Natural Resources Wales permitting decisions

Drax Power Limited - Hirwaun OCGT Plant

Decision Document

Contents

Glossary of acronyms used in this document

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

BAT	Best Available Technique(s)
BAT-AEL	BAT Associated Emission Level
BREF	BAT Reference Note
CEM	Continuous emissions monitor
CHP	Combined heat and power
CROW	Countryside and rights of way Act 2000
DAA	Directly associated activity – Additional activities necessary to be carried out to allow the principal activity to be carried out
DD	Decision document
EAL	Environmental assessment level
ELV	Emission limit value
EMAS	EU Eco Management and Audit Scheme
EMS	Environmental Management System
EPR	Environmental Permitting (England and Wales) Regulations 2016
EQS	Environmental quality standard
EU-EQS	European Union Environmental Quality Standard
GWP	Global Warming Potential
IED	Industrial Emissions Directive (2010/75/EU)
LHB	Local Health Board
NOx	Oxides of nitrogen (NO plus NO_2 expressed as NO_2)
OPRA	Operator Performance Risk Appraisal
PC	Process Contribution
PEC	Predicted Environmental Concentration
PHW	Public Health Wales
PPS	Public participation statement
PR	Public register
RGS	Regulatory Guidance Series
SAC	Special Area of Conservation
SCR	Selective catalytic reduction
SGN	Sector guidance note

SPA(s)	Special Protection Area(s)
SSSI(s)	Site(s) of Special Scientific Interest
TGN	Technical guidance note
WHO	World Health Organisation

1. Our decision

We have decided to grant the Permit for Hirwaun OCGT Plant, operated by Drax Power Limited.

The Permit number is EPR/XXXXXX

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

2. Purpose of this document

This decision document:

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

This document should be read in conjunction with the application & supporting information and the Permit.

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

3. Key issues of the decision

3.1 What the Installation does

The Installation will operate as an Open Cycle Gas Turbine (OCGT) peaking plant with a thermal input of 760MW. Natural gas will be burnt to generate approximately 299MW of electrical energy.

The natural gas will be supplied to the Installation by a new gas pipeline connected to the existing National Grid Gas National Transmission System which is approximately 0.9km away from the Installation.

Electricity generated by the Installation will then be exported to the National Grid National Transmission System by a newly laid underground cable to a the existing Rhigos substation, 250m from the Installation.

By operating as a peaking plant, the Installation will only operate for 1500 per year. By operating in this way, the Installation will be used to balance the grid during times of high demand, in addition it will be used to 'top-up' the grid during times that other power generating technology is under producing.

There is 1 emergency diesel generator that will provide energy in the case of plant failure, this will enable the plant to shut-down safely. There is also 1 diesel powered fire pump on-site, both less than 2MW. Both units will fall under the Medium Combustion Plant Directive (MCPD).

Excluded Generators are generators that are exempt from Schedule 25B. As the generators are part of a Chapter III IED installation. BAT applies in this instance and therefore the generator is classed as an 'excluded generator'. Further to this as it is an emergency backup generator (Backup Generator means a generator that is operated for the sole purpose of providing power at a site during an on-site emergency.

Balancing Services, and Demand Side Response operations, whether procured or not, such as Triad Avoidance or Fast Frequency Response are not on-site emergencies and a generator that provides these services is not excluded) that is not tested for more than 50 hours a year, it is also excluded. Even though this is the case, the units are listed in the permit in both the activities table and as emission sources. No ELV's have been set.

3.2 Remote Operation

The Installation will be run from the main control room located at Drax power station in Selby, North Yorkshire. The control room is manned 24 hours per day, 7 days per week.

A small number of people will be employed locally, to monitor and check the equipment and infrastructure on-site, ensuring that it is operational, safe and secure. The Installation will be equipped with modern equipment (SCADA type system), this gives operators in the control accurate, up-to-date information on the status of the plant. The operators in the control room will be able to monitor the site remotely and react to any alarms, situations that occur at the Installation.

Issues like fire and gas leaks can be detected by the on-site equipment and alarms will alert the operators in the control room to the situation and they will be able to react accordingly and take the appropriate action. More specifically, the Installation's fire detection and gas leak detection system will be designed in accordance with the relevant British Standard, this will incorporate local automatic detection linked to the control room at Drax's main power station.

Any leaks of diesel fuel will be detected by automatic sensors and an alarm will sound in the main Drax control room, operators will then contact the fire service for a local response.

Any leakages of oil on-site would be dealt with locally, the alarm would sound and trigger an automatic plant shutdown, the alarm would also sound in the main Drax control room, where operators could contact the fire service if necessary.

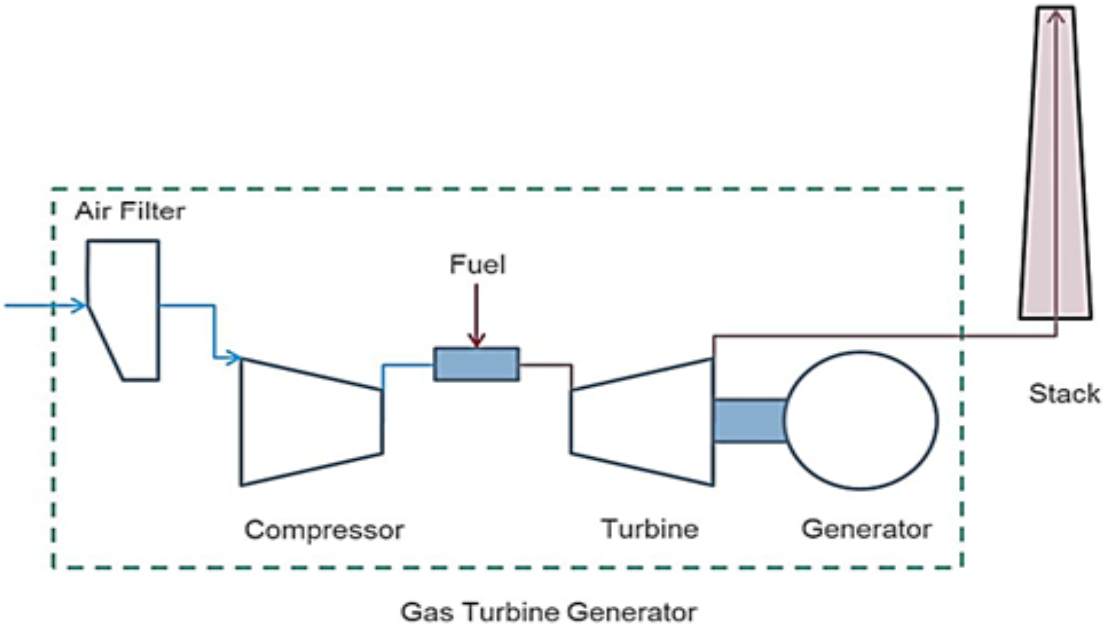
All the drive belts on the cooling system will utilise heat detectors, if these are triggered it would set off the alarm and trigger an automatic plant shut-down.

The Installation will also incorporate pressure and temperature sensors on the compressor and generator, this will alert control room operators of any gas leak or plant failure on the Installation. A plant shut-down would be initiated and in the event of a fire an automatic fire suppression system would be initiated.

In terms of site security, the Installation will have an outer and inner perimeter fence. The inner security fence will have an electrified, 2.4m welded wire mesh fence fitted with anti-spread, and short detection. The site will also have an advanced CCTV system, including motion sensors and lighting. The Installation will be monitored 24/7 from the Drax control room, in the event of an attempted security breach, a police response can be initiated. Due to the nature of the plant any police response will be given a high priority. Having considered the information submitted in the Application, we are satisfied that appropriate infrastructure and procedures will be in place to ensure that the site remains secure.

3.3 Process Flow Diagram

The process is illustrated in the following simplified diagram:



Improvement Condition 5 (IC5) requires the Operator to provide reports to NRW relating to the commissioning of the Installation. Summaries of the environmental performance of the plant against design specs will be submitted as well as actual performance of the plant against the Permit conditions. Pre-operational Condition 2 (PO2), requires the Operator to provide written commissioning plans, including timescales, this includes expected emissions to the environment during the different stages of commissioning.

3.4 Key Issues in the Determination

The key issues arising during this determination were;

- Emissions to air
- Best Available Techniques
- Noise

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

3.5 Consultation on the Application

The consultation requirements were identified and implemented. The decision was taken in accordance with our Public Participation Statement and our Working Together Agreements.

We advertised receipt of the Application by a notice placed on our website, which contained all the information required by the EPR and IED, including telling people where and when they could see a copy of the Application. This ran for 4 weeks from 11th July 2018 until the 8th August 2018. We placed copies of the application on our Public Register and anyone wishing to see these documents could do so.

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

- Rhondda Cynon Taf County Borough Council (Environmental Protection Department)
- Rhondda Cynon Taf County Borough Council (Planning Department)
- Public Health Wales
- South Wales Fire and Rescue Service
- Health and Safety Executive
- National Grid

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

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

3.6 Requests for further information

The application was submitted on 29th June 2018 and was duly made on 10th July 2018. As is common with these types of application, further information was required to enable final determination of it. We issued three 'Notices requiring further information' (Schedule 5 Notice) on the 13th August 2018, 15th October 2018 and the 20th December requesting further information in relation to the Applicants noise modelling and assessment. The first Schedule 5 required the Applicant to resubmit their modelling in-line with BS4142:2014 and the second Schedule 5 requested further clarification on the submitted modelling.

The Applicant submitted the response to the first Schedule 5 notice on the 11th September 2018, the response to the 2nd Schedule 5 notice was received on the 28th November 2018 and responses to the 3rd Schedule 5 notice were received on the 25th January 2019, 14th March 2019 and the 9th April 2019. The 4th Schedule 5 response was received on the 1st May 2019. The responses received satisfied all notices.

4. Operator

We are satisfied that the Applicant (now the Operator) is the person who will have control over the operation of the facility after the grant of the Permit. The decision was taken in accordance with EPR RGN 1 “Understanding the meaning of Operator”.

5. The Legal Framework

5.1 European Directives

All applicable European directives have been considered in the determination of the application.

The applicability of the following European directives has particular relevance to combustion plant applications. We have therefore assessed their relevance to this particular Permit as follows:

- Industrial Emissions Directive
- Medium Combustion Plant Directive
- Energy Efficiency Directive
- Large Combustion Plant Directive.

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

6.The Regulated Facility

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

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

- Section 1.1 Part A (1) – burning any fuel in an appliance with a rated thermal input greater than 50 megawatts.

Schedule 1 EPR defines 'Installation to include 'directly associated activities' ('DAA'). At this Installation, the DAA includes a Gas Reception Facility (GRF), main cooling system, raw material storage, tank farms and surface water drainage system. Together, these listed and directly associated activities comprise the Installation.

6.1 The site

The Operator submitted a site plan which we consider satisfactory, showing the site of the Installation, its extent, and emission points.

The site plan is included in Schedule 7 of the Permit, and the Operator is required to carry out the permitted activities within the site boundary.

6.2 Site Condition Report

The site setting, layout and history of the site is described by the Applicant in the 'Hirwaun Power Limited Site Condition Report' supplied with the Application.

The Operator has provided a description of the condition of the site. We consider this description is satisfactory.

The decision was taken in accordance with our guidance on Site Condition Report's – guidance and templates (H5). Article 22(2) of the IED requires the Applicant to provide a baseline report containing at least the information set out in paragraphs (a) and (b) of the Article before starting operation.

6.3 Proposed site design: potentially polluting substances and prevention measures

The operator has provided a description of the condition of the site. We consider this description is satisfactory. The decision was taken in accordance with our guidance on Site Condition Report's – guidance and templates (H5). Article 22(2) of the IED requires the Applicant to provide a baseline report containing at least the information set out in paragraphs (a) and (b) of the Article before starting operation.

The Applicant has submitted a Site Condition Report, this was a desktop study and no intrusive sampling was carried out to check the status of the land. The land has previously been used for ordnance manufacturing (ROF facility) and television manufacture. There have also been historic landfilling activities carried out within a few hundred meters of the site boundary.

Whilst setting a baseline is recommended to assist when the Permit is surrendered, it is at the Applicant's own risk to not carry this out. On cessation of activities and surrender of the Permit, the land will need to be of zero contamination. The Installation isn't located within a Groundwater Protection Zone.

The site uses Natural gas as a fuel which is piped on to site and used immediately. High pressure pipework will be designed to minimise potential leak sources. The Installation will be fitted with a fuel gas leak detection system with sensors to trigger automatic system purge and shut-down of the gas system and turbine if a leak is detected. Large quantities of polluting substances such as diesel and chemicals will not be stored on-site, reducing the risk of pollution. The fuel tanks provided for the emergency generator and fire pump will be bunded and comply with the oil and chemical storage regulations.

Chemicals will be stored in the appropriate containers within a bunded area to prevent the loss of contaminating liquids to the environment.

Spill kits will be available on site and staff trained to use them, in an event of a spillage. Secondary containment will also be employed for the cooling system drain and air vents to prevent the releases of anti-freeze used in the process.

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

In addition, there are no point source releases of process effluents to controlled waters from site, as the Installation uses air cooling for the turbine, large volumes of water are not needed. The compressor blades will need to be periodically cleaned to remove debris that has passed the air intake filters. The frequency of cleaning will depend on the performance of the gas turbine and the local air quality. Washing will either take place on-line or off-line. Any water or waste generated during this activity will be stored on-site and removed by tanker for disposal at an authorised and licenced waste facility.

There will be a discharge of foul sewerage to the local sewer network.

The Applicant has confirmed that all relevant elements of the Installation will be designed in accordance with recognised standards, methodologies and practices.

6.4 Closure and decommissioning

Having considered the information submitted in the Permit application, we are satisfied that the appropriate measures will be in place for the closure and decommissioning of the Installation.

Permit condition 1.1.1a requires the Operator to have a written management system in place which identifies and minimises risks of pollution including those arising from closure.
At the definitive cessation of activities, the Operator must satisfy us that the necessary measures have been taken so that the entire Installation ceases to pose a risk to soil or groundwater, considering both the baseline conditions and the site's current or

approved future use. To do this, the Operator must apply to us for surrender, which we will not grant unless and until we are satisfied that these requirements have been met. Pre-operational condition PO1 in the Permit requires a soil and groundwater monitoring plan be submitted to Natural Resources Wales for approval.

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

7. Biodiversity, Heritage, Landscape and Nature Conservation

7.1 Sites Considered

The Installation is within the relevant screening distance criteria of protected habitats. A full assessment of the Application and its potential to affect the designated site has been carried out as part of the permitting process. We consider that the Application will not affect the features of the designated sites listed below.

The following European protected sites (i.e. Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar) are located within 10km of the Installation:

- Blaen Cynon SAC
- Coedydd Nedd a Mellte SAC
- Cwm Cadlan SAC

There were 3 Sites of Special Scientific Interest located within 2km of the Installation; 2 underpinned the Blaen Cynon SAC –

- Cors Bryn-y-Gaer SSSI,

- Woodland Park and Pren SSSI;

and the other underpinned the Coedydd Nedd a Mellte SAC –

- Dyffrynoedd Nedd SSSI

Several non-statutory Local Wildlife Sites (LWS), National Nature Reserves (NNR), Local Nature Reserves (LNR) and Ancient Woodlands are located within 2km of the Installation. These have been considered in the assessment.

We have also checked our records for the presence of European Protected Species (EPS), as defined by the Habitats Directive, within the locality of the Installation. The species in the vicinity are being assessed through the development consent order.

7.2 Habitats Assessment

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

Acid deposition is of low risk with an Installation of this type, as Natural Gas is the only fuel which is low in Sulphur.

The existing deposition levels exceeds the lower estimates of the critical load for all sensitive habitats for nitrogen and for all acid sensitive habitats except Acidophilus woodland.

7.2.1 Blaen Cynon SAC

The qualifying feature for this SAC is the Marsh Fritillary Butterfly. APIS states that there isn't sufficient information to assess direct effects on the species itself. However, the Applicant has assessed the habitat as a whole and assessed against the most

sensitive features which are features in the 2 underpinned SSSIs (Cors Bryn-y-Gaer and Woodland Park & Pont Pren).

For the potential effects of oxides of nitrogen (NO and NO_2 expressed as NO_2 (NO_x) from emission point A1 the Applicant has used the APIS website to obtain relevant critical levels/loads; NO_x - Annual mean - 30µg/m^3 and Daily mean - 75µg/m^3, the process contribution from the Installation has then been assessed against the 1% (annual mean) and 10% (daily mean) significance thresholds.

For Nutrient Nitrogen deposition, the Applicant has used the following habitat features – Raised/blanket bogs (Critical load – 5 kgN/ha/yr), Acidophilus wood (Critical load – 10 kgN/ha/yr) and Acid Grassland (Critical load – 8 kgN/ha/yr). These figures are taken from the APIS website.

For Acid deposition, the Applicant has used the following habitat features – Raised/blanket bogs (Critical load – 1.078 keqN/ha/yr), Acidophilus wood (Critical load – 2.974 keqN/ha/yr) and Acid Grassland (Critical load – 1.161 keqN/ha/yr). These figures are taken from the APIS website.

As there is no specific SAC category for the Marsh Fritillary Butterfly, the Applicant has assessed the Impact against; Raised/Blanket Bog, Acidophilus Woodland and Acid Grassland, the assessment of these habitat features is below.

NO_x

Cors Bryn-y-Gaer

The long-term predicted Process Contribution (PC) is 0.30% of the annual mean Critical Level (CLe) and the short-term predicted PC is 4.66% of the 24-hour mean CLe.
In this instance the PC is less than 1% and 10% of the long and short-term CLe screening thresholds respectively and as such the impacts are considered insignificant. No further assessment is required.

Woodland Park & Pren

The long-term predicted PC is 0.30% of the annual mean CLe and the short-term predicted PC is 4.66% of the 24-hour mean CLe. In this instance the PC is less than 1% and 10% of the long and short-term CLe screening thresholds respectively and as such the impacts are considered insignificant. No further assessment is required.

Nitrogen Deposition

Cors Bryn-y-Gaer

The predicted PC is 0.19% of the maximum CLo for raised/blanket bogs. The impacts are therefore considered insignificant. No further assessment is required.

Woodland Park & Pren

The predicted PC is 0.19% of the maximum CLo for Acidophilus wood and 0.12% for acid grassland. The impacts are therefore considered insignificant. No further assessment is required.

Acid Deposition

Cors Bryn-y-Gaer

Even though SO_2 isn't a pollutant of concern as the principal fuel is natural gas, for completeness the Applicant modelled the impact of acid deposition at sensitive sites. The Applicant has used the APIS website to obtain the relevant Critical Loads (CLo) for Acidification.

The predicted PC is 0.06% as a percentage of the Critical Load Function (CLF) for raised/blanket bogs. The impacts are therefore considered insignificant. No further assessment is required.

Woodland Park & Pren

The predicted PC is 0.05% as a percentage of the Critical Load Function (CLF) for Acidophilus wood and 0.06% for acid grassland. The impacts are therefore considered insignificant. No further assessment is required.

7.2.2 Coedydd Nedd a Mellte

The Applicant carried out detailed modelling of the potential effects of oxides of nitrogen (NO and NO_2 expressed as NO_2 (NO_x) from emission point A1, in addition the effects of Nutrient Nitrogen and Acid Deposition have been considered. They have used the APIS website to obtain relevant critical levels/loads. The most sensitive habitat has been considered within the SAC. There is also a SSSI underpinning this SAC; Dyffrynoedd Nedd a Mellte, the features of the SAC and SSSI are similar in that the main interests are woodland. The Applicant has assessed the impacts against lowland beech and old sessile oak woods.

NO_x

The long-term predicted PC is 0.05% of the annual mean CLe and the short-term predicted PC is 0.90% of the 24-hour mean CLe. In this instance the PC is less than 1% and 10% of the long and short-term CLe screening thresholds respectively and as such the impacts are considered insignificant. No further assessment is required.

Nitrogen Deposition

The predicted PC is 0.06% of the maximum CLo for lowland beech/old sessile oak woods. The impacts are therefore considered insignificant. No further assessment is required.

Acidification

The predicted PC is 0.01% as a percentage of the CLF for lowland beech/old sessile oak woods. The impacts are therefore considered insignificant. No further assessment is required.

7.2.3 Cwm Cadlan

The Applicant carried out detailed modelling of the potential effects of oxides of nitrogen (NO and NO_2 expressed as NO_2 (NO_x) from emission point A1, in addition the effects of Nutrient Nitrogen and Acid Deposition have been considered. They have used the APIS website to obtain relevant critical levels/loads. The most sensitive habitat has been considered within the SAC. The Applicant has assessed the impacts against Molina meadows.

NO_x

The long-term predicted PC is 0.08% of the annual mean CLe and the short-term predicted PC is 0.92% of the 24-hour mean CLe. In this instance the PC is less than 1% and 10% of the long and short-term Cle screening thresholds respectively and as such the impacts are considered insignificant. No further assessment is required.

Nitrogen Deposition

The predicted PC is 0.03% of the maximum CLo for Molina meadows. The impacts are therefore considered insignificant.

Acid Deposition

The predicted PC is 0.02% as a percentage of the CLF for Molina meadows. The impacts are therefore considered insignificant.

7.2.4 Appropriate Assessment

Even though the impacts relating to NO_x, nutrient deposition and acid deposition from the Installation can be considered insignificant due to the levels being below the thresholds for significance, the APIS website shows that the background nitrogen

deposition at Blaen Cynon SAC already exceeds the upper CLo for Nitrogen, with Nitrogen levels at 26.7 KgN/ha/yr, it also shows that the background acid deposition slightly exceeds the maximum critical load for acid grasslands, however the background does not exceed the maximum critical load for calcareous grassland.

Coedydd Nedd a Mellte SAC already exceeds the upper CLo for nitrogen, with Nitrogen levels at 30.5 KgN/ha/yr, the APIS website shows that the background does not exceed the Maximum Critical load for acidification and the background sits within the envelope, between the minimum and maximum Critical Load.

Cwm Cadlan SAC already exceeds the upper CLo for nitrogen, with Nitrogen levels at 26.7 KgN/ha/yr, the APIS website shows that the background does not exceed the Maximum Critical load for acidification and the background sits within the envelope, between the minimum and maximum Critical Load Based on this information an Appropriate Assessment has been carried out to investigate the impacts in further detail.

Nutrient Enrichment

The applicant has presented a detailed assessment of annual mean and daily NO_x, annual mean nitrogen deposition and acid deposition as part of the application. The process contribution from the installation has been calculated and compared against the relevant critical levels and loads (explained in sections above).

In practice, we also consider that an actual exceedance is unlikely based on the following criteria which means that the modelling predictions are very conservative:

1. All items of plant run at peak capacity when operating, which in reality is expected to be around a maximum of 17% over a 5-year average.
2. Emissions from all combustion plant are at the ELVs, whereas actual plant performance is likely to be well below the ELV.
3. Operation of all items of plant occur during the worst-case weather conditions for dispersion; for the annual mean calculation, whole year met data is used and the impact is determined considering operational time fraction (as

mentioned above). For short term assessment, worst case weather conditions have been considered in the modelling.

4. The predicted impacts are based on the maximum predicted concentration using 5 years of weather data.

The PC's for short-term and long-term NO_x, annual mean nutrient and acid deposition are significantly below the 1 and 10% screening thresholds for long and short-term impact (as shown above) at all the relevant European sites within the screening distance.

Blaen Cynon SAC

Further investigation of the source using APIS attributes the largest proportion of the background (31.24%) to Livestock Contributions, as the surrounding area is predominantly rural. The existing background attributable to Industrial Combustion is 0.7 KgN/ha/yr (total deposition) which is equivalent to 2.65%. Aberthaw power station contribution was 1.58%, but this figure will have reduced as the power station is now operating in the capacity market and has projected load factors of less than 10%. Also, coal generation is likely to be phased out before 2025, or possibly earlier.

Measures to reduce emissions further from other industrial combustion sources, such as the Industrial Emissions Directive large combustion plant permit reviews and the implementation of the Medium Combustion Plant Directive are expected to contribute up to a further 30% reduction in NOx emissions by 2030. Proposed action to address agricultural ammonia emissions will reduce nutrient nitrogen inputs by a further 16%. These future anticipated reductions, combined with the knowledge[1] that APIS tends to overestimate actual inputs, suggests that in the medium term actual nutrient nitrogen inputs will fall and potentially drop below critical loads.

Coedydd Nedd a Mellte

[1]Assessment of air emissions from Aberthaw power station - CEH ESI monitoring results analysis and modelling study, AQMRAT Final report – 27th November 2015

Further investigation of the source using APIS attributes the largest proportion of the background (31.35%) to Livestock Contributions, as the surrounding area is predominantly rural. The existing background attributable to Industrial Combustion is 0.7 KgN/ha/yr (total deposition) which is equivalent to 2.70%. Aberthaw power station contribution was 1.63%, this figure will have reduced as the power station is operating for shorter periods of time and other inputs are projected to reduce in the medium term.

Cwm Cadlan SAC

Further investigation of the source using APIS attributes the largest proportion of the background (31%) to Livestock Contributions, as the surrounding area is predominantly rural. The existing background attributable to Industrial Combustion is 0.7 KgN/ha/yr (total deposition) which is equivalent to 2.68%. Aberthaw power station contribution was 1.57%, this figure will have reduced as the power station is operating for shorter periods of time and other inputs are projected to reduce in the medium term.

Acidification

Blaen Cynon SAC

Further investigation of the source using APIS attributes the largest proportion of the background (22.45%) to International Shipping. The existing background attributable to Industrial Combustion is 0.05 keq H+/ha/yr (total deposition) which is equivalent to 7.78%.
Aberthaw power station contribution was 4.12%, this figure will have reduced as the power station is operating for shorter periods of time and other inputs are projected to reduce in the medium term.

There are 3 other Installations with similar emissions within the 10km screening, the Applicant carried out an in-combination assessment and concluded that the emissions from the installation both alone and in-combination were insignificant.

The current projection is that the European Protected sites exceed the critical loads for nutrient enrichment and acidification (as mentioned above), but this Installations incremental contribution is expected to be offset by current and future reductions in pollutant inputs. However, this cannot be quantified without local site deposition measurements and so future proposed developments will need to be considered with care if better site-specific information is not available via APIS or other sources.

There are no emissions to surface waters, sewer or land associated with this Installation, therefore there is no risk to the environment from this aspect.

Specialists within NRWs agreed with the assessment's conclusions, that the proposal, when considered alone and in-combination, will not adversely affect the integrity of any Natura 2000 sites.

7.3 SSSIs

7.3.1 Cors Bryn-y-Gaer SSSI & Woodland Park & Pont Pren SSSI

For the potential effects of oxides of nitrogen (NO and NO_2 expressed as NO_2 (NO_x) from emission point A1 the Applicant has used the APIS website to obtain relevant critical levels; NO_x - Annual mean - 30µg/m^3 and Daily mean - 75µg/m^3, the process contribution from the Installation has then been used to assess against the 1% (annual mean) and the 10% (daily mean) significance thresholds.

For Nutrient Nitrogen deposition, the Applicant has used the following habitat features;

- Raised/blanket bogs (Critical load – 5 kgN/ha/yr),
- Acidophilus wood (Critical load – 10 kgN/ha/yr) and
- Acid Grassland (Critical load – 8 kgN/ha/yr).

For Acid deposition, the Applicant has used the following habitat features -

- Raised/blanket bogs (Critical load – 1.078 keqN/ha/yr),
- Acidophilus wood (Critical load – 2.974 keqN/ha/yr)

- Acid Grassland (Critical load – 1.161 keqN/ha/yr).

Cors Bryn-y-Gaer SSSI

NO_x

The long-term predicted PC is 0.30% of the annual mean CLe and the short-term predicted PC is 4.66% of the 24-hour mean CLe. In this instance the PC is less than 1% and 10% of the long and short-term CLe screening thresholds respectively and as such the impacts are considered insignificant. No further assessment is required.

Nitrogen Deposition

The predicted PC is 0.19% of the maximum CLo for raised/blanket bogs. The impacts are therefore considered insignificant. No further assessment is required.

Acid Deposition

The predicted PC is 0.06% as a percentage of the Critical Load Function (CLF) for raised/blanket bogs. The impacts are therefore considered insignificant. No further assessment is required.

Woodland Park & Pont Pren SSSI

NO_x

The long-term predicted PC is 0.30% of the annual mean CLe and the short-term predicted PC is 4.66% of the 24-hour mean CLe. In this instance the PC is less than 1% and 10% of the long and short-term Cle screening thresholds respectively and as such the impacts are considered insignificant. No further assessment is required.

Nitrogen Deposition

The predicted PC is 0.19% of the maximum CLo for Acidophilus wood and 0.12% for acid grassland. The impacts are therefore considered insignificant. No further assessment is required.

Acid Deposition

The predicted PC is 0.05% as a percentage of the CLF for Acidophilus wood and 0.06% for acid grassland. The impacts are therefore considered insignificant. No further assessment is required.

Dyffrynoedd Nedd a Mellte SSSI

For the potential effects of oxides of nitrogen (NO and NO_2 expressed as NO_2 (NO_x) from emission point A1 the Applicant has used the APIS website to obtain relevant critical levels/loads; (NO_x - Annual mean - 30µg/m^3 and Daily mean - 75µg/m^3) (Nutrient nitrogen – 5kgN/ha/yr) (Acid deposition - (1.837 keqN/ha/yr).

NO_x

The long-term predicted PC is 0.05% of the annual mean CLe and the short-term predicted PC is 0.90% of the 24-hour mean CLe. In this instance the PC is less than 1% and 10% of the long and short-term Cle screening thresholds respectively and as such the impacts are considered insignificant. No further assessment is required.

Nitrogen Deposition

The predicted PC is 0.06% of the maximum CLo for lowland beech/old sessile oak woods. The impacts are therefore considered insignificant. No further assessment is required.

Acid Deposition

The predicted PC is 0.01% as a percentage of the CLF for lowland beech/old sessile oak woods. The impacts are therefore considered insignificant. No further assessment is required.

Cors Bryn-y-Gaer SSSI and Woodland Park and Pont Pren SSSI form part of the Blaen Cynon SAC and Dyffrynoedd Nedd SSSI forms part of the Coedydd Nedd a Mellte SAC. Both SAC's were subject to an Appropriate Assessment due to the existing levels of nutrient enrichment and acidification exceeding the maximum critical loads, the result of the Appropriate Assessment was that the new emissions from the Installation will not adversely affect the SAC's and by virtue the SSSIs.

Therefore, based on the results of the modelling the emissions to air are not likely to damage any of the special interest features in the SSSIs listed above.

7.4 Non – Statutory sites

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

The Applicant screened for non-statutory sites within a 2km range and included all of the sites in the air dispersion impact modelling carried out to inform both the HRA and the Air Quality assessment.

The impact on the closest non-statutory site was less than 100% of the relevant critical levels and loads and therefore we are satisfied that significant pollution will not be caused for all non-statutory sites within the 2km screening radius. The modelling looked at a worst-case scenario meaning that max deposition and concentrations were seen at closest site, so sites that are further away will be less affected.

8. Environmental Risk

In determining the application, we have considered the Environmental Statement.

8.1 Assessment of Impact on Air Quality

The Applicant's assessment of the impact on air quality is set out in the Air Quality Assessment sections of the application. The assessment comprises:

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

This section of the decision document deals primarily with the dispersion modelling of emissions to air from the Installation's stack and its impact on local air quality. The impact on conservation sites is considered in the Biodiversity, Heritage, Landscape and Nature Conservation section above.

The Applicant has assessed the Installation's predicted emissions to air against the relevant air quality standards, and human health.

The Applicant used dispersion modelling software ADMS, version 5.2. Within the modelling they used 5 years (2008-2012) of hourly sequential meteorological data measured at Sennybridge.

Our check modelling was carried out using ADMS version 5.2 software. Meteorological (MET) data was based on the short-term forecast fields of the Numerical Weather Prediction system known as the 'Met Office Unified Model (UM)' modelled at XY coordinates 293844 & 206820, approximately 500m from the emission point, between 2013 and 2015 (inclusive). The NWP-UM data had a resolution of approximately 1.5km and was modelled at hourly intervals.

While Sennybridge meteorological data is not representative of the conditions prevailing at Hirwaun, a comparison of submitted results with our check modelling

using NWP extract data indicate that differences in predictions are small and will not therefore affect overall conclusions.

Terrain data with a resolution of 100m was used in the Applicants ADMS model. The submitted report concluded that the differences between a 32x32 and 64x64 internal calculation grid were insignificant and therefore a 32x32 grid was subsequently used in the final model runs. Submitted modelling files used a roughness value of 0.2, typical of agricultural areas with short vegetation.

For the conversion of NO_X to NO_2 a conversion factor of 70% for long-term and 35% for short-term has been applied.

The plant will operate as a “peaking plant” supplying electricity to the National Grid during periods of peak electricity demand and not exceeding 1,500 hours per annum, the Applicant factored their predicted annual process contribution concentrations by 0.33. Our check modelling was unable to verify the reported maximum 24-hour impacts at environmental receptors using the reported factor of 0.33 (8 hours ÷ 24 hours) to correct submitted 24 hourly results.

While predicted values from our check modelling differed from submitted and reported values, differences were not sufficiently large to result in a change in overall conclusions. When assessing the impact of short-term emissions, continuous operation throughout the year was assumed.

The Applicant assessed the impact of emissions of nitrogen dioxide (NO_X) and carbon monoxide (CO). Emission limits for the pollutants have been taken from Large Combustion Plant Bref.

The Applicant carried out a detailed stack height assessment as part of the Environmental Impact Assessment (EIA), to investigate how the dispersion of pollutants differed due to the proposed stack height. The assessment considered the long-term effects of NO_2 and the short-term effects of NO_2 and CO.

The results showed that there were significant benefits in terms of maximum ground level concentrations of NO_2 and CO as the stack height increases from 20m to 35m, this is due to the building downwash effect becoming less prominent.

Based on the above information, the Applicant concluded that a stack height of at least 35m was suitable. The predicted concentrations presented in the assessment are based on the stack height of 35m and this is a worst-case. NRW agree that the stack height assessment is sufficient.

A quantitative assessment of start-up and shut down operations was not provided, as this is not normal practice for an Installation such as this. However, the Applicant states' *"Typical start up procedures will take around ten minutes to complete, and combustion fuel will not be introduced into the system until two to three minutes of the start-up have elapsed. During the next seven to eight minutes, fuel will be introduced into the system, first at a low rate and then at an increasing rate, up to full load operations. During start up, whilst the concentration of pollutants in the engine exhaust (at reference conditions) may be higher than under partial or full load operation during the first few minutes (e.g. minutes two to eight, at <75% load), the pollutant mass release rate will be lower than under full load operations due to the overall lower flow rates of exhaust gases. Furthermore, the concentration of pollutants decreases rapidly as start-up proceeds and, by around 8 minutes into start up, has decreased to levels equivalent to full load operations."*

As the Installation is identical to the Installation in Abergelli, the conclusions for start-up/shut-down apply to Hirwaun also. For the Abergelli plant the Applicant stated that the impact of start-up and shut-down would be 5% greater than normal operation. When this additional 5% was added to the normal operation impact of short-term NO_x, the impact was still insignificant. To take it a step further, the Applicant assumed the impact would be 50% greater, even at this increased level, the impacts were still insignificant.

The Air Quality Assessment considered the following substances;

- Oxides of Nitrogen (NO_x), expressed as NO_2
- Carbon Monoxide (CO)

The Applicant's modelling predictions with regard to human health are summarised in the following sections.

8.1.1 Consideration of Key Air Pollutants

Oxides of Nitrogen (NO and NO_2), expressed as NO_2 (NO_x)

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

The Applicant used the Defra background maps for the background values used in the assessment. The Applicant has modelled the predicted impact of long-term and short-term NO_x emissions at 28 human receptors.

Long Term (Annual Mean)

The maximum off-site long-term Process Contribution (PC) was modelled at 0.06 µg/m^3. At 0.2% of the 40 µg/m^3 EUEQS, this is below the 1% threshold for long-term impact and therefore the effects at all off-site locations are insignificant. No further assessment is required.

Short-Term (Daily Mean)

The maximum off-site short-term Process Contribution (PC) was modelled at 6.99 µg/m^3. At 3.5% of the 200 µg/m^3 EUEQS, this is below the 10% threshold for short-term impact and therefore the effects at all off-site locations are insignificant.

The results of our check modelling broadly agree with the Applicants, that there is unlikely to be any exceedances of air quality standards for protection of human health at sensitive receptors due to the proposal. Our check modelling further indicates that the predicted process contributions of NO_2 at human receptors will be less than 1%

and 10% of the long and short-term air quality standards respectively. No further assessment is required.

Carbon Monoxide - CO

The maximum off-site 8 hour rolling CO Process Contribution (PC) was modelled at 51.2 µg/m^3. At 0.5% of the 10000 µg/m^3 EUEQS, this is below the 1% threshold for long-term impact and therefore the effects at all off-site locations are insignificant. The results of our check modelling agree with the Applicants, that there is unlikely to be any exceedances of air quality standards for protection of human health at sensitive receptors due to the proposal. Our check modelling further indicates that the predicted process contributions of CO at human receptors will be less than 1% of the air quality standards.

In summary, we are satisfied that there are unlikely to be any exceedances of long and short-term air quality standards (for NO_x and CO) for protection of human health at sensitive receptors due to the proposal.

8.2 Emissions to surface water

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

There will be no release to surface water or land of process effluent. The only discharge will be clean surface water run via the site surface water drainage system. Run-off from hard surfaces, including parking and storage areas, will be passed through an oil separator prior to discharge to the Nant Yr Ochain/River Camnant. This will be passed through an oil interceptor prior to discharge. The oil interceptor will comply with all relevant legislation.

The oil interceptor will be fitted with an alarm to indicate when oil storage tanks need to be emptied. The oil interceptor is part of the sites EMS and therefore will be regularly serviced and maintained. Pre-operational condition (PO3) has been included in the Permit requesting a full ‘as-built’ drainage plan.

There is a process monitoring requirement in the Permit that requires the Operator to have a permanent oil in water monitor on the outfall that will alert the main control room to the presence of any oil in the water.

Surface water from roofs will not pass through oil interceptors.

8.3 Emissions to sewer

There will be no emissions to sewer, as the Installation is largely un-manned, pre-fabricated toilets will be installed with a waste tank that will be emptied by tanker and removed to an authorised waste facility for disposal.

The Installation uses air as the main source of cooling therefore there will be no requirement for large amounts of waste water to be discharged. On the occasion that water is needed for maintenance and cleaning activities, the waste water will be retained on-site and removed by tanker to an authorised waste facility for disposal.

8.4 Emissions to ground

There will be no emissions to ground

8.5 Fugitive emissions

There will be no significant fugitive emissions associated with the Installation, as the primary fuel is Natural Gas and all operations will occur inside a building.

8.6 Odour

We consider that the Applicant's proposals represent the appropriate measures to prevent/minimise odour from the permitted activities. The Natural Gas is piped into the Installation at pressure. The Installation has leak detection equipment that will detect any leak of gas and purge and shutdown the system.

As we are satisfied that appropriate measures will be in place to prevent or, where that is not practicable to minimise odour and prevent pollution from odour, we consider that no odour management plan is needed and Permit conditions 3.3.1 and 3.3.2 are sufficiently protective.

8.7 Noise

The Applicant submitted a noise assessment considering the potential impact on nearby sensitive receptors. Amendments were made to the noise assessment which was re-submitted on the 14th March 2019 and additional supporting information provided on the 9th April 2019.

The Applicant predicted noise levels at sensitive receptor locations by using the calculation method prescribed in ISO 9613-2. Typical octave band data for the proposed turbine and generator equipment has been analysed from example manufacturer's data sheets and is likely to have minor tonal characteristics for which a maximum 2 dB penalty is considered appropriate.

The Applicant did provide detailed information regarding the source noise levels. The following levels were used:

- The single turbine plant layout used as a template;
- The sound pressure level at a distance of 1 m from the generator / turbine will be limited to a sound pressure level of 75 dB (A);
- The sound power emission at the top of the exhaust stack will be limited to 102 dB (A);
- The sound pressure level a distance of 1 m from the area containing the fin-fan coolers will be limited to 75 dB (A), and;
- Ground absorption in the noise model is set to 0.5.

The assessment predicted impact from various situations using the assessment methodology BS 4142:2014. BS 4142:2014 assesses the likelihood of significant adverse impact by subtracting the measured background noise level from the rating level:

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

Six noise sensitive receptors (NSRs) were identified in the assessment.

BS4142:2014 defines daytime periods and night time periods. Day time is defined as 7am-11pm and night time is defined as 11pm to 7am.

The scheme is intended to be used as a peaking plant to supply extra power to the grid during times of heavy demand, as such, the plant would only typically be operational during the morning between 0600hrs to 1000hrs and in the evening between 1800hrs and 2200hrs. During operational hours the noise produced by the plant would be steady state and continuous, therefore a penalty has not been applied for intermittency.

The BS4142 assessment has demonstrated that during the daytime there is no noise impact, but during the night time there is an initial indication of adverse impact. The power plant will be operated as a peaking plant, therefore is very unlikely to ever be operational throughout the night time period.
It was agreed that a suitably conservative assessment of potential maximum impact the night time ‘shoulder’ hour of 0600-0700 and the evening ‘shoulder’ hour of 2100-2200 have been considered. Statistical analysis to identify the representative mode has been undertaken of the background L_{A90} dB data at all NSRs during the shoulder hour between 0600 and 0700, and for the evening peak between 2100 – 2200 (considered to represent the lowest noise levels of the evening peaking period).

It has been concluded that "*Predicted noise impacts associated with the proposed power plant are considered unlikely to have adverse effects at the closest receptors assessed. In particular, the results of the BS 4142 assessment for nearby residential properties indicate that the predicted rating noise levels are considered to present no impact during the daytime. During the night time, and the evening operational period, an initial indication of adverse impact, depending on context was identified.*

The Applicant has put forward the following contextual considerations:

- *A BS 4142 assessment focussing on the peak periods of operation (night time hour between 0600 to 0700 and evening hour between 2100 and 2200). The results show that noise from the power plant is not predicted to exceed the background noise level (LA90) by more than 5dB at all NSRs except NSR 1 (the closest receptor) where the difference is +6 dB during the evening peak period. BS 4142 considers a difference of around +10 dB or more to be an indication of significant adverse impact.*
- *A comparison of the predicted equivalent noise level (LAeq, T) from the power plant and the baseline ambient noise level, at each NSR location has been carried out. This comparison has shown that the predicted equivalent noise level from the power plant is below the baseline ambient noise level at all NSR locations.*
- *A noise ingress assessment has been conducted at all NSR locations. The assessment of noise ingress indicates that the proposed development would not prevent a good standard of amenity being maintained; this is taken as an indication that adverse effects are not expected, and accordingly, the operation of the proposed Hirwaun power plant is considered to present a low impact.*

- *It is concluded that the proposed Hirwaun power plant is unlikely to generate significant adverse noise impacts at any noise-sensitive receptors, and that the risk of adverse noise impacts has been suitably minimised by consideration of the site layout and the use of best available techniques."*

NRW agrees with this conclusion.

Our checks are based on the noise source information supplied by the Applicant.

Our check calculations and check modelling agree with the Applicants noise predictions.

Improvement Condition (IC6) requires the Operator to undertake a noise impact assessment at sensitive receptors once the plant is operational, this this aims to provide validation to the Applicants proposed noise source levels and predicted impact.

8.8 Efficient use of raw materials, water and Energy

Having considered the information submitted in the Application, we are satisfied that the appropriate measures will be in place to ensure the efficient use of raw materials and water within the Installation. The Operator is required to report raw material usage under condition 4.2 and Schedule 4. The efficiency of the use of auxiliary fuel will be tracked separately as part of the energy reporting requirement under condition 4.2.2.

The primary fuel is Natural Gas, this will be piped into the Installation when it is needed, the gas will be delivered via high pressure pipework where it is metered into the Installation. Leak detection equipment on the gas system will minimise leak and wastage of gas. The Installation will shut down once a leak is detected.

Large volumes of other materials aren't stored on-site. Lubricating oils, chemicals and supplementary (emergency) fuel are stored in small quantities and only used when needed.

The cooling system for the Installation uses air, therefore significant amounts of water will not be needed. Water will only be used for maintenance purposes and washing of fan-blades when needed.

The Installation uses on-line monitoring of the plant conditions, by using the SCADA monitoring equipment, operators can continuously monitor the plant condition & operation thus ensuring optimal running conditions are maintained.

The energy requirements for an Installation such as this will be low, as there are no permanent staff on-site, minimal heating and lighting will be required.

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

This requirement addresses wastes produced at the Installation. The principal waste streams produced by the Installation are general waste, used gas turbine intake filters, separated oil and sludge from oil separators and used lubricating oil. Large quantities of waste will not be generated on-site as the Installation will be largely un—manned. All waste will be removed from site by a licenced waste contractor, adhering to all relevant legislation.

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

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

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

9. Operating Techniques

We have reviewed the techniques used by the Operator and have compared these with those set out in the BAT Conclusions for Large Combustion Plant and EPR 1.01 “How to comply with your environmental Permit Additional guidance for combustion activities” and concluded that the operating techniques conform with BAT. The installation will incorporate the following techniques that are considered to be BAT:

9.1 Technology Choice

The Applicant initially assessed 4 different technology types for the Installation, these were; Combined Heat and Power (CHP), Combined Cycle Gas Turbine Plant (CCGT), Open Cycle Gas Turbine Plant (OCGT) and Reciprocating Gas Engine (RGE). The Applicant chose OCGT equipment, as this is considered the most suitable technology for the way in which the plant will operate. The Installation will generate 299MW of electrical power as a peaking plant; operating for 1500 hours per year. OCGT was chosen for several reasons;

- The most important reason, is the fast start-up and shut-down times of the plant These are a lot quicker when compared to a similar sized CCGT plant. This means OCGT is better at being able to meet the electricity demands of the grid at short notice.
- The stack height for an OCGT plant is typically lower than a CCGT plant due CCGT plant having a steam turbine, therefore visual impacts are lower with OCGT plant.
- No cooling water is required for the OCGT plant as no cooling is required for condensing steam, therefore the cooling requirements are a lot lower for OCGT when compared to CCGT. Further to this air cooling is utilised on the OCGT through fin fan cooling, this means that there is no significant water usage for an OCGT plant when compared to a CCGT plant. This will further result in no emissions to either surface water or sewer and less demand on the local water resource.
- Due to electricity prices and demand, the plant needs to be flexible and able to meet the demands of the grid and be able to start-up and provide power quickly.
- Noise generated by an OCGT plant is a lot lower than an RGE plant. This is because to meet the 299MW electrical, a larger number of RGE plants would be needed, this would also have a much greater visual impact than an OCGT plant.
- As OCGT plant do not have any associated HRSG/steam turbine plant, the provision of steam from an OCGT plant would not be possible without the provision of additional steam raising equipment, which would require a larger

overall land take. With this in mind, CHP has not been a significant factor in the technology choice of the plant.

The chosen technology is an 'Open Cycle Gas Turbine (OCGT)'. This technology has been chosen over 'Combined Cycle Gas Turbines (CCGT)' as OCGT is better suited to peak power generation. The BAT conclusions document for Large Combustion Plant, doesn't state whether OCGT or CCGT represents BAT for plants that operate less than 1500 hours per year, whereas over 1500 hours per year CCGT represents BAT. Based on this, the choice of technology is acceptable.

The OCGT plant will achieve net efficiencies of between 38.0 and 41.5% depending on the actual equipment purchased. The LCP BREF document states net efficiencies should be between 36.0 and 41.5% to be considered BAT. Based on the Applicants proposed efficiency figures, we accept this as BAT. However, the efficiency quoted in the BREF document only applies to plant operating more than 1500 hours per year, this Installation will not operate more than these hours and therefore the efficiencies don't strictly apply. Based on the restricted operating hours, the provisions of Article 14 of the Energy Efficiency Directive do not apply.

9.2 Cooling

The Applicant considered 4 options for the cooling system for the plant, these were; once through cooling using river water, evaporative cooling tower, hybrid cooling towers and fin fan coolers.

Fin fan coolers (with a closed loop water system) utilise air as the cooling medium rather than water, therefore there is no significant water consumption. This makes it the best fit for the location of the site plus the operational footprint. Another benefit is that there will be no process discharges to either surface water or sewer, plus the visual impact is greatly reduced.

A full noise impact assessment was carried out by the Applicant, one aspect of this assessment focused on the fin fan coolers as they can often generate more noise than

other cooling methods. The noise assessment concluded that noise impacts from the Installation are insignificant at noise sensitive receptors.
Fin fan coolers also use more energy than other cooling methods, however, on balance this won't affect the overall energy efficiency of the site.

Based on energy consumption, once through cooling would have a lower energy demand, however, it would require vast volumes of water, based on the location of the site this method isn't feasible as there isn't a suitable water source that would provide the volumes of water needed, as the Installation is a peaking plant and doesn't run continuously there would be the added complications of siltation and fouling as water would sit in pipes for periods of time, process effluent discharges would also be another factor with this type of cooling system.

Hybrid cooling towers have a higher energy demand than fin fan coolers plus the requirement to have water as the cooling medium.

On balance, NRW agree that fin fan coolers with a closed cycle cooling system for this Installation in this location represents BAT.

9.3 Releases to Air

NO_x

BAT 42 in the Large Combustion Plant BREF document deals with minimising emissions of NO_x to air, using one or a combination of the techniques listed.

Advanced control systems are used, the Installation is equipped with the latest monitoring equipment to ensure the plant is operating at peak performance and any deviations are detected early.

Water/Steam addition is not relevant for this Installation due to the location and availability of a local water source.

The Applicant has stated that Dry Low NO_x (DLN) burners will be used at the Installation. These burners reduce the peak flame temperature, which is an effective way of reducing NO_x emissions and is a proven primary pollution control measure that does not need secondary control measures, such as Selective Catalytic Reduction (SCR) in place. The DLN burners will control NO_x emissions to the daily BAT-AEL level of 50mg/Nm^3. Improvement Condition 2 (IC2) requires the Operator to define an output load or operational parameters to justify when Dry Low NO_x is effective.

Low-load design is not relevant at the Installation due to differences in turbine design.

Low NO_x burners (LNB) are not employed here as DLN burners are used. LNB are generally applicable to supplementary firing for heat recovery steam generators (HRSGs) in the case of CCGT plants. Since the Installation is an OCGT plant this is not relevant. The use of SCR is also not relevant at this Installation. As stated above, DLN burners are used and therefore there isn't the need for secondary NO_x control. In addition, due to the Installation being a peaking plant, the plant will start and stop frequently. This means that SCR is not suitable as the catalysts within the SCR require heat to warm up and become effective, this would require a bypass stack at the Installation, meaning significant additional work with no real benefit in NO_x reduction.

CO

BAT conclusion 44 in the LCP BREF document states; *'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'.*
The Applicant will use technology to ensure the combustion conditions and performance of the Installation is such that emissions of CO will be minimised. NRW agrees that this represents BAT for the control of CO emissions.

The proposed techniques/ emission levels for priorities for control are in line with the benchmark levels contained in the TGN and we consider them to represent appropriate techniques for the facility.

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

The Installation is designed, constructed and operated using BAT for Large Combustion Plant. We are satisfied that the operating and abatement techniques being employed are BAT for Large Combustion Plant.

9.4 CHP Assessment

CHP is the simultaneous generation of electricity and usable heat within the same process, this is also known as cogeneration.

The energy efficiency directive encourages the development of CHP or CHP ready plant; however, it also exempts back-up electricity generating installations which operate less than 1500 hours per year.

CHP has been discounted at this Installation for several reasons. The provision of CHP is not economically feasible as the plant operates as a peaking plant and there is no guarantee that the demand for electricity and heat will be required at the same time. Heat demand is usually constant for a large proportion of the year, due to the nature of this plant, this could not be provided.

OCGT plants do not produce any steam, therefore to provide this an additional steam raising plant would be required, this would add a large financial cost and technical issues which are not reasonable, as explained above a peaking plant would struggle to meet any heat demand as it does not operate continuously.
The Applicant however did carry out a screening assessment of potential heat demand within a 10km screening distance. The only heat demand came from domestic customers, as described above, due to the nature of the plant, a consistent heat demand cannot be met. No future heat requirement in the area has been found that will match the operational pattern of the peaking plant.

Based on the above statements, NRW agree with the Applicant that it can be excluded from being considered CHP/CHP-ready and no further assessment is required.

9.5 Carbon Capture Readiness

The threshold for Carbon Capture readiness applies when a power generating installation has a thermal input more than 300MW. Regarding this Installation the thermal input is 299MW and therefore the requirement to carry this activity out does not apply.

10. The Permit Conditions

10.1 Raw Materials

We have specified limits and controls on the use of raw materials and fuels. Diesel brought on to site must not exceed 0.1% w/w sulphur content.

10.2 Incorporating the application

We have specified that the Applicant must operate the Installation in accordance with the descriptions in the application, including all additional information received as part of the determination process. These descriptions are specified in table S1.2 “Operating Techniques” in the Permit and are therefore directly enforceable.

10.3 Emission Limits

We have decided that emission limits should be set for the parameters listed in the Permit.

The emission limits proposed in the Application are taken directly from the BAT Conclusions document for Large Combustion Plant. Emission limits will apply to NO_x

and CO, these are listed in Table S3.1 in the site's Environmental Permit. The ELVs selected in the Permit are compliant with the BAT-AELs listed in the BREF document.

The limits set in the Permit are as follows;

NO_x	
Monthly mean of validated hourly averages (from 70% to baseload and from Effective Dry Low NO_x to baseload)	50 mg/m^3
Daily mean of validated hourly averages (BAT-AEL) (from 70% to baseload and from Effective Dry Low NO_x to baseload)	50 mg/m^3
Daily mean of validated hourly averages (from Minimum Start-Up Load (MSUL) to baseload)	TBC following completion of IC9
95% of validated hourly averages within a calendar year (from 70% to baseload and from Effective Dry Low NO_x to baseload)	100 mg/m^3
Annual mean (from Effective Dry Low NO_x to baseload)	35 mg/m^3

CO	
Monthly mean of validated hourly averages (from 70% to baseload and from Effective Dry Low NO_x to baseload)	100 mg/m^3
Daily mean of validated hourly averages (BAT-AEL) (from 70% to baseload and from Effective Dry Low NO_x to baseload)	110 mg/m^3
Daily mean of validated hourly averages (BAT-AEL) (from Minimum Start-Up Load (MSUL) to baseload)	TBC following completion of IC9
95% of validated hourly averages within a calendar year (from 70% to baseload and from Effective Dry Low NO_x to baseload)	200 mg/m^3
Annual mean (Effective Dry Low NO_x to baseload)	TBC following completion of IC3

As the Installation is new, the Operator needs to determine what the MSUL is. Improvement Condition 1 (IC1) requires the Operator to define the minimum start-up and shut-down loads. Based on this the daily ELV for MSUL to baseload will need to be determined once the MSUL has been determined. Improvement Condition (IC9) requires the Operator to set the ELV once the MSUL has been determined.

The CO limits in the BATC document are indicative BAT-AELs. Improvement Condition 3 (IC3) requires the Operator to propose an achievable ELV for the annual mean CO, if this ELV deviates from the indicative BAT-AEL then a BAT assessment will also need to be submitted to justify the deviation.

Actual emissions are almost certain to be below emission limits in practice, because any Applicant who sought to operate its Installation continually at the maximum permitted level would almost inevitably breach those limits regularly, simply by normal fluctuations in plant performance, resulting in enforcement action (including potential prosecution) being taken.

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

The following substances have been identified as being emitted in significant quantities and ELVs based on BAT have been set for those substances;

- NO_2
- CO

It is considered that the ELVs described above will ensure that significant pollution of the environment is prevented and a high level of protection for the environment secured.

10.4 Monitoring

We have decided that monitoring should be carried out for the parameters listed in Schedule 3 of the Permit using the methods detailed and to the frequencies specified in those tables. These monitoring requirements have been imposed in order:

- to demonstrate compliance with emission limit values and to enable correction of measured concentration of substances to the appropriate reference conditions.

For emissions to air, the methods for continuous monitoring are in accordance with the Environment Agency Guidance M2 for the monitoring of stack emissions to air. NRW has adopted this guidance.

The Applicant has confirmed that continuous monitoring will be carried out for the parameters listed in Schedule 3 of the Permit. Once the Continuous Emission Monitors (CEMs) are installed they will be checked for functionality and the performance will be verified. Performance checks will include: leak testing, response times, linearity, interference (particularly any substances that could cause bias), zero and span drift and comparison with a reference method. The installation and management of the CEM will comply with European Standard EN14181, Stationary source emissions. The standard consists of 3 Quality Assurance Levels (QALs 1, 2 and 3) and an Annual Surveillance Test (AST). These will be carried out to ensure compliance. Improvement Condition 8 (IC8) requires the Operator to submit a written summary which presents the results of the calibration and verification testing confirming the performance of the CEMS.

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

10.5 Reporting

We have specified the reporting requirements in Schedule 4 of the Permit. The Operator will report continuous emissions data for NO_2 and CO every 3 months, and report sulphur dioxide and dust (by calculation) every 6 months. We are satisfied that

this frequency is appropriate for a plant of this type. These meet the reporting requirement set out in the IED and ensure data is reported to enable timely review by NRW.

11. Operator Competence

11.1 Environmental Management System

The Applicant has stated in the Application that they operate an Environmental Management System (EMS) certified under ISO14001, a copy of the certificate confirming this was provided as part of the Application, this was for the entire Drax Power station, the site-specific EMS for Hirwaun Power will be incorporated into Drax's EMS.

Improvement Condition (IC7) requires the Operator to provide a summary of the EMS within 12 months of the date of commissioning of the plant. We are therefore satisfied that appropriate management systems and management structures will be in place for this Installation, and that sufficient resources are available to the Operator to ensure compliance with all the Permit conditions.

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

11.2 Relevant convictions

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

11.3 Financial Provision

There is no known reason to consider that the Operator will not be financially able to comply with the Permit conditions. The decision was taken in accordance with EPR RGN 5 on Operator Competence.

11.4 OPRA

We are satisfied that the Applicant's submitted Operator Performance Risk Appraisal ('OPRA') profile is accurate. The OPRA score is 122 and will be used as the basis for subsistence and other charging, in accordance with our Charging Scheme. OPRA is Natural Resources Wales method of ensuring application and subsistence fees are appropriate and proportionate for the level of regulation required.

ANNEX 1: Pre-Operational Conditions

Table S1.4 Pre-operational measures	
Ref.	**Pre-operational measures**
PO1	At least 1 month prior to the commencement of commissioning, the Operator shall submit the written monitoring plan referenced in Condition 3.1.3 for the monitoring of soil and groundwater for approval by Natural Resources Wales. The monitoring plan shall demonstrate how the Operator will meet the requirements of Articles 14(1)(b), 14(1)(e) and 16(2) of the IED. The monitoring plan shall be implemented in accordance with the written approval from Natural Resources Wales.
PO2	At least 1 month prior to the commencement of commissioning; the Operator shall provide a written commissioning plan, including timelines for completion, for approval by Natural Resources Wales. The commissioning plan shall include the expected emissions to the environment during the different stages of commissioning, the expected durations of commissioning activities and the actions to be taken to protect the environment, you will report to Natural Resource Wales if actual emissions exceed expected emissions and compliance with LCP Bref BAT-AELs, Annex V, Part 2 NOx limits to be qualified from 70% load to baseload. Commissioning shall be carried out in accordance with the commissioning plan as approved.
PO3	At least 1 month prior to the commencement of commissioning the Operator shall supply an as-built drainage plan for the Installation, covering all aspects of the system listed in the Application Supporting Document.

ANNEX 2: Improvement Conditions

Table S1.3 Improvement programme requirements		
Ref.	**Requirement**	**Date**
IC1	The Operator shall submit a report in writing to Natural Resources Wales for approval. The report shall define and provide a written justification of the "minimum start up load" and "minimum shut-down load", for the LCP as required by the Commission Implementing Decision 2012/249/EU in terms of: i. The output load (i.e. electricity, heat or power generated) (MW); and ii. This output load as a percentage of the rated thermal output of the combustion plant (%). And / Or iii. At least three criteria (operational parameters and/or discrete processes as detailed in the Annex of the commissioning decision) or equivalent operational parameters that suit the technical characteristics of the plant, which can be met at the end of start-up or start of shut-down as detailed in Article (9) 2012/249/EU.	Within 4 months of the completion of commissioning
IC2	The Operator shall submit a report in writing to Natural Resources Wales for approval. The report shall 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.	Within 4 months of the completion of commissioning
IC3	The Operator shall propose an achievable emission limit value (ELV) for carbon monoxide expressed as an annual mean of validated hourly averages. If the proposed ELV deviates from the indicative BAT AEL for CO of 40mg/m^3 then an associated BAT justification shall be submitted to Natural Resources Wales for approval in the form of a written report.	Within 4 months of the completion of commissioning
IC4	The Operator shall provide a report in writing to Natural Resources Wales for approval which provides the net rated thermal input and net rated electrical output for LCP002743. Evidence to support this figure, in order of preference, shall be in the form of: - a) Performance test results* during contractual guarantee testing or at commissioning (quoting the specified standards or test codes); b) Manufacturer's contractual guarantee value; c) Published reference data, e.g., Gas Turbine World Performance Specifications (published annually); d) Design data, e.g., nameplate rating of a boiler or design documentation for a burner system; e) Operational efficiency data as verified and used for heat accountancy purposes; f) Data provided as part of Due Diligence during acquisition. *Performance test results shall be used if these are available.	Within 4 months of the completion of commissioning

Table S1.3 Improvement programme requirements		
Ref.	**Requirement**	**Date**
IC5	The Operator shall submit a written report to Natural Resources Wales for approval on the commissioning of the installation. The report shall summarise the environmental performance of the plant as installed against the design parameters set out in the application. The report shall also include a review of the performance of the facility against the conditions of this Permit and details of procedures developed during commissioning for achieving and demonstrating compliance with Permit conditions.	Within 4 months of the completion of commissioning
IC6	Following successful commissioning and establishment of routine steady operation, the Operator shall undertake noise monitoring at the nearest local receptors for both normal operation and for periods of start-up and shut-down. This shall include: • A full noise monitoring survey and assessment meeting the BS4142:2014 standard • 1/3rd octave and narrow band (FFT) measurements to identify any tonal elements or low frequency noise • Reference to the World Health Organisation guidelines for community noise • Reference to the Noise Action Plan for Wales Upon completion of the work, a written report shall be submitted to Natural Resources Wales. The report shall refer to the predictions in the report produced as part of the application. If rating levels likely to cause adverse impact at sensitive receptors are detected, the report shall include an assessment of the most suitable abatement techniques, an estimate of the cost and a proposed timetable for their installation.	Within 6 months of the completion of commissioning
IC7	The Operator shall submit a written report to Natural Resources Wales on the implementation of its Environmental Management System and the progress made in the certification of the system by an external body or if appropriate submit a schedule by which the EMS will be certified.	Within 12 months of the date commissioning
IC8	The Operator shall submit a written summary report to Natural Resources Wales which presents the results of calibration and verification testing to confirm that the performance of Continuous Emission Monitors for parameters as specified in Table S3.1 complies with the requirements of BS EN 14181, specifically the requirements of QAL1, QAL2 and QAL3.	Initial calibration report to be submitted to Natural Resources Wales within 3 months of completion of commissioning Full summary evidence compliance report to be submitted within 18 months of commissioning
IC9	The Operator shall 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. This must be supported by a summary of emissions data. Justification shall be submitted to Natural Resources Wales for approval in the form of a written report.	Within 6 months of the completion of commissioning

ANNEX 3: Consultation Responses

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

We received no responses from the specific statutory bodies that were consulted. No responses were received from members of the public.