Cyfoeth Naturiol Cymru
Natural Resources Wales

Natural Resources Wales permitting decisions

Culvery Power Limited
Decision Document

Normal variation

The Variation number is: **PAN-003961/V002**
The application number is: **PAN-003961**
The Applicant / Operator is: **Culvery Power Limited**
The Facility is located at: **4 Chemisty Lane, Pentre, Deeside, Wales, CH5 2DA**

We have decided to issue the variation to Culvery Power Limited.

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

Purpose of this document

This decision document:

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

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

Structure of this document

- Table of contents
- Key issues

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Key issues of the decision

1 Our decision

We have decided to grant a normal variation for Culvery Power Limited – Deeside.

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 variation application is to increase the operational hours of the Specified Generator from 2500 hours per year to 4000 hours per year, all other aspects of the facility remain unchanged. The habitats screening distances for natural gas fuelled Tranche B Specified Generators have changed since initial permit issue therefore the plant has changed from a simple bespoke plant to a complex bespoke plant, as it no longer screens out using the Tranche B SG Screening Tool.

The permit contains many conditions taken from our standard Environmental Permit template including the relevant Annexes. We developed these conditions in consultation with industry, having regard to the legal requirements of Environmental Permitting Regulations (EPR) 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 conditions appropriate.

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

2 How we reached our decision

2.1 Receipt of Application

The Application was accepted as duly made on **11/03/2021.** 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.

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

2.2 Consultation on the Application

There was no requirement to carry out a consultation on the Application, the plant is not located within an AQMA.

2.3 Requests for Further Information

In order for us to be able to consider the Application duly made, we needed more information. We requested further information relating to a relevant person completing the declaration section on form F1. Upon receipt of this information we were able to consider the application Duly Made.

An email was sent to the relevant environment team regarding a query relating to freshwater features of the River Dee and Bala Lake Special Area of Conservation (SAC) which does not have a nitrogen critical load assigned to the designated feature.

A request was made to the operator to explain the change to the companies registration number from the original permit.

A copy of the information notice and e-mails requesting further information were placed on our public register as were the responses when received.

3 The Legal Framework

The variation will be granted, under Regulation **20** of the EPR. The Environmental Permitting regime is a legal vehicle which delivers most of the relevant legal requirements for activities falling within its scope. In particular, the regulated facility is:

- plant as described by Schedule 25B covering Specified Generator (SG) regulations
- subject to aspects of the Well-Being of Future Generations (Wales) Act 2015 and the Environment (Wales) Act 2016 which also have to be addressed.

We address the legal requirements directly where relevant in the body of this document. NRW is satisfied that this decision is consistent with its general purpose of

pursuing the sustainable management of natural resources (SMNR) in relation to Wales, and applying the principles of SMNR. In particular, NRW acknowledges that it is a principle of sustainable management to take action to prevent significant damage to ecosystems. We consider that, in granting the Permit a high level of protection will be delivered for the environment and human health through the operation of the Facility in accordance with the permit conditions. NRW is satisfied that this decision is compatible 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.

4 The Facility

4.1 Description of the Facility and related issues

4.1.1 The permitted activities

The Facility is subject to the EPR because it carries out an activity as described in Schedule 25B of the EPR:

- One combined Tranche B Specified Generator/existing Medium Combustion Plant aggregated to <50MWth at a specified location

A Generator means any combustion plant generating electricity. The regulations use the term ‘specified generator’ to encompass both individual generators and multiple generators at the same location or site, operated by the same Operator and for the same purpose. The “same purpose” means that having a different function does not stop individual generators being treated as part of a specified generator, e.g. generators with a capacity market agreement or providing a balancing service whether they are under the same contract or not would be classed as operating for the “same purpose” as they generate electricity. Similarly generators with different fuels or technologies are also classed as operating for the “same purpose”.

The specified generator permit will apply to the site, rather than its constituent individual generators. All specified generators equal to or more than 1 MWth will also be Medium Combustion Plant (MCP) and must also meet the requirements of the MCP Directive once these requirements apply from 01/01/2024.

Specified Generators are also divided into Tranche A and Tranche B sites, which will determine the relevant permitting date. A site is a Tranche A site if it meets the following criteria:

- It came into operation before 1 December 2016, or
- It is the subject of a capacity agreement arising from the 2014 or 2015 capacity auctions

A generator with a rated thermal input of less than 1MWth will be classed as Tranche A if:

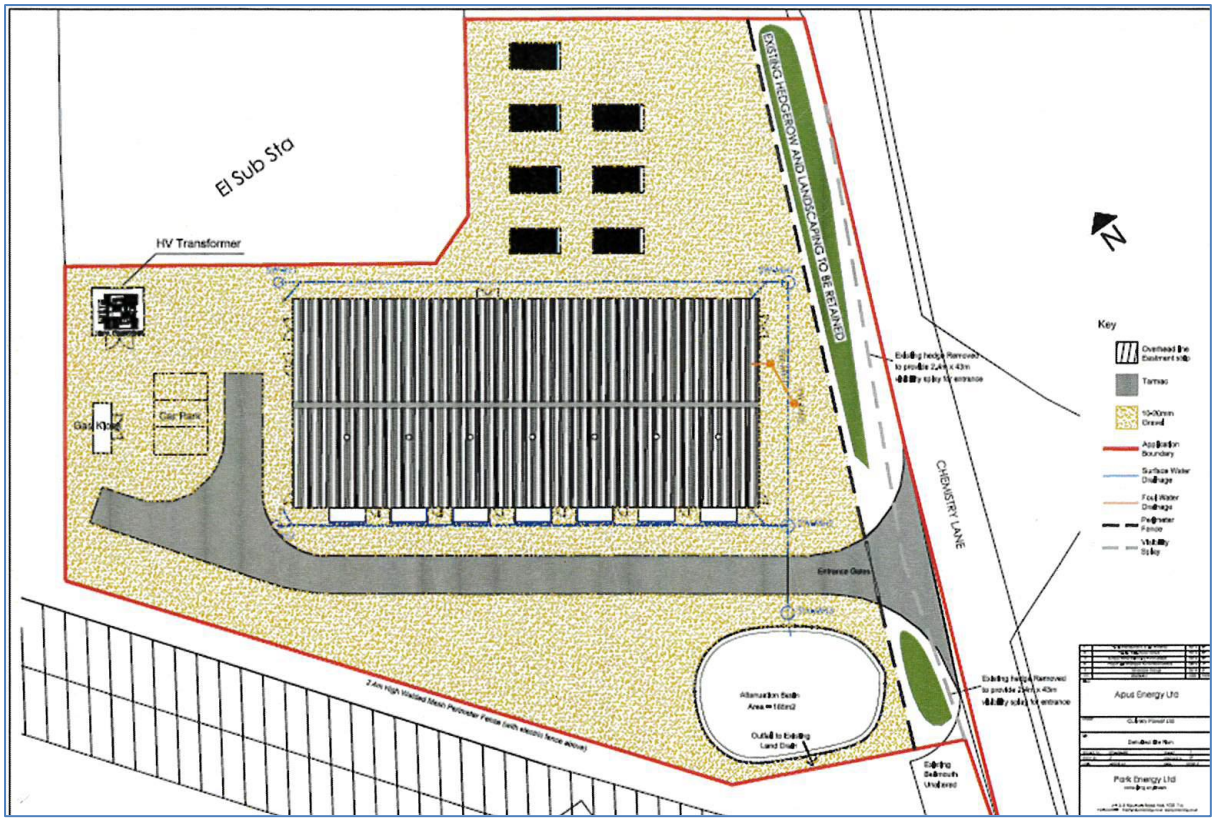
- It is the subject of a capacity agreement arising from the 2014, 2015 or 2016 capacity auctions, or
- A FiT preliminary accreditation application was received by OfGEM before 1 December 2017, or
- Is the subject of an agreement to provide balancing services entered into before 31 October 2017.

Tranche B generators are all those that are not Tranche A.

Culvery Power Limited to operate seven 4.65 MWth spark ignition reciprocating engines (one 32.6 MWth Specified Generator) which are used for the purposes of electricity generation. The facility at Culvery Power Ltd can be classified as a Tranche B Specified Generator, by virtue of a Short-Term Operating Reserve contract with National Grid entered into in August 2018.

4.1.2 The Site

Culvery Power Limited is a small 14 MWe natural gas fired power station located at, 4 Chemistry Lane, Pentre, Deeside CH5 2DA. The power plant was constructed on an area of brown field land. The land is the subject of a 20-year lease and is self-contained and fully enclosed by a perimeter fence. No activities other than the generation of electricity from natural gas will take place on site.



4.1.3 What the Facility does

The power plant itself is made up of 7 gas fuelled spark ignition reciprocating engines manufactured by MWM, Germany. Each engine, model TCG 2020V20, has a maximum output of 2 MWe. They are best available technology operating with an electrical efficiency of approximately 43 %. The electricity is generated by burning the gas within the spark ignition engines exporting the electricity produced at 33,000 volts to the SP Energy Network substation.

Gas is supplied to the power plant via a dedicated gas pipeline connected to the medium pressure gas network owned by Wales and West Utilities running along Chemistry lane The gas engines and all associated equipment are contained within a portal steel framed building on the centre of the site.

The plant is designed to operate intermittently at short notice on short duration runs. The plant has been designed as a flexible power generation facility providing electricity to the grid during times of low renewable energy output, high winter demand, market scarcity, system constraints and system instability.

4.1.4 Key Issues in the Determination

The key environmental and human health issues considered during the determination of this variation were:

- **Air quality – Oxides of Nitrogen**

4.2 Operation of the Facility – general issues

4.2.1 Administrative issues

The Applicant is the sole Operator of the Facility. We are satisfied that the Applicant is the person who will have control over the operation of the Facility if the Permit were to be granted; and that the Applicant will be able to operate the Facility so as to comply with the conditions included in the permit variation. There is no change to the Operator as part of this variation.

Relevant Convictions

NRW's COLINS Database has been checked to ensure that all relevant convictions have been declared. No relevant convictions were found.

4.2.2 Management

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

4.2.3 Operating techniques

The operator has stated that they will implement the following quality assurance techniques and maintenance schedule, in order to for the generators to achieve and retain optimal performance. In order to enable each generator and the power plant in general to achieve and retain optimal performance in both efficiency and emissions, the plant engages in the following best available operational management techniques :-

(a) **Benchmark Performance Testing and Acceptance** – On completion of the construction phase of the power plant, tests demonstrating fitness for purpose, reliability, efficiency, emissions and noise ensure the facility complies with all applicable design standards, procurement guarantees, and

generally good engineering practice. Such ‘performance acceptance testing’ is carried out in accordance with ISO 3046-4:2009 (Reciprocating internal combustion engines. Performance. Speed governing). This is the main standard of performance tests for reciprocating internal combustion engines and ensures the provision of data for acceptance of the plant based on tests of appropriate scientific quality.

(b) **Scheduled Maintenance** – The routine operation and maintenance of the plant is contracted to the Original Equipment Manufacturer’s (OEM) UK Agent; typically also the original EPC construction contractor. Maintenance of the plant is therefore undertaken based on strict OEM schedules retaining optimised performance of the assets through-out their life-cycle (>20 years).

(c) **Plant remote monitoring and operational control** – The performance of each engine and the power plant is monitored continuously. During periods of generation, each generator has sophisticated control systems which monitors operational parameters within strict operating conditions. These control systems detect operation at Other than Normal Operating Conditions (OTNOC) and make adjustments to air/fuel mixture, ignition and valve timing to ensure both efficiency and ELVs are maintained. The performance of the plant is analysed and trended over time to ensure its operating efficiency and energy consumption remain optimal.

(d) **Emission monitoring and engine mapping** – Emissions monitoring and engine mapping is undertaken as part of scheduled annual maintenance. Measurements are taken generally in accordance with Environment Agency Technical Guidance Note M5 (Medium Combustion Plant Directive and Generator Controls: monitoring point source emissions) using equipment assessed against EN 50379-2. Measurements are made by the organisations that service and maintain the MCP as part of their maintenance regime. Sample points have been provided in readily accessible locations of the exhaust system where the exhaust gasses remain hot (>300C) and are well mixed – typically the location is within the generator housing down-stream of the engine turbochargers but before the exhaust silencing system.

(e) **Analysing Plant failures and implementing improvements/remedies** – Plant failures are analysed by the operations and maintenance providers for root causes. Cause is identified against maintenance procedures, design requirements and life expectancy invoking a culture of continuous improvement in all aspects of plant reliability and performance.

(f) **Recording, analysis and management systems** - Through continuous monitoring and remote telemetry, records of performance, maintenance and testing are retained and reviewed regularly as part of performance and commercial plant management. In performing their duties, the plants Operations and Maintenance providers adhere to a fully ISO accredited Health Safety and Environmental and Quality Management System (SHEQ);ISO 9001, 140001 & 180001.

The installation whilst operational is maintained per the manufacturer's guidance with regular and routine servicing which involves periodic testing of emissions to ensure the plant operates in accordance with its design and continues to meet the appropriate emission limit values. The engines are 'tuned' periodically to ensure compliance.

We have reviewed the techniques used by the operator and compared these with the relevant guidance notes. The proposed techniques/ emission levels for priorities for control are in line with the benchmark levels contained in TGN M5 and we consider them to represent appropriate techniques for the facility. These are specified in the Operating Techniques table in the permit.

We have specified that the applicant must operate the permit in accordance with descriptions in the application, including all additional information received as part of the determination process.

5 Minimising the Facility's environmental impact

For this kind of regulated activity, the principal emissions are emissions to air. There are no permit conditions for water, land, energy efficiency, odour or noise and BAT does apply but only for emissions to air.

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

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.

We will discuss the operators risk assessment in more detail as follows:

5.1 Assessment of Impact on Air Quality

This section of the decision document deals primarily with the dispersion modelling of emissions to air from the stacks and its impact on local air quality.

The Applicant has assessed the Facility's potential emissions to air against the relevant air quality standards, and the potential impact upon human health. These assessments predict the potential effects on local air quality from the Facility's stack emissions.

The air impact assessments, and the dispersion modelling has been based on the Facility (peaking plant) operating up to 4000 hours per year at the relevant long-term or short-term emission limit values, i.e. the maximum permitted emission rate.

The air impact assessment included the assessment of the short-term and long-term emissions against the relevant critical level of the following pollutants: NOx. An assumption that 35 % NOx to NO_2 conversion for the short-term assessment and 70 % for the long-term assessment has been made, this is in accordance with current NRW guidance.

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

Annual Oxides of Nitrogen (NOx) emissions

The applicant has modelled process contributions (PC) at a number of sensitive receptor locations. The maximum annual PC at any modelled sensitive receptor is 0.56 % of the Ambient Air Directive (AAD) Limit Value for annual mean NO_2 concentrations (40 µg m^{-3}), therefore in accordance with NRW guidance it could be screened out at this stage.

1-Hour Oxides of Nitrogen (NOx) emissions

The applicant has modelled process contributions (PC) and predicted environmental concentrations (PEC) at a number of sensitive receptor locations. The maximum hourly PC at any modelled receptor is 17.2 % of the Ambient Air Directive (AAD) Limit Value for hourly mean NO_2 concentrations (200 µg m^{-3}), therefore in accordance with NRW guidance it could not be screened out at this stage. The maximum hourly PEC at any modelled sensitive receptor is 32.6 % of the AAD Limit Value for hourly mean NO_2 concentrations (200 µg m^{-3}). The maximum PEC (65.2 µg m^{-3}) leaves ample headroom within the AAD Limit Value and is unlikely to lead to an exceedance of the AAD Limit Value and can be deemed not significant.

The results indicate that all receptor locations within the study area there is unlikely to be an exceedance of the relevant air quality standards for annual and hourly NO_2 concentrations and can be considered not significant in line with NRW guidance.

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

There are two Sites of Specific Scientific Interest (SSSI) within 2 km of the site (the relevant screening distance used). Afon Dyfrdwy (SSSI 2554) and Dee Estuary / Aber Afon Dyfrdwy (SSSI 839) are situated approximately 0.5 km away from the proposed site.

An Appendix 4 Form (CRoW Act Assessment) was completed to assess the potential to effect the SSSI site, this is available on the public register. The assessment concluded the installation is not likely to damage any of the features of the SSSI site.

5.3 Natura 2000/Ramsar sites

Four Natura 2000 sites are located within 5 km of the site (relevant screening distance used). River Dee and Bala Lake / Afon Dyfrdwy a Lly n Tegid (Wales) SAC, Deeside and Buckley Newt Sites SAC, Dee Estuary / Aber Dyfrdwy (Wales) SAC and The Dee Estuary (Wales) SPA / Ramsar are located in the relevant screening distance.

An OGN200 Form 1 has been completed with regards to a Habitats Regulations Assessment (HRA). This is required because there are conceivable impact pathways to the SACs, SPA / Ramsar. The HRA is available to view on the public register a summary of the conclusions given herein. The project was screened in for likely significant effect as there is an impact pathway. Therefore, an appropriate assessment was completed and it was established the project will not adversely affect the integrity of any Natura 2000 site either alone or in-combination.

6 Setting ELVs and other Permit conditions

We have decided that emission limits should be set for the parameters listed in the permit. Emissions Limit Values (ELVs) are in line with those set out in Schedule 25B of EPR. There are no changes to the emission limit values as part of this variation.

6.1 Monitoring

We have decided that monitoring should be carried out for the parameters listed in Schedule 3 of the permit using the methods and to the frequencies specified in those tables. These monitoring requirements have been imposed in order to demonstrate compliance with the emissions limits in the permit, as per the ELV and monitoring frequency requirements specified within the EPR Schedule 25B Regulations.

For a Tranche B Specified Generator, that is an engine fuelled on natural gas, the monitoring requirements are as follows:

Pollutant	**Type of Specified Generator**	**Fuel Type**	**Emission Limit Value (mg/Nm^3)**	**Monitoring Required**

NOx	Spark Ignition Engine	Natural Gas	190*	Periodic – every 3 years

*380 mg/Nm3 for dual fuel engines in gas mode.

Emission limit values are defined 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 O_2 content of 15 % for engines (and gas turbines)

Based on the information in the Application and the requirements set in the conditions of the permit we are satisfied that the monitoring techniques, personnel and equipment employed by the Operator will have either MCERTS certification or MCERTS accreditation as appropriate. MCERTS monitoring is required as this plant is now a complex bespoke plant due to changes in habitats screening distance for Tranche B Specified Generators.

6.2 Other Permit Conditions

As a Specified Generator, the facility must adhere to the following operating techniques for SG.

As a Specified Generator (SG), these are:

(a) Each generator must be operated in accordance with the manufacturer's instructions and records must be made and retained to demonstrate this.

(b) The operator must keep periods of start-up and shut down of the generators as short as possible

(c) There must be no persistent emission of 'dark smoke' as defined in section 3(1) of the Clean Air Act 1993.

(d) Where secondary abatement is required to ensure compliance with the NOx ELV it must be met within 10 minutes from when the generator commences operation or within 20 minutes when the generator was a Tranche A and is now a Tranche B generator.

(e) The stack must be vertical and unimpeded by cowls or caps.

6.3 Reporting

We have specified the reporting requirements in Schedule 4 of the Permit to ensure data is reported to enable timely review by Natural Resources Wales to ensure compliance with permit conditions.

7 Specified Generator Charges and Subsistence Fees

The type of application regarding Specified Generators will have an associated charge. The Specified Generator application type will also form the basis for ongoing subsistence fees. More information on this can be found in our charging scheme on our website. There is no change to the subsistence fee due to this variation.