

# Natural Resources Wales permitting decisions

## Variation of a bespoke Permit.

We have decided to issue the variation for Aberthaw Power Station operated by RWE Generation UK plc.

The variation number is EPR/RP3133LD/V014.

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.

## Key issues of the decision

### Introduction

Natural Resources Wales has received an application from RWE Generation UK plc to vary the environmental permit for Aberthaw Power Station. The application follows the recent Natural Resources Wales (NRW) led variation EPR/RP3133LD/V013 which reduced oxides of nitrogen (NO and NO<sub>2</sub> expressed as NO<sub>x</sub>) emission limit values (ELVs) in line with the Court of Justice of the European Union (CJEU) judgement on 21<sup>st</sup> September 2016.

The current variation application from the operator is for plant modifications which are necessary to allow the installation to burn Higher Volatile Matter Coals (HVMC) in order to comply with the tightened NO<sub>x</sub> emission limits in the permit. As such the focus of our assessment is based on the proposed fuel diet change (from Low Volatile Matter Coals to HVMC) and the Best Available Techniques (BAT) case associated with the plant changes and proposed operating techniques. There is no change in risk to human health or ecological receptors as a result of this variation.

## **Our consultation position**

We do not routinely consult with external organisations for normal permit variation applications. We consider that there is no change in risk to human health associated with this normal variation application. On this basis, Natural Resources Wales considers that paragraph 6 of Schedule 5 of the Environmental Permitting (England and Wales) Regulations 2016 does not apply and therefore formal consultation with Public Health Wales and Cardiff and Vale University Health Board is not required. However, based on the high level of interest in this application, we took the decision to write to Public Health Wales (PHW) and Cardiff and Vale University Health Board (CVUHB) to formally explain this position and seek agreement to our approach.

Individual letters were sent to PHW and CVUHB on 10 May 2017. A joint response from the two organisations was received on 16 May 2017. The response agrees with NRW's position that there is no need to formally consult with PHW & CVUHB on this permit variation given that there is no anticipated change in process emissions and reiterates that the changes made to the permit to reduce emissions from the installation are welcomed.

## **Applicable Directives**

All applicable European directives have been considered in the determination of the application. Furthermore, a new ELV has been added to the permit to demonstrate equivalence of the current daily 95<sup>th</sup>ile ELV to the requirement to at least maintain the Large Combustion Plant Directive (LCPD) minimum standards during the Transitional National Plan (TNP) period. See **Emission Limits** section below.

## **Operating Techniques**

We have reviewed the techniques used by the operator and compared these with the relevant guidance notes. During the determination of this variation application, the European Commission published the Best Available Techniques Reference Document (BAT BREF) BAT conclusions for large combustion plant (referred to further here as the LCP BREF). This was published on the 17 August 2017. As such, this becomes a formally recognised document for the assessment of BAT for plant within scope of the LCP BREF.

The LCP BREF sets out BAT Associated Emission Levels (BAT-AELs). Under Article 21(3) of the Industrial Emissions Directive (IED) regulators must ensure that permit conditions are reconsidered and if necessary updated within 4 years of the publication of the LCP BREF. Article 15(3) of the IED requires regulators to set emission limit values that, under normal operating conditions, do not exceed the BAT-AELs, unless by derogation under Article 15(4).

The European Commission also provide a set of Frequently Asked Questions (FAQ) in relation to IED, which provides the following guidance in relation to plant subject to specific derogations under IED Chapter III. The FAQ is set out below:

***IED.III.8: What is the relationship between IED Chapters II and III, in particular between the provisions of Article 15(4) providing for a general derogation from BAT conclusions, and the specific derogations applicable to large combustion plants?***

*For combustion plants benefitting from the time-limited and specific derogation provisions of Articles 32 to 35, Article 15(3) does not apply for certain air pollutants and these plants are not required, for those air pollutants, to comply in addition with the conditions for the derogation set out in Article 15(4);*

*Combustion plants which do not benefit from time-limited and specific derogations pursuant to the Articles 32 to 35 are obliged to meet the requirements as set out in compliance with Article 15(3). However the national authorities may in certain cases and if all conditions set out there are met grant a derogation according to Article 15(4);*

*Article 18 is applicable under all derogation regimes.*

Therefore, plants that are subject to Article 32 to 35, which includes the Transitional National Plan (TNP) – Article 32 – are not subject to the requirements of Article 15(3) and thus Article 15(4), whilst subject to such derogation provisions in Articles 32 to 35. Aberthaw Power Station is subject to Article 32, and thus the European Commission FAQ is relevant here, although this does not remove the requirement to apply BAT.

We have therefore required the applicant to submit a BAT assessment for the control of NO<sub>x</sub> emissions, and for this BAT assessment to consider the recently published LCP BREF. The applicant has provided in their BAT assessment, consideration of the damage costs of the NO<sub>x</sub> emissions in a similar approach that would be required if an applicant sought to apply for an Article 15(4) derogation. This has been considered for scenarios up to operation through to 2028, although it remains the proposal of UK Government that all UK coal fired power stations cease operation by 2025. It should be noted that no such derogation is required prior to exit of the TNP, however this does provide additional information to inform BAT and its associated emission limits prior to the power station's exit from the TNP.

RWE have provided a cost benefit analysis for each abatement option. NRW is satisfied that all appropriate abatement options have been included in the submission. The cost benefit analysis includes a range of values for NO<sub>x</sub> including the most extreme value assigned by the European Environment Agency for this type of emission and a more valid site specific value derived from a tool developed by the UK regulators to properly reflect the impact on the surrounding population. We have assessed the cost benefit analysis against a number of criteria including those set out in Article 15(4) of IED and used the bold text headings below to demonstrate BAT compliance in this regard:

## **Are there geographical, local environmental or technical reasons for allowing a less strict emission value than that stated in the Bref?**

There are no local environmental or geographical reasons that make this installation different from others in the UK or Europe, the initial design to use locally sourced coal does have an impact but this is considered as a technical reason. Aberthaw is the only plant of this design in the UK and rare throughout Europe. The plant was originally designed to use locally sourced coal of low volatility. This design means that the boilers operate at higher temperatures and have longer combustion residence times resulting in higher NO<sub>x</sub> levels in the emissions than plant of a more conventional design. The plant is only expected to operate until 2025 and only for part of the year reducing the viability of any possible abatement. NRW consider the design of the plant to be a technical reason that enables consideration of a NO<sub>x</sub> ELV that is higher than that set out on the LCP Bref document, in BAT conclusion 20, Table 3 (including footnotes).

## **If a less strict limit is set, will there be a breach of Environmental Quality Standard?**

Air dispersion modelling has shown that NO<sub>x</sub> emissions result in local ground level concentrations lower than air quality standards. The models have used historic emission levels that are higher than current and proposed levels. The results of the modelling are conservative and therefore there will be no breach of an environmental quality standard because of this emission.

## **Will the limit set breach any applicable limit in the Annexes to the Directive?**

NRW will ensure that the limits set in the permit at the end of the TNP period comply with Annex V of the Industrial Emissions Directive. The proposed limit that will be achieved following optimisation of the boilers, (and completion of improvement condition IC41), during the TNP, matches the 450 mg NO<sub>x</sub>/Nm<sup>3</sup> limit listed in paragraph 4 of Part 1 of Annex V of IED for plants that do not operate more than 1500 hours per year as a rolling average over 5 years. The ELV set in the permit is also considered to represent current site specific BAT for NO<sub>x</sub> emissions from the station, subject to a review of performance during optimisation in accordance with improvement condition IC41 (see **Improvement Conditions** section below) to be completed before the end of the TNP.

## **Will the ELV result in any significant pollution and is there a high level of protection?**

The limits in the permit have been set to be protective of the environment based on air quality modelling. There has also been monitoring of ambient air quality in areas likely to be affected by Aberthaw Power Station. Since monitoring began in 2002 the NO<sub>x</sub> concentrations have been consistently below air quality standards which are set to be protective of human health, the reduced operating time and reduced emissions from Aberthaw will ensure this reduces further.

### **Does the cost benefit analysis use recognised figures for harm where they exist?**

The cost benefit submitted with the BAT assessment uses recognised figures of harm per tonne of NO<sub>x</sub>, RWE have also included site specific costs that are the most appropriate to the specific emissions from Aberthaw.

### **Does the cost benefit analysis use costs that can be verified?**

The costs of the abatement provided by RWE are comparable with costs of similar plant in the electricity supply sector and other industries. In addition, the actual costs of installing low NO<sub>x</sub> technology on Unit 9 has been used and is indicative of the costs likely to be incurred at Aberthaw.

### **Are the costs disproportionate to the environmental benefits that could be achieved?**

RWE have submitted a robust set of data and a cost benefit analysis that shows that the installation of Windbox technology onto units 7 and 8 is cost effective and will meet the requirements of Annex V of the IED. The cost benefit analysis submitted shows that reductions to meet the BAT AELs post the TNP will be disproportionate to benefits that could be achieved.

Using the criteria set out in Article 15(4) of IED, NRW is satisfied that BAT is represented by a limit of 450 mg/Nm<sup>3</sup> or lower if this can be achieved through optimisation and that further abatement to reduce this limit, results in disproportionate cost compared to the benefits that could be achieved.

Following the submission of additional data on cost benefit analysis sensitivity to the current operational baseline, we have concluded the following:

- The costs of all viable techniques outweigh the benefits significantly, with the exception of the proposed HVMC fuel conversion in combination with existing mixed primary NO<sub>x</sub> controls;
- The cost-benefit assessment (CBA) uses an appropriate methodology and conservative assumptions; and
- Sensitivity analysis of the CBA assumptions to baseline date, closure date, abatement costs, achieved abatement level and damage costs does not alter the disproportionality of the costs compared to the environmental benefits.

In order to assess BAT in terms of the future of Aberthaw we have used the criteria set out in the Industrial Emissions Directive to evaluate the potential abatement options. The criteria listed in Article 15(4) have been used to evaluate the validity of the emission limit set in the permit against the limits laid out in the recently published BREF note. The BREF limits will not apply to the power station until at least the TNP has ended and the power station is no longer subject to derogation under Article 32. A further assessment may be required if the parameters used in the assessment have changed.

The Environment Agency and Natural Resources Wales IED BAT ESI review paper “BAT Review for the period 1 January 2016 until implementation of new BAT conclusions, or end of the TNP/LLD (as appropriate) E&W” (28<sup>th</sup> October 2014), set out site specific BAT for the installation when firing on Low Volatile Matter Coal. However, this has now been superseded by the BAT assessment submitted as part of this variation application.

A further review against the LCP Bref BAT conclusions will be undertaken during 2018 allowing further operating performance to be considered when setting BAT ELVs for the post-TNP period.

We consider that the emission limits included in the permit reflect the BAT for the installation. We also consider that the operating techniques represent appropriate techniques for the facility.

### **Start-up / Shut down load threshold.**

The Operator originally applied to change the minimum start up and shut down load (MSUL/MSDL) thresholds in Table S1.5 from 395 MWe (74%) to 385 MWe (72%) as part of this variation. This change was requested to account for variations in works power taking sent out generation below the Stable Export Limit (SEL) which is equal to 395 MWe. However, since the variation application was submitted, the Operator has confirmed that they wish to withdraw this particular change request from the application, as their preference is for the information in the permit to match the SEL which remains at 395 MWe. However, from an environmental perspective, the operator has confirmed that the data capture for emissions reporting in MERS the (Continuous Emissions Monitoring (CEMs) system), will be triggered at the lower value of 385 MWe, which means that more emissions data will be captured when the station is running at lower loads.

### **Raw Materials**

We have specified limits and controls on the use of raw materials and fuels. More specifically we have updated Table S2.1 of the permit to reflect the fact that the installation will now be fired on higher volatile matter coal as well as low volatile content coal. As such, we have identified a volatile matter content range for the coal typically from 9% to >33% as received.

### **Improvement Conditions**

Based on the information on the application, we consider that we need to impose improvement conditions.

Improvement Condition IC41 requires that:

- Following the commissioning of Units 7, 8 and 9 and a period of 6 months operation on HVMC, the Operator shall submit a written post-commissioning report to Natural Resources Wales for approval. The report shall confirm the commissioning completion date for each unit conversion to bituminous coal firing. The report shall also state the emission reductions achieved and relevant performance parameters under the full range of operating scenarios, including, but not limited to:
  - noise levels associated with commissioning activities and routine start up and operation
  - fugitive dust emissions associated with coal stocking and handling
  - ash quality (and identification of the need for PFA landfill design review)
  - carbon in ash levels
  - tube failure rates
  - start up, shut down thresholds and boiler stability
  - slagging
  - thermal performance
  - CEMs performance
  - electrostatic precipitator performance
  - FGD performance
  - NOx emissions, including NO:NO2 ratio
  - CO emissions

The report shall include a justification of the Best Available Techniques Emission Limit Values (BAT ELVs) to be adopted upon full optimisation of all units, including a date by which the BAT ELVs will be achieved.

Recognising that Aberthaw Power Station will no longer be subject to Article 32 from 1 July 2020, we have included this improvement condition to confirm the performance of the plant modifications which will further inform the full LCP BREF review to be conducted for Aberthaw Power Station and the emission limit values for NO<sub>x</sub>.

The Operator's response to improvement condition IC41 is required to be submitted by 31<sup>st</sup> May 2018.

Improvement Condition IC42 requires that:

The operator shall carry out a review of the Accident Management Plan to take account of each unit conversion to bituminous coal.

The reviewed plan shall be submitted to Natural Resources Wales for approval, and any additional measures and controls identified in the approved plan shall be implemented within 12 months of the written approval of the report by Natural Resources Wales.

NRW has already assessed the proposed measures for fire management and control as part of the variation application. However this improvement condition enables the operator to demonstrate that these control measures have been

incorporated into the installation's Accident Management Plan and to ensure that the plan is reflective of operating experience using HVMC.

The Operator's response to improvement condition IC42 is required to be submitted by 31<sup>st</sup> May 2018.

### **Incorporating the Application**

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. These descriptions are specified in Table S1.2 "Operating Techniques" in the permit.

### **Emission Limits**

For combustion plant in the TNP, Article 32(2) requires that plant shall at least maintain the emission limit values for sulphur dioxide, nitrogen oxides and dust under the requirements of the Large Combustion Plant Directive (now repealed but still relevant for setting minimum standards during the TNP).

The current 95% of validated daily means within a calendar year was considered to provide an appropriate equivalent for the 95% of validated 48 hourly means set out in the LCPD. However, to ensure that this is the case, this specific provision is also now included in the permit for the duration of the TNP, delivering the requirements of Article 32(2).

A 550 mg/m<sup>3</sup> 48-hourly annual 95<sup>th</sup>ile Emission Limit Value (ELV) for NO<sub>x</sub> has been added to the permit as part of this variation. This new ELV will take effect from 1<sup>st</sup> November 2017. The purpose of the new ELV is to demonstrate equivalence of the current daily 95<sup>th</sup>ile ELV to the requirement to at least maintain the Large Combustion Plant Directive (LCPD) minimum standards during the Transitional National Plan (TNP) period. As there is currently very limited operational emissions data from the station using bituminous coal, it has not been possible to derive a daily 95<sup>th</sup>ile ELV for NO<sub>x</sub> with clearly demonstrable equivalence to the LCPD 550 mg/m<sup>3</sup> 48-hourly annual 95<sup>th</sup>ile ELV for NO<sub>x</sub>. The current daily 95<sup>th</sup>ile NO<sub>x</sub> ELV of 605 mg/m<sup>3</sup> will be retained until the end of the TNP for transition to Industrial Emissions Directive (IED) Annex V ELV purposes.

As a result of the BAT assessment, we consider the following emission limit values as site specific BAT for NO<sub>x</sub> emissions whilst Aberthaw power station is subject to the Article 32 TNP derogation provisions in IED Chapter III:

Monthly average 450-500 mg/Nm<sup>3</sup>. 500mg/Nm<sup>3</sup> applies immediately with 450 mg/Nm<sup>3</sup> or less to apply following completion of unit optimisation and approval of the date specified in the response to improvement condition IC41.

Annual 95<sup>th</sup> percentile of daily averages 550-605 mg/Nm<sup>3</sup>. 605mg/Nm<sup>3</sup> applies immediately with 550 mg/Nm<sup>3</sup> or less to apply following completion of unit

optimisation and approval of the date specified in the response to improvement condition IC41).

Annual 95<sup>th</sup> percentile of 48 hourly averages 550 mg/Nm<sup>3</sup>, representing the 110% of the monthly average ELV as set out in Article 14(1)(b)(ii) of the LCPD.

### **Monitoring**

We have decided that monitoring should be carried out for the new 550 mg/m<sup>3</sup> 48-hourly annual 95<sup>th</sup> percentile ELV for NO<sub>x</sub> using the methods detailed in Table S3.1 of the permit and to the frequencies specified therein. Condition 3.6.7(a) has been updated to reflect the fact that the new emission limit will be measured using Continuous Emissions Monitors (CEMS) and therefore all monitoring is subject to the permit requirements and confidence intervals associated with the use of CEMs.

### **Reporting**

Reporting of NO<sub>x</sub> emissions from emission point A1 continues to be required every three months. This reporting requirement also applies to the new 48-hourly annual 95<sup>th</sup> percentile ELV of 550 mg/m<sup>3</sup>

### **Administrative Change**

The text “designed to operate on low volatile content coal” has been removed from Table S3.1 (under source: coal fired boiler plant). This is based on the fact that although this statement remains accurate, the installation’s coal fired boiler plant will now be operating on Hard Coal which includes HVMC.