater. Adequate storage capacity for contaminated rain water run-off from the site or for contaminated water from spillage of 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	Conditions 2.3.10 and 2.3.11
47	In the event of a 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
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 emissions 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 €

50 (1)	Slag and bottom ash to have Total Organic Carbon (TOC) <3% or loss of ignition (LOI) <5%	Condition 3.5.1 and Table S3.5
50 (2)	Flue gas to be raised to a temperature of 850^{o}C got 2 seconds, as measured at representative point of the combustion chamber	Pre-operational condition. The application specifies the measurement point
50 (3)	At least one auxiliary burner which must not be fed with fuels which can cause higher emission than those resulting from the burning of has oil, liquefied gas or natural gas	Condition 2.3.7
50 (4)(a)	Automatic shut-down to prevent waste feed if at start-up until the specified temperature has been reached	Condition 2.3.6
50 (4)(b)	Automatic shut-down to prevent waste feed if the combustion temperature is not maintained	Condition 2.3.6
50 (4)(c)	Automatic shut-down to prevent waste feed if the CEMs shows that ELVs are exceeded due to disturbances or failure of waste cleaning devices	Condition 2.3.6
50 (5)	Any heat recovered from the process shall be recovered as far as practicable	(a) the plant will generate electricity (b) the plant is CHP ready
50 (6)	Relates to the feeding of infectious, clinical waste into the furnace	No infectious, clinical waste to be burned
50 (7)	Management of the Installation to be in the hands of a natural person who is competent to manage it	Conditions 1.1.1 to 1.1.3 and 2.3.1 of the permit 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 (2)	'Authorisation to change operating conditions' - For waste incineration plants, the change of the operating conditions shall not cause more residues or residues with a higher content of organic polluting substances compared to those residues which could be expected under the conditions laid down in Article 50(1), (2) and (3).	Not Applicable
51 (3)	Changes in operating conditions shall include emission limit values for CO, and TOC as 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	(a) EPR requires prevent or minimise pollution (b) the application documents define how this is carried out, conditions 2.3.1, 2.3.3, 3.2, 3.3, 3.4 of the permit
52 (2)	Determine the mass of each category of wastes, if possible according to the waste code, prior to accepting waste	The application documents describe procedures for the reception, monitoring and storage of incoming waste. This will form part of the Applicants EMS.

52(3)	Prior to accepting hazardous waste at the waste incineration plant or waste co-incineration plant, the operator shall collect available information about the waste for the purpose of verifying compliance with the permit requirements specified in Article 45(2).	Hazardous waste not permitted to be accepted
52(4)	Prior to accepting hazardous waste at the waste incineration plant or waste co-incineration plant, at least the following procedures shall be carried out by the operator: (a) the checking of the documents required by Directive2008/98/EC and, where applicable, those required by Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste (1) OJ L 190, 12.7.2006, p. 1. And by legislation on transport of dangerous goods; (b) the taking of representative samples, unless inappropriate as far as possible before unloading, to verify conformity with the information provided for in paragraph 3 by carrying out controls and to enable the competent authorities to identify the nature of the wastes treated.	Hazardous waste not permitted to be accepted

52(5)	The competent authority may grant exemptions from paragraphs 2, 3 and 4 to waste incineration plants or waste co-incineration plants which are a part of an Installation covered by Chapter II and only incinerate or co-incinerate waste generated within that Installation.	Not Applicable
53 (1)	Residues to be minimised in their amount and harmfulness, and recycled where possible	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 4
54	A change of operation of a waste incineration plant or a waste co-incineration plant treating only non-hazardous waste in an Installation covered by Chapter II which involves the incineration or co-incineration of hazardous waste shall be regarded as a substantial change.	Not applicable
55 (1)	Application, decision and permit to be made 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 tonnes/hour of waste	Condition 4.2.2 and 4.2.3

55(3)	A list of waste incineration plants or waste co-incineration plants with a nominal capacity of less than 2 tonnes per hour shall be drawn up by the competent authority and shall be made available to the public.	Not Applicable
82(5)	In relation to combustion plants which co-incinerate waste, point 3.1 of Part 4 of Annex VI shall apply until: (a) 31 December 2015, for combustion plants referred to in Article 30(2); (b) 7 January 2013, for combustion plants referred to in Article 30(3).	Not Applicable
82(6)	Point 3.2 of Part 4 of Annex VI shall apply in relation to combustion plants which co-incinerate waste, as from: (a) 1 January 2016, for combustion plants referred to in Article 30(2) (b) 7 January 2013, for combustion plants referred to in Article 30(3).	Schedule 3 in permit lists emission values

ANNEX 2: Pre-Operational Conditions

Table S1.4 Pre-operational measures	
Ref.	**Pre-operational measures**
PO1	At least 1 month prior to the commencement of commissioning, the operator shall submit the written monitoring plan referenced in Condition 3.1.4 for the monitoring of soil and groundwater for approval by Natural Resources Wales. The monitoring plan shall demonstrate how the operator will meet the requirements of Articles 14(1)(b), 14(1)(e) and 16(2) of the IED. The monitoring plan shall be implemented in accordance with the written approval from Natural Resources Wales.
PO2	Prior to the commencement of commissioning, the Operator shall send a summary of the site Environment Management System (EMS) to Natural Resources Wales and make available for inspection all documents and procedures which form part of the EMS. The EMS shall be developed in line with the requirements set out in Environment Agency web guide on developing a management system for environmental permits (found on www.gov.uk). The documents and procedures set out in the EMS shall form the written management system referenced in condition 1.1.1 (a) of the permit.
PO3	At least 1 month 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 Resource Wales if actual emissions exceed expected emissions. Commissioning shall be carried out in accordance with the commissioning plan as approved.
PO4	At least 1 month prior to the commencement and commissioning, the operator shall submit to Natural Resources Wales for approval a protocol for the sampling and testing of co-incinerator bottom ash for assessing its hazard status. Sampling and testing shall be carried out in accordance with the protocol as approved.
PO5	Prior to the commencement of commissioning, the operator shall submit a copy of the trade effluent consent for the discharge to sewer to Natural Resources Wales
PO6	Within 1 month the operator will propose a methodology for Temperature - Residence Time verification in writing to Natural Resources Wales. The methodology shall be implemented in accordance with the written approval from Natural Resources Wales

ANNEX 3: Improvement Conditions

Table S1.3 Improvement programme requirements		
Ref.	**Requirement**	**Date**
IC1	The Operator shall submit a written report to Natural Resources Wales for approval 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.
IC2	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.
IC3	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.
IC4	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 refer to the predictions in the report produced as part of the application. If rating levels likely to cause adverse impact 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.	Within 6 months of the completion of commissioning

Table S1.3 Improvement programme requirements		
Ref.	**Requirement**	**Date**
IC5	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.
IC6	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.	Within 12 months of the date commissioning.
IC7	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; i.e. Cd, Cr(VI), As. 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. If 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.	Within 15 months of the completion of commissioning
IC8	The Operator shall submit a written summary report to Natural Resources Wales to which presents the results of calibration and verification testing to confirm 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.

ANNEX 4: Consultation Responses

Consultation was conducted as detailed above. Below are tables which summarise responses received together with how they have been addressed in the determination process.

For specific statutory bodies and voluntary organisations, we have summarised their specific responses. Where responses were received from individuals we have not included their personal details and have grouped responses into categories. Where we received similar responses from individuals we have grouped those together and shown how the issue raised was addressed.

1) Consultation Responses from Statutory and Non-Statutory Bodies

Response Received from Food Standards Agency	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. The Food Standards Agency responded to our consultation only to inform us that they would not be commenting on the application.	1. None required.

Response Received from Vale of Glamorgan Council – Planning Department	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Conditions included in the Planning Permission for the site requiring the operator to monitor and abate (if necessary) noise	1. Noise assessment and abatement is dealt with within this Decision Document, in particular at section 6.7.5.

Response Received from the Shared regulatory services (Environmental Protection department and joint council response) – 1st response received 8th September 2017	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Impacts of noise at sensitive receptors	1. Noise assessment and abatement is addressed within this Decision Document, in particular at section 6.7.5.
2. Impacts of aerial emissions on sensitive receptors	2. Impacts relating to aerial emissions are addressed within this Decision Document, in particular at sections 5.1, 5.2, 5.3, 5.4 and 6.
3. Issues connected with traffic	3. Issues connected with traffic movements are planning matters and are not within the remit of Environmental permitting.

Response Received from Cardiff and Vale University Health Board (incorporating comments from Public Health Wales) (first response received 22nd December 2016 in relation to first consultation on receipt of the application)	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. The applicant has not submitted its consideration of transport emissions within this application. The regulator should be satisfied that the operation will not result in adverse air quality impacts because of vehicles servicing the site. 2. The vicinity of the proposed plant has been the subject of many development proposals. The regulator should be satisfied that the applicant has considered the cumulative emissions to air of the development in conjunction with other consented schemes in the vicinity likely to be operational during the life of the plant. 3. The applicant should seek external accreditation (to ISO 14001 or equivalent) for its Environmental Management System. 4. The regulator should seek assurances that the recommended acoustic mitigation strategies are employed prior to operation of the plant.	1. Issues connected with traffic movements are planning matters and are not within the remit of Environmental permitting. Impacts on air quality are addressed within this Decision Document, in particular at sections 5.1, 5.2, 5.3, 5.4 and 6. 2. Impacts on air quality are addressed within this Decision Document, in particular at sections 5.1, 5.2, 5.3, 5.4 and 6. 3. The Environmental Management System is addressed within this Decision Document, in particular at section 4.3.3. 4. Noise assessments and abatement are address within this Decision Document, in particular at section 6.7.5.

Response Received from Cardiff and Vale University Health Board (incorporating comments from Public Health Wales) (third response received 8th August 2017 in relation to consultation on collated public health concerns)	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. The correspondence noted that no objections were raised by the health board in relation to the proposed Installations impact on human health.	1. None required.

Response Received from Cardiff and Vale University Health Board (incorporating comments from Public Health Wales) (third response received 17th August 2017)	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. The applicant has not considered how emissions from transport associated with this process will impact on local air quality. It is important that the applicant should provide sufficient information to demonstrate that vehicles servicing the site will not adversely impact local air quality.	1. Issues connected with traffic movements are planning matters and are not within the remit of Environmental permitting.
2. Similarly, we have previously highlighted the need to consider cumulative impacts of currently operating (and consented) developments with similar emissions in the background air quality assessment. It is important that the applicant includes the cumulative emissions of other developments in the vicinity likely to be operational during the life of the plant. In our view this still has not been done.	2. Impacts on air quality are addressed within this Decision Document, in particular at sections 5.1, 5.2, 5.3, 5.4 and 6. A letter was sent to PHW on the 28/09/17, explaining our position and that we are satisfied with the assessment of cumulative impact as the background assessment included this.
3. The applicant has not revised their dioxin risk assessment considering the new dispersion modelling. We recommend that this assessment be revised and circulated for comment prior to any decision.	3. We are satisfied that increases in emissions concentrations predicted by ADMS 5.3 modelling software compared with AERMOD modelling software are relatively minor and as such will not change the outcome and conclusions of the human health risk assessment. A letter was sent to PHW on the 28/09/17, explaining our position and that we are satisfied that the HHRA is suitable
4. The regulator should seek assurances that the recommended acoustic mitigation strategies are employed prior to operation of the plant. Additionally, given the heightened community awareness of the plant, any increase in noise levels should be avoided.	4. Noise assessment and abatement is addressed within this Decision Document, in particular at section 6.7.5

Response Received from South Wales Fire and Rescue Service (first response received 20th February 2017) – receipt of application	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. The Fire Prevention Plan refers to TGN 7.01 in the beginning of the document, which both NRW & EA Guidance now supersede, however later in the document it refers to NRW guidance;	1. Fire prevention issues are addressed within the Decision Document, in particular at section 4.3.11.
2. The storage sizes quoted within the plan are more than the current guidelines, however throughout the document there is reference to separation distances required between piles depending on site layout. Also, due to several factors in place such as: a. Wood chip is internal stored only; this will mean that the moisture content is lower and due to the high turnover of woodchip (3-4 weeks) due to the production process the risk of self-heating is low; b. Stored within segregated area; Internal fire barriers separating fire areas on site will be a minimum of 2-hour fire resisting rating; c. On site, automatic fire detection and alarm system; d. On site, automatic sprinkler system; e. An automatic suppression system will be installed; f. The site is equipped with fire response system with emergency standby water bowsers/fire tenders; and g. The management procedures for monitoring and controlling the woodchip; An increase in stack sizes could be acceptable;	2. All issues have been addressed through the new FPP and subsequent information. Full details of the proposals are detailed in the applicants updated Fire Prevention Plan.

3. Would it be possible to ask for confirmation as to the quantities of water that will be held at any one time within the onsite storage systems and what methods of monitoring will be in place to ensure that appropriate levels can be maintained during warmer periods of weather;	3. Information provided by applicant in response to email sent on the 5th October 2017, we are happy with the response.
4. Prior to occupancy, the Fire Prevention Plan will need to be revisited to ensure that any outstanding issues have been addressed and that a Fire Risk Assessment has been carried out.	4. This will be carried out if a permit is issued and therefore not addressed during determination.

Response Received from South Wales Fire and Rescue Service (second response received 28th February 2017) – additional comments	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Housekeeping – how things are stored on-site, the maintenance and cleaning programme should aim to keep levels of dust, loose fibre and paper and other combustible materials in buildings and around the site to a minimum.	1. The applicant has provided information in the form of procedures and management plans that address these issues, the Fire Prevention Plan is an operating technique in Table S1.2 and is therefore enforceable.
2. Accident Management Plan, regarding the storage of wood on-site and emergency plans surrounding the operation, such as hydrant access, firefighting equipment, specific hazards, communication arrangements.	2. The site will attain an externally accredited Environmental Management System, the points listed in this section, have been addressed with the procedures supplied, the FPP also addresses these concerns. PO2 and IC6 will monitor the EMS development.
3. Fire appliance access, pile size, detections equipment	3. As above

Response Received from South Wales Fire and Rescue Service (third response received 18th October 2017 based on Schedule 5 response, re-submitted FPP and Capita reports.)	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Issues previously raised with monitoring are now satisfied based on the amount of wood stored on-site	1. No action required

2. Based on comments within the Capita report, SWFRS provided information regarding the firefighting strategy that would be employed in the event of a fire 3. SWFRS suggested that the size of the water main, flow rates and pressure for the site are provided, the water tank size to be confirmed and the availability of fire service connections available on the tank, finally what is the estimated refill time for the tank, so that sprinkler times are achieved. 4. Recommended that the size of the underground storage tank be confirmed for water containment and what measure will the site have in place for the removal of water run-off. These details need to be available in the FPP as a clear water run-off strategy and if possible times for measures to be implemented	2. No action required 3. and 4. Fire prevention issues are addressed within this decision Document, in particular at section 4.3.11.

• **Response Received from Health and Safety Executive (response received 18th October 2017 – correspondence from the HSE to Jane Hutt AM)**	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. The HSE confirmed that the site is not considered under the COMAH regulations and further it is not considered as a domino site, the HSE had no further comments on these points. 2. The HSE confirmed that DSEAR is only applicable if and when the site becomes operational and it is within their remit.	1. None required. 2. None required.

No responses received from	• Dŵr Cymru Welsh Water

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

We received 427 consultation responses. Some of the issues raised were outside the remit of the permitting regime. Specifically, questions were raised which fall within the jurisdiction of the planning system, both on the development of planning policy and the grant of planning permission. Guidance on the interaction between planning and pollution control is given in the National Planning Policy Framework. It says that the planning and pollution control systems are separate but complementary. We are only able to consider those issues which fall within the scope of the Environmental Permitting Regulations 2016.

a) Representations from MPs, AMs, councillors and parish/town/community councils

Response Received from Jane Hutt AM (response received 23rd August 2017)	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Public Consultation	1. The consultation process is detailed within this Decision Document.
2. Technical issues with how the process has been described in previous documents; incorrect information relating to the process and syngas, availability of information in the public buildings, no non-technical summary and restriction of items included in the Schedule 5.	2. This has been dealt with through correspondence. The application, determination and consultation processes are detailed within this Decision Document
3. Stack height assessment and the fact that SEPA required additional information.	3. Emissions to air are addressed within this Decision document, in particular sections 5.1, 5.2, 5.3, 5.4 and 6. SEPA are a different organisation and as such have different policies and procedures which we cannot comment on.
4. Information relating to real world emissions and performance data (preferably from an operational plant) would be required by SEPA.	4. Full details of the air quality assessment are contained within this document. This has been assessed and is satisfactory.
5. Mapping of the maximum levels of 1-hour NOx levels like the Fife results was requested.	5. Full details of the air quality assessment are contained within this document. This has been assessed and is satisfactory.
6. Impacts of flood risk – why haven't we required a flood risk assessment.	6. Flood risk is a planning concern and not within the remit of EPR.

7. Is this plant stop/start operation or continuous and will the National Grid require the plant to stop during times of over-supply? 8. The plants location is in a built-up area. SEPA state a buffer zone is probably needed because of unknown fire and explosion risks. Will NRW consider if the siting is therefore unsuitable for a permit?	7. The plant is designed to run continuously. 8. This is primarily a planning concern and not within our remit. However, the impact assessments for air quality, human health, habitats and noise are detailed within the relevant sections of this Decision document. SEPA are a different organisation and as such have different policies and procedures.

Response Received from Cllr Richard Bertin (response received 21st March 2017)	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Location of the Installation 2. Emissions - Noise, nuisance, air pollution and risk to human health 3. Wood containing heavy metals, particulates, dioxins etc.	1. This is a planning concern and is outside of the remit of EPR 2. Noise, air and risks to human health are addressed within this Decision Document. Issues relation to statutory nuisance are addressed by the local authority 3. This is addressed within this Decision Document, in particular at section 6.2.6.

Response Received from Cllr Richard Bertin (response received 26th April 2017)	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Emissions to air – discrepancies between data 2. Noise concerns	1. Impacts on air quality are addressed within this Decision Document, in particular at sections 5.1, 5.2, 5.3, 5.4 and 6. 2. Noise assessment and abatement is addressed within this Decision Document, in particular at section 6.7.5.

Response Received from Independent Cllr Kevin Mahoney (response received 8th May 2017)	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Location of the plant 2. Air quality impact on local community 3. Noxious fumes from stack	1. This is a planning concern and is outside of the remit of EPR, therefore this hasn't been considered further. 2. and 3. The applicants air quality and human health risk assessment have been assessed and are acceptable. There is no objection from Public Health Wales.

Response Received from Cllr Richard Bertin (response received 13th August 2017)	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Consultation times, amount of time for the public to scrutinise documents	1. The consultation process is detailed within this Decision Document
2. Environmental Impact	2. Environmental impacts are addressed within this Decision Document, in particular at sections 5 and 6.
3. Evacuation plans for the public	3. This is a planning concern and is outside of the remit of EPR

Response Received from Cllr Sandra Perkes (response received 9th September 2017)	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Fire Risk and Fire Prevention Plan.	1. Fire prevention issues are addressed within the Decision Document, in particular at section 4.3.11

Response Received from Rt. Hon Alun Cairns MP (response received 9th September 2017)	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Location of the plant	1. This is a planning concern and is outside of the remit of EPR.
2. Role of the operator	2. The response received on the 19th October 2017 is satisfactory.
3. Efficiency of the plant	3. Energy efficiency is addressed within this Decision Document, in particular at section 6.5 and 4.3.8.
4. Waste Acceptance procedures	4. The Applicant's policies and procedures have been assessed by NRW and we are satisfied that they are sufficient. Conditions in the permit ensure sufficient protection.
5. Choice of technology	5. The choice of technology is addressed within this Decision Document, in particular in section 6

Response Received from Andrew RT Davies AM (response received 30th October 2017)	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Information has changed throughout the application and the public have not had the opportunity to scrutinise the information.	1. The consultation process is detailed within this Decision Document

2. Lack of consultation, not considered HPI and not enough resource allocated to deal with the application. 3. No Environmental Impact Assessment carried out by the applicant.	2. There has been a considerable amount of public consultation (as detailed above in this document). The application was determined in accordance with NRW's Sites of High Public Interest guidance. Our Public Participation Statement (PPS) and our Regulatory Guidance Note RGN6 for Determinations involving Sites of High Public Interest. 3. EIA issues are addressed within this Decision document, in particular at section 7.2. NRW's own assessment of potential environmental impacts is also described within this Decision Document, in particular in sections 5 and 6.

b) Representations from Community and Other Organisations

Representations were received from The Docks Incinerator Action Group, Biofuel watch, Friends of the Earth and Capita Consulting. A summary of the issues raised together with the way in which we have addressed those issues is shown below;

Response Received from Barry Town Council – April 2017 (commissioned from Capita Consulting)	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Air Quality – review of methodology, discrepancy between the database files containing process data, and the process data provided in the air quality assessment 2. Human Health Impact 3. Handling & Storage of waste wood 4. Stack Height 5. Noise – the report does provide confidence that the proposals sufficiently control noise emissions from the proposed development.	1. Impacts on air quality are addressed within this Decision Document, in particular at sections 5.1, 5.2, 5.3, 5.4 and 6. 2. Human health risks are addressed within this Decision Document, in particular at section 5.3 3. Handling and storage of waste wood is addressed within this Decision Document, in particular in section 4.3 4. To the extent that they fall within the remit of environmental permitting stack height and plant design are addressed within this Decision Document, in particular at section 5 and 6 5. Noise assessment and abatement is addressed within this Decision Document, in particular at section 6.7.5.

Response Received from Biofuel watch – received 8th May.	
Summary of issues raised:	**Summary of action taken / how this has been covered**
Response raised concerns connected to inefficient use of raw material, the Waste Hierarchy Principle and the proposed technology. These concerns have been addressed in this section, and are explained in detail in this Decision Document.	

Response Received from Docks Incinerator Action Group (DIAG)	
Summary of issues raised:	**Summary of action taken / how this has been covered**
Several issues were raised, some of which are outside of the remit of EPR and were therefore not addressed;	
1. High Public Interest and how the application was dealt with	1. The consultation process is detailed within this Decision Document, in particular in section 2.
2. Perceived planning errors	2. Not relevant to our determination
3. Plant efficiency	3. Plant efficiency is addressed within this Decision document, in particular at section 6.5 and 4.3.8
4. Environmental Impact Assessment (EIA) – requirements & failures	4. EIA issues are addressed within this Decision document, in particular at section 7. NRW's own assessment of potential environmental impacts is also described within this Decision Document, in particular in sections 5 and 6.
5. Traffic congestion and pollution	5. Issues connected with traffic movements are planning matters and are not within the remit of Environmental permitting.
6. East Quays development plan.	6. This is a planning issue and outside of the remit of EPR
7. Dangerous Substances and Explosive Atmospheres (DSEAR)	7. Outside of the remit of EPR and therefore not relevant to our determination. The relevant regulator, HSE, confirmed in a letter to Jane Hutt AM that DSEAR would be relevant if the site becomes operational.
8. COMAH – requirements & failures	8. The Installation is not classed as a COMAH site.
9. Health Impact Assessment (HIA) – what is HIA & Wales Support Unit	9. To the extent that they are within the remit of EPR we have addressed potential impacts on human health within this Decision document, in particular in section 5.3.
10. Relevant Chemicals – carcinogenic emissions, wood pellet provenance, process explosion risk, start/stop operation, cross contamination.	10. These matters have been addressed within this Decision document, in particular at sections 4 and 6.

11. Health profile of Barry	11. AQ Assessment shows that pollutants are below threshold for health concerns
12. Deprivation and ill health in Barry	12. As Above
13. Air Pollution & Health	13. These issues are addressed within this decision Document, in particular at sections 5 and 6
14. Health effects of dioxins and PAHs	14. As Above, at 13
15. Health effects of incineration	15. As Above, at 13
16. Wellbeing impacts	16. This issue is addressed within this Decision document. In particular, at sections 3 and 7.6.
17. Incidents and pollution minimisation – FPP, CIRIA736, Docks involvement and Domino effect, limitations of emergency response.	17. Accidents and fire preventions are addressed within this Decision document, in particular at section 4. Other specific enquiries were addressed in correspondence between the HSE/SWFRS and Jane Hutt AM.
18. Noise Impact Assessment	18. Noise assessment and abatement is addressed within this Decision Document, in particular at section 6.7.5.
19. Site Drainage	19. These issues are addressed within this Decision Document, in particular at section 4 and 6.
20. Site Condition Report	20. These issues are addressed within this Decision Document, in particular at section 4.
21. Site procedures	21. These issues are addressed within this Decision Document, in particular at section 4.
22. Pre-acceptance of waste	22. These issues are addressed within this Decision Document, in particular at section 4.
23. Operator competence	23. These issues are addressed within this Decision Document, in particular at section 4.
24. Comparative plants	24. Comparative plants do not form part of our determination, we assess the application at hand but note the BAT assessment at section 6.
25. BAT Assessment	25. These issues are addressed within this Decision Document, in particular at section 6.
26. Air Quality Assessment: quality of report, policy context, start/stop emissions, failure to cover coastal effects, un-recognised receptors, stack height calculation, nanoparticles, PAHs, POPs, fuel, the Hull incinerator	26. Impacts on air quality are addressed within this Decision Document, in particular at sections 5.1, 5.2, 5.3, 5.4 and 6.

Response Received from Barry Town Council – August 2017 (commissioned from Capita Consulting)	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Air Quality	1. Impacts on air quality are addressed within this Decision Document, in particular at sections 5.1, 5.2, 5.3, 5.4 and 6.

2. Noise Impact 3. Fire Prevention Plan 4. Review of applicants Schedule 5	2. Noise assessment and abatement is addressed within this Decision Document, in particular at section 6.7.5. 3. Fire prevention issues are addressed within the Decision Document, in particular at section 4.3.11. 4. This is addressed within this Decision Document, in particular at sections 2 and 4.

Response Received from Friends of the Earth – received 11th September.	
Summary of issues raised:	**Summary of action taken / how this has been covered**
Response raised concerns surrounding Fire Risk & Prevention, Energy Efficiency/CHP-ready, process, noise impacts, plume/air quality and global warming potential. These concerns have been addressed in this section, and are explained in detail in this Decision Document.	

c) Representations from Individual Members of the Public

A total of 425 responses were received from members of the public prior to our 'minded to' public consultation. Many of the issues raised were the same as those considered above. In addition to the above-mentioned responses, we also received a petition and a bundle of drawings from local school children.

Response Received from members of the public	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Location	1. This is a planning concern and is outside of the remit of EPR. NRW's assessment of environmental impacts is detailed within this Decision Document, in particular in section 5.
2. Emissions to air	2. Impacts on air quality are addressed within this Decision Document, in particular at sections 5.1, 5.2, 5.3, 5.4 and 6.
3. Waste Framework Directive – fate of bottom and APC ash	3. These issues are addressed within this Decision Document, in particular at sections 4, 6 and 7.
4. Stack height calculations	4. To the extent that they fall within the remit of environmental permitting stack height and plant design are addressed within this Decision Document, in particular at section 5 and 6.
5. Transport and traffic	5. Issues connected with traffic movements are planning matters and are not within the remit of Environmental permitting.

6. Energy efficiency	6. This is addressed within this Decision Document, in particular at section 6.5 and 4.3.8.
7. Fire risk and Fire Prevention Plan	7. Fire prevention issues are addressed within the Decision Document, in particular at section 4.3.11.
8. Drainage strategy	8. This is addressed within this Decision Document, in particular in section 4 and 6.7
9. Origin and Traceability of wood	9. This is addressed within this Decision Document, in particular at section 4
10. Stand-by diesel plant emissions	10. Impacts on air quality are addressed within this Decision Document, in particular at sections 5.1, 5.2, 5.3, 5.4 and 6.
11. Emissions to surface water	11. These issues are addressed within this Decision Document, in particular in section 6.7 and 7.
12. Emissions to sewer	12. These issues are addressed within this Decision Document, in particular in section 6.7 and 7.
13. Impact on ecological sites	13. EIA issues are addressed within this Decision document, in particular in section 7.2. NRW's own assessment of potential environmental impacts is also described with this decision document, in particular in sections 5 and 6.
14. Local Development Plan	14. The Local Development Plan is a planning concern and is outside of the remit of EPR.
15. Evacuation plans	15. Evacuation plans for the public are outside of the remit of EPR.
16. Availability of emergency services	16. This is outside of the remit of EPR
17. Road infrastructure	17. This is outside of the remit of EPR
18. Efficient use of raw materials	18. This issue is addressed within this Decision Document, in particular in section 6.5.
19. Noise impact	19. Noise assessment and abatement is addressed within this Decision Document, in particular at section 6.7.5.
20. Technology proposed/BAT	20. This issue is addressed within this Decision Document, in particular at section 6.
21. Health, Wellbeing & Future Generations Act	21. This issue is addressed within this Decision document. In particular at sections 3, 5.3 and 7.6.
22. Flood risk	22. Flood risk is a planning issue and outside of the remit of EPR
23. Effect on property prices	23. This is outside of the remit of EPR.
24. Visual impacts	24. This is outside of the remit of EPR.
25. Impact on human health	25. These issues are addressed within this Decision Document, in particular at section 5.3.

26. Waste input & procedures	26. These issues are addressed within this Decision Document, in particular at section 4.
27. Consultation process issues/HPI	27. The consultation process is detailed within this Decision Document in particular in section 2.
28. Only electricity generation proposed, no use of waste heat	28. This issue is addressed within this Decision Document, in particular at sections 4.3.8 and 6.5.
29. COMAH, DSEAR & Domino effect	29. The site is not a COMAH site nor is it near other COMAH sites that qualify it as a domino site. DSEAR only applies once a facility is operational and this falls under the remit of the HSE. A letter from the head of the HSE to Jane Hutt AM confirms this.
30. Future impacts on the area in respect of investment etc.	30. This is outside of the remit of EPR. We consider the application to be consistent with the principles of sustainable management of natural resources.
31. Perceived planning failures	31. This is outside of the remit of EPR and must be addressed to the local planning authority.
32. Lack of EIA or HIA	32. These are outside of the remit of EPR. NRW's environmental assessments are detailed at section 5 of this decision Document.
33. Siting of electrical equipment	33. The site design has been proposed and accepted, the location of electrical grid connections is outside of the remit of EPR.
34. Who is the operator/role of operator?	34. The operator is Biomass No.2 UK Ltd.

2B) Advertising and Consultation on the Draft Decision

This section reports on the outcome of the public consultation on our draft decision carried out between the 27th November 2017 and 22nd January 2018.

In some cases, the issues raised in this phase of consultation were the same as those raised previously and already reported in section 2A of this Annex. Where this is the case, NRW's response has not been repeated and reference should be made to section 2A for an explanation of the concerns or issues.

Also, some of the consultation responses received were on matters which are outside the scope of NRW's powers under the EPR. NRW's position on these matters is as described previously.

a) Consultation Responses from Statutory and Non-Statutory Bodies

Further representations were received from Public Health Wales, who raised the following issues: -

Response Received from Public Health Wales – received 21st December 2017	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Clarification that there were no changes in the air quality assessment and modelling since the last correspondence in September. 2. In relation to non-threshold pollutants PHW sought reassurance that the applicant was committed to keeping emissions as low as possible. 3. Reassurance was sought in relation cumulative impacts in relation to aerial emissions, and that there had not been any changes since the last correspondence in September.	1. We confirmed that the air quality assessment was complete and there had been no changes since the last correspondence in September. 2. The applicant has committed to continuous monitoring in-line with the requirements if the Industrial emissions directive and the EPR. The Installation is in-line with BAT and NRW will monitor emissions to air. 3. We confirmed with PHW that there has been no changes to the cumulative impacts since the last correspondence in September.

Response Received from Vale of Glamorgan Council's Environmental and Regeneration Scrutiny Committee – received 19th January 2018	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Request independent air quality monitoring be carried out should a permit be issued 2. Request that a full accident and flood study of the site be undertaken	1. Air quality monitoring conditions have been included in the permit. The applicant will need to comply with those conditions. 2. This is a planning concern and outside of the scope of EPR.

Response Received from the Shared regulatory services (Environmental Protection department and joint council response) – received 19th January 2018	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Noise - Choice of whether "Typical" Measured Background Noise Levels are representative at Night Time (23:00-07:00hrs) 2. Noise - Assessment of Impacts – Context and proposed condition IC4. 3. Noise - Assessment of Impacts – Initial Assessment of Impact 4. Noise - Consideration of Low Frequency Noise. 5. Noise - Choice of penalty for determination of the Rating Level for BS4142: 2014. 6. Noise – Uncertainty. 7. Noise - Exclusion of one location from consideration for the permitting process 8. Air Quality – no issues to raise, VOG are satisfied with the air quality assessment.	1. – 7 Noise assessment and abatement is addressed within this Decision Document, in particular, at section 6.7.5. 8. None required.

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

Representations were received from Barry Town Council, Rt. Hon Alun Cairns MP, Jane Hutt AM, Neil McEvoy AM, Andrew RT Davies AM who raised the following issues: -

Response Received from Barry Town Council – received 28th November 2017	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Admin error noted in the draft permit, DIAG quoted as commissioning Capita when in fact it was Barry Town Council	1. This has been rectified.

Response Received from Jane Hutt AM - received 8th December 2017	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. NRW has yet to reply to the representations made by PHW in August 2017 2. Jane Hutt states that NRW have not corresponded with PHW since September and not passed over information or informed them of their 'minded to' decision 3. NRW is not attending a further public meeting 4. Request NRW attendance at an additional public meeting.	These issues have been answered through direct response to Jane Hutt AM. 1. NRW responded to PHW representations on the 28th September 2017. 2. NRW have corresponded with PHW and sent a letter to inform them of our 'minded to' decision. Further to this PHW sent a letter to NRW on the 21st December 2017 requesting clarification that there had been no changes since the last correspondence. NRW responded on the 2nd January 2018 confirming this. 3. And 4 – this has been communicated directly to both Jane Hutt AM and DIAG.

Response Received from Rt. Hon Alun Cairns MP – received 13th December 2017	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Requests NRW publish internal reports and assessments 2. Requested that NRW inform him how we have assessed the proposals. 3. Planning applications have been submitted by the applicant, it was requested that NRW put the permit decision on hold until the planning issues are resolved.	1. This has been dealt with by way of a Freedom of Information Request by DIAG. the information has been released to them. 2. This Decision Document explains our decision-making process in detail. 3. This was addressed in correspondence with Alun Cairns.

Response Received from Barry Town Council – received 18th December 2017	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. The council requested additional consultation time to review the documents. 2. Consultation – the council questioned whether NRW had met their statutory obligation with regards to public consultation. 3. The council highlighted a simple error within the draft decision document. There was reference to DIAG commissioning the Capita reports, when in fact it was BTC. 4. The council have spent money on consultation fees during the consultations, and requested that NRW reimburse them. 5. The council requested assurances of independent monitoring of emissions if a permit is granted.	1. This was addressed in correspondence with Barry Town Council. 2. As above and section 2 in particular of this Decision document. 3. This was a simple typo, and BTC highlighted this in previous correspondence, this has been corrected 4. This was addressed in correspondence. 5. Monitoring requirements are addressed within this Decision Document, in particular at section 6.9

Response Received from Andrew RT Davies AM – received 20th December 2017	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Request that NRW release documents to the public	1. The list of documents was identical to the list of documents requested by DIAG, the documents were released to DIAG on 11th January 2018

Response Received from Jane Hutt AM - received 21st December 2017	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Highly technical nature of application documents, Jane Hutt felt this was an obstacle to public consultation. 2. The impact of emissions on local communities and sensitive environmental receptors 3. The nature and scale of pollution prevention measures necessary to minimise the risk to the environment and human health	1. The consultation process is detailed in this Decision Document. 2. – 10 are all addressed within this Decision Document at the relevant sections.

4. The extent to which the Installation is consistent with the objective of promoting the achievement of the principles of sustainable management of natural resources and contributing to the achievement of the well-being goals. 5. Emissions to air 6. Cumulative effects 7. Sceptical of data presented 8. Fire Prevention Plan 9. Waste acceptance and storage 10. Noise impact 11. Light pollution 12. Traffic congestion and traffic emissions	11. & 12 are planning concerns and outside of the scope of EPR.
13. Health and wellbeing of children and elderly people	13. Issues relating to human health have been addressed within this Decision document, in particular at section 5.3.
14. Climate change issues	14. This is addressed within this Decision document, in particular at section 6.4.
15. Flooding and tidal surge 16. Location of the Installation	15. & 16 are planning concerns and outside of the scope of EPR
17. Best available techniques (BAT)	17. This issue is addressed within this Decision document, in particular at section 6
18. COMAH & Domino effect	18. The HSE has confirmed to Jane Hutt AM that the site does not fall under COMAH and is not a domino effect site.
19. Emissions to surface water and sewer	19. This issue is addressed within this Decision Document, in particular at section 6.7 and 7.
20. Additional planning issues 21. Environmental Impact Assessment (EIA) and Health Impact Assessment (HIA)	20. & 21 EIA issues are addressed within this Decision document, in particular at section 7.2. NRW's own assessment of potential environmental impacts are also described within this Decision Document, in particular in sections 5 and 6.
22. 1-17th hourly NO2 concentration	22. This has been addressed by correspondence sent to DIAG as part of an information request. The questions raised were answered.
23. Civil Protection plans	23. This is a planning concern and outside of the scope of EPR.
24. Well-being of future generations act	24. This issue is addressed within this Decision Document, in particular at sections 3 and 7.

Response Received from Neil McEvoy AM – received 5th January 2018	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Location	1. This is a planning concern and outside of the scope of EPR.

Response Received from Barry Town Council – received 22nd January 2018	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Air Quality Assessment 2. Noise Assessment 3. Fuel safety 4. Fire Safety 5. Consultation process 6. Failure to disclose information 7. Emissions of construction dust 8. v7 of the air quality assessment was not available for review	1. – 5 Are addressed above 6. All relevant information has been provided when requested. 7. This is a planning concern and outside of the scope of EPR 8. Monitoring reports are submitted to NRW as the regulator, the reports are public register so could be requested and viewed. These have also been released to DIAG on request.

c) Representations from Community and Other Organisations

Representations were received from Docks Incinerator Action Group (DIAG), who raised the following issues.

Response Received from DIAG	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Consultation process with the public 2. Schedule 5 information 3. Similar sites – financial difficulty that these sites are experiencing 4. Will NRW insist that the applicant attend a public meeting. 5. Why didn't NRW issue a summary statement of the application or a non-technical summary	1. & 2 are addressed above 3. This does not form part of our decision 4. NRW has no powers to instruct the applicant to attend a public meeting 5. The consultation process is detailed within this Decision Document, in particular at section 2

6. Release of met data relevant in making our decision	6. The data is not ours to release, we have a licence with the met office to use the data ourselves
7. Human Rights	7. We have considered the Human Rights Act 1998. Full details are included in Section 7 of this document.
8. NRW's involvement in the planning stages – as a consultee.	8. This determination relates to an EPR permit application. The planning process is not part of this process.
9. The well-being and future generations act and NRWs responsibilities under this act.	9. - 12 these are addressed above.
10. How NRW and PHW have collaborated throughout the determination of the permit.	
11. National indicators – emissions of greenhouse gases, levels of NO_2 in the air and proposed updated air quality standards,	
12. Local populace ability to influence the consultation.	
13. Increases in traffic on the roads.	13. This is a planning concern and outside of the scope of EPR.
14. Site Drainage	14. This is addressed within this decision Document, in particular at sections 6.7 and 7.
15. Flood Risk Assessment	15. This point is addressed above.
16. Water Framework Directive	16. This is addressed within this decision Document, in particular at sections 6.7 and 7.
17. Heavy metal in blowdown water	17. No heavy metals present, reference is to cooling towers, there are no cooling towers on-site.
18. Global Warming Potential and Carbon neutrality.	18. - 19 have previously been considered, how we have assessed these issues and addressed the concerns are listed in Section 2A of this document
19. Classification of waste wood (haz v non-haz).	
20. Storage and sampling of wood	20. This has been assessed by NRW and the applicant's assessment is satisfactory. Full details are included in this document.
21. Availability and location of laboratory that will test the wood.	21. This issue is addressed within this Decision document, in particular at section 4.3
22. Retention of documents and company secretary.	22. The permit application document states 6 years, this is the time which it will be kept for as the supporting document is listed in the operating techniques table in the permit, the named company secretary will be responsible for documentation as this is the legal role.
23. Who will delegate for the site manager as procedures state the site manager or delegate will sign the producer declaration form	23. Who is delegated by the site manager is up to the operator to decide.

24. Storage of wood on-site	24. It is listed in the permit that the operator can only store 2000m^3 of wood on-site, this equates to nearly 3.5 days' storage. This is a maximum that cannot be exceeded.
25. Qualification of on-site personnel	25. This is addressed within this Decision Document, in particular at section 4.3.3
26. Waste acceptance and rejection procedures	26. has previously been considered, how we have assessed these issues and addressed the concerns are listed in Section 2A of this document
27. Fire Preventions Plans – what is considered close to the plant, how does the applicant propose to telephone people to warn of fire, what steps are taken to ensure buildings are empty if a phone call can't be answered. How do we factor in the use of mobile phones? How will residents be informed of fire at night, is there sufficient staff on-site to handle phone calls, what about residents without phones, data protection act.	27. This level of public alerting is outside of the scope of EPR. This is not required under the guidance or the legislation.
28. The use of met office data to inform the air quality assessment, the data should also be passed to the public.	28. NRW has used the met office data, which was provided to NRW on licence. The data set is not the property of NRW
29. The use of the 18th NO_2 1-hour level and the exclusion of the 1-17th.	29. The 1-17th NO_2 1-hour levels have been provided to DIAG, use of the 18th figure is consistent with meeting the AQS limit.

Response Received via Welsh Government from Clarke Kiernan LLP Solicitors – 3rd, 21st, 26th November 2017	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Issues surrounding additional information and Schedule 5	1. Requests for further information are addressed within this Decision Document, in particular at section 2.3.
2. Environmental Impact Assessment (EIA) – requirements & failures	2. EIA issues are addressed within this Decision document, in particular at section 7.2. NRW's own assessment of potential environmental impacts is also described within this Decision Document, in particular in sections 5 and 6.
3. High Public Interest and how the application and consultation process was dealt with	3. The consultation process is detailed within the Decision Document, in particular at section 2
4. Perceived planning issues	4. This is a planning concern and outside of the scope of EPR.

5. Explosion risks/DSEAR/Fire Prevention plan 6. Flood risk 7. Energy Efficiency 8. COMAH, off-site effects and Domino Effect 9. Emissions to air	5. - 9 have previously been considered, how we have assessed these issues and addressed the concerns are listed in 2A of this document

d) Representations from Individual Members of the Public

A total of 77 responses were received from individual members of the public. These representations raised many of the same issues as previously addressed. As such they won't be repeated. Please see Section 2A of this document to see how we have addressed all the concerns raised.

Matters on which the public may comment which may be more relevant to an application for Planning Permission or other matters

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

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

The environmental impact is assessed as part of the determination process and has been reported upon in the main body of this document.

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

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.

2C) Advertising and Consultation on the Draft Decision – representations received after the official closing date

Response Received from DIAG – 22nd & 23rd January 2018	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Language used in the decision document and consultation process	1. The draft decision document details how we have made our 'minded to' decision. The 'minded to' consultation advertises our draft decision and invites new information to be submitted, therefore the language used is appropriate.
2. Receipt of the application and 'duly made' status'	2. This issue is addressed within this Decision Document, in particular at section 2.
3. Claims for commercial confidentiality – no paper trail	3. No information was withheld from the public register based on confidentiality. The applicant claimed confidentiality in their application, it was decided it wasn't confidential and that fact was communicated to the applicant, all correspondence/information has been made publicly available.

4. Consultation – not carried out in accordance with EPR/RGN6 or PPD	4. The consultation process is detailed within this Decision Document
5. Operator competence – links to the planning portal, showing planning enforcement action	5. Planning and permitting are separate regimes and as such this s not part of our determination.
6. EIA	6. EIA issues are addressed within this Decision document, in particular at section 7.2. NRW's own assessment of potential environmental impacts is also described within this Decision Document, in particular in sections 5 and 6.
7. Comments on foul water and surface water – link to planning document explaining surface water drainage?	7. This has been addressed previously, this is a planning concern and therefore outside the scope of EPR.
8. Off-site drainage, attenuation tank	8. This has been addressed previously and is addressed within this decision Document, in particular at section 6.7.
9. Details 'allegedly' missing or not detailed from the FPP	9. Fire prevention issues are addressed within the Decision Document, in particular at section 4.3.11.
10. Calculation on pile size with regards to the FPP	10. See above at point 9.
11. Calculations surrounding available fire water	11. See above at point 9.
12. Comments on discharges to sewer, ground water and surface water	12. See above at points 9 and 8.
13. Misleading information regarding fuel	13. This is addressed within this decision document, in particular at section 4
14. Differences in information in Biomass planning applications	14. Planning and permitting are different processes; the environmental permit lists the waste codes that can be accepted and used on site, this is enforceable.
15. Perceived consultation failures/HPI	15. The consultation process is detailed within this Decision Document
16. Consultation with statutory public bodies	16. See above at point 15
17. Availability of the public register.	17. We have addressed these issues in correspondence and remain confident that we have complied with all public consultation and public register requirements.
18. Comments on 'minded to' consultation and missing document	18. The consultation began on the 27th November not the 10th, the application documents were on the website before 5pm and the paper copies were in the public library and Barry town council the day the consultation began

19. Failure to disclose 'pivotal information' in October 2017, relating to the Schedule 5 response	19. This information was released to DIAG via Jane Hutt's office in October, before the 'minded to' consultation began.
20. Public responses	20. These issues are addressed within this Decision Document, in particular at section 2 and Annex 4.
21. Energy efficiency	21. This has been previously assessed, our response can be found in section 2A and detailed within this document
22. Emissions to air/air quality assessment and modelling	22. Impacts on air quality are addressed within this Decision Document, in particular at sections 5.1, 5.2, 5.3, 5.4 and 6.
23. How we have not applied the precautionary principle in our determination	23. We have detailed how we have determined this application within this Decision Document. We are confident that we have conducted the process correctly.
24. Biodiversity – have not considered aquatic life	24. This issue is addressed within this decision Document, in particular at sections 5.4 and 6.7.
25. No abnormal operation requested by the applicant.	25. The applicant has not applied for abnormal operation and have justified their reasons for this, we are satisfied with the response
26. Best Available technique (BAT) - stack height	26. BAT is addressed at section 6 of this Decision document.
27. Off-site drainage – CSO and storm surge	27. Off-site drainage and storm surge is outside of the scope of EPR and therefore not part of this determination. It is for Dŵr Cymru welsh water to decide whether they have the capacity to give a trade effluent discharge consent to Biomass..
28. BREF's from 2006 – is the most up-to-date information used	28. This addressed within this Decision Document, in particular at section 6.
29. BAT & Global warming	29. – 33 are addressed within this Decision Document, in particular at sections 6 and 7.This has been addressed previously, the applicant provided a BAT assessment, we are satisfied with the assessment, full details can be found in Section 6 of this document.
30. BAT & water usage	
31. WID & IPPC – stricter emission limits	
32. New information received relating to water emissions	
33. BAT for the Installation – general	
34. Combined Storm Overflows (CSO)	34. CSO's are outside of the scope of EPR.
35. Fugitive emissions	35. & 36 are addressed within this Decision document, in particular at section 4.3.11, 5 and 6
36. Parameters by which NRW measured pollution	
37. Site Condition Report	37. This is addressed within this Decision Document, in particular at section 4.2.
38. Waste wood accepted to site does not become hazardous through addition of other substances	38. This will be ensured through the applicant's waste acceptance procedures; these have been assessed and are acceptable. See in particular section 4.1.

39. How can it be established that no creosote and other hazardous chemicals are included?	39. As Above
40. Is reused boiler water separate to foul water release to the sewer	40. The water that is reused within the plant is part of a closed system and is separate to the water discharged via the sewer system.
41. NRW refer to 'cleaned flue gas', the representation stated that it gives the impression that there are no pollutants.	41. This is addressed within this Decision Document, in particular at section 6.
42. Have NRW checked with Dwr Cymru Welsh Water that they own the sewers	42. This has been addressed previously, there is a pre-operational condition in the permit that requires the applicant to provide proof of the trade effluent consent with Dŵr Cymru Welsh Water.
43. Representation questions the competence of the operator.	43. This has been addressed previously, we are satisfied with the operator competence.
44. Energy efficiency and the fact that the Installation is in the wrong location as there are no receptors for waste heat	44. This has been addressed previously, location of the site is outside the remit of EPR. Energy efficiency is addressed in particular by sections 4.3.8 and 6.5 of this Decision Document.
45. Efficient use of raw materials – water	45. See section 6.5 of this Decision Document.
46. Disposal of effluent via the sewer system, issues with the CSO	46. CSO's are outside of the scope of EPR. The maintenance of CSO's are the responsibility of Dŵr Cymru Welsh Water.
47. Description of wood to be accepted and waste codes	47. This has been assessed, the codes of waste that can be accepted are listed in the permit. Waste acceptance procedures have been assessed and we are satisfied. This is regularly audited by NRW.
48. Independent monitoring of emission from the Installation	48. Monitoring is addressed within this Decision Document, in particular section 6.9.
49. Issues with improvement conditions in the draft permit	49. The Improvement conditions in the permit are listed at Annex 3 of this Decision Document and explained in relevant section of the document.
50. Inadequacies of pre-operational conditions, mainly attenuation tanks, emissions to sewer, CSO's	50. The pre-operational conditions are listed in Annex 2 of this Decision Document and explained in the relevant section of the document. Emissions to water are addressed within this Decision Document, in particular at section 6.7. The applicant will require a trade effluent consent from Dŵr Cymru Welsh Water, finally CSO's are outside of the scope of EPR.

51. Emissions of pollutants to air	51. Impacts on air quality are addressed within this Decision Document, in particular at sections 5.1, 5.2, 5.3, 5.4 and 6.
52. Risks to human health	52. This has been addressed within this Decision Document, in particular at section 5.3

Responses Received from Friends of the Earth	
Summary of issues raised:	**Summary of action taken / how this has been covered**
1. Previous correspondence on the 11 September was ignored	1. As previously communicated, the information was not ignored and was considered as part of the determination.
2. Public register incomplete and not widely available.	2. This was addressed in correspondence and in section 2 this Decision Document.
3. Flood consequence	3. This has been addressed previously, Flood risk is a planning issue and therefore outside of the scope of EPR
4. Off-site risks of Fire/explosion/accidents	4. This has been addressed previously. Fire prevention issues are addressed within the Decision Document, in particular at section 4.3.11. Section 6 details the BAT assessment of the Installation.
5. Consultation failure through presentation as 'gasification' and 'similar to natural gas'	5. This point is not accepted by NRW
6. Failure to supply cost benefit analysis	6. This has been addressed previously, and is addressed within this Decision Document, in particular at section 4.3.8 in relation to energy efficiency.
7. Energy efficiency	7. See above at point 6
8. Power purchase agreement	8. This is outside of the scope of EPR and therefore not considered in our determination.
9. No credible operator.	9. This has been addressed previously, and is addressed within this Decision Document, in particular at sections 2.1 and 4.3
10. Optimising combustion, minimising NO2	10. This has been addressed previously, and is addressed within this Decision Document, in particular at section 6
11. Emission limits not stringent and not well enforced	11. This is addressed within this Decision Document, in particular at section 6.2 and 6.7
12. Health Impacts of Air Pollution not assessed under current legislation and guidance	12. This has been addressed previously, and is addressed in particular at section 5 and 7 of this Decision Document

13. Assessing peak hourly NO_2 levels	13. The plant has not applied for abnormal operation and this is not permitted. Peak NO_2 has been addressed in correspondence, it is also addressed within this Decision Document, in particular at sections 5 and 6
14. Stack Height Assessment	14. This is addressed within this Decision Document, in particular at section 5
15. Noise Concerns	15. Noise assessment and abatement is addressed within this Decision Document, in particular at section 6.7.5.
16. Air Emissions	16. This has been addressed previously, and is addressed within this Decision Document, in particular at section 5

In addition to the above listed representations, we received a number of further representations from members of the public, no new information was submitted in these representations, how we have assessed the application and taken the comments in to account are detailed above.