

Environment Agency Permitting Decisions

Variation

We have decided to issue the variation for Templeborough Biomass Energy Development operated by Brite Partnership (North East) Limited.

The variation number is EPR/GP3433WS/V002

We consider in reaching that decision we have taken into account all relevant considerations and legal requirements and that the permit will ensure that the appropriate level of environmental protection is provided.

Purpose of this document

This decision document:

- explains how the application has been determined
- provides a record of the decision-making process
- shows how all relevant factors have been taken into account
- justifies the specific conditions in the permit other than those in our generic permit template.

Unless the decision document specifies otherwise we have accepted the applicant's proposals.

Structure of this document

- Key Issues
- Annex 1 – the decision checklist
- Annex 2 – the consultation and web publicising responses

Key issues of the decision

1. Application overview

The original permit (EPR/QP3932KK) was issued to Brite Partnership on 27 June 2011 to operate a co-incinerator facility consisting of a Solid Biomass CHP Plant and a Liquid Biomass CHP Plant. The combined electrical output was 31 MWe, of which 29 MWe was proposed to be exported to the National Grid. The original permit also included the operation of a Wood Drying and Pelletising Plant producing 200,000 tonnes of wood pellets from de-barked forest wood, composted wood and saw-mill co-products.

The original permit (EPR/QP3932KK) was transferred to Brite Partnership (North East) Limited on 18 July 2014 (EPR/GP3433WS).

This variation authorises the amendment of various parts of the original permit application as follows:

- replacement of the Solid Biomass CHP Plant (75 MW) with a combined heat and power-ready (CHP-R) Solid Biomass Plant (125 MW);
- removal of the Liquid Biomass CHP Plant; and
- removal of the Wood Drying and Pelletising Plant

The facility is an installation, whose main purpose is the generation of energy using waste as fuel in a waste co-incineration plant. The relevant listed activity is Section 5.1 A(1)(b): *The incineration of non-hazardous waste in a waste co-incineration plant with a capacity exceeding 3 tonnes per hour*. The permit implements the requirements of the EU Directive on Industrial Emissions (IED). The main features of the Installation are as follows:

The Templeborough Biomass Energy Development consists of a biomass-fuelled electricity generating station located within the Firth Rixson site on Sheffield Road, Templeborough, near Rotherham. The Installation is located in a predominantly industrial area, the nearest residential properties are approximately 600 metres to the north, with Rotherham Town Centre approximately 1.5 km to the east.

The following operations are included within the scope of this variation:

- combustion of fuel in a combined heat and power-ready (CHP-R) Plant
- reception, transfer and storage of waste wood;
- steam turbine operation and the generation / export of electrical energy;
- cooling and condensing of exhaust steam in water cooled towers;
- storage and handling of process residues (ash) from biomass fuel streams

2. The Installation

The Operator proposes to burn waste wood in a moving grate co-incineration Plant. The facility consists of a Solid Biomass Plant which will burn recycled waste wood to produce steam. In total, the Plant is designed to burn up to 270,000 tonnes of waste per annum, with a maximum of 320,000 tonnes,

depending on the operating hours and the calorific value of the waste. The steam produced will be used to generate about 44.1 MWe. The majority of the electricity generated (about 40.1 MWe) will be exported to the National Grid with the remainder used to power the Plant.

The Solid Biomass Plant comprises the following principal components:

- Waste wood reception, storage and handling;
- Moving grate combustion plant;
- Steam boiler and associated turbine generator;
- Pollution abatement system for particulates, acid gases and oxides of nitrogen;
- Chimney; and
- Residue handling and storage

Each section of the process is fully instrumented and is controlled by a local control panel, overseen by a central process control unit situated in the control room.

The site is divided into four main areas:

- Area for the reception, storage and handling of biomass (internal);
- Main building housing the combustion facility and its ancillary energy recovery and power generation equipment;
- Flue gas filtration plant (external); and
- Cooling tower (external).

The boiler is equipped with start-up and support burners fuelled by light fuel oil and are used to generate the temperatures in the system prior to the introduction of the waste fuel. The burners will be used to maintain the furnace conditions which may fluctuate according to variations in the calorific content of the waste fuel.

The heat generated from the combustion is used to produce superheated steam. The steam produced will be supplied to the steam turbine and used to generate electricity. The exhaust steam from the turbine is condensed in water-cooled condensers.

The flue gas is cleaned using a number of technologies:-

- i. Selective Non-catalytic Reduction (SNCR) for nitrogen oxide reduction – the SNCR system involves the injection of an aqueous ammonia solution into the furnace. The ammonia reacts with nitrogen oxide and reduces it to nitrogen and water.
- ii. Dry adsorbent injection, for acid gas removal – levels of sulphur dioxide, hydrogen chloride and hydrogen fluoride are reduced by the injection of hydrated lime into the flue gas upstream of the bag filter. The hydrated lime is contained in a storage silo prior to use in the injection system.
- iii. Activated carbon injection for removal of heavy metals – the activated carbon is injected to control emissions of gaseous heavy metals, dioxins and furans.

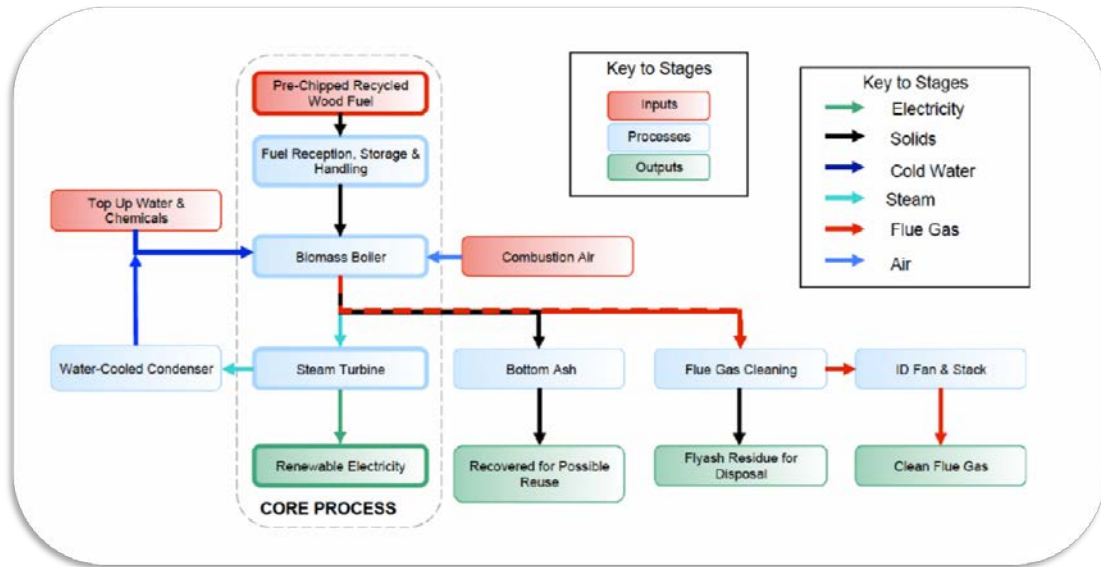
- iv. Fabric filters, for particulate removal – a multi-compartment, pulse jet cleaned bag filter system is used for particulate removal.

Two types of ash will be generated, one from the combustion process as bottom ash, the other as fly ash – mainly collected from the flue gas bag filters. These ashes will be collected for disposal or recycling, the bottom ash will be collected in skips, the fly ash is collected in a dedicated silo prior to being taken offsite.

There will be no process discharges to controlled waters. Uncontaminated site surface water run-off arising from rain will be directed to the River Don after passing through oil interceptors. All process effluent including blowdown liquids from the boiler and cooling tower are discharged as trade effluent to Yorkshire Water’s Blackburn Meadows Sewage Treatment Works.

Process Flow Diagram

The process is illustrated in the following simplified flow diagram:



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

Waste throughput/ mass feed rate	270,000 tonnes / annum (typical design) 320,000 tonnes / annum (maximum throughput)	32.92 tonnes/hour
Waste processed	Waste wood	
Furnace technology	Moving Grate	
Number of lines	1	
Typical operating hours	8,200 hours/annum	
Calorific value of waste	13.67 MJ/kg	
Incinerator Bottom Ash (IBA) produced	Approximately 10,500 tpa	
Air Pollution Control Residues (APCR) produced	Approximately 5,500 tpa	
Metals recovered	No estimate given	
Auxiliary Fuel	Gas oil	

Acid gas abatement	Semi-dry	Slaked lime
NO _x abatement	SNCR	Ammonia
Reagent consumption	Auxiliary Fuel: 600 m ³ /annum Ammonia: ~660 tonnes/annum Lime: ~2,100 tonnes/annum Activated carbon: ~120 tonnes/annum Potable water: ~70,000 m ³ /annum Non-potable water: ~715,000 m ³ /annum	
Flue gas recirculation	Yes	
Dioxin abatement	Activated carbon	
Stack	Height, 60 m	Diameter, 2.38 m
Flue gas	Flow, 65.56 Nm ³ /s	Velocity, 17 m/s
Electricity generated	44.1 MWe	361,620 MWh
Electricity exported	40.1 MWe	328,000 MWh
Heat exported	0 MWth	0 MWth
Heat conditions	501.4 °C	83 bar
Waste heat use	None proposed	

3. Operating techniques

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

Operating techniques		
Description	Parts	Date Received
Variation Application EPR/GP3433WS/V002	Supporting Information dated 11 August 2014.	18/08/14
Additional information	Response to Schedule 5 notice dated 19/09/14 (questions 3 and 6 detailing plant annual throughput, operating hours and nitrogen dioxide abatement).	25/09/14
Additional information	Confirmation of feedstock and annual throughput for co-incinerator. Confirmation of discharge to sewer of all boiler and cooling towers blow down.	06/11/14
Additional information	Clarification of aspects of the design aspects of the co-incinerator.	18/11/14
Additional information	Revised site plan.	01/12/14
Response to pre-operational condition PO2	Waste acceptance procedures agreed and approved in writing by the Environment Agency.	Date of approval

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

4. Energy efficiency

4.1 Consideration of energy efficiency

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

Our draft CHP Ready Guidance (Dec 2012) 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, the Environment Agency 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. This is the case with this variation application. The Operator reports that the Solid Biomass Plant incorporates all the relevant extraction points should heat demand applications become available in the future, therefore it is considered to be CHP-Ready.

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

This Installation will generate electricity only and has been specified to maximise electrical output with little or no use of waste heat. The Application states that about 44.1 MWe of electricity will be produced for an annual burn of 270,000 tonnes, which represents 16.3 MW per 100,000 tonnes/yr of waste burned (1.3 MWh/tonne of waste). The Installation exceeds the indicative BAT range.

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

The location of the Installation largely determines the extent to which waste heat can be utilised, and this is a matter for the planning authority. The Applicant carried out a feasibility study, which showed there was potential to

provide district heating to local businesses; suitable opportunities are being explored, though there are no firm commitments at this stage. There is provision within the design of the steam turbine to extract low-grade steam for a district heating scheme. Establishing a district heating network to supply local users would involve significant technical, financial and planning challenges such that this is not seen as a practicable proposition at present.

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

We consider that, within the constraints of the location of the Installation explained above, the Installation will recover heat as far as practicable, and therefore the requirements of Article 6(6) are met.

4.2 Choice of Cooling System

The chosen cooling system for the Installation is via an evaporative cooling tower. The Operator states that this cooling system has been chosen because of its higher vacuum capabilities compared to an air-cooled system, the associated increase in the efficiency of the steam turbine and the reduced footprint size (an important consideration as space is restricted on site). The energy consumption of air cooled condenser cooling systems may be twice that of an evaporative cooling tower, with associated increases in CO₂ emissions.

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

5. Assessment of Impact on Air Quality

The Operator's assessment of the impact of air quality is set out in the supporting information document of the Application. The assessment comprises:

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

This section of the decision document deals primarily with the dispersion modelling of emissions to air from the co-incinerator chimney and its impact on local air quality. The impact on conservation sites is considered in section 5.2.

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

the potential effects on local air quality from the Installation's stack emissions using the ADMS version 5 dispersion model, which is a commonly used computer model for regulatory dispersion modelling. The model used 5 years of meteorological data collected from the weather station at Robin Hood Airport near Doncaster between 2006 and 2010. This is the nearest weather station to the Installation. The impact of the terrain surrounding the site upon plume dispersion was considered in the dispersion modelling.

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

- First, they assumed that the ELVs in the Permit would be the maximum permitted by Article 46(2) of the IED. These substances are:
 - Oxides of nitrogen (NO_x), expressed as NO₂
 - Total dust
 - Carbon monoxide (CO)
 - Sulphur dioxide (SO₂)
 - 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)
 - Gaseous and vaporous organic substances, expressed as Volatile Organic Compounds (VOCs)
- Second, they assumed that the Installation operates continuously at the relevant long-term or short-term emission limit values, i.e. the maximum permitted emission rates under the IED.

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

The Operator has assessed data on background concentrations of pollutants from Background Air Pollution Maps published by Defra.

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

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

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

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

5.1 Assessment of Air Dispersion Modelling Outputs

The Operator's modelling Process Contribution (PC) predictions are summarised in the tables below. The figures shown indicate the predicted peak ground level exposure to pollutants in ambient air. Whilst we have used the Operator's modelling predictions in the tables below, we have made our own simple verification calculation of the percentage process contribution and predicted environmental concentration. Where a PC is indicated as being less than the relevant insignificance threshold, no further analysis of PEC has been carried out.

Predicted Long Term Impacts

Pollutant	EQS / EAL	Back-ground	Process Contribution (PC)		Predicted Environmental Concentration (PEC)	
	$\mu\text{g}/\text{m}^3$		$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	% of EAL	$\mu\text{g}/\text{m}^3$
NO ₂	40	24.3	2.2	5.50	26.5	66.3
PM ₁₀	40	--	0.1	0.25	--	--
PM _{2.5}	25	--	0.1	0.40	--	--
HCl	750	--	3.7	0.49	--	--
HF	16	--	0.02	0.13	--	--
VOCs	5	1.26	0.2	4.00	1.46	29.2
PCBs	0.2	--	1.51×10^{-10}	0.00	--	--
Dioxins		8.5×10^{-09}	1.26×10^{-09}		9.76×10^{-09}	
Cd	0.005	0.00032	5.38×10^{-04}	10.8	8.6×10^{-04}	17.2
Tl		0	5.38×10^{-04}		5.38×10^{-04}	
Hg	0.25	--	5.38×10^{-04}	0.22	--	--
Sb	5	--	5.38×10^{-03}	0.11	--	--
Pb	0.25	--	5.92×10^{-04}	0.24	--	--
Co		0	5.92×10^{-04}		5.9×10^{-04}	
Cu	10	--	5.38×10^{-03}	0.05	--	--
Mn	0.15	--	5.38×10^{-04}	0.36	--	--
V	5	--	5.38×10^{-03}	0.11	--	--
As	0.003	--	7.53×10^{-06}	0.25	--	--
Cr (II)(III)	5	--	5.38×10^{-03}	0.11	--	--
Cr (VI)	0.0002	--	3.77×10^{-07}	0.19	--	--
Ni	0.02	0.01444	0.0002	1.19	0.01468	73.4

Predicted Short Term Impacts

Pollutant	EQS / EAL	Back-ground	Process Contribution (PC)		Predicted Environmental Concentration (PEC)	
	$\mu\text{g}/\text{m}^3$		$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	% of EAL	$\mu\text{g}/\text{m}^3$
NO ₂	200	--	18	9.0	--	--
PM ₁₀	50	--	0.4	0.80	--	--
SO ₂	266	--	16	6.0	--	--
SO ₂	350	--	13	3.71	--	--
SO ₂	125	--	6	4.8	--	--
HCl	750	--	3.7	0.49	--	--
HF	160	--	0.4	0.25	--	--
CO	10000	--	15.0	0.15	--	--
PCBs	6	--	1.85×10^{-03}	0.03	--	--
Hg	7.5	--	6.28×10^{-03}	0.08	--	--
Sb	150	--	0.185	0.12	--	--
Cu	200	--	0.185	0.09	--	--
Mn	1500	--	0.185	0.01	--	--
V	1	0.0167	0.185	18.50	0.20	20.17
As	0.003	--	7.53×10^{-06}	0.25	--	--
Cr (II)(III)	150	--	0.185	0.12	--	--

(i) Screening out emissions which are insignificant

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

- PM₁₀, PM_{2.5}, Carbon monoxide, Hydrogen chloride, Hydrogen fluoride, Mercury, Antimony, PCBs, Chromium, Lead, Manganese, Arsenic and Copper

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

(ii) Emissions unlikely to give rise to significant pollution

Also from the tables above the following emissions (which were not screened out as insignificant) have been assessed as being unlikely to give rise to significant pollution in that the predicted environmental concentration is less

than 100% (taking expected modelling uncertainties into account) of both the long term and short term EQS/EAL

- Nitrogen oxides, VOCs, Cadmium, Vanadium and Nickel

For these emissions, we have carefully scrutinised the Operator's proposals to ensure that they are applying the BAT to prevent and minimise emissions of these substances. Improvement Condition IC4 requires that an environmental impact assessment of the pollutants above is carried out by the Operator when monitoring in the first year of operation to produce actual site-specific results. Even so, from the tables above, the emissions are not expected to result in the EAL being exceeded.

Thallium and Cobalt do not have an EAL. As shown below, the process contribution of these metals is similar to that of the other metals and we consider the emissions of these metals to be not significant.

Pollutant	EQS / EAL	Background Conc	PC
Cobalt	None	None available	0.000592
Thallium	None	None available	0.000538

(iii) Emissions requiring further assessment

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

5.2 Impact on Habitats sites, SSSIs, non-statutory conservation sites

5.2.1 Sites Considered

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

There is only one Site of Special Scientific Interest located within 2 km of the Installation. This is *Bradgate Brickworks* SSSI, which is designated for its geological significance, and so will not be affected by emissions from the Installation.

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

- Blackburn Meadows Nature Reserve
- Centenary Riverside Nature Reserve

5.2.2 Assessment of Non-Statutory Sites

The Operator's assessment of non-statutory sites was reviewed by the Environment Agency's technical specialists for modelling, air quality, conservation and ecology technical services, who agreed with the assessment's conclusions, that the proposal will not damage the special features of the non-statutory sites.

As there are no specific regulations for the protection of these sites (*beyond our requirements to enhance biodiversity under the Natural Environment and Rural Communities Act 2006 and our wider conservation duties under the Environment Act*), we are required to ensure that the permitting of the Installation will not result in significant pollution.

The Operator has assessed the dispersion of important pollutants against critical level criteria for the protection of vegetation and ecosystems which is summarised in the following table. The values shown represent the worst for any of the receptors for each pollutant.

Pollutant	EQS / EAL ($\mu\text{g}/\text{m}^3$)	PC ($\mu\text{g}/\text{m}^3$)[1]	PC as % of EQS / EAL
SO ₂	20 (LT)	1.4	7.0
NO _x	75 (ST)	12.2	16.2
	30 (LT)	1.8	6.0
HF	5 (ST)	0.094	1.88
	0.5 (LT)	0.047	9.4
NH ₃	3 (LT)	0.14	4.6

Note 1 – PC is given as the worst case of results for all non-statutory sites

The Operator has assessed the critical loads for nitrogen and acid deposition against critical load criteria for sites as obtained from the UK Air Pollution Information System (APIS) which is summarised in the following table. The values shown represent the worst for any of the receptors for each parameter.

Pollutant	Critical load (most severe criterion used to exemplify receptors)	PC	PC as % of CL
Nitrogen deposition	20 kg N/ha/yr	0.99 kg N/ha/yr	4.95
Acid deposition	4.00 keq/ha/yr	0.26 keq/ha/yr	6.5

In accordance with Environment Agency guidance, we consider that given the size of the PC which is a small fraction of the critical level/load, the impact on the sites is not likely to cause significant pollution. As modelling and assessment has demonstrated that the predicted ground level environmental concentrations of pollutants in the area even at a maximum will not compromise any Air Quality Objectives then we are satisfied that the operation of the co-incinerator will not compromise the integrity of the above sites.

5.3 Human health risk assessment

5.3.1 Assessment of Intake of Dioxins and Furans

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

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

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

Receptor	Maximum concentration (pg/ kg-BW/day)
Resident (Adult)	0.017
Resident (Child)	0.013
Calculated maximum daily intake of dioxins by local receptors resulting from the operation of the proposed facility (I-TEQ/ kg-BW/day).	

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

5.4 Impact of abnormal operations

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

For incineration plant, IED sets backstop limits for particulates, CO and TOC which must continue to be met at all times. The CO and TOC limits are the same as for normal operation, and are intended to ensure that good combustion conditions are maintained. The backstop limit for particulates is 150 mg/m³ (as a half hourly average) which is five times the limit in normal operation.

Article 45(1)(f) requires that the permit shall specify the maximum permissible period of any technically unavoidable stoppages, disturbances, or failures of the purification devices or the measurement devices, during which the

concentrations in the discharges into the air may exceed the prescribed emission limit values. In this case we have decided to set the time limit at 4 hours, which is the maximum period prescribed by Article 46(6).

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

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

Pollutant	EQS / EAL	Back-ground	Process Contribution (PC)	Predicted Environmental Concentration (PEC)		
	$\mu\text{g}/\text{m}^3$		$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	% of EAL	$\mu\text{g}/\text{m}^3$
NO ₂	200	48.6	55	27.5	103.6	51.8
PM ₁₀	50	35.8	6	12.00	41.8	83.6
SO ₂	266	7.61	144	54.1	151.61	57.0
SO ₂	350	7.61	195	55.71	202.61	57.9
HCl	750	0	39.47	5.26	--	--
HF	160	2.35	36	22.5	38.35	24.0
Hg	7.5	--	0.0942	1.26	--	--
Sb	150	--	0.105	0.07	--	--
Cu	200	--	0.047	0.02	--	--
Mn	1500	--	0.267	0.02	--	--
Cr (II)(III)	150	--	0.034	0.02	--	--
Dioxins		--	1.81×10^{-07}		1.81×10^{-07}	

From the table above the emissions of the following substances can still be considered insignificant, in that the process contribution (PC) is still <10% of the short-term EQS/EAL for HCl, Hg, Sb, Cu, Mn, Cr and dioxins.

Also from the table above, emissions of NO₂, PM₁₀, SO₂ and HF which were not screened out as insignificant have been assessed as being unlikely to give rise to significant pollution in that the predicted environmental concentration (PEC) is less than 100% of short term EQS/EAL.

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

We have not assessed the impact of abnormal operations against long term EQSs for the reasons set out above. If dioxin emissions were at 10 ng/m³ for the maximum period of abnormal operation, 60 hours per year for every year for the duration of the co-incinerator operation, there would be an increase in the TDI reported in section 5.3.1. We consider that this represents the worst case situation and is in practice a highly unlikely scenario. In these circumstances the TDI would be (for a human lifespan of 70 years with appropriate proportions as a child and adult) 0.014 pg (I-TEQ)/ kg-bw/day for a resident and would still not pose a risk to human health.

5.5 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 (CO₂) 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, CO₂ is clearly a pollutant for IED purposes.

The principal greenhouse gas emitted is CO₂, however wood is considered to be a renewable fuel and its CO₂ emissions from combustion attract a GWP of zero in accordance with our guidance document H1 annex H. The plant also emits small amounts of N₂O arising from the operation of secondary NOx abatement. N₂O has a global warming potential 310 times that of CO₂. The Operator will therefore be required to optimise the performance of the secondary NOx abatement system to ensure its GWP impact is minimised.

There will also be CO₂ 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.

Taking this into account, the net emissions of CO₂ from the Installation are estimated at minus 123,215 tonnes per annum (i.e. there is a net reduction of CO₂ in the atmosphere as the result of the operation of this co-incineration plant). At this level, emissions can be characterised as insignificant. The Operator has considered GWP as part of its BAT options appraisal.

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

On the debit side

- CO₂ emissions from the burning of the wood (however wood is considered to be a renewable fuel and with a GWP of zero in accordance with our guidance document H1 annex H);

- CO₂ emissions from burning auxiliary or supplementary fuels;
- CO₂ emissions associated with electrical energy used;
- N₂O from the de-NO_x process.

On the credit side

- CO₂ saved from the export of electricity to the public supply by displacement of burning of virgin fuels.

Ammonia has no direct GWP effect.

The Operator's assessment shows that the GWP of the plant is dominated by the emissions of nitrous oxide that are released as a result of the selected NO_x abatement technique. However this emission is insignificant in relation to the saving of carbon dioxide emissions by the burning of wood, a renewable fuel with a GWP of zero. The Environment Agency agrees with this assessment and that the chosen option is BAT for the Installation.

5.6 Other emissions

5.6.1 Emissions to water

Emissions to water will comprise only clean uncontaminated surface water, which will be discharged to the River Don after passing through oil interceptors. As such emissions to water are considered environmentally insignificant.

It is not considered necessary to set any emission limits with regard to surface water discharges. We are satisfied that the Operator's proposals for spill prevention are BAT for the Installation.

5.6.2 Emissions to sewer

Emissions to sewer will comprise boiler blow down and cooling tower blow down, along with any domestic effluent from meeting the sanitary needs of the workforce. The effluent will be discharged to Blackburn Meadows Sewage Treatment Works, which is operated by the Sewerage Undertaker (Yorkshire Water). The Operator reports that discussions with Yorkshire Water have taken place and the Sewage Treatment Works is capable of handling discharges from the Installation. As such emissions to sewer are considered environmentally insignificant.

As the discharges would be controlled by a Trade Effluent Consent, there is no need for us to set limits as releases are capable of being treated by the Sewage Treatment Works, which in turn has limits set to protect the environment. The Operator will be required to report on the quantity of water discharged to sewer.

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

5.6.3 Noise and vibration

The Application contained a noise impact assessment which identified local noise-sensitive receptors (NSRs), potential sources of noise at the proposed plant and noise attenuation measures. Measurements were taken of the

prevailing ambient noise levels to produce a baseline noise survey and an assessment was carried out in accordance with BS4142 to compare the predicted plant rating noise levels with the established background levels.

The assessment concluded that during daytime and night time periods, the operation of the plant at the predicted noise levels would be unlikely to cause complaints at any of the assessment locations as the change in noise impact at the sensitive receptors was assessed as being below marginal significance in line with BS4142.

An Improvement Condition (IC7) is included in the Permit which requires the Operator to verify that the plant, once fully operational, meets the design conditions of 80 dB, measured 1 metre outside the biomass building. This will ensure that any impact can be identified and rectified at the earliest opportunity.

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

Annex 1: decision checklist

This document should be read in conjunction with the Duly Making checklist, the application and supporting information and permit/notice.

Aspect considered	Justification / Detail	Criteria met
		Yes
Consultation		
Scope of consultation	The consultation requirements were identified and implemented. The decision was taken in accordance with RGN 6 High Profile Sites, our Public Participation Statement and our Working Together Agreements.	✓
Responses to consultation and web publicising	The web publicising and consultation responses (Annex 2) were taken into account in the decision. The decision was taken in accordance with our guidance.	✓
Operator		
Control of the facility	We are satisfied that the applicant (now the operator) is the person who will have control over the operation of the facility after the grant of the permit. The decision was taken in accordance with EPR RGN 1 Understanding the meaning of operator.	✓
European Directives		
Applicable Directives	All applicable European Directives have been considered in the determination of the application.	✓
The site		
Extent of the site of the facility	The operator has provided a plan which we consider is satisfactory, showing the extent of the site of the facility. A plan is included in the permit and the operator is required to carry on the permitted activities within the site boundary.	✓
Biodiversity, Heritage, Landscape and Nature Conservation	The application is within the relevant distance criteria of a site of heritage, landscape or nature conservation, and/or protected species or habitat. A full assessment of the application and its potential to affect the sites have been carried out as part of the permitting process. We consider that the application will not affect the features of the sites. We have not formally consulted on the application. The decision was taken in accordance with our guidance.	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
Environmental Risk Assessment and operating techniques		
EIA	In determining the application we have considered the Environmental Statement. We have also considered the planning permission and the committee report approving it.	✓
Environmental risk	We have reviewed the operator's assessment of the environmental risk from the facility. The operator's risk assessment is satisfactory. The assessment shows that, applying the conservative criteria in our guidance on Environmental Risk Assessment [or similar methodology supplied by the operator and reviewed by ourselves], all emissions may be categorised as environmentally insignificant.	✓
Operating techniques	We have reviewed the techniques used by the operator and compared these with <i>EPR 5.01 – Incineration of Waste</i> (See Key Issues). The proposed techniques are in line with the benchmark levels contained in the TGN and we consider them to represent appropriate techniques for the facility.	✓
The permit conditions		
Updating permit conditions during consolidation	We have updated previous permit conditions to those in the new generic permit template as part of permit consolidation. The new conditions have the same meaning as those in the previous permit. The operator has agreed that the new conditions are acceptable.	✓
Waste types	We are satisfied that the operator can accept permitted wastes because they have the necessary infrastructure, operating systems and technical capability to manage these wastes in an appropriate manner.	✓
Pre-operational conditions	We have amended Table S1.4 in the permit to reflect the removal of the Liquid Biomass CHP Plant. The remaining pre-operational conditions are retained.	✓
Improvement conditions	We have amended Table S1.3 in the permit to reflect the removal of the Liquid Biomass CHP Plant. The remaining improvement conditions are retained.	✓
Incorporating	We have specified that the applicant must operate the	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
the application	permit in accordance with descriptions in the application, including all additional information received as part of the determination process. These descriptions are specified in the Operating Techniques table in the permit.	
Emission limits	We have not amended the emission limits in the permit.	✓
Monitoring	We have not amended the monitoring requirements in the permit.	✓
Reporting	We have not amended the reporting requirements in the permit.	✓
Operator Competence		
Environment Management System	There is no known reason to consider that the operator will not have the management systems to enable it to comply with the permit conditions. The decision was taken in accordance with RGN 5 on Operator Competence.	✓
Relevant Convictions	The National 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.	✓
Financial provision	There is no known reason to consider that the operator will not be financially able to comply with the permit conditions. The decision was taken in accordance with RGN 5 on Operator Competence. The financial provision arrangements satisfy the financial provisions criteria.	✓

Annex 2: Consultation, web publicising and newspaper advertising responses

Summary of responses to consultation and web publication and the way in which we have taken these into account in the determination process. We did not carry out newspaper advertising on this Application. Newspaper advertising is only carried out for certain application types, in line with our guidance. The Application was advertised on the Environment Agency website from 21 August to 19 September 2014. Copies of the Application were placed on the Environment Agency Public Register at Lateral, 8 City Walk, Leeds, LS11 9AT.

1) Consultation Responses from Statutory and Non-Statutory Bodies

Response Received from Health and Safety Executive dated 27/08/14	
Brief summary of issues raised:	Summary of action taken / how this has been covered
No comments made	No further action

Response Received from Rotherham Metropolitan Borough Council (Planning) dated 01/09/14	
Brief summary of issues raised:	Summary of action taken / how this has been covered
No comments made	No further action

Response Received from Public Health England dated 03/10/14	
Brief summary of issues raised:	Summary of action taken / how this has been covered
No comments made	No further action

No responses received from	Yorkshire Water National Grid Health & Safety Executive Food Standards Agency Rotherham Metropolitan Borough Council (Environmental Health Department) South Yorkshire Fire & Rescue Service Director of Public Health (Rotherham)
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2) Consultation Responses from Members of the Public and Community Organisations

No consultation responses were received.