

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

Decision document recording our decision-making process

The Permit Number is: EPR/WP3730EP/A001
The Applicant / Operator is: Broadcrown Limited
The Installation is located at: Portway Road, Wednesbury,
West Midlands, WS10 7DZ

What this document is about

This is a decision document, which accompanies a permit.

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

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

Preliminary information and use of terms

We gave the application the reference number EPR/WP3730EP/A001. We refer to the application as "the **Application**" in this document in order to be consistent.

The number we have given to the permit is EPR/WP3730EP. We refer to the permit as "the **Permit**" in this document.

The Application was duly made on 03/01/14.

The Applicant is Broadcrown Limited. We refer to Broadcrown Limited as “the **Applicant**” in this document. Where we are talking about what would happen after the Permit is granted we call Broadcrown Limited “the **Operator**”.

Broadcrown Limited’s facility is located at Portway Raod, Wednesbury, West Midlands, WS10 7DZ. We refer to this as “the **Installation**” in this document.

How this document is structured

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Glossary of acronyms used in this document

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

APC	Air Pollution Control
BAT	Best Available Technique(s)
BAT-AEL	BAT Associated Emission Level
BREF	BAT Reference Note
CEM	Continuous emissions monitor
CHP	Combined heat and power
CROW	Countryside and rights of way Act 2000
CV	Calorific value
DAA	Directly associated activity – Additional activities necessary to be carried out to allow the principal activity to be carried out
DD	Decision document
EAL	Environmental assessment level
EIAD	Environmental Impact Assessment Directive (85/337/EEC)
ELV	Emission limit value
EMAS	EU Eco Management and Audit Scheme
EMS	Environmental Management System
EPR	Environmental Permitting (England and Wales) Regulations 2010 (SI 2010 No. 675) as amended
EQS	Environmental quality standard
EU-EQS	European Union Environmental Quality Standard
EWC	European waste catalogue
HRA	Human Rights Act 1998
IED	Industrial Emissions Directive (2010/75/EU)
IPPCD	Integrated Pollution Prevention and Control Directive (2008/1/EC) – now superseded by IED
LCV	Lower calorific value – also termed net calorific value
NOx	Oxides of nitrogen (NO plus NO ₂ expressed as NO ₂)
Opra	Operator Performance Risk Appraisal
PC	Process Contribution
PEC	Predicted Environmental Concentration
PPS	Public participation statement
PR	Public register

RDF	Refuse derived fuel
RGS	Regulatory Guidance Series
SAC	Special Area of Conservation
SCR	Selective catalytic reduction
SGN	Sector guidance note
SNCR	Selective non-catalytic reduction
SPA(s)	Special Protection Area(s)
SSSI(s)	Site(s) of Special Scientific Interest
SWMA	Specified waste management activity
TGN	Technical guidance note
TOC	Total Organic Carbon
UN_ECE	United Nations Environmental Commission for Europe
WFD	Waste Framework Directive (2008/98/EC)

1 Our decision

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

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

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

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

2 How we reached our decision

2.1 Receipt of Application

The Application was duly made on 03/01/14. 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 claimed that certain information was commercially confidential and should be withheld from the public register. The Applicant claimed that their BAT assessment and energy balance information was confidential. We considered this request and determined that: the information was not confidential. Apart from the issues and information just described, we have not received any information in relation to the Application that appears to be confidential in relation to any party.

2.2 Consultation on the Application

We carried out consultation on the Application in accordance with the EPR, and our statutory PPS. We consider that this process satisfies, and frequently goes beyond the requirements of the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in

Environmental Matters, which are directly incorporated into the IED, which applies to the Installation and the Application. We have also taken into account our obligations under the Local Democracy, Economic Development and Construction Act 2009 (particularly Section 23). This requires us, where we consider it appropriate, to take such steps as we consider appropriate to secure the involvement of representatives of interested persons in the exercise of our functions, by providing them with information, consulting them or involving them in any other way. In this case, our consultation already satisfies the Act's requirements.

We advertised the Application by a notice placed on our website, which contained all the information required by the IED, including telling people where and when they could see a copy of the Application.

We made the Application and all other documents relevant to our determination (see below) available to view on our Public Register at Sentinel House, 9 Wellington Crescent, Fradley Park, Lichfield, WS13 8RR and also sent a copy to Sandwell Metropolitan Borough Council for its own Public Register. Anyone wishing to see these documents could do so and arrange for copies to be made.

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

- Sandwell Metropolitan Borough Council;
- Public Health England;
- Director of Public Health;
- Food Standards Agency;
- Local Fire Service;
- Health and Safety Executive
- Severn Trent Water

These are bodies whose expertise, democratic accountability and/or local knowledge make it appropriate for us to seek their views directly. Note under our Working Together Agreement with Natural England, we only inform Natural England of the results of our assessment of the impact of the installation on designated Habitats sites.

Further details along with a summary of consultation comments and our response to the representations we received can be found in Annex 3. We have taken all relevant representations into consideration in reaching our decision.

2.3 Requests for Further Information

Although we were able to consider the Application duly made, we did in fact need more information in order to determine it, and issued a request for information on 27/01/14 and an information notice on 10/02/14. A copy of the request and information notice were placed on our public register and sent to

Sandwell Metropolitan Borough Council for inclusion on its register, as were the responses when received.

3 The legal framework

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

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

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

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

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

4 The Installation

4.1 Description of the Installation and related issues

4.1.1 The permitted activities

The Installation is subject to the EPR because it carries out an activity listed in Part 1 of Schedule 1 to the EPR. The Installation will gasify waste to produce a syngas which will be subsequently combusted in gas engines to produce electricity. The Applicant plans to clean the syngas to ensure that when burned it will not cause emissions higher than natural gas. Article 42(1) of IED excludes such plant from the requirements of chapter IV of IED. Therefore we consider that the most appropriate activity is:

- Section 1.2 Part A(1)(ja) – gasification of carbonaceous material.

An installation may also comprise “directly associated activities”, which at this Installation includes the pre-treatment of the waste, purification of syngas and the generation of electricity using gas engines.

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

4.1.2 The Site

The Installation will be located at Spreadeagle Works, Wednesbury. It is bordered on all sides by commercial properties. The nearest residential properties are ~100m to the north, with commercial properties in between. The Installation will be located on a minor aquifer but not within a source protection zone. The River Tame is the closest watercourse at ~750m from the proposed Installation.

Fens Pool (SAC) is ~9km away. There is a Local Nature Reserve and several local wildlife sites within 2km.

The Installation is located in an AQMA that has been designated for NO₂.

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

Further information on the site is addressed below at 4.3.

4.1.3 What the Installation does

Received wastes (RDF/SRF to CEN/ISO 15359) will be stored in a reception hall. The hall will be kept under negative pressure with air being drawn through combustion units. The waste will be shredded, dried and cubed to prepare the material for the gasification process.

The waste will then fed into the gasifier which will be a bubbling fluidised bed system that will operate at 740-900°C. The bed material will be kaolinite based fired clay. The fluidising agent will be a mixture of oxygen and steam. A cyclone will remove 80-90% of entrained particulate matter from the syngas with the remainder removed in later clean up stages.

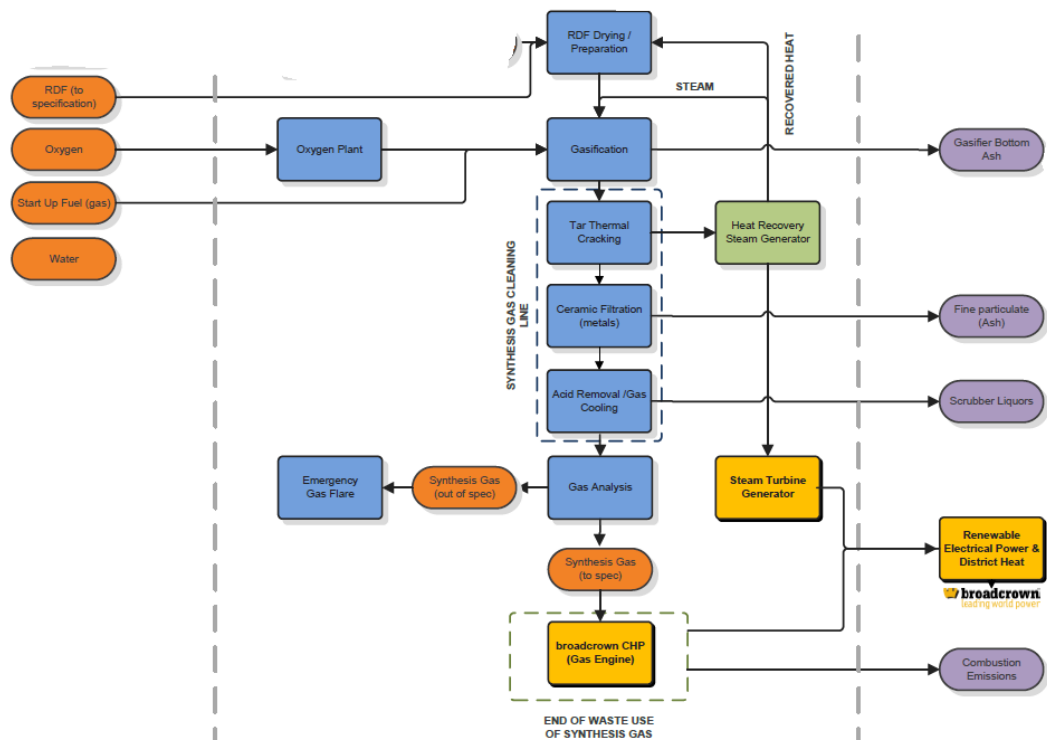
The syngas will also contain tars which will be reformed in a thermal cracking stage. The syngas will be heated to 1050-1200°C through injection of oxygen. Tars will be cracked and thermally destroyed. The syngas will then be cooled with energy recovery and steam generation to feed back into the gasifier. After cooling to ~160°C, activated carbon and sodium bicarbonate will be injected before passing through a ceramic filtration plant. The syngas will then be quenched and scrubbed to remove any acid and ammonia and then finally pass through an activated carbon column to remove remaining hydrogen sulphide.

The syngas will then be burned in lean burn gas engines to generate electricity. Emissions will be abated using a SCR abatement system with urea reagent. Waste heat from the gas engine exhausts will also be used to

generate electricity using an Organic Rankine Cycle plant. Any additional heat will be available for export if users become available.

If the syngas does not meet the required specification the waste feed will be stopped and syngas flared.

Effluent from the syngas cleaning wet scrubber will be treated with a vibratory shear membrane filtration plant before discharge to sewer.



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

Waste throughput, Tonnes	30,000 tonnes /annum	4.1 tonnes /hour
Waste processed	Received waste to SRF standard CEN/TS 15359	
Technology	Gasification	
Auxiliary Fuel	Natural Gas	
Syngas cleanup	Cyclone, thermal cracker, carbon injection, filtration, scrubbing, condensation, carbon	

	filter	
NOx abatement on gas engines	SCR	Urea
Combustion units	Two 1.7MWe and one 1MWe	
Stacks (3)	Height 3 x 27.5 m	Diameter 2 x 0.45m 1 x 0.35m
Flue gas	Flow 2 stacks at 3.7Nm ³ /s, 1 stack at 2.2 Nm ³ /s	Velocity 3 stacks at 22.6 m/s
Electricity generated	3.3MWe	24,090
Electricity exported	~3.3MWe	24,090
Waste heat use	Drying waste feed and steam input to gasifier	

4.1.4 Key Issues in the Determination

The key issues arising during this determination were the assessment of emissions to air, comparison of the syngas with natural gas and monitoring requirements for the syngas. We therefore describe how we determined these issues in most detail in this document.

4.2 The site and its protection

4.2.1 Site setting, layout and history

The Installation will be located at Spreading Works, Wednesbury. It is bordered on all sides by commercial properties. The nearest residential properties are ~100m to the north, with commercial properties in between. The Installation will be located on a minor aquifer but not within a source protection zone. The River Tame is the closest watercourse at ~750m from the Installation.

Fens Pool (SAC) is ~9km away. There is a Local Nature Reserve and several local wildlife sites within 2km.

The Installation is located in an AQMA that has been designated for NO₂.

4.2.2 Proposed site design: potentially polluting substances and prevention measures

The following prevention measures are proposed:

- All tanks will have secondary containment and will comply with the requirements of pollution prevention guidance note 2;
- Level gauges;
- Oil interceptors will be used on surface water drains;
- There are no drains within the process building so any spillages will be dealt with by the sealed drainage system;
- Pollution prevention measures will be inspected and maintained;
- Process water will be treated and re-used.

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

The Applicant has submitted a site condition report which includes a description report on the baseline conditions as required by Article 22. This did not include a quantitative assessment of baseline conditions. We have therefore set a pre-operational condition (PO2) requiring the Operator to provide this information prior to the commencement of operations.

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

4.2.3 Closure and decommissioning

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

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

4.3 Operation of the Installation – general issues

4.3.1 Administrative issues

The Applicant is the sole Operator of the Installation.

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

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

We have adjusted the Applicant's submitted Opra profile from 153 to 151.

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

4.3.2 Management

The Applicant has stated in the Application that they will implement an Environmental Management System (EMS) that will be certified under ISO14001. A pre-operational condition (PO1) is included requiring the Operator to provide a summary of the EMS prior to commissioning of the plant and to make available for inspection all EMS documentation. The Environment Agency recognises that certification of the EMS cannot take place until the Installation is operational. An improvement condition (IC1) is

included requiring the Operator to report progress towards gaining accreditation of its EMS.

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

4.3.3 Site security

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

4.3.4 Accident management

The Applicant has submitted an Accident Management Plan. An Accident Management Plan will form part of the Environmental Management System and must be in place prior to commissioning as required by a pre-operational condition (PO1).

4.3.5 Off-site conditions

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

4.3.6 Operating techniques

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

Description	Parts Included	Justification
The Application	Application document volume 1 sections 3.2.1, 3.2.2, 3.3, 3.4, 3.5, 3.6.1, 4.1, 4.2, 4.3, 4.6.1, 4.6.2. Not duly made response to questions 13, 14 and 17	These sections contain key operating techniques
Additional information received on 04/02/014	Response to question 5 and the revised odour management plan	
Schedule 5 response received on 17/02/14	Response to question 2	

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

We have specified the permitted waste types, descriptions and where appropriate quantities which can be accepted at the installation in Table S2.2. Only one waste type will be received which will be combustible waste from waste management facilities: 19 12 10. All waste will be to CEN/ISO 15359.

We are satisfied that the Applicant can accept this waste contained in Table S2.2 of the Permit because it will be well suited to the gasification process.

We have limited the capacity of the Installation to 30,000 tonnes per annum. This is based on the installation operating 7300 hours per year at a nominal capacity of 4.1 tonnes per hour. We consider this annual capacity is consistent with the design, scale and nature of waste materials to be processed at the facility.

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

4.3.7 Energy efficiency

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

- i. The use of energy within, and generated by, the Installation which are normal aspects of all EPR permit determinations. This issue is dealt with in this section.
- ii. Whether energy is generated efficiently from the activity.
- iii. The process efficiency and energy utilisation of different design options for the Installation are relevant considerations in the determination of BAT for the Installation, including the Global Warming Potential of the different options. This aspect is covered in the BAT assessment in section 6 of this Decision Document.

(i) Use of energy within the Installation

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

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

- Electrical motors and fans will have variable speed drives;
- Monitoring of equipment using SCADA system;
- Waste heat used where possible;
- Insulation and lagging used on heated tanks and pipelines;
- High efficiency motors;
- Effective maintenance.
- Energy usage of 548MWh which equates to 18 kwh/tonne of waste gasified

(ii) Efficient generation of energy

Our CHP Ready Guidance considers that BAT for energy efficiency for combustion 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.

Although this Installation is not an incineration or co-incineration plant, the incineration BREF provides a useful benchmark for efficiency of electricity generated from waste. The BREF says that where a plant generates electricity only, it is BAT to recover 0.4 – 0.65 MWh/ tonne of waste (based on LCV of 10.4 MJ/kg). Our technical guidance note, SGN EPR S5.01, states that where electricity only is generated, 5-9 MW of electricity should be recoverable per 100,000 tonnes/annum of waste (which equates to 0.4 – 0.72 MWh/tonne of waste).

The Installation will generate electricity and also use waste heat within the process The Application shows that 3.3 MW of electricity will be generated from 30,000 tonnes of waste treated which represents 11MW per 100,000 of

waste. The Installation will therefore be highly efficient if compared to the incineration BREF.

Waste heat will be used for drying waste prior to gasification and also for steam input to the gasifier. Provision has been made for export of waste heat if a user is identified.

(iii) Permit conditions concerning energy efficiency

Pre-operational condition PO7 requires the Operator to carry out a comprehensive review of the available heat recovery options prior to commissioning, in order to ensure that waste heat from the plant is recovered as far as possible.

Condition 1.2.2 has also been included in the Permit, which require the Operator to review the options available for heat recovery on an ongoing basis.

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: total electrical energy generated and exported and energy generated, used and exported (if any) as heat. Together with the total waste treated, this will enable the Environment Agency to monitor energy recovery efficiency at the Installation and take action if at any stage the energy recovery efficiency is less than proposed.

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

4.3.8 Efficient use of raw materials

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

The Operator is required to report with respect to raw material usage under condition 4.2 and Schedule 4, of urea used per tonne of waste gasified. This will enable the Environment Agency to assess whether there have been any changes in the efficiency of the operation of the SCR to abate NO_x. This is most significant raw materials that will be used at the Installation, other than the waste feed itself (addressed elsewhere). The use of auxiliary fuel will also be reportable under condition 4.2.1. Optimising reagent dosage for syngas clean-up and air abatement systems and minimising the use of auxiliary fuels is further considered in the section on BAT.

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

This requirement addresses wastes produced at the Installation and does not apply to the waste being treated there. The principal waste streams the Installation will produce are gasification char, fly ash, scrubber wastes, activated carbon, maintenance oils and waste water treatment wastes.

The Applicant plans to send the gasification char for recovery. Fly ash caught by the ceramic filters will be disposed off. Before the wastes are sent off site the Operator will need to assess the hazard classifications.

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

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

5. Minimising the Installation's environmental impact

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

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

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

5.1 Assessment Methodology

5.1.1 Application of Environment Agency H1 Guidance

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

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

The H1 methodology uses a concept of “process contribution (PC)”, which is the estimated concentration of emitted substances after dispersion into the receiving environmental media at the point where the magnitude of the concentration is greatest. The guidance provides a simple method of calculating PC primarily for screening purposes and for estimating process contributions where environmental consequences are relatively low. It is based on using dispersion factors. These factors assume worst case dispersion conditions with no allowance made for thermal or momentum plume rise and so the process contributions calculated are likely to be an overestimate of the actual maximum concentrations. More accurate calculation of process contributions can be achieved by mathematical dispersion models, which take into account relevant parameters of the release and surrounding conditions, including local meteorology – these techniques are expensive but normally lead to a lower prediction of PC.

5.1.2 Use of Air Dispersion Modelling

Air dispersion modelling enables the process contribution to be predicted at any environmental receptor that might be impacted by the plant.

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

Where an EU EQS exists, the relevant standard is the EU EQS. Where an EU EQS does not exist, our guidance sets out a National EQS (also referred to as Environmental Assessment Level - EAL) which has been derived to provide a similar level of protection to Human Health and the Environment as the EU EQS levels. In a very small number of cases, e.g. for emissions of Lead, the National EQS is more stringent than the EU EQS. In such cases, we use the National EQS standard for our assessment.

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

PCs are considered **Insignificant** if:

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

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

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

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

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

Where an emission is screened out in this way, we would normally consider 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 exceedences of the relevant EQS are likely. This is done through detailed audit and review of the Applicant's air dispersion modelling taking background concentrations and modelling uncertainties into account. Where an exceedence of an EU EQS is identified, we may require the Applicant to go beyond what would normally be considered BAT for the Installation or refuse the application if the applicant is unable to provide suitable alternative proposals. Whether or not exceedences are considered likely, the application is subject to the requirement to operate in accordance with BAT.

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

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

5.2 Assessment of Impact on Air Quality

The Applicant's assessment of the impact of air quality is set out in Annex C of the Application. The assessment comprises:

- Dispersion modelling of emissions to air from the operation of gas engines.

- 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 and the impact on local air quality. The impact on conservation sites is considered in section 5.4.

The Applicant has assessed the Installation's potential emissions to air against the relevant air quality standards, and the potential impact upon local conservation and habitat sites and human health. These assessments predict the potential effects on local air quality from the Installation's stack emissions using the AERMOD 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 Coleshill from 2006 to 2010. The weather station is 20km east of the proposed Installation and the Applicant stated that it is the most representative data available.

The air impact assessments considered emissions of oxides of nitrogen, ammonia, carbon monoxide, VOCs, particulates and sulphur dioxide. Emission concentrations used in the model were based on expected emissions. They are summarised below.

Substance	Emission concentration (mg/m ³)
NO ₂	25
SO ₂	50
Particulate matter	10
VOCs	10
CO	50

The Applicant has reviewed air quality monitoring data in order to establish background air quality.

The Applicant has modelled the concentration of key pollutants at a number of specified locations within the surrounding area.

The way in which the Applicant used dispersion models, its selection of input data, use of background data and the assumptions it made have been reviewed by the Environment Agency's modelling specialists to establish the robustness of the Applicant's air impact assessment.

Our review of the Applicant's assessment leads us to agree with the Applicant's conclusions.

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

5.2.1 Assessment of Air Dispersion Modelling Outputs

The Applicant's modelling predictions are summarised in the tables below. The figures shown indicate the predicted peak ground level exposure to pollutants in ambient air. Whilst we have used the Applicant's modelling predictions in the table below, we have made our own simple verification calculation of the percentage process contribution and predicted environmental concentration. These are the numbers shown in the tables below and so may be very slightly different to those shown in the Application. Any such minor discrepancies do not materially impact on our conclusions.

Pollutant	EQS / EAL		Back-ground	Process Contribution (PC)		Predicted Environmental Concentration (PEC)	
	$\mu\text{g}/\text{m}^3$			$\mu\text{g}/\text{m}^3$	% of EAL	$\mu\text{g}/\text{m}^3$	% of EAL
NO ₂	40	1	35	0.24	0.60	35.2	88.1
	200	2	70	0.89	0.4	70.89	35.4
PM ₁₀	40	1	19.5	0.14	0.35	19.6	49.1
	50	3	23	0.38	0.76	23.38	46.8
PM _{2.5}	25	1	13.5	0.14	0.56	13.64	54.6
SO ₂	266	4	5.6	7.1	2.7	12.7	4.8
	350	5	4.2	4.8	1.37	9	2.6
	125	6	2.5	3	2.4	5.5	4.4
CO	10000	8	174	4.3	0.04	178	1.8
	30000.0	7	348.0	5.8	0.0	353.8	1.2
VOCS (as benzene)	5	1	0.48	0.14	2.80	0.620	12.40

- 1 Annual Mean
- 2 99.79th %ile of 1-hour means
- 3 90.41st %ile of 24-hour means
- 4 99.9th ile of 15-min means
- 5 99.73rd %ile of 1-hour means
- 6 99.18th %ile of 24-hour means
- 7 1-hour average
- 8 Maximum daily running 8-hour mean

(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 EQS/EAL. These are:

- NO₂, PM₁₀, PM_{2.5}, SO₂ and CO.

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

(ii) Emissions unlikely to give rise to significant pollution

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

- VOCs

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

(iii) Emissions requiring further assessment

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

We have also carefully considered whether additional measures are required above what would normally be considered BAT in order to prevent significant pollution. Consideration of additional measures to address the pollution risk from these substances is set out in section 5.2.4.

5.2.2 Consideration of key pollutants

(i) Nitrogen dioxide (NO₂)

The impact on air quality from NO₂ emissions has been assessed against the EU EQS of 40 µg/m³ as a long term annual average and a short term hourly average of 200 µg/m³. The model assumes a 70% NO_x to NO₂ conversion for the long term and 35% for the short term assessment in line with Environment Agency guidance on the use of air dispersion modelling.

The above tables show that the peak long term PC is less than 1% of the EU EQS and the peak short term PC is less than 10% of the EU EQS and so can be screened out as insignificant. Therefore we consider the Applicant's proposals for preventing and minimising the emissions of these substances to be BAT for the Installation. The Applicant's modelling was based on an emission of 25mg/m³.

(ii) Particulate matter PM₁₀ and PM_{2.5}

The impact on air quality from particulate emissions has been assessed against the EQS for PM₁₀ (particles of 10 microns and smaller) and PM_{2.5} (particles of 2.5 microns and smaller). For PM₁₀, the EUEQS are a long term annual average of 40 µg/m³ and a short term daily average of 50 µg/m³. For PM_{2.5} the EUEQS of 25 µg/m³ as a long-term annual average (to be achieved by 2010 as a Target Value and by 2015 as a Limit Value) has been used.

The Applicant's predicted impact of the emissions from Installation against these EQSs is shown in the tables above. The assessment assumes that **all** particulate emissions are present as PM₁₀ for the PM₁₀ assessment and that **all** particulate emissions are present as PM_{2.5} for the PM_{2.5} assessment.

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

- It assumes all particulates emitted are below either 10 microns (PM₁₀) or 2.5 microns (PM_{2.5}), when some are expected to be larger.

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

The above assessment shows that the predicted process contribution for emissions of PM₁₀ is below 1% of the long term EQS and below 10% of the short term EQS 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 above assessment also shows that the predicted process contribution for emissions of PM_{2.5} is also below 1% of the Environmental Quality Objective. Therefore the Environment Agency concludes that particulate emissions from the installation, including emissions of PM₁₀ 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 PM₁₀ or PM_{2.5} fraction. In the light of current knowledge and available data however the Environment Agency is satisfied that the health of the public would not be put at risk by such emissions.

(iii) Acid gases (SO₂)

There is no long term EAL for SO₂ for the protection of human health. Protection of ecological receptors from SO₂, for which there is a long term EAL, is considered in section 5.4.

Emissions of SO₂ can also be screened out as insignificant in that the short term process contribution is also <10% of each of the three short term

EUEQS values. Therefore we consider the Applicant's proposals for preventing and minimising the emissions of SO₂ to be BAT for the Installation.

(iv) Emissions to Air of CO, VOCs

The above tables show that for CO, the peak long term PC is less than 1% of the EAL/EQS and the peak short term PC is less than 10% of the EAL/EQS and so can be screened out as insignificant. Although VOCs were not insignificant this is based on the assumption that all VOCs are benzene which is highly unlikely to occur in practice. In reality emissions of VOCs are likely to be insignificant. Therefore we consider the Applicant's proposals for preventing and minimising the emissions of these substances to be BAT for the Installation.

5.2.3 Consideration of Local Factors

The impact on local receptors was considered in the air quality assessment. The above assessment is based on the maximum off-site concentrations and so represents the worst case.

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

Sandwell Metropolitan Borough Council has declared an Air Quality Management Areas (AQMAs) with respect to nitrogen dioxide. The Installation is located within the AQMA.

From the Applicants model, the process contribution at all points within each of the AQMAs is predicted to be well below 1% of the EUEQS and can therefore be considered insignificant.

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

5.3 Human health risk assessment

5.3.1 Our role in preventing harm to human health

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

5.3.2 Assessment of Health Effects from the Installation

We have assessed the health effects from the operation of this installation. 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.

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 made a health risk assessment. These air quality standards have been developed primarily in order to protect human health.

The Environment Agency is therefore satisfied that the Applicant's conclusions presented above are soundly based and we conclude that the potential emissions of pollutants are unlikely to have an impact upon human health.

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

5.4.1 Sites Considered

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

- Fens Pools (SAC)

There are no Sites of Special Scientific Interest within 2Km of the proposed Installation.

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

- Moorcroft Wood
- Bayley's Lane Pool
- Hydes Road Pool
- Bradley Locks
- Ward's Pool
- Shaw Street
- Bayley's Pool, Ocker Hill
- Basin Sidings
- Snow Hill to Wolverhampton Railway
- Moorcroft Wood
- Heathfield Lane West Pond
- Rocket Pool
- Princes End disused railway
- Walsall Canal

- Great Bridge Road
- Great Bridge Canal Basins
- Ocker Hill Balancing Pool

5.4.2 Habitats Assessment

There is one European habitat site within 10km of the Installation , Fens Pool ~9km away.

Emissions to air will be from the gas engines. The gas engines will have combined thermal input of <20MW and as such, using screening criteria agreed with Natural England, sites more than 0.5km from the Installation can be screened out from further assessment.

The Installation is not considered '*relevant*' for assessment under the Agency's procedures which cover the Conservation (Natural Habitats &c.) Regulations 1994 (Habitats Regulations). This was determined by referring to the Agency's guidance 'AQTAG014: Guidance on identifying '*relevance*' for assessment under the Habitats Regulations for installations with combustion processes.' There are no other emissions from the installation, thus no detailed assessment of the effect of the releases from the installation on SACs, SPAs and Ramsar sites is required.

5.4.3 Assessment of Non-Statutory Sites

The Applicant carried out an assessment of impacts at 11 local wildlife sites within 2km of the Installation. Process contributions are well below significance for critical levels and critical loads.

Although the Applicant did not model at all of the sites 17 sites within 2km of the Installation, we are satisfied that impacts will not be significant at any of these sites.

6. Application of Best Available Techniques

6.1 Scope of Consideration

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

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

- We consider the options for the syngas clean up system and consider the end of waste status of the syngas;
- We consider in particular control measures for the combustion emissions from the gas engines;
- We also consider the energy efficiency 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.

6.1.1 Consideration of thermal treatment option

The prime function of the gasifier is thermal treatment of the waste to produce syngas. The Applicant carried out a BAT assessment of their method of thermally treating the waste.

The Applicant's assessment is summarised as follows:

- High energy efficiency with low parasitic load;
- High energy generation efficiency of 27.5%;
- Waste generation is minimised. Gasification char is expected to be 1,600 tonnes per year with 100 tonnes per year of fly ash;
- Limited footprint that fits into existing industrial area;
- Less flue gas cleaning than mass burn incineration and steam cycle gasification;
- Potential for dioxin formation removed;
- Technique is suited for treatment of the proposed RDF waste stream;
- Reduced water use compared to mass burn incineration.
- Capital cost per unit of energy generated is less than conventional systems.

The Applicant has proposed to use a thermal treatment involving gasification using a bubbling fluidised bed gasifier with subsequent combustion of syngas in gas engines to generate electricity.

Based on the information supplied by the Applicant we are satisfied that the chosen thermal treatment option is BAT.

6.2 Syngas Clean-up and end of waste

The purpose of the syngas clean-up is to produce a gas that will when burned have emissions no higher than natural gas. The Applicant's proposed clean up system consists of the following measures:

- Cyclone to remove particulate matter;
- Thermal cracking to remove tars;

- Ceramic filtration with sodium bicarbonate and activated carbon addition , and metallic oxide injection for removal of metals and acid gases;
- Condensation to remove water vapour, water soluble compounds and some light oils;
- Alkaline scrubbing for further removal of hydrogen sulphide;
- Reheating to 55°C (to avoid condensation);
- Activated carbon filtration to remove trace hydrogen sulphide and other trace contaminants.

The Applicant provided a BAT justification as follows:

- Thermal tar cracker is described as having 99% efficiency for tar removal. It is preferred over quenching/condensation or plasma. Quenching/condensation poor availability and track record. Plasma has the same cracking mechanism but has lower energy efficiency.
- Use of carbon to remove metals is described as >99.9% efficient and is described as a recognised BAT approach;
- Filtration for particulate removal (99% efficient) is described as a recognised BAT approach;
- Alkaline scrubber for hydrogen sulphide removal is described as a recognised BAT approach and is most economically favourable;

The Applicant provided a specification of their syngas and compared it to natural gas. The specification is shown below.

	SynGas	Natural Gas specification
Total Sulphur	<50mg/m ³	50 mg/m ³
Hydrogen Sulphide (H ₂ S)	See below	5 mg/m ³
Total Halogenated Hydrocarbons	<1.5mg/m ³	1.5 mg/m ³
Xylenes (all isomers)	<100mg/m ³	100 mg/m ³
All heavy metals	<0.1mg/m ³ (below limit of detection)	<Limit of detection

The specification for natural gas was based on National Grid standards and also on the Environment Agency biomethane quality protocol. The quality protocol identifies when biomethane is no longer a waste and is suitable for injection into the gas grid, or for use as a fuel in suitably designed appliances.

The table shows that levels of xylenes, metals, total halogenated hydrocarbons, and total sulphur are no higher than in natural gas. The Applicant did not commit to meeting the H₂S level of 1.5 mg/m³. The Applicant stated that meeting the total sulphur specification of 50 mg/m³ will be sufficient to ensure that burning the syngas will not cause emissions higher than natural gas, in that SO₂ emissions will be controlled by the total sulphur limit. We agreed with this.

The Applicant has supplied sufficient information to show that the syngas will be capable of being classed as a non waste. Based on the above

specification we are satisfied that the syngas would be no more polluting than natural gas when burned. If it turns out that the syngas is more polluting than natural gas, the plant will not be able to operate under this permit due to condition 2.3.6.

Based on the information supplied in the Application, we are satisfied that the clean up system is likely to be capable of cleaning up the syngas to the desired level. Pre-operational condition PO4 requires the Operator to submit a commissioning plan to include a proposal for syngas monitoring during commissioning. IC4 then requires a report on the syngas monitoring carried out during operation of the Installation.

We have set monitoring requirements to ensure that syngas is monitored against this specification. This is covered in section 6.7 of this decision document.

The Applicant stated that the flare will only be used during start-up and shut down. Out of specification syngas will be burned in a flare to protect gas engines. Condition 2.3.6 will prevent waste feed to the gasifier if the syngas is found to be out of specification. This condition will also prevent waste feed if the flare is operating because operation of the flare will be indicative of syngas being out of specification. A brief description of start-up and shut-down was provided. PO6 requires detailed procedures to be submitted for approval.

6.3 BAT and emissions control

The prime function of syngas gas treatment is to produce a syngas that when burned is no more polluting than natural gas.

6.3.1 Particulate Matter

Ceramic filtration followed by scrubbing will be used to remove particulate matter from the syngas. No additional abatement for particulate matter is proposed above that for cleaning the syngas. Emissions of particulate matter have been previously assessed as insignificant, and so the Environment Agency agrees that the Applicant's proposed technique is BAT for the installation.

6.3.2 Oxides of Nitrogen

The Applicant proposes to minimise primary emissions of oxides of nitrogen (NOx). The Applicant stated that engine modelling had demonstrated that very low levels of primary NOx would be generated at ~100mg/m³. This is achievable because syngas combustion does not require the same level of air as biogas.

There are two recognised techniques for secondary measures to reduce NO_x. These are Selective Catalytic Reduction (SCR) and Selective Non-Catalytic Reduction (SNCR). For each technique, there is a choice of urea or ammonia reagent. However SNCR cannot be used on gas engines due to short residence time.

The Applicant proposes to use SCR with urea as the reagent. The Applicant stated that a 75% reduction will be able to achieve the modelling level of 25mg/m³, although 90% abatement is common and 95% can be achieved.

Emissions of NO_x have been previously been assessed as insignificant, and so the Environment Agency agrees that the Applicant's proposed technique is 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 NH₃ slip. Improvement condition IC3 requires the Operator to report to the Environment Agency on optimising the performance of the NO_x abatement system. The Operator is also required to monitor and report on NH₃ every 6 months.

6.3.3 Acid Gases (SO₂ and HCl)

Primary control for SO₂ will be using a homogeneous waste stream to avoid peaks in acid gas loading. Sodium bicarbonate injection and scrubbing of the syngas will then be used to remove acid gases. In addition metallic oxides will also be used to remove trace hydrogen sulphide.

No additional abatement for acid gases is proposed above that for cleaning the syngas. The emission of SO₂ was previously assessed as insignificant, and so the Environment Agency agrees that the Applicant's proposed technique is BAT for the installation. Although the emission of HCl was not modelled the measures to reduce acid gases in the syngas (water and alkaline) scrubbing are likely to be effective for HCl in addition to SO₂.

6.3.4 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.

6.3.5 Metals

The syngas will be treated to be no more polluting than natural gas hence no metals will be present. Activated carbon injection into the syngas will be used to remove metals including mercury. In addition particulate phase metals will be removed in the particulate filtration stage of the syngas cleaning.

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 (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, but the plant also emits small amounts of N₂O arising from the operation of secondary NO_x abatement. N₂O has a global warming potential 310 times that of CO₂. The Applicant will therefore be required to optimise the performance of the secondary NO_x abatement system to ensure its GWP impact is minimised (IC3).

The major source of greenhouse gas emissions from the installation is however CO₂ from the combustion of the syngas. There will also be CO₂ emissions from the burning of support fuels at start up and shut down. BAT for greenhouse gas emissions is to maximise energy recovery and efficiency.

The electricity that is generated by the Installation will displace emissions of CO₂ elsewhere in the UK, as virgin fossil fuels will not be burnt to create the same electricity. The Applicant has therefore included within its GWP calculations a CO₂ offset for the net amount of electricity exported from the Installation.

Taking this into account, the net emissions of CO₂ from the installation are estimated at ~25,000 tonnes per annum. At this level emissions cannot be characterised as insignificant. The Installation is not subject to the Greenhouse Gas Emissions Trading Scheme Regulations 2003; therefore it is a requirement of IED to investigate how emissions of greenhouse gases emitted from the installation might be prevented or minimised.

The Applicant has considered GWP as part of its BAT assessment. There are a number of areas in which a difference can be made to the GWP of the Installation. In summary: the following factors influence the GWP of the facility:

On the debit side

- CO₂ emissions from the burning of the syngas;
- 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;

Note: avoidance of methane which would be formed if the waste was landfilled has not been included in this assessment. If it were included due to its avoidance it would be included on the credit side.

The Applicant's assessment shows that the GWP of the plant is dominated by the emissions of carbon dioxide that are released as a result of syngas combustion. This is constant for all options considered in the BAT assessment. The Applicant did not consider emissions of N₂O from SCR in their assessment. However N₂O emissions from SCR are low (lower than from the alternative method of SNCR).

Taking these factors into account, we are satisfied that the Operator's preferred option is BAT in terms of GWP.

6.5 Other Emissions to the Environment

6.5.1 Emissions to water

Rainwater run-off from external areas will be discharged to surface water drain (emission point W1) via oil interceptors. This emission point leads to the River Tame.

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

6.5.2 Emissions to sewer

Water treatment plant residue will be the only process effluent released at a maximum of 780kg/hour.

The Applicant carried out an H1 for metals that could be in the discharge. This was based on discharge to the River Tame via Minworth Sewage Treatment Works. The assessment showed that the impact for all substances will be insignificant.

The Applicant included dilution from the sewage treatment works and used sewage treatment reduction factors that are lower than those in the current version of H1. We repeated the assessment without any dilution from the treatment works and with more conservative sewage treatment reduction factors. This showed that the impact was still insignificant with the PC <4% of the EQS for all substances except Cu. The PC for Cu was just over 4% at 4.4%, but given the conservative nature of the H1 assessment further modelling of this emission was not justified and we are satisfied that the impact will in reality be insignificant.

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. A trade effluent consent will also be in place.

6.5.3 Fugitive emissions

The IED specifies that plants must be able to demonstrate that the plant is designed in such a way as to prevent the unauthorised and accidental release of polluting substances into soil, surface water and groundwater.

- All storage tanks will be equipped with secondary containment bunds that have been designed to comply with EA best practice guidelines as defined by PPG2 – Above Ground Storage Tanks;
- Tanks will be fitted with level gauges;
- Odour and vapours will be contained in the building.

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

6.5.4 Odour

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

The Applicant provided an Odour Management Plan which sets out odour control methods. Waste will be delivered to a reception building. Waste will be processed within two hours. The building will have roller shutter doors that will remain closed other than to allow vehicle access. Air from the building will be pulled through combustion units, keeping the building under a negative pressure. Waste drying is enclosed with air extracted to combustion units. There will be provision to divert waste away from site if there is not capacity to take it.

Waste will be dried and processed into pellets immediately. The reception area will be cleared of waste at the end of each shift. The dried waste will be stored in sealed vessels before gasification.

If waste cannot be accepted it will sent to an alternative site or diverted to landfill.

The gas engines will continue to run on natural gas if the gasifier is not operating, so odour control will be maintained.

A planned preventative maintenance procedure will be used to minimise breakdown. The Application describes process monitoring of key equipment.

We have set pre-operational condition PO5. This is for the Operator to provide details to show that the odour control system can achieve what was stated in the Application. This will need to include information to show that the air

extraction system is sufficient to maintain the building negative pressure control system.

This Application is for a permit for a new Installation. We have therefore not formally approved the OMP although we consider that the measures proposed are likely to control odour. The OMP is incorporated as an operating technique in table S1.2. We have set odour condition 3.3.2 as a precaution so that we can require a revised OMP if odour is not controlled adequately.

6.5.5 Noise and vibration

Operations will be carried out in a building with sound insulation. The building fabric will comprise of 'Paroc' metal sandwich composite panels. The construction will be 80mm or greater panel with steel rail, 50mm stone wool and 12mm gypsum board.

All associated external ancillary plant will be enclosed within dedicated acoustic enclosures and screened by the main plant building. All air emission sources will be fitted with stack attenuators, to ensure that they are inaudible at the site boundary.

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 outside the site.

The application contained a noise impact assessment which assessed the noise impact at houses on Monway Terrace. Noise levels were conservatively assumed to be 85dB(A) in the building and 48dB(A) outside of the process building. When projected to the nearest housing ~80m away this would result in levels well below the current background with noise complaints unlikely.

The Applicant did not carry out a full BS 4142 assessment because at this early design stage noise power levels were not known for the equipment. However the risk of noise impacts at nearby receptors is very low. The nearest residential receptors are towards Monway terrace. Most equipment will be inside the building. Exterior equipment will be on the south East of the building and shielded from the receptors. Delivery doors and delivery vehicles will also be shielded by the main building. The stack will be fitted with a noise attenuator. It will have a noise level of 45dB(A) at 10m. The stack will be ~140m from the receptors and the noise at the receptors will be very low.

We are satisfied that there is unlikely to be a significant impact due to noise. We have set pre-operational condition (PO3) to confirm this. PO3 will require the Operator to carry out a full BS 4142 assessment based on design parameters. In addition permit condition 3.4 will require a noise management plan should noise become an issue at any point.

6.6 Setting ELVs and other Permit conditions

6.6.1 Translating BAT into Permit conditions

IED 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.

The Applicant's modelling was based on emissions that they stated could be achieved. The impacts were shown to be insignificant and there is therefore no justification to reduce ELVs further

(i) Global Warming

CO₂ is an inevitable product of the combustion of the syngas. The amount of CO₂ emitted will be essentially determined by the quantity and characteristics of the gas, which are already subject to conditions in the Permit. It is therefore inappropriate to set an emission limit value for CO₂, which could do no more than recognise what is going to be emitted. The gas is not therefore targeted as a key pollutant under Annex II of IED, which lists the main polluting substances that are to be considered when setting emission limit values (ELVs) in Permits.

We have therefore considered setting equivalent parameters or technical measures for CO₂. However, provided energy is recovered efficiently (see section 4.3.7 above), there are no additional equivalent technical measures (beyond those relating to the quantity and characteristics of the waste) that can be imposed that do not run counter to the primary purpose of the plant, which is the gasification of waste and generation of electricity from the syngas. Controls in the form of restrictions on the volume and type of waste that can be accepted at the Installation and permit conditions relating to energy efficiency effectively apply equivalent technical measures to limit CO₂ emissions.

(ii) Commissioning

Pre-operational condition PO4 has been set for a commissioning programme to be agreed. IC2 requires a report on commissioning to be submitted.

6.7 Monitoring

6.7.1 Emissions monitoring

We have decided that monitoring should be carried out for the parameters listed in Schedule 3 using the methods and to the frequencies specified in those tables. These monitoring requirements have been imposed in order to demonstrate compliance with emission limit values and to gather information about the performance of the SCR system

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

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

6.7.2 Syngas process monitoring

We have set a requirement to monitor the syngas in table S3.4 of the permit. Permit conditions 3.5.5 and 3.5.6 set the monitoring frequency of the monitoring.

Section 6.2 of this decision document includes the specification that the Applicant provided for their syngas. Monitoring has been set for the key components to ensure that emissions are no higher than natural gas combustion. The table below shows the monitoring that has been set in the permit.

Process monitoring requirements – syngas quality	
Parameter	Monitoring frequency
Total Sulphur	As specified in condition 3.5.5
Total halogenated hydrocarbons	As specified in condition 3.5.5
Heavy metals Hg, Cd, Tl, Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	As specified in condition 3.5.5
Xylenes	Quarterly

Total sulphur, total halogenated hydrocarbons and metals are the components with the most potential to pollute. Condition 3.5.5 will require daily sampling to start with for these components. Condition 3.5.5 allows the frequency to be relaxed if samples are shown to meet the limits. If samples fail then the required monitoring frequency will increase. Xylenes are considered a lower pollution potential and therefore monitoring is set at quarterly. Hydrogen sulphide has not been included because the total sulphur limit and monitoring will be protective. Condition 3.5.6 ensures that if a sample fails another is taken within a week. Condition 2.3.6 will prevent waste feed if two consecutive samples fail the limits.

6.8 Reporting

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

7 Other legal requirements

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

7.1 The EPR 2010 and related Directives

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

7.1.1 Schedules 1 and 7 to the EPR 2010 – IED Directive

We address the requirements of the IED in the body of this document above.

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

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

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

In determining the Application we have considered the following documents: -

- The Environmental Statement submitted with the planning application (which also formed part of the Environmental Permit Application).
- The decision of Sandwell Metropolitan Borough Council to grant planning permission.
- The report and decision notice of the local planning authority accompanying the grant/refusal of planning permission.
- The response of the Environment Agency to the local planning authority in its role as consultee to the planning process.

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

The Environment Agency has also carried out its own consultation on the Environmental Permitting Application which includes the Environmental Statement submitted to the local planning authority. The results of our consultation are described in Annex 3 of this decision document.

7.1.2 Schedule 9 to the EPR 2010 – Waste Framework Directive

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

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

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

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

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

Article 23(1) requires the permit to specify:

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

These are all covered by permit conditions.

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

We consider that the intended method of waste treatment is acceptable from the point of view of environmental protection so Article 23(3) does not apply.

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

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

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

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

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

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

This Application has been consulted upon in line with this statement. The way in which this has been done is set out in Section 2. A summary of the responses received to our consultations and our consideration of them is set out in Annex 3.

7.2 National primary legislation

7.2.1 **Environment Act 1995**

(i) Section 4 (Pursuit of Sustainable Development)

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

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

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

(ii) Section 7 (Pursuit of Conservation Objectives)

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

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

(iii) Section 81 (National Air Quality Strategy)

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

7.2.2 Human Rights Act 1998

We have considered potential interference with rights addressed by the European Convention on Human Rights in reaching our decision and consider that our decision is compatible with our duties under the Human Rights Act 1998. In particular, we have considered the right to life (Article 2), the right to a fair trial (Article 6), the right to respect for private and family life (Article 8) and the right to protection of property (Article 1, First Protocol). We do not believe that Convention rights are engaged in relation to this determination.

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

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

7.2.4 Wildlife and Countryside Act 1981

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

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

7.2.5 Natural Environment and Rural Communities Act 2006

Section 40 of this Act requires us to have regard, so far as is consistent with the proper exercise of our functions, to the purpose of conserving biodiversity. We have done so and consider that no different or additional conditions in the Permit are required.

7.3 National secondary legislation

7.3.1 The Conservation of Natural Habitats and Species Regulations 2010

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

The habitat assessment is summarised in greater detail in section 5.4 of this document.

7.3.2 Water Framework Directive Regulations 2003

Consideration has been given to whether any additional requirements should be imposed in terms of the Environment Agency's duty under regulation 3 to secure the requirements of the Water Framework Directive through (inter alia) EP permits, but it is felt that existing conditions are sufficient in this regard and no other appropriate requirements have been identified.

7.4 Other relevant legal requirements

7.4.1 Duty to Involve

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

The way in which the Environment Agency has consulted with the public and other interested parties is set out in section 2 of this document. The way in which we have taken account of the representations we have received is set out in Annex 3. Our public consultation duties are also set out in the EP Regulations, and our statutory Public Participation Statement, which implement the requirements of the Public Participation Directive.

ANNEX 1: Pre-Operational Conditions

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

Reference	Pre-operational measures
PO1	<p>Prior to the commencement of commissioning, the Operator shall send a summary of the site Environment Management System (EMS) to the Environment Agency and make available for inspection all documents and procedures which form part of the EMS. The EMS shall be developed in line with the requirements set out in Section 1 of How to comply with your environmental permit – Getting the basics right. The documents and procedures set out in the EMS shall form the written management system referenced in condition 1.1.1 (a) of the permit.</p>
PO2	<p>Prior to the commencement of commissioning, the Operator shall submit a report on the baseline conditions of soil and groundwater at the installation. The report shall contain the information necessary to determine the state of soil and groundwater contamination so as to make a quantified comparison with the state upon definitive cessation of activities provided for in Article 22(3) of the IED. The report shall contain information, supplementary to that already provided in application Site Condition Report, needed to meet the information requirements of Article 22(2) of the IED.</p>
PO3	<p>Prior to the commencement of commissioning, the Operator shall undertake a noise assessment in accordance with the procedures given in BS4142: 1997 (Rating industrial noise affecting mixed residential and industrial areas) in order to verify the assessment provided within the application. The assessment shall include, but not be limited to:</p> <ul style="list-style-type: none"> ▪ A review of the noise sources from the facility. Where any noise source(s) are identified as exhibiting tonal contributions, they shall be quantified by means of frequency analysis. <p>A report shall be provided to the Agency detailing the findings of the assessment along with any proposals for noise reductions if the assessment shows that the impacts could be higher than those shown in the application</p>
PO4	<p>Prior to the commencement of commissioning; the Operator shall provide a written commissioning plan including timelines for completion, for approval by the Environment Agency. The commissioning plan shall include a written plan for testing the syngas against the parameters set out in table S3.4 of the permit, the expected emissions to the environment during the different stages of commissioning, the expected durations of commissioning activities and the actions to be taken to protect the environment and report to the Environment Agency in the event that actual emissions exceed expected emissions. Commissioning shall be carried out in accordance with the commissioning plan as approved.</p>
PO5	<p>At least three months before commissioning, the operator shall submit details of the odour control system. This shall include information to show that the system has been designed adequately to maintain negative pressure in the reception building.</p>
PO6	<p>The Operator shall submit details of the start up and shut down operating procedures to the Environment Agency for approval.</p>
PO7	<p>Prior to the commencement of commissioning, the Operator shall send a report to the Environment Agency which will contain a comprehensive review of the options available for utilising the heat generated by the process in order to ensure that it is recovered as far as practicable. The review shall detail any identified proposals for improving the recovery and utilisation of waste heat and shall provide a timetable for their implementation.</p>

ANNEX 2: Improvement Conditions

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

Reference	Requirement	Date
IC1	The Operator shall submit a written report to the Environment Agency 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 on which waste is first burnt.
IC2	The Operator shall submit a written report to the Environment Agency 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.
IC3	The Operator shall submit a written report to the Environment Agency describing the performance and optimisation of the Selective Catalytic Reduction (SCR) 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 ₂ O emissions that can be achieved under optimum operating conditions.	Within 4 months of the completion of commissioning.
IC4	The Operator shall submit a written report to the Environment Agency on syngas testing carried out under condition 3.5.5. The report shall include a comparison of syngas quality compared to the limits in table S3.4.	Within 6 months of the start of operation

ANNEX 3: Consultation Responses

A) Advertising and Consultation on the Application

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

The Application was advertised on the Environment Agency website. We made the Application and all other documents relevant to our determination (see below) available to view on our Public Register Sentinel House, 9 Wellington Crescent, Fradley Park, Lichfield, WS13 8RR and also sent a copy to Sandwell Metropolitan Borough Council for its own Public Register. Anyone wishing to see these documents could do so and arrange for copies to be made.

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

- Sandwell Metropolitan Borough Council;
- Public Health England;
- Director of Public Health
- Food Standards Agency;
- Local Fire Service;
- Health and Safety Executive
- Severn Trent Water

1) Consultation Responses from Statutory and Non-Statutory Bodies

Response Received from Severn Trent Water	
Brief summary of issues raised:	Summary of action taken / how this has been covered
Confirmed that consent issued to applicant. No problems were raised.	No action required

No other consultation comments were received.

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

No responses were received.