Draft determination of an Application for an Environmental Permit under the Environmental Permitting (England & Wales) Regulations 2016

Consultation on our decision document recording our decision-making process

The Permit Number is:	EPR/ZP3437YG
The Applicant / Operator is:	Drax Power Limited
The Installation is located at:	Millbrook Power Station, Rookery Pit South, Stewartby, Bedfordshire, MK43 0PR
Consultation commences on:	06 December 2018
Consultation ends on:	10 January 2018

What this document is about

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

It explains how we have considered the Applicant's Application, and why we have included the specific conditions in the draft permit we are proposing to issue 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.

The document is in draft at this stage, because we have yet to make a final decision. Before we make this decision we want to explain our thinking to the public and other interested parties, to give them a chance to understand that thinking and, if they wish, to make relevant representations to us. We will make our final decision only after carefully taking into account any relevant matter raised in the responses we receive. Our mind remains open at this stage: although we believe we have covered all the relevant issues and reached a reasonable conclusion, our ultimate decision could yet be affected by any information that is relevant to the issues we have to consider. However, unless we receive information that leads us to alter the conditions in the draft Permit, or to reject the Application altogether, we will issue the Permit in its current form.

In this document we frequently say “we have decided”. That gives the impression that our mind is already made up; but as we have explained above, we have not yet done so. The language we use enables this document to become the final decision document in due course with no more re-drafting than is absolutely necessary.

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/ZP3437YG/A001. We refer to the application as “the **Application**” in this document in order to be consistent.

The number we propose to give to the permit is EPR/ZP3437YG/A001. We refer to the proposed permit as “the **Permit**” in this document.

The Application was duly made on 21/11/17.

The Applicant is Drax Power Limited. We refer to Drax Power Limited as “the **Applicant**” in this document. Where we are talking about what would happen after the Permit is granted (if that is our final decision), we call Drax Power Limited “the **Operator**”.

Drax Power Limited’s proposed facility is located at Millbrook Power Station, Rookery Pit South, Stewartby, Bedfordshire, MK43 0PR. We refer to this as “the **Installation**” in this document.

Contents:

Glossary

Baseload	means: (i) as a mode of operation, operating for >4000hrs per annum; and (ii) as a load, the maximum load under ISO conditions that can be sustained continuously, i.e. maximum continuous rating
BAT	best available techniques
BREF	best available techniques reference document
CCGT	combined cycle gas turbine
Emergency use	<500 operating hours per annum
ELV	emission limit value set out in either IED or LCPD
GT	gas turbine
IED	Industrial Emissions Directive 2010/75/EC
LCP	large combustion plant – combustion plant subject to Chapter III of IED
MCR	Maximum Continuous Rating
Mid merit	1500-4000 operating hours per annum
MSUL/MSDL	Minimum start up load/minimum shut-down load
OCGT	Open Cycle Gas Turbine
Peaking	500-1500 operating hours per annum
Part load operation	Operation during a 24 hr period that includes loads between MSUL/MSDL and maximum continuous rating (MCR). Also referred to as low load operation.
SCR	selective catalytic reduction
SNCR	selective non catalytic reduction

1. Our proposed decision

We are minded 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 draft 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 draft decision

2.1 Receipt of Application

The Application was duly made on 21/11/17. 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 Application was deemed to be considered High Public Interest following the initial advertising period based on the level of public interest shown.

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

2.2 Consultation on the Application

We carried out consultation on the Application in accordance with the EPR and our statutory Public Participation Statement (PPS) and our own internal guidance RGS Note 6 for Determinations involving Sites of High Public Interest. We consider that this process satisfies, and frequently goes beyond the requirements of the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, which are directly incorporated into the 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. The advertising period was extended from 20 working days to a period that ran between 16/01/18 and 30/03/18.

We made a copy of the Application and all other documents relevant to our determination (see below) available to view on our Citizenspace web based consultation portal and the public register. Anyone wishing to see these documents could also 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":

- Public Health England
- The Director of Public Health
- The Health and Safety Executive
- The Food Standards Agency
- Bedford Borough Council – Environmental Health

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 2. We have taken all relevant representations into consideration in reaching our draft determination.

2.3 Requests for Further Information

Although we were able to consider the Application duly made, we did in fact need more information in order to determine it, and issued information notices on 07/02/18 and 16/05/18. A copy of each information notice and the response was placed on our public register.

Having carefully considered the Application and all other relevant information, we are now putting our draft decision before the public and other interested parties in the form of a draft Permit, together with this explanatory document. As a result of this stage in the process, the public has been provided with all the information that is relevant to our determination, including the original Application and additional information obtained subsequently, and we have given the public two separate opportunities (including this one) to comment on the Application and its determination. Once again, we will consider all relevant representations we receive in response to this final consultation and will amend this explanatory document as appropriate to explain how we have done this, when we publish our final decision.

3. Chapter III of the Industrial Emissions Directive (IED)

Chapter III of the Industrial Emissions Directive applies to new and existing large combustion plants (LCPs) which have a total rated thermal input which is greater or equal to 50MW. Articles 28 and 29 explain exclusions to chapter III and aggregation rules respectively.

The aggregation rule is as follows:

- A Large Combustion Plant (LCP) has a total rated thermal input ≥50MW.
- Where waste gases from two or more separate combustion plant discharge through a common windshield, the combination formed by the plants are considered as a single large combustion plant.
- The size of the LCP is calculated by adding the capacities of the plant discharging through the common windshield disregarding any units <15MWth.

A "common windshield" is frequently referred to as a common structure or windshield and may contain one or more flues.

The OCGT on this site consists of an individual combustion unit with a total rated thermal input ≥50MW making it an LCP.

Combustion plant on the installation that do not form part of an LCP and so do not come under chapter III requirements, are still listed within the Section 1.1 A(1)(a) activity listed in Schedule 1 of the Environmental Permitting regulations where they are larger than 1 MWth. In this instance the standby diesel generator will be greater than 1MWth but less than 2MWth and is therefore has been listed within the LCP activity. The generator is also within the scope of the Medium Combustion Plant Directive (MCPD) and has been listed as

an MCP in the permit. This will operate for less than 500 hours per year and therefore no limits have been specified.

Chapter III lays out special provisions for LCP and mandatory maximum ELVs are defined in part 2 of Annex V for new plant, however it is worth noting that best available techniques (BAT) requirements may lead to the application of lower ELVs than these mandatory values. Mandatory ELVs cannot be exceeded even if a site specific assessment can be used to justify emission levels higher than BAT.

4. Large Combustion Plant(s) Description and Number

The Permit uses the DEFRA LCP reference numbers to identify each LCP. The LCP permitted is as follows: **LCP650**

This LCP consists of one 754MWth OCGT which vents via a single stack. The unit burns natural gas.

5. Net thermal input

The Applicant has stated that the Net Thermal Input of LCP650 is 754 MWth.

The Applicant has not provided sufficient information to demonstrate the net thermal input of the LCP as the plant has not been built yet. Consequently we have set improvement condition IC2, requiring them to provide this information within 12 months of the plant starting up.

6. Minimum start up load and Minimum shut-down load (MSUL/MSDL)

The applicant has not provided sufficient information to set the MSUL/MSDL as the plant has not been built yet. Consequently we have set improvement condition IC1, requiring them to provide this information within 12 months of the plant starting up. Table S1.5 in the permit has also been completed to reflect this.

7. Large Combustion Plant Best available techniques reference document conclusions (BATc)

We have reviewed the permit application against the revised BAT Conclusions for the large combustion plant sector published on 31st July 2017.

BAT conclusions 1 – 17 applicable to all sites and 40 – 45 applicable to plant combustion gaseous fuels (but excluding those relating to iron and steel and chemical industries) have been considered. The response to each is set out in section 13 of this decision document.

The BAT AELs for emissions of NOx and CO have been included in table S3.1 of the permit.

8. The Installation's environmental impact

Regulated activities can present different types of risk to the environment, these include 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 and other environmental impacts. Consideration may also have to be given to the effect of emissions being subsequently deposited onto land (where there are ecological receptors). The key factors relevant to this determination 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.

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.

8.1 Assessment Methodology

8.1.1 Application of Environment Agency Web Guide for Air Emissions Risk Assessment

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 Web Guide 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 emissions

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

8.1.2 Use of Air Dispersion Modelling

For LCP applications, we usually require the Applicant to submit a full air dispersion model as part of their application, for the key pollutants. 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).

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

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

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

For those pollutants which do not screen out as insignificant, we determine whether exceedances of the relevant EQS are likely. This is done through detailed audit and review of the Applicant's air dispersion

modelling taking background concentrations and modelling uncertainties into account. Where an exceedance of an EU EQS is identified, we may require the Applicant to go beyond what would normally be considered BAT for the Installation or we may refuse the application if the applicant is unable to provide suitable proposals. Whether or not exceedances are considered likely, the application is subject to the requirement to operate in accordance with BAT.

This is not the end of the risk assessment, because we also take into account local factors (for example, particularly sensitive receptors nearby such as Sites of Special Scientific Interest (SSSIs), Special Areas of Conservation (SACs) or Special Protection Areas (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.

8.2 Assessment of Impact on Air Quality

The Applicant's assessment of the impact of air quality is set out in *'Chapter 7 – Air Quality Assessment for Open Cycle GasTurbines'* dated 01/11/2017 of the Application. The assessment comprises:

- Dispersion modelling of emissions to air from the operation of the installation.
- A study of the impact of emissions on nearby sensitive conservation sites.

This section of the decision document deals primarily with the dispersion modelling of emissions to air from the installation and its impact on local air quality. The impact on conservation sites is considered in section 8.3.

The Applicant has assessed the Installation's potential emissions to air against the relevant air quality standards, and the potential impact upon local conservation sites and human health. These assessments predict the potential effects on local air quality from the Installation's stack emissions using the ADMS (Atmospheric Dispersion Modelling System) 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 Cranfield 6.9km west of the installation between 2012 and 2016. 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 Annex V of the IED or AELs outlined within the BAT Conclusions. These substances are:
    - Oxides of nitrogen (NO_x), expressed as NO_2
    - Carbon monoxide (CO)
- Second, they assumed that the Installation operates at a worst case of up to 2,250 hours in any given year. The gas turbine is restricted through a permit condition from exceeding 1500 hours of operation in any given year, with a worst case yearly maximum of 2,500 hours.

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

The Applicant used the values from the DEFRA background mapping system as background concentrations.

The Applicant provided us with modelled output showing the concentration of key pollutants at a number of specified locations within the surrounding area. We used our Air Quality Screening tool to audit these outputs and confirm the likely predicted peak ground level concentrations for nitrogen dioxide as well as auditing predicted concentrations at the receptors.

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 to establish the robustness of the Applicant's air impact assessment. The output from the model has then been used to inform further assessment of health impacts and impact on habitats and conservation sites.

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

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

8.2.1 Assessment of Air Dispersion Modelling Outputs

The modelling predictions are summarised in the tables below.

The modelling predicted pollutant concentrations at discreet receptors

The table below shows the ground level concentrations at the most impacted receptor. Where emissions screen out as insignificant, the background pollutant levels are not considered within the assessment in accordance with our H1 screening process.

Pollutant	EQS / EAL (µg/m³)	Process Contribution (PC) (µg/m³)	PC as % of EQS / EAL
NO_2 Annual	40	0.04	0.11
NO_2 Hourly Mean	200	3.5	1.7
CO 8 hour mean	10,000	20.5	0.2

From the table 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:

- NO_2 annual mean (at receptors), NO_2 hourly mean and short term carbon monoxide at discrete receptors.

Therefore we consider the Applicant's proposals for preventing and minimising the emissions of these substances to be BAT for the Installation subject to the audit of BAT considered later in this document.

The modelling predicted maximum pollutant concentrations

The table below shows the maximum ground level concentrations of nitrogen dioxide. Where emissions screen out as insignificant, the background pollutant levels are not considered within the assessment in accordance with our H1 screening process. Where we take the background levels into account we combine these with the PC to determine the Predicted Environmental Concentration (PEC) and assess the headroom between the PEC and the EQS as shown below.

Pollutant	EQS / EAL (µg/m³)	Process Contribution (PC) (µg/m³)	PC as % of EQS / EAL	PEC (µg/m³) (Background + PC)	PEC as % of EQS
NO_2 Annual	40	0.46	1.15	14.22	35.6
NO_2 Hourly Mean	200	10.2	5.1	NA	NA

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

- NO_2 hourly mean at maximum grid concentration.

From the tables above the annual maximum ground level emissions were over 1% of the EQS at 1.15% so we also considered the background NO_2 levels. When taking these into account there is adequate headroom

between the PEC and EAL to indicate that it is unlikely that there will be an exceedance of an EQS. The PEC is 35.6% of the EQS.

Predicted pollutant concentrations at discreet receptors as a result of an in-combination impact with the proposed Covanta Incinerator

The table below shows the predicted ground level concentrations at the most impacted receptor from emissions from both the Covanta incinerator and the Milbrook Powerstation in combination. Where emissions screen out as insignificant, the background pollutant levels are not considered within the assessment in accordance with our H1 screening process.

Pollutant	EQS / EAL (µg/m³)	Process Contribution (PC) (µg/m³)	PC as % of EQS / EAL
NO_2 Annual	40	0.20	0.5
NO_2 Hourly Mean	200	5.7	2.8
CO 8 hour mean	10,000	20.9	0.2

From the table 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:

- NOx annual mean, NO_2 hourly mean and CO at discrete receptors.

From the tables above the annual maximum ground level emissions were over 1% of the EQS at 1.15% so we also considered the background NO_2 levels. When taking these into account there is adequate headroom between the PEC and EAL to indicate that it is unlikely that there will be an exceedance of an EQS. The PEC is 35.6% of the EQS.

Predicted pollutant maximum grid concentrations as a result of an in-combination impact with the proposed Covanta Incinerator

The table below shows the maximum ground level concentrations from emissions from both the Covanta incinerator and the Millbrook Power Station in combination. Where emissions screen out as insignificant, the background pollutant levels are not considered within the assessment in accordance with our H1 screening process.

Pollutant	EQS / EAL (µg/m³)	Process Contribution (PC) (µg/m³)	PC as % of EQS / EAL	PEC (µg/m³) (Background + PC)	PEC as % of EQS
NO_2 Annual	40	1.32	3.3	15.08	37.7
NO_2 Hourly Mean	200	25.78	12.89	53.3	26.6

From the table above the emissions cannot 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. From the tables above the maximum ground level emissions were over 1% of the long term EQS at 3.3% and over 10% of the short term EQS at 12.9% so we also considered the background NO_2 levels. When taking these into account there

is adequate headroom between the PEC and EAL to indicate that it is unlikely that there will be an exceedance of an EQS for either long term or short term NOx.

8.2.2 Consideration of key pollutants

(i) Nitrogen dioxide (NO_2)

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

The above tables show that the long term PC is less than 1% of the EU EQS and the short term PC is less than 10% of the EU EQS at sensitive receptors and so can be screened out as insignificant or where this is not the case (long term at grid maximum) we consider that there is adequate headroom between the PEC and EQS to indicate an exceedance is unlikely. Therefore we consider the Applicant's proposals for preventing and minimising the emissions of these substances is likely to be BAT for the Installation, however we address this in further detail in sections 8 and 12 of this decision document.

(ii) Dust

Natural gas is an ash-free fuel and high efficiency combustion in the gas turbine does not generate additional particulate matter. The fuel gas is always filtered and, in the case of gas turbines, the inlet air is also filtered resulting in a lower dust concentration in the flue than in the surrounding air. Thus for natural gas fired turbines dust emissions are not an issue.

(iii) Sulphur Dioxide

Natural gas, that meets the standard for acceptance into the National transmission System, is considered to be sulphur free fuel. Hence, sulphur dioxide emissions from burning natural gas, were not considered to be significant were not modelled by the Applicant. We agree with this approach.

(iv) Emissions to Air of CO

The above table shows that for CO emissions, 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. Therefore we consider the Applicant's proposals for preventing and minimising the emissions of these substances to be BAT for the Installation.

Temperature inversion

The dispersion model used by the Applicant does not explicitly predict complex conditions relating to vertical profiling such as temperature inversion, complex terrain stagnation or fumigation. There are alternative dispersion models that can model these conditions. However, we have previously conducted a number of case studies investigating the likely dispersion impacts of such conditions, and found that although these conditions could lead to increases in the long-term and short-term Process Contributions (PCs) the variability is within any modelling uncertainties. As a result the Applicant's conclusions would not be likely to change if this factor was taken into account and we have not considered this aspect further in this determination.

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

8.3.1 Sites Considered

There are no Habitats (i.e. Special Areas of Conservation, Special Protection Areas and Ramsar) sites located within 10km of the Installation. There are no SSSIs located within 2km of the installation.

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

- Millbrook CWS (2199m)
- Millbrook Churchyard CWS (2081m)
- Heydon Hill CWS (1983m)
- Lidlington Pit CWS (1211m)
- Rookery Clay Pit CWS (0m)
- Millbrook Pillinge Pit CWS (500m)

- Stewartby Lake CWS (628m)
- Heydon Hill ancient woodland (1993m)

The modelling predicted pollutant concentrations at ecological receptors

The Applicant's modelling predicted pollutant concentrations at ecological receptors. The tables below show the ground level concentrations at the most impacted ecological receptor – Rookery Clay Pits CWS. For the nutrient nitrogen deposition and acidification, an in-combination assessment with the proposed Covanta Incinerator was carried out. Where emissions screen out as insignificant, the background pollutant levels are not considered within the assessment in accordance with our H1 screening process.

Pollutant	EQS / EAL (µg/m³)	Back-ground (µg/m³)	Process Contribution (PC) (µg/m³)	PC as % of EQS / EAL	Predicted Environmental Concentration (PEC) (µg/m³)	PEC as % EQS / EAL
Direct Impacts[1]						
NO_x Annual	30	N/a	0.06	0.21	N/a	N/a
NO_x Daily Mean	75	N/a	7.3	9.8	N/a	N/a
Deposition Impacts[1]						
N Deposition (kg N/ha/yr)	10	N/a	0.026	0.26	N/a	N/a
Acidification - Nitrogen Dep (Keq/ha/yr)	10.81	N/a	0.0019	0.017	N/a	N/a
Note 1: Direct impact units are µg/m³ and deposition impact units are kg N/ha/yr or Keq/ha/yr.						

The tables above show that the PCs are below the critical levels or loads and can be considered insignificant in that the process contribution is <1% of the long term critical load/critical level and <10% of the short term critical load/critical level. These are:

- NO_2 annual mean, NO_2 daily mean, nitrogen deposition and acidification.

We are satisfied that the Installation will not cause significant pollution at the sites. The Applicant is required to prevent, minimise and control emissions using BAT, this is considered further in Section 9.

No further assessment of impact on conservation sites is required.

8.4 Emissions to Water

There are no discharges to surface water of process effluent. The small volume of effluent that is produced from cleaning of the turbine blade is tankered off site for treatment.

Only surface water run off will be discharged but the drainage plan was not available at this stage and provision of this has been included as a pre operational condition. The site will be covered by hardstanding and an oil interceptor will be in place on site. Diesel and chemicals on site will be bunded.

8.5 Noise Impacts

The following measures were proposed to minimise noise impacts:

- An exhaust silencer
- Acoustic lagging and low noise trims to be fitted to all pipe-work
- High performance acoustic enclosures considered for all plant where practicable
- All plant to be designed and positioned to minimise impact from vibration

The application contained a noise impact assessment which identified local noise-sensitive receptors, potential sources of noise at the proposed plant and noise attenuation measures. Measurements were taken of the prevailing ambient noise levels to produce a baseline noise survey and an assessment was carried out in accordance with BS4142:2014 to compare the predicted plant rating noise levels with the established background levels.

The table below shows how the predicted rating level compares to the background levels at the receptors near to the Installation. Impacts at receptors further away will be lower. Impacts during the daytime and evening will be below the current background level.

	Rating level compared to background (dB A)	
	Daytime	Night-time
South Pillinge Farm	-8	-1

We audited the Applicant's assessment. Although we agreed with the conclusion that adverse or significant adverse impacts are unlikely at nearby receptors we have included a pre operational condition specifying that the applicant is required to carry out an additional feasibility study to establish whether additional mitigation measures can be incorporated into the design. This is based on the technology selection and the lack of information provided to demonstrate whether other mitigation options that could be available have been considered.

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 if pre-operational condition PO5 is completed satisfactorily.

9. Application of Best Available Techniques

9.1 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.

- We address is the fundamental choice of combustion technology;
- We consider energy efficiency, and options for Combined Heat and Power, and the compliance with the Energy Efficiency Directive;
- We consider the cooling system proposed.

Chapter III of the IED specifies a set of maximum emission limit values. Although these limits are designed to be stringent, and to provide a high level of environmental protection, they do not necessarily reflect what can be achieved by new plant. Article 14(3) of the IED says that BAT Conclusions shall be the reference for setting the permit conditions, so it may be possible and desirable to achieve emissions below the limits referenced in Chapter III. The BAT Conclusions and a revised BREF for LCP were published in July so BAT Associated Emission Levels (AELs) are specified alongside Chapter III limits from the IED within the permit.

Operational controls complement the emission limits and should generally result in emissions below the maximum allowed; whilst the limits themselves provide headroom to allow for unavoidable process fluctuations. Actual emissions are therefore almost certain to be below emission limits in practice, because any Operator who sought to operate its installation continually at the maximum permitted level would almost

inevitably breach those limits regularly, simply by virtue of normal fluctuations in plant performance, resulting in enforcement action (including potentially prosecution) being taken. Assessments based on Chapter III ELVs or BAT AELs are therefore "worst-case" scenarios.

We are satisfied that emissions at the permitted limits would ensure a high level of protection for human health and the environment in any event.

9.2 Consideration of Combustion Plant

The operator has chosen to operate an OCGT plant.

Open cycle gas turbines operate without a heat recovery steam generator (HRSG) and therefore have a lower efficiency when compared with a Combined Cycle Gas Turbine (CCGT). The exhaust gases are emitted to atmosphere without any energy recovery.

Operation of gas turbines in open cycle is not considered a best available technique due to reduced energy efficiency and the potential increase of pollutants released to air in comparison to operating gas turbines in combined cycle mode. However, operating in open cycle enables a quick start up time in order to provide energy to the National Grid to maintain electrical generation for emergency use compared with a CCGT. With no steam turbine generating equipment, OCGTs can start faster and ramp quicker since there are no constraints on a steam turbine to warm-up prior to generation. The comparison of start-up times is significant when dealing with the challenges associated with managing greater capacity of intermittent renewables on the system. The operator is authorised to install one gas turbine for operation in open cycle mode. It does not set BAT for open cycle operation.

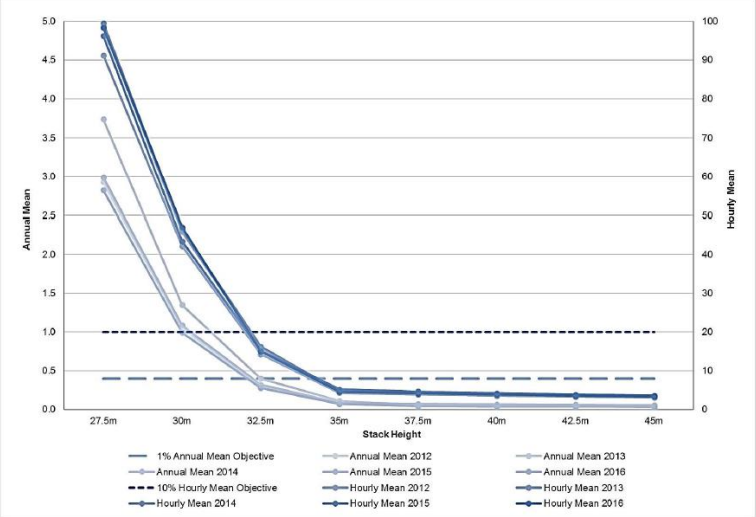
During open cycle operation the turbines will only burn natural gas and the main pollutant of concern will be NO_2. The Operator is restricted to operation in open cycle mode for 1,500 hours in any one year over a five year period with a maximum of 2,500 hours in any one year. The assessment has modelled the impact of emissions conservatively for operation of the turbine for 2,500 hours in one year.

A Short Term Operating Reserve (STOR) contract requires the power station to generate power on demand within specific time windows to support the energy supply requirement of the National Grid. These typically occur six days per week for two periods per day of between approximately 5-6 hours. Generally open cycle runs would typically be two hours or less in duration.

The application specifies that the need to operating gas turbines in open cycle mode is part of improving the resilience of the electrical supply industry and therefore contributes to the emergency preparedness of the country.

Stack height sensitivity testing indicated that a stack height of 32.5m would be required to achieve adequate dispersion of emissions, with the maximum ground level concentrations within the receptor grid as insignificant – see graph below. We accept that this indicates BAT for stack height.

Graph showing stack height sensitivity testing.



9.3 Consideration of emission control measures

We have reviewed the techniques used by the operator and compared these with the relevant guidance notes. The OCGT will be fitted with dry low NOx burners to minimise emissions of NOx.

Emissions of oxides of nitrogen are either considered insignificant (at discrete receptors) or are considered to have adequate headroom between the PEC and EQS to indicate that an exceedance of the EQS is unlikely (maximum grid and in combination assessment).

We consider that the emission limits included in the installation permit reflect the BAT for the sector.

9.4 Energy efficiency

9.4.1 Consideration of energy efficiency

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

1. The use of energy within, and generated by, the Installation which are normal aspects of all EPR permit determinations. This issue is dealt with in this section.
2. The applicability of the combined heat and power ready (CHP-R) guidance to the installation.
3. The extent to which the Installation meets the requirement of Article 14(5) of the Energy Efficiency Directive which requires new thermal electricity generation installations with a total thermal input exceeding 20 MW to carry out a cost-benefit assessment to "*assess the cost and benefits of providing for the operation of the installation as a high-efficiency cogeneration installation*".

   Cogeneration means the simultaneous generation in one process of thermal energy and electrical or mechanical energy and is also known as combined heat and power (CHP)

   High-efficiency co-generation is cogeneration which achieves at least 10% savings in primary energy usage compared to the separate generation of heat and power – see Annex II of the Energy Efficiency Directive for detail on how to calculate this.

4. The extent to which the Applicant has demonstrated energy efficiency in line with the BAT AEELs set out in the BAT Conclusions.

9.4.2 Use of energy within the Installation

The primary considerations of energy efficiency for this site relates to the initial selection of combustion plant as set out in section 9.2 above.

9.4.3 Combined Heat and Power Ready

Our CHP Ready Guidance - February 2013 considers that BAT for energy efficiency for new combustion power 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.

The Installation will generate electricity only and has been specified to maximise electrical output with little or no use of waste heat.

Whilst it is considered that CHP is technically feasible for all types of new plants, it is recognised that in some cases (such as peaking plant) the provision of CHP would not be compatible with original operating regimes / intentions. In this case the Applicant has stated that the OCGT was chosen as the most suitable technology choice for peaking plant based on a BAT assessment and that the chosen technology involves no steam cycle that would enable an offtake for CHP developments. The plant will be limited to 1500 hours per year as a rolling average and we recognise this is unlikely to be compatible with CHP as specified within the Energy Efficiency Directive exemption.

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

The operator is exempt from the need to carry out a cost-benefit assessment under Article 14(6)(a) of the Energy Efficiency Directive because the installation will operate for less than 1,500 operating hours per year as a rolling average over a period of five years.

(i) Permit conditions concerning energy efficiency

The Operator is required to report energy usage and energy generated under condition 4.2 and table S4.2 in Schedule 4. This will enable the Environment Agency to monitor energy efficiency at the Installation and take action if at any stage the energy 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.

9.4.5 Compliance with energy BAT AEELs set out in BAT Conclusions

The BAT AEELs do not apply to plant operating <1500 hours however, the operator has specified that the OCGT will be 39% efficient which is within the range specified in the BAT Conclusions of 36 – 41.5% efficient.

9.4.4 Choice of Cooling System

The current practice for operation of GTs is to exhaust the combustion gases via the Heat Recovery Steam Generator (HRSG), but cooling is required. The proposed cooling system is in the form of air cooled fin-fan coolers. We consider that it is unlikely that water cooling would be considered BAT for plant will be limited to 1,500 hours per year as a rolling average.

10. Emission limits

The operator has proposed limits in line with part 2 annex V of the IED and BAT AELs set out within the BAT Conclusions for Large Combustion Plant. As discussed in section 8 above, emissions at these limits will not cause significant pollution. Consequently we have accepted the proposed limits and incorporated them into table 3.1 of the permit. Annex V of the IED is a backstop and these limits are included where there is no tighter limit specified within the BAT Conclusions.

The BAT Conclusions specify that the AELs will apply when dry low NOx (DLN) is effective. We have specified an improvement condition IC6 requiring the operator to define an output load or operational parameters and provide a written justification for when the dry low NO_x operation is effective. The report shall also include the NO_x profile through effective dry low NO_x to 70% and then to full load.

The Operator is also required to propose achievable emission limit values (ELV) for NO_x and CO expressed as a daily mean of validated hourly averages from Minimum start-up load (MSUL) to baseload through improvement condition IC7.

The annual AEL for CO from the BAT Conclusions is indicative. At this stage the Operator did not have adequate information to demonstrate whether the selected plant can meet the CO AEL. We have included improvement condition IC5 specifying that the Operator is required to propose an achievable ELV for carbon monoxide expressed as an annual mean of validated hourly averages within 4 months following commissioning. If the proposed ELV deviates from the indicative BAT AEL for CO of 40mg/m^3 then an associated BAT justification will need to be submitted to the Environment Agency as a written report.

Parameter	Reference Period	Annex V mg/m^3	BAT AEL	Permit limit mg/m3
NO_x	95%ile of hourly averages	100	-	100
	Monthly averages	50	-	50
	Daily average or average over the sampling period	-	50	50
	Yearly average	-	35	35

CO	95%ile of hourly averages	200	-	200
	Monthly averages	100	-	100
	Daily average or average over the sampling period	110	-	110
	Yearly average	-	40	To be confirmed under improvement condition IC5

11. Monitoring & Reporting

Gas fired plant:

Sulphur dioxide emissions from natural gas firing of gas turbines and boilers will be reported as six monthly concentrations on the basis of the fuel sulphur content without continuous or periodic monitoring since only trace quantities of sulphur are present in UK natural gas. For gas turbines we have not required any reporting as the dust emissions will always be reported as zero. This is because natural gas is an ash-free fuel and high efficiency combustion in the gas turbine does not generate additional particulate matter. The fuel gas is always filtered and, in the case of gas turbines, the inlet air is also filtered resulting in a lower dust concentration in the flue than in the surrounding air.

The IED Annex V ELVs and BAT Conclusions AELs for oxides of nitrogen and carbon monoxide apply to OCGTs.

Standards:

Standards for assessment of the monitoring location and for measurement of oxygen, water vapour, temperature and pressure have been added to the permit.

A row has been included in table S3.1 which requires the operator to confirm compliance with BS EN 15259 in respect of monitoring location and stack gas velocity profile in the event there is a significant operational change (such as a change of fuel type) to the LCP.

Notifications:

A breach of permit condition is NOT implicit in notification under Part C.

Resource efficiency metrics:

A more comprehensive suite of reporting metrics has been added to the permit template for Electrical Supply Industry (ESI) plant. Table S4.2 “Resource Efficiency Metrics” has been added requiring the reporting of various resource parameters, as this is an ESI power plant. This table is being used for all ESI plant.

12. Meeting the requirements of the IED

The table below shows how each requirement of the IED has been addressed by the permit conditions.

IED Article Reference	IED requirement	Permit condition
30(6)	If there is an interruption in the supply of gas, an alternative fuel may be used and the permit emission limits deferred for a period of up to 10 days, except where there is an overriding need to maintain energy supplies. The EA shall be notified immediately.	N/A – plant runs on natural gas only

IED Article Reference	IED requirement	Permit condition
32(4)	For installations that have applied to derogate from the IED Annex V emission limits by means of the transitional national plan, the monitoring and reporting requirements set by UK Government shall be complied with.	N/A – applies to existing plant only
33(1)b	For installations that have applied to derogate from the IED Annex V emission limits by means of the Limited Life Derogation, the operator shall submit annually a record of the number of operating hours since 1 January 2016.	N/A – applies to existing plant only
37	Provisions for malfunction and breakdown of abatement equipment including notifying the EA.	N/A
38	Monitoring of air emissions in accordance with Ann V Pt 3	3.5, 3.6
40	Multi-fuel firing	N/A – no multi fuel firing
41(a)	Determination of start-up and shut-down periods	2.3.6 Schedule 1 Table S1.5
Ann V Pt 1(1)	All emission limit values shall be calculated at a temperature of 273,15 K, a pressure of 101,3 kPa and after correction for the water vapour content of the waste gases and at a standardised O2 content of 6 % for solid fuels, 3 % for combustion plants, other than gas turbines and gas engines using liquid and gaseous fuels and 15 % for gas turbines and gas engines.	Schedule 6, Interpretation
Ann V Pt 1	Emission limit values	3.1.2 Schedule 3, Table S3.1
Ann V Pt 1	For plants operating less than 500 hours per year, record the used operating hours	N/A
Ann V Pt 1(6(1))	Definition of natural gas	Schedule 6, Interpretation
Ann V Pt 2	Emission limit values	3.1.2 Schedule 3, Table S3.1
AnnV Pt 3(1)	Continuous monitoring for >100MWth for specified substances	3.5, 3.6 Schedule 3, Table S3.1
AnnV Pt 3(2, 3, 5)	Monitoring derogations	3.5.1 Schedule 3, Table S3.1
AnnV Pt3(4)	Measurement of total mercury	3.5.1 Schedule 3, Table S3.1
AnnV Pt3(6)	EA informed of significant changes in fuel type or in mode of operation so can check Pt3 (1-4) still apply	2.3.1 Schedule 1, Table S1.2
AnnV Pt3(7)	Monitoring requirements	3.5.1 Schedule 3, Table S3.1
AnnV Part 3(8,9,10)	Monitoring methods	3.5, 3.6
AnnV Pt 4	Monthly, daily, 95%ile hourly emission limit value compliance	3.5.1 Schedule 3, Table S3.1
AnnV Pt7	Refinery multi-fuel firing SO_2 derogation	3.5.1 Schedule 3, Table S3.1

13. Meeting the requirements of the BAT Conclusions

This annex provides a record of decisions made in relation to each relevant BAT Conclusion considered potentially applicable to the installation. This table should be read in conjunction with the permit.

The overall status of compliance with the BAT conclusion is indicated in the table as:

NA Not Applicable

CC Currently Compliant

FC Compliant in the future (within 4 years of publication of BAT conclusions) or where plant not built yet but will be compliance once operational

NC Not Compliant

PC Partially Compliant

BAT Concn. Number	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement	Relevant permit condition(s)
General				
1	**In order to improve the overall environmental performance of the plants for the refining of mineral oil and gas, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features:** i. commitment of the management, including senior management; ii. definition of an environmental policy that includes the continuous improvement of the installation by the management; iii. planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment; iv. implementation of procedures (a) Structure and responsibility (b) Training (c) Communication (d) Employee involvement (e) Documentation (f) Efficient process control (g) Maintenance programmes (h) Emergency preparedness and response (i) Safeguarding compliance with environmental legislation v. checking performance and taking corrective action, paying particular attention to: (a) monitoring and measurement (see also the Reference Document on the General Principles of Monitoring) (b) corrective and preventive action (c) maintenance of records (d) independent (where practicable) internal and external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been	FC	An EMS will be in place at the installation and will be certified to ISO14001.	1.1.1

<table>
<tr><th>BAT Concn. Number</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th><th>Relevant permit condition(s)</th></tr>
<tr><td></td><td>properly implemented and maintained;

vi. review of the EMS and its continuing suitability, adequacy and effectiveness by senior management;

vii. following the development of cleaner technologies;

viii. consideration for the environmental impacts from the eventual decommissioning of the installation at the stage of designing a new plant, and throughout its operating life;

viii. consideration for the environmental impacts from the eventual decommissioning of the installation at the stage of designing a new plant, and throughout its operating life;

ix. application of sectoral benchmarking on a regular basis.

Applicability. The scope (e.g. level of detail) and nature of the EMS (e.g. standardised or non-standardised) will generally be related to the nature, scale and complexity of the installation, and the range of environmental impacts it may have.</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>BAT is to determine the net electrical efficiency and/or the net total fuel utilisation and/or the net mechanical energy efficiency of the gasification, IGCC and/or combustion units by carrying out a performance test at full load (1), according to EN standards, after the commissioning of the unit and after each modification that could significantly affect the net electrical efficiency and/or the net total fuel utilisation and/or the net mechanical energy efficiency of the unit. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.</td><td>FC</td><td>A process monitoring table specifies that the operator shall determine the net electrical efficiency after commissioning.</td><td>S3.3</td></tr>
<tr><td>3</td><td>BAT is to monitor key process parameters relevant for emissions to air and water including those given below.
<table><tr><th>Stream</th><th>Parameter(s)</th><th>Monitoring</th></tr><tr><td rowspan="3">Flue-gas</td><td>Flow</td><td>Periodic or continuous determination</td></tr><tr><td>Oxygen content, temperature, and pressure</td><td rowspan="2">Periodic or continuous measurement</td></tr><tr><td>Water vapour content (3)</td></tr></table></td><td>FC</td><td>Monitoring parameters specified within the permit emissions table S3.1.</td><td>3.1.1 and 3.5.1 and table S3.1</td></tr>
</table>

<table>
<tr><th>BAT Concn. Number</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th><th>Relevant permit condition(s)</th></tr>
<tr><td></td><td>
<table>
<tr><td>Waste water from flue-gas treatment</td><td>Flow, pH, and temperature</td><td>Continuous measurement</td></tr>
</table>
</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td>BAT is to monitor emissions to air with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.
<table>
<tr><th>Substance/Parameter</th><th>Fuel/Process/Type of combustion plant</th><th>Combustion plant total rated thermal input</th><th>Standard(s) [4]</th><th>Minimum monitoring frequency [5]</th><th>Monitoring associated with</th></tr>
<tr><td>NH_3</td><td>— When SCR and/or SNCR is used</td><td>All sizes</td><td>Generic EN standards</td><td>Continuous [6] [7]</td><td>BAT 7</td></tr>
<tr><td>NO_X</td><td>— Coal and/or lignite including waste co-incineration
— Solid biomass and/or peat including waste co-incineration
— HFO- and/or gas-oil-fired boilers and engines
— Gas-oil-fired gas turbines
— Natural-gas-fired boilers, engines, and turbines
— Iron and steel process gases
— Process fuels from the chemical industry</td><td>All sizes</td><td>Generic EN standards</td><td>Continuous [6] [8]</td><td>BAT 20
BAT 24
BAT 28
BAT 32
BAT 37
BAT 41
BAT 42
BAT 43
BAT 47
BAT 48
BAT 56
BAT 64
BAT 65
BAT 73</td></tr>
</table>
</td><td>FC</td><td>NOx, CO and SO_2 monitoring specified in table S3.1 for the gas turbine. Other parameters are not applicable to this plant.</td><td>3.1.1 and 3.5.1 and table S3.1</td></tr>
</table>

BAT Concn. Number	Summary of BAT Conclusion requirement						Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement	Relevant permit condition(s)
		— IGCC plants							
		— Combustion plants on offshore platforms	All sizes	EN 14792	Once every year (9)	BAT 53			
	N_2O	— Coal and/or lignite in circulating fluidised bed boilers — Solid biomass and/or peat in circulating fluidised bed boilers	All sizes	EN 21258	Once every year (10)	BAT 20 BAT 24			
	CO	— Coal and/or lignite including waste co-incineration — Solid biomass and/or peat including waste co-incineration — HFO- and/or gas-oil-fired boilers and engines — Gas-oil-fired gas turbines — Natural-gas-fired boilers, engines, and turbines — Iron and steel process gases — Process fuels from the chemical industry — IGCC plants	All sizes	Generic EN standards	Continuous (6) (8)	BAT 20 BAT 24 BAT 28 BAT 33 BAT 38 BAT 44 BAT 49 BAT 56 BAT 64 BAT 65 BAT 73			

BAT Concn. Number	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement	Relevant permit condition(s)
	<table><tr><td></td><td>— Combustion plants on offshore platforms</td><td>All sizes</td><td>EN 15058</td><td>Once every year (9)</td><td>BAT 54</td></tr><tr><td>SO_2</td><td>— Coal and/or lignite incl waste co-incineration — Solid biomass and/or peat incl waste co-incineration — HFO- and/or gas-oil-fired boilers — HFO- and/or gas-oil-fired engines — Gas-oil-fired gas turbines — Iron and steel process gases — Process fuels from the chemical industry in boilers — IGCC plants</td><td>All sizes</td><td>Generic EN standards and EN 14791</td><td>Continuous (6) (11) (12)</td><td>BAT 21 BAT 25 BAT 29 BAT 34 BAT 39 BAT 50 BAT 57 BAT 66 BAT 67 BAT 74</td></tr><tr><td>SO_3</td><td>— When SCR is used</td><td>All sizes</td><td>No EN standard available</td><td>Once every year</td><td>—</td></tr></table>			
5	BAT is to monitor emissions to water from flue-gas treatment with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	NA	This BAT Conclusion is not applicable to this site because there is no flue-gas treatment.	
6	In order to improve the general environmental performance of combustion plants and to reduce emissions to air of CO and unburnt substances, BAT is to ensure optimised combustion and to use an appropriate combination of the techniques given below.	FC	(a) NA natural gas use only. (b) Regular and	Conditions 1.1.1 and 2.3

BAT Concn. Number	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement	Relevant permit condition(s)

	Technique	Description	Applicability
a.	Fuel blending and mixing	Ensure stable combustion conditions and/or reduce the emission of pollutants by mixing different qualities of the same fuel type	Generally applicable
b.	Maintenance of the combustion system	Regular planned maintenance according to suppliers' recommendations	
c.	Advanced control system	See description in Section 8.1	The applicability to old combustion plants may be constrained by the need to retrofit the combustion system and/or control command system
d.	Good design of the combustion equipment	Good design of furnace, combustion chambers, burners and associated devices	Generally applicable to new combustion plants
e.	Fuel choice	Select or switch totally or partially to another fuel(s) with a better environmental profile (e.g. with low sulphur and/or mercury content) amongst the available fuels, including in start-up situations or when back-up fuels are used	Applicable within the constraints associated with the availability of suitable types of fuel with a better environmental profile as a whole, which may be impacted by the energy policy of the Member State, or by the integrated site's fuel balance in the case of combustion of industrial process fuels. For existing combustion plants, the type of fuel chosen may be limited by the configuration and the design of the plant

planned maintenance will be implemented.

(c) An advanced control system will be implemented to automatically control and optimise combustion efficiency and manage prevention and reduction of emissions

(d) The combustion system selected will be of a proven design.

(e) Only natural gas will be used including for start up and shut down.

BAT Concn. Number	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement	Relevant permit condition(s)
7	In order to reduce emissions of ammonia to air from the use of selective catalytic reduction (SCR) and/or selective non-catalytic reduction (SNCR) for the abatement of NO_X emissions, BAT is to optimise the design and/or operation of SCR and/or SNCR (e.g. optimised reagent to NO_X ratio, homogeneous reagent distribution and optimum size of the reagent drops). **BAT-associated emission levels** The BAT-associated emission level (BAT-AEL) for emissions of NH_3 to air from the use of SCR and/or SNCR is < 3–10 mg/Nm^3 as a yearly average or average over the sampling period. The lower end of the range can be achieved when using SCR and the upper end of the range can be achieved when using SNCR without wet abatement techniques. In the case of plants combusting biomass and operating at variable loads as well as in the case of engines combusting HFO and/or gas oil, the higher end of the BAT-AEL range is 15 mg/Nm^3.	NA	This BAT Conclusion is not applicable to this site because there is no SCR.	
8	In order to prevent or reduce emissions to air during normal operating conditions, BAT is to ensure, by appropriate design, operation and maintenance, that the emission abatement systems are used at optimal capacity and availability.	NA	This BAT Conclusion is not applicable to this site because there is no abatement on site.	
9	In order to improve the general environmental performance of combustion and/or gasification plants and to reduce emissions to air, BAT is to include the following elements in the quality assurance/quality control programmes for all the fuels used, as part of the environmental management system (see BAT 1): (i) Initial full characterisation of the fuel used including at least the parameters listed below and in accordance with EN standards. ISO, national or other international standards may be used provided they ensure the provision of data of an equivalent scientific quality; (ii) Regular testing of the fuel quality to check that it is consistent with the initial characterisation and according to the plant design specifications. The frequency of testing and the parameters chosen from the table below are based on the variability of the fuel and an assessment of the relevance of pollutant releases (e.g. concentration in fuel, flue-gas treatment employed); (iii) Subsequent adjustment of the plant settings as and when needed and practicable (e.g. integration of the fuel characterisation and control in the advanced control system (see description in Section 8.1)). ***Description*** Initial characterisation and regular testing of the fuel can be performed by the operator and/or the fuel supplier. If performed by the supplier, the full results are provided to the	FC	As the natural gas supplied by the National Grid is required to meet a standard we consider acceptable environmentally we have decided that plant fuelled on natural gas from the grid will not require characterisation or testing.	1.1.1 and 2.3

BAT Concn. Number	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement	Relevant permit condition(s)
	operator in the form of a product (fuel) supplier specification and/or guarantee. **Fuel(s)** / **Substances/Parameters subject to characterisation** Biomass/peat: — LHV; — moisture Biomass/peat: — Ash; — C, Cl, F, N, S, K, Na; — Metals and metalloids (As, Cd, Cr, Cu, Hg, Pb, Zn) Natural gas: — LHV; — CH_4, C_2H_6, C_3, C_4+, CO_2, N_2, Wobbe index			
10	In order to reduce emissions to air and/or to water during other than normal operating conditions (OTNOC), BAT is to set up and implement a management plan as part of the environmental management system (see BAT 1), commensurate with the relevance of potential pollutant releases, that includes the following elements: — appropriate design of the systems considered relevant in causing OTNOC that may have an impact on emissions to air, water and/or soil (e.g. low-load design concepts for reducing the minimum start-up and shutdown loads for stable generation in gas turbines), — set-up and implementation of a specific preventive maintenance plan for these relevant systems, — review and recording of emissions caused by OTNOC and associated circumstances and implementation of corrective actions if necessary, — periodic assessment of the overall emissions during OTNOC (e.g. frequency of events, duration, emissions quantification/estimation) and implementation of corrective actions if necessary.	NA	This BAT Conclusion is not applicable to this site because there is no provision for other than normal operations.	
11	BAT is to appropriately monitor emissions to air and/or to water during OTNOC. ***Description*** The monitoring can be carried out by direct measurement of emissions or by monitoring of surrogate parameters if this proves to be of equal or better scientific quality than the direct measurement of emissions. Emissions during start-up and shutdown (SU/SD) may be assessed based on a detailed emission measurement carried out for a typical SU/SD procedure at least once every year, and using the results of this measurement to estimate	NA	This BAT Conclusion is not applicable to this site because there is no provision for other than normal operations.	

<table>
<tr><th>BAT Concn. Number</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th><th>Relevant permit condition(s)</th></tr>
<tr><td></td><td>the emissions for each and every SU/SD throughout the year.</td><td></td><td></td><td></td></tr>
<tr><td>12</td><td>In order to increase the energy efficiency of combustion, gasification and/or IGCC units operated ≥ 1 500 h/yr, BAT is to use an appropriate combination of the techniques.</td><td>NA</td><td>This BAT Conclusion is not applicable to this site as it operates <1500 hours</td><td></td></tr>
<tr><td>13</td><td>In order to reduce water usage and the volume of contaminated waste water discharged, BAT is to use one or both of the techniques given below.
<table>
<tr><th colspan="2">Technique</th><th>Description</th><th>Applicability</th></tr>
<tr><td>a.</td><td>Water recycling</td><td>Residual aqueous streams, including run-off water, from the plant are reused for other purposes. The degree of recycling is limited by the quality requirements of the recipient water stream and the water balance of the plant</td><td>Not applicable to waste water from cooling systems when water treatment chemicals and/or high concentrations of salts from seawater are present</td></tr>
<tr><td>b.</td><td>Dry bottom ash handling</td><td>Dry, hot bottom ash falls from the furnace onto a mechanical conveyor system and is cooled down by ambient air. No water is used in the process.</td><td>Only applicable to plants combusting solid fuels.
There may be technical restrictions that prevent retrofitting to existing combustion plants</td></tr>
</table></td><td>FC

NA</td><td>(a) Water use at the site will be limited to fire water, inlet fogging during periods of high temperature and compressor blade washing. Demineralised water would be required for inlet fogging and compressor blade washing. Recycling of run-off water is not applicable due to the quality requirements of these systems.
(b) No ash handing on site so NA.</td><td>1.1.1 and 2.3</td></tr>
<tr><td>14</td><td>In order to prevent the contamination of uncontaminated waste water and to reduce emissions to water, BAT is to segregate waste water streams and to treat them separately, depending on the pollutant content.
Description
Waste water streams that are typically segregated and treated include surface run-off water, cooling water, and waste water from flue-gas treatment.
Applicability
The applicability may be restricted in the case of existing plants due to the configuration of the drainage systems.</td><td>FC</td><td>A minimal number of waste water streams will be present on site - these are dealt with separately. Surface water runoff is not mixed with process effluent.</td><td></td></tr>
</table>

<table>
<tr><th>BAT Concn. Number</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th><th>Relevant permit condition(s)</th></tr>
<tr><td>15</td><td>In order to reduce emissions to water from flue-gas treatment, BAT is to use an appropriate combination of the techniques given below, and to use secondary techniques as close as possible to the source in order to avoid dilution.</td><td>NA</td><td>This BAT Conclusion is not applicable to this site as there is no flue gas treatment on the site.</td><td></td></tr>
<tr><td>16</td><td>In order to reduce the quantity of waste sent for disposal from the combustion and/or gasification process and abatement techniques, BAT is to organise operations so as to maximise, in order of priority and taking into account life-cycle thinking:
(a) waste prevention, e.g. maximise the proportion of residues which arise as by-products;
(b) waste preparation for reuse, e.g. according to the specific requested quality criteria;
(c) waste recycling;
(d) other waste recovery (e.g. energy recovery),
by implementing an appropriate combination of techniques such as:
<table>
<tr><th colspan="2">Technique</th><th>Description</th><th>Applicability</th></tr>
<tr><td>a.</td><td>Generation of gypsum as a by-product</td><td>Quality optimisation of the calcium-based reaction residues generated by the wet FGD so that they can be used as a substitute for mined gypsum (e.g. as raw material in the plasterboard industry). The quality of limestone used in the wet FGD influences the purity of the gypsum produced</td><td>Generally applicable within the constraints associated with the required gypsum quality, the health requirements associated to each specific use, and by the market conditions</td></tr>
<tr><td>b.</td><td>Recycling or recovery of residues in the construction sector</td><td>Recycling or recovery of residues (e.g. from semi-dry desulphurisation processes, fly ash, bottom ash) as a construction material (e.g. in road building, to replace sand in concrete</td><td>Generally applicable within the constraints associated with the required material quality (e.g. physical properties, content of harmful substances) associated to each specific use, and by the</td></tr>
</table></td><td>FC

NA

NA</td><td>The site is unlikely to generate significant quantities of waste. No ash residue. Any materials that are removed from site will be recycled or retained as spares.

No generation of gypsum on site

No generation of residues</td><td>1.4</td></tr>
</table>

BAT Concn. Number	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement	Relevant permit condition(s)
	<table><tr><td></td><td></td><td>production, or in the cement industry)</td><td>market conditions</td></tr><tr><td>c.</td><td>Energy recovery by using waste in the fuel mix</td><td>The residual energy content of carbon-rich ash and sludges generated by the combustion of coal, lignite, heavy fuel oil, peat or biomass can be recovered for example by mixing with the fuel</td><td>Generally applicable where plants can accept waste in the fuel mix and are technically able to feed the fuels into the combustion chamber</td></tr><tr><td>d.</td><td>Preparation of spent catalyst for reuse</td><td>Preparation of catalyst for reuse (e.g. up to four times for SCR catalysts) restores some or all of the original performance, extending the service life of the catalyst to several decades. Preparation of spent catalyst for reuse is integrated in a catalyst management scheme</td><td>The applicability may be limited by the mechanical condition of the catalyst and the required performance with respect to controlling NO_x and NH_3 emissions</td></tr></table>	NA NA	No acceptance of waste. No catalyst used on site.	
17	In order to reduce noise emissions, BAT is to use one or a combination of the techniques given below. <table><tr><th colspan="2">Technique</th><th>Description</th><th>Applicability</th></tr><tr><td>a.</td><td>Operational measures</td><td>These include: — improved inspection and maintenance of equipment — closing of doors and windows of enclosed areas, if possible — equipment operated by experienced staff — avoidance of noisy activities at night, if possible</td><td>Generally applicable</td></tr></table>	FC	Maintenance visits to take place. Due to the plant being peaking plant it is unlikely that it will be operated at night. Low noise equipment will be selected and mitigation measures used where possible. A silencer will be fitted to the stack.	3.4 and PO5

BAT Concn. Number	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement	Relevant permit condition(s)
	<table><tr><td></td><td></td><td>— provisions for noise control during maintenance activities</td><td></td></tr><tr><td>b.</td><td>Low-noise equipment</td><td>This potentially includes compressors, pumps and disks</td><td>Generally applicable when the equipment is new or replaced</td></tr><tr><td>c.</td><td>Noise attenuation</td><td>Noise propagation can be reduced by inserting obstacles between the emitter and the receiver. Appropriate obstacles include protection walls, embankments and buildings</td><td>Generally applicable to new plants. In the case of existing plants, the insertion of obstacles may be restricted by lack of space</td></tr><tr><td>d.</td><td>Noise-control equipment</td><td>This includes: — noise-reducers — equipment insulation — enclosure of noisy equipment — soundproofing of buildings</td><td>The applicability may be restricted by lack of space</td></tr><tr><td>e.</td><td>Appropriate location of equipment and buildings</td><td>Noise levels can be reduced by increasing the distance between the emitter and the receiver and by using buildings as noise screens</td><td>Generally applicable to new plant</td></tr></table>			
Combustion of gaseous fuels				
40	In order to increase the energy efficiency of natural gas combustion, BAT is to use an appropriate combination of the techniques given in BAT 12 and below. <table><tr><th colspan="2">Technique</th><th>Description</th><th>Applicability</th></tr><tr><td>a</td><td>Combined</td><td>See description in</td><td>Generally applicable to new gas turbines and engines except</td></tr></table>	NA	This BAT Conclusion is not applicable to this installation as the gas turbine operates <1500 hours. However, the operator has confirmed that	

<table>
<tr><th>BAT Concn. Number</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th><th>Relevant permit condition(s)</th></tr>
<tr><td></td><td>
<table>
<tr><td>.</td><td>cycle</td><td>Section 8.2</td><td>when operated < 1 500 h/yr.
Applicable to existing gas turbines and engines within the constraints associated with the steam cycle design and the space availability.
Not applicable to existing gas turbines and engines operated < 1 500 h/yr.
Not applicable to mechanical drive gas turbines operated in discontinuous mode with extended load variations and frequent start-ups and shutdowns.
Not applicable to boilers</td></tr>
</table>
BAT-associated energy efficiency levels (BAT-AEELs) for the combustion of natural gas
<table>
<tr><th rowspan="2">Type of combustion unit</th><th colspan="5">BAT-AEELs (136) (137)</th></tr>
<tr><th colspan="2">Net electrical efficiency (%)</th><th>Net total fuel utilisation (%) (138) (139)</th><th colspan="2">Net mechanical energy efficiency (%) (139) (140)</th></tr>
<tr><th>New unit</th><th>Existing unit</th><th></th><th>New unit</th><th>Existing unit</th></tr>
<tr><td>Gas engine</td><td>39,5–44 (141)</td><td>35–44 (141)</td><td>56–85 (141)</td><td colspan="2">No BAT-AEEL.</td></tr>
<tr><td>Gas-fired boiler</td><td>39–42,5</td><td>38–40</td><td>78–95</td><td colspan="2">No BAT-AEEL.</td></tr>
<tr><td>Open cycle gas turbine, ≥ 50 MWth</td><td>36–41,5</td><td>33–41,5</td><td>No BAT-AEEL</td><td>36,5–41</td><td>33,5–41</td></tr>
</table>
</td><td></td><td>the efficiency of the plant will be 39% which is within the range specified within the BAT AEELs.</td><td></td></tr>
<tr><td>41</td><td>In order to prevent or reduce NO_X emissions to air from the combustion of natural gas in boilers, BAT is to use one or a combination of the techniques specified.</td><td>NA</td><td>This BAT conclusion is not applicable to this site as there are no boilers on site</td><td></td></tr>
<tr><td>42</td><td>In order to prevent or reduce NO_X emissions to air from the combustion of natural gas in gas turbines, BAT is to use one or a combination of the techniques given below.
<table>
<tr><th colspan="2">Technique</th><th>Description</th><th>Applicability</th></tr>
<tr><td>a.</td><td>Advanced control system</td><td>See description in Section 8.3.
This technique is often used in combination with other techniques or may be used alone</td><td>The applicability to old combustion plants may be constrained by the need to retrofit the combustion system</td></tr>
</table>
</td><td>FC</td><td>(a) An advanced electronic control system will be implemented to automatically control and optimise combustion efficiency and manage prevention and</td><td></td></tr>
</table>

BAT Concn. Number	Summary of BAT Conclusion requirement				Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement	Relevant permit condition(s)
			for combustion plants operated < 500 h/yr	and/or control command system		reduction of emissions. (b) NA (OCGT with no steam cycle) (c) Dry low NOx burners will be fitted. (d) An advanced electronic control system will be implemented to optimise combustion efficiency and manage emissions. (e) Dry low NOx burners fitted. (f) NA as no SCR.	
	b.	Water/steam addition	See description in Section 8.3	The applicability may be limited due to water availability			
	c.	Dry low-NO_X burners (DLN)		The applicability may be limited in the case of turbines where a retrofit package is not available or when water/steam addition systems are installed			
	d.	Low-load design concept	Adaptation of the process control and related equipment to maintain good combustion efficiency when the demand in energy varies, e.g. by improving the inlet airflow control capability or by splitting the combustion process into decoupled combustion stages	The applicability may be limited by the gas turbine design			
	e.	Low-NO_X burners (LNB)	See description in Section 8.3	Generally applicable to supplementary firing for heat recovery steam generators (HRSGs) in the case of combined-cycle gas turbine (CCGT) combustion plants			
	f.	Selective catalytic reduction (SCR)		Not applicable in the case of combustion plants operated < 500 h/yr. Not generally applicable to existing combustion plants of < 100 MW_{th}. Retrofitting existing combustion plants may be constrained by the availability of sufficient space.			

<table>
<tr><th>BAT Concn. Number</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th><th>Relevant permit condition(s)</th></tr>
<tr><td></td><td>
<table>
<tr><td></td><td></td><td></td><td>There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr</td></tr>
</table>
</td><td></td><td></td><td></td></tr>
<tr><td>43</td><td>In order to prevent or reduce NO_X emissions to air from the combustion of natural gas in engines, BAT is to use one or a combination of the techniques specified.</td><td>NA</td><td>This BAT conclusion is not applicable to this site as there are no engines on site</td><td></td></tr>
<tr><td>44</td><td>In order to prevent or reduce CO emissions to air from the combustion of natural gas, BAT is to ensure optimised combustion and/or to use oxidation catalysts.
Description - See descriptions in Section 8.3.
BAT-associated emission levels (BAT-AELs) for NO_X emissions to air from the combustion of natural gas in gas turbines
<table>
<tr><th rowspan="2">Type of combustion plant</th><th rowspan="2">Combustion plant total rated thermal input (MW_{th})</th><th colspan="2">BAT-AELs (mg/Nm^3) (142) (143)</th></tr>
<tr><th>Yearly average (144) (145)</th><th>Daily average or average over the sampling period</th></tr>
<tr><td colspan="4">Open-cycle gas turbines (OCGTs) (146) (147)</td></tr>
<tr><td>New OCGT</td><td>≥ 50</td><td>15–35</td><td>25–50</td></tr>
<tr><td>Existing OCGT (excluding turbines for mechanical drive applications) — All but plants operated < 500 h/yr</td><td>≥ 50</td><td>15–50</td><td>25–55 (148)</td></tr>
<tr><td colspan="4">Combined-cycle gas turbines (CCGTs) (146) (149)</td></tr>
<tr><td>New CCGT</td><td>≥ 50</td><td>10–30</td><td>15–40</td></tr>
<tr><td>Existing CCGT with a net total fuel utilisation of < 75 %</td><td>≥ 600</td><td>10–40</td><td>18–50</td></tr>
<tr><td>Existing CCGT with a net total fuel utilisation of ≥ 75 %</td><td>≥ 600</td><td>10–50</td><td>18–55 (150)</td></tr>
<tr><td>Existing CCGT with a net total fuel utilisation of < 75 %</td><td>50–600</td><td>10–45</td><td>35–55</td></tr>
</table>
</td><td>FC</td><td>The relevant BAT AELs are specified in table S3.1

The annual AEL for CO from the BAT Conclusions is indicative. At this stage the Operator did not have adequate information to demonstrate whether the selected plant can meet the CO AEL. We have included an improvement condition specifying that the Operator is required to propose an achievable ELV for carbon monoxide expressed as an annual mean of validated hourly averages within 4 months following commissioning. If the proposed ELV deviates from the indicative BAT AEL for CO of 40mg/m^3 then an associated BAT justification</td><td>3.5 and table S3.1 and IC5 and IC6</td></tr>
</table>

BAT Concn. Number	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement	Relevant permit condition(s)

Existing CCGT with a net total fuel utilisation of ≥ 75 %	50–600	25–50 (151)	35–55 (152)

Open- and combined-cycle gas turbines

Gas turbine put into operation no later than 27 November 2003, or existing gas turbine for emergency use and operated < 500 h/yr	≥ 50	No BAT-AEL	60–140 (153) (154)
Existing gas turbine for mechanical drive applications — All but plants operated < 500 h/yr	≥ 50	15–50 (155)	25–55 (156)

As an indication, the yearly average CO emission levels for each type of existing combustion plant operated ≥ 1 500 h/yr and for each type of new combustion plant will generally be as follows:

— New OCGT of ≥ 50 MW_{th}: < 5–40 mg/Nm^3. For plants with a net electrical efficiency (EE) greater than 39 %, a correction factor may be applied to the higher end of this range, corresponding to [higher end] × EE/39, where EE is the net electrical energy efficiency or net mechanical energy efficiency of the plant determined at ISO baseload conditions.

— Existing OCGT of ≥ 50 MW_{th} (excluding turbines for mechanical drive applications): < 5–40 mg/Nm^3. The higher end of this range will generally be 80 mg/Nm^3 in the case of existing plants that cannot be fitted with dry techniques for NO_X reduction, or 50 mg/Nm^3 for plants that operate at low load.

— New CCGT of ≥ 50 MW_{th}: < 5–30 mg/Nm^3. For plants with a net electrical efficiency (EE) greater than 55 %, a correction factor may be applied to the higher end of the range, corresponding to [higher end] × EE/55, where EE is the net electrical energy efficiency of the plant determined at ISO baseload conditions.

— Existing CCGT of ≥ 50 MW_{th}: < 5–30 mg/Nm^3. The higher end of this range will generally be 50 mg/Nm^3 for plants that operate at low load.

— Existing gas turbines of ≥ 50 MW_{th} for mechanical drive applications: < 5–40 mg/Nm^3. The higher end of the range will generally be 50 mg/Nm^3 when plants operate at low load.

In the case of a gas turbine equipped with DLN burners, these indicative levels correspond to when the DLN operation is effective.

BAT-associated emission levels (BAT-AELs) for NO_X emissions to air from the combustion of natural gas in boilers and engines

Type of	BAT-AELs (mg/Nm^3)

will need to be submitted to the Environment Agency as a written report.

Improvement condition IC6 requires the operator to define an output load or operational parameters and provide a written justification for when the dry low NO_x operation is effective. The report shall also include the NO_x profile through effective dry low NO_x to 70% and then to full load.

The Operator is also required to propose achievable emission limit values (ELV) for NO_x and CO expressed as a daily mean of validated hourly averages from Minimum start-up load (MSUL) to baseload through improvement condition IC7.

See section 10 – Emissions for further information.

<table>
<tr><th>BAT Concn. Number</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th><th>Relevant permit condition(s)</th></tr>
<tr><td></td><td>
<table>
<tr><th>combustion plant</th><th colspan="2">Yearly average (157)</th><th colspan="2">Daily average or average over the sampling period</th></tr>
<tr><th></th><th>New plant</th><th>Existing plant (158)</th><th>New plant</th><th>Existing plant (159)</th></tr>
<tr><td>Boiler</td><td>10–60</td><td>50–100</td><td>30–85</td><td>85–110</td></tr>
<tr><td>Engine (160)</td><td>20–75</td><td>20–100</td><td>55–85</td><td>55–110 (161)</td></tr>
</table>
As an indication, the yearly average CO emission levels will generally be:
— < 5–40 mg/Nm^3 for existing boilers operated ≥ 1 500 h/yr,
— < 5–15 mg/Nm^3 for new boilers,
— 30–100 mg/Nm^3 for existing engines operated ≥ 1 500 h/yr and for new engines.</td><td></td><td></td><td></td></tr>
<tr><td>45</td><td>In order to reduce non-methane volatile organic compounds (NMVOC) and methane (CH_4) emissions to air from the combustion of natural gas in spark-ignited lean-burn gas engines, BAT is to ensure optimised combustion and/or to use oxidation catalysts.</td><td>NA</td><td>This BAT conclusion is not applicable to this site as there are no engines on site</td><td></td></tr>
</table>

Annex 1 Decision checklist

Aspect considered	Decision
Receipt of application	
Confidential information	A claim for commercial or industrial confidentiality has not been made.
Identifying confidential information	We have not identified information provided as part of the application that we consider to be confidential.
Consultation	
Consultation	The consultation requirements were identified in accordance with the Environmental Permitting Regulations and our public participation statement. The application was publicised on the GOV.UK website. We consulted the following organisations: Public Health England The Director of Public Health The Health and Safety Executive The Food Standards Agency List the organisations consulted Bedford Borough Council – Environmental Health The comments and our responses are summarised in the consultation section.
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 our guidance on legal operator for environmental permits.
The facility	
The regulated facility	We considered the extent and nature of the facility at the site in accordance with RGN2 'Understanding the meaning of regulated facility', Appendix 2 of RGN 2 'Defining the scope of the installation', Appendix 1 of RGN 2 'Interpretation of Schedule 1', guidance on waste recovery plans and permits. The extent of the facility is defined in the site plan and in the permit. The activities are defined in table S1.1 of the permit.
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. The plan is included in the permit.
Site condition report	The operator has provided a description of the condition of the site, which we consider is not satisfactory at this stage. The decision was taken in accordance with our guidance on site condition reports and baseline reporting

Aspect considered	Decision
	under the Industrial Emissions Directive. The power station is unlikely to cause pollution of controlled waters, however, historical contamination could be mobilised and the proposed drainage could be influenced by historic contamination. The operator confirmed only surface water run-off will be discharged but that a drainage plan is not available during permit determination. A pre-operational condition has been included, that requires the applicant to complete site investigations once dewatering has allowed access to the full site. A pre-operational condition has also been included requiring the operator to submit a drainage plan prior to commissioning.
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. There are no Habitats (i.e. Special Areas of Conservation, Special Protection Areas and Ramsar) sites located within 10km of the Installation. There are no SSSIs located within 2km of the installation. There are 8 non-statutory local wildlife and conservation sites located within 2 km of the Installation. We have assessed the application and its potential to affect all known sites of nature conservation, landscape and heritage and/or protected species or habitats identified in the nature conservation screening report as part of the permitting process. We consider that the application will not affect any sites of nature conservation, landscape and heritage, and/or protected species or habitats identified. See section 8 above for further information. We have not consulted Natural England on the application. The decision was taken in accordance with our guidance.
Environmental risk assessment	
Environmental impact assessment	In determining the application we have considered the Environmental Statement.
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, all emissions may be categorised as environmentally insignificant. See section 8 above for further information.
Operating techniques	
General operating techniques	We have reviewed the techniques used by the operator and compared these with the relevant guidance notes and we consider them to represent

Aspect considered	Decision
	appropriate techniques for the facility. The operating techniques that the applicant must use are specified in table S1.2 in the environmental permit.
Operating techniques for emissions that screen out as insignificant	Emissions of oxides of nitrogen and carbon dioxide have been screened out as insignificant, and so we agree that the applicant's proposed techniques are BAT for the installation. We consider that the emission limits included in the installation permit reflect the BAT for the sector.
Permit conditions	
Pre-operational conditions	Based on the information in the application, we consider that we need to impose pre-operational conditions.
Improvement programme	Based on the information on the application, we consider that we need to impose an improvement programme.
Emission limits	ELVs and equivalent parameters or technical measures based on BAT have been set for the following substances: Oxides of nitrogen (NOx) Carbon monoxide Sulphur dioxide
Monitoring	We have decided that monitoring should be added for the following parameters, using the methods detailed and to the frequencies specified: • continuous emissions monitoring for LCP650 – oxides of nitrogen and carbon monoxide; and • 6 monthly for LCP650 – sulphur dioxide These monitoring requirements have been imposed in order to meet requirements of Annex V of the IED and the AELs specified in the Large Combustion Plant BAT Conclusions document. We made these decisions in accordance with the SGN Combustion Activities (EPR1.01) and the monitoring methods are in accordance with the Monitoring of Stack Emissions to Air Technical Guidance Note (M2). Based on the information in the application we are satisfied that the operator's techniques, personnel and equipment have either MCERTS certification or MCERTS accreditation as appropriate.
Reporting	We have specified reporting in the permit. We have added reporting in the permit for the following parameters: • every 3 months for LCP650 – oxides of nitrogen and carbon monoxide; and • every 6 months for LCP650 – sulphur dioxide The reporting requirements in the permit have been specified in order to comply with the requirements of the Industrial Emissions Directive. We made these decisions in accordance with the *JEP Electricity Supply*

Aspect considered	Decision
	Industry – IED Compliance Protocol for Utility Boilers and Gas Turbines. February 2015.
Operator competence	
Management system	There is no known reason to consider that the operator will not have the management system to enable it to comply with the permit conditions. The decision was taken in accordance with the guidance on operator competence and how to develop a management system for environmental permits.
Relevant convictions	The Case Management System has been checked to ensure that all relevant convictions have been declared. No relevant convictions were found. The operator satisfies the criteria in our guidance on operator competence.
Financial competence	There is no known reason to consider that the operator will not be financially able to comply with the permit conditions.
Growth Duty	
Section 108 Deregulation Act 2015 – Growth duty	We have considered our duty to have regard to the desirability of promoting economic growth set out in section 108(1) of the Deregulation Act 2015 and the guidance issued under section 110 of that Act in deciding whether to grant this permit. Paragraph 1.3 of the guidance says: "The primary role of regulators, in delivering regulation, is to achieve the regulatory outcomes for which they are responsible. For a number of regulators, these regulatory outcomes include an explicit reference to development or growth. The growth duty establishes economic growth as a factor that all specified regulators should have regard to, alongside the delivery of the protections set out in the relevant legislation." We have addressed the legislative requirements and environmental standards to be set for this operation in the body of the decision document above. The guidance is clear at paragraph 1.5 that the growth duty does not legitimise non-compliance and its purpose is not to achieve or pursue economic growth at the expense of necessary protections. We consider the requirements and standards we have set in this permit are reasonable and necessary to avoid a risk of an unacceptable level of pollution. This also promotes growth amongst legitimate operators because the standards applied to the operator are consistent across businesses in this sector and have been set to achieve the required legislative standards.

Annex 2 Consultation

The following summarises the responses to consultation with other organisations, our notice on GOV.UK for the public and the way in which we have considered these in the determination process.

Responses from organisations listed in the consultation section

Response received on 06/02/2018 from
Public Health England
Brief summary of issues raised
Any Environmental Permit issued for the site should contain conditions to ensure that the following potential emissions do not impact upon public health: point source emissions of nitrogen dioxide and carbon monoxide from the combustion activities on site. The Environment Agency should ensure that the applicant has an accident management plan which identifies all the potential hazards and risks in relation to all of the proposed operations, including fires and has in place necessary control and mitigation measures. Based on the information contained in the application provided, PHE has no significant concerns regarding risk to health of the location population from this proposed activity, providing that the applicant takes all appropriate measures to prevent or control pollution, in accordance with the relevant sector technical guidance or industry best practice. Recommendation that the Environment Agency also consult: • The local authority • The Food Standards Agency • The Director of Public Health
Summary of actions taken or show how this has been covered
The decision document outlines how we carried out our assessment of the potential impact on human health. Conditions within the application require the operator to operate the site in line with those parameters specified in the permit application and best available techniques. Conditions relating to monitoring and reporting of emissions to air are included in the permit and are in line with sector guidance. An accident management plan will be required to be incorporated into the site environmental management system under condition 1.1.1. An improvement condition requiring the operator to confirm progress on the development of the EMS has been specified within the permit. We consulted the local authority, the Food Standards Agency and the Director of Public Health.

Response received from
The Director of Public Health
Brief summary of issues raised
No response received
Summary of actions taken or show how this has been covered
No action taken

Response received from
Health and Safety Executive
Brief summary of issues raised
No response received
Summary of actions taken or show how this has been covered
No action taken

Response received from
Food Standards Agency
Brief summary of issues raised
No response received
Summary of actions taken or show how this has been covered
No action taken

Response received on 23/01/2018 from
Bedford Borough Council – Environmental Health
Brief summary of issues raised
Referred to the level of assessment done on the potential for noise disturbance to nearby premises from low frequency noise emitted from the substation on site. The substation, whilst set in a pit would extend above the top of the pit and is of significant size and you may wish to consider if this has been adequately mitigated against.
Summary of actions taken or show how this has been covered
The decision document outlines how we carried out our assessment of the potential impacts from noise. We audited the Applicant's noise assessment. We agreed with the conclusion that adverse or significant adverse impacts are unlikely at nearby receptors. This was provided the Installation is constructed to the design and mitigation measures as proposed in the Application. The proposed measures are incorporated into the permit as operating techniques in table S1.2 of the Permit. We have also set pre operation condition (PO5) which requires that the operator carries out further assessment of the feasibility of the provision of additional mitigation measures for noise to ensure noise is minimised.

Representations from councillors and parish/town community councils

Response received from
Central Bedfordshire Council Ward Councillor for Cranfield and Marston Response states that it is submitted on behalf of Marston Moretaine, Cranfield, Ridgmont, Lidlington Millbrook and Brogborough Parish Councils.
Brief summary of issues raised
Consultation process No publicity from the Environment Agency or Millbrook Power about the permit application. The Local Authority only found out about the permit application consultation when attended a DCO Hearing for the Millbrook Power application. The EA is most definitely not acting in the public interest on this new Permit application, as the public are completely unaware of it. This is evidenced by the fact that there is only one response to this consultation on your web site. This is compared to about 2000 responses to the Covanta permit application. The public will be no less interested in the Millbrook Power permit because they will be very concerned about the cumulative effects from the 2 sites which are adjacent to each other. No mention was ever made at the Covanta Liaison Meetings of this permit application. This consultation period should be extended and it should be properly publicised so that the EA is acting in the public interest. **Planning and permitting** The DCO and EA permitting process is little understood by the public with much confusion. **Temperature inversions** Concern around temperature inversions as a regular weather feature in the Marston Vale, and express concern about the possible effect inversions may have on the safe dispersal of emissions from the stack. Concern that evidence given in the past by Covanta has been dismissed. Will you require Millbrook Power to provide dispersion modelling that uses Meteorological data from the Marston Vale to model complex conditions such as inversion complex terrain stagnation and fumigation?

Until this modelling is carried out and audited we do not believe a permit can be safely issued.

How is the cumulative effect with the Covanta Energy from waste facility being taken into account?

How will resident's fears about the safe dispersal of emissions be addressed?

Emissions

We do not see how it is possible to reach a conclusion that the plant would be operated safely, in compliance with applicable environmental regulations. Residents will be fearful that this plant combined with the Covanta plant pose a significant risk to the health and wellbeing of local residents and the wider population. We therefore believe that the application for an EP should be refused.

Summary of actions taken or show how this has been covered

Consultation on application

We undertook a period of extended advertising. The advertising period was extended from 20 working days to 30 working days.

Regulation 60 of the EPR 2016 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.

We carried out consultation on the Application in accordance with the EPR, our statutory Public Participation Statement. This Application has been consulted upon in line with this statement. See section 2 in the decision document for further information on this.

Planning and permitting

Guidance on the permitting and planning processes on the .gov.uk website and planning portal website can be found at the following locations:

Permitting: https://www.gov.uk/topic/environmental-management/environmental-permits

Planning: https://www.planningportal.co.uk/info/200126/applications/58/the_decision-making_process

Temperature inversion

The dispersion model used by the Applicant does not explicitly predict complex conditions relating to vertical profiling such as temperature inversion, complex terrain stagnation or fumigation. There are alternative dispersion models that can model these conditions. However, we have conducted a number of case studies investigating the likely dispersion impacts of such conditions, including the assessment of the initial Rookery Pit ERF application in 2011, and found that although these conditions could lead to increases in the long-term and short-term Process Contributions (PCs) the variability is within any modelling uncertainties. As a result the Applicant's conclusions are not likely to change.

Emissions to air

We are satisfied that there will not be a significant impact on human health or species in the nearby area. Section 8 has further details about how we assess 'significance' in relation to emissions to air.

Response received from

Marston Moreteyne Parish Council

Brief summary of issues raised

Consultation on application

The Parish Council were unaware that the application had been submitted until they attended the Preliminary Meeting for the Development Consent Order and have not received any communication from the Environment Agency advising that the application had been made. The council is astonished and disappointed at the lack of consultation by the Environment Agency and feels that the process is both undemocratic and lacks transparency.

Emissions to air

Concern regarding the potential increase of ground levels of Nitrogen Dioxide (NO2) which could be caused by emissions from the stack and the subsequent detrimental impact that this would have upon environmental habitats and effects upon both human life and wildlife.

The council would also draw attention to the wording in 3.2.11, especially "*it is concluded that there are expected to be no likely significant effects during operation ….*" The council would like to know - significant in relation to what? At what level is a detrimental effect deemed significant?

The proposed site is within the Marston Vale. The council expresses deep concerns regarding emission

inversions and the fact that any Nitrous Oxide (NO2) gases have the potential to be delayed from being dispersed to a specific height and therefore this time delay has the effect that Nitrous Oxide gases could fall to the ground with detrimental effects.
Summary of actions taken or show how this has been covered
Consultation on application We undertook a period of extended advertising. The advertising period was extended from 20 working days to between 16/01/18 and 30/03/18. Regulation 60 of the EPR 2016 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. We carried out consultation on the Application in accordance with the EPR, our statutory Public Participation Statement. This Application has been consulted upon in line with this statement. **Emissions to air** We are satisfied that there will not be a significant impact on human health or species in the nearby area. Section 8 has further details about how we assess 'significance' in relation to emissions to air. The dispersion model used by the Applicant does not explicitly predict complex conditions relating to vertical profiling such as temperature inversion, complex terrain stagnation or fumigation. There are alternative dispersion models that can model these conditions. However, we have conducted a number of case studies investigating the likely dispersion impacts of such conditions, and found that although these conditions could lead to increases in the long-term and short-term Process Contributions (PCs) the variability is within any modelling uncertainties. As a result the Applicant's conclusions are not likely to change and we have not considered this aspect further in this determination.

Representations from individual members of the public.

Issue 1 – impact on landscape and wildlife
Brief summary of issues raised
Opposed to the destruction of landscape by heavy industry as well as the resultant increase in pollution locally and impact on the environment. This place has no place being built on the doorstep of residents nor in the habitat of many species of wild animals in close proximity to a country park.
Summary of actions taken or show how this has been covered
The location of the installation is primarily a planning consideration. Location is only a relevant consideration for Environmental Permitting in assessing potential to have an adverse environmental impact on communities or sensitive environmental receptors. The environmental impact has been assessed as part of this determination process and has been reported upon in the main body of this document. We are satisfied that there will not be a significant impact on human health or species in the nearby area. Section 8 has further details.

Issue 2 – emissions to air
Brief summary of issues raised
Environmental Permit should not be granted until the neighbouring Covanta incinerator is operating, its emissions measured and pollution assessed by adding Millbrook's expected pollution to Covanta's actual. Post-Covanta, Millbrook Power should conduct a completely new Environmental Impact Assessment that fully takes into account the Temperature Inversion Condition prevailing in the Marston Vale. Concern raised that emissions may not be monitored correctly. Concern raised that the government is not serious about ensuring clean air for everyone.
Summary of actions taken or show how this has been covered
The Covanta air quality modelling submitted or the Covanta permit application was based on a worst case scenario and the plant will be required to operate no higher than the emission levels modelled which are also included in the permit. An in combination assessment with the operation of the proposed Millbrook Power Station and the proposed Covanta site have been considered in section 8 of this document. We are satisfied that there will not be a significant impact on human health or species in the nearby area from the

in combination operation of the proposed plants. Monitoring in line with Chapter III of the Industrial Emissions Directive and the Best Available Techniques Conclusions document are specified within all permits for this type of plant. We are satisfied that there will not be a significant impact on human health or species in the nearby area as outlined in section 8 of this document.

Issue 3 – carbon capture
Brief summary of issues raised
Millbrook Power should address the 'fiction of the 299MW' capability of this plant because the tolerances of the technology could easily push capability to 300MW or more, which requires Carbon Capture Technology, the costs of which MP is seeking to avoid.
Summary of actions taken or show how this has been covered
We require combustion plants that generate 300 MW or more electricity to be carbon capture ready. The Application specifies that the proposed plant is less than 300 MW. This is included in the operating techniques in the permit. This aspect will also be considered at planning.

Issue 4 – planning permission
Brief summary of issues raised
Planning permission (the DCO) has not been granted and a decision is not expected before the conclusion of the Examination by the Planning Inspectorate in September 2018. Therefore, it seems premature to apply for an environmental permit since the parameters of the installation may change.
Summary of actions taken or show how this has been covered
If the parameters of the installation changed significantly from what has been applied for within a permit application then the applicant would be required to apply for a variation to the permit and a revised impact assessment would need to be submitted and assessed. The operating techniques as committed to in the permit application would need to be applied.

Issue 5 - noise
Brief summary of issues raised
(a) The noise assessment appears to be inadequate. The applicant seems to be asserting that the environs of the installation (at the nearest human receptor) will be quieter with the plant running than without it. This assertion seems to be erroneous. At the very least, the installation will add to the background. It should also be noted that the particular area in which the applicant has chosen to site this project is generally valued by residents for its quietness. This context means that even the apparently modest noise levels engendered by the proposed installation (subject to (b) below) are likely to be unacceptable. (b) How reliable is the acoustic modelling software? No information is provided. It would be more convincing if data from plants of similar type and output was included in the application. Such data should be gathered and provided. (c) Furthermore, the noise will be intermittent and will occur suddenly and unpredictably. Far from alleviating the impact of noise (since the average, taken over 1 year for example, will be lower than noise during continuous operation), this feature greatly increases its adverse impact. The intermittency could cause profound psychological distress in some residents, driven to live in constant fear of the noise suddenly starting up. (d) The erection of such a large structure will undoubtedly affect the way existing noise sources are received, through reverberation, reflexion etc. This aspect has been neglected. Its impact should be assessed, either by modelling or from data from similar installations, or some combination thereof.
Summary of actions taken or show how this has been covered
The decision document outlines how we carried out our assessment of the potential impacts from noise. We audited the Applicant's noise assessment. We agreed with the conclusion that adverse or significant adverse impacts are unlikely at nearby receptors. This was provided the Installation is constructed to the design and mitigation measures as proposed in the Application. The proposed measures are incorporated

into the permit as operating techniques in table S1.2 of the Permit. We have also set pre operation condition (PO5) which requires that the operator carries out further assessment of the feasibility of the provision of additional mitigation measures for noise to ensure noise is minimised.