

Environment Agency

Review of an Environmental Permit under the Environmental Permitting (England & Wales) Regulations 2010 (as amended)

Decision document recording our decision-making process following review of a permit

The Permit number is: EPR/VP3337SR
The Operator is: Keadby Generation Limited
The Installation is: Ferrybridge C Power Station
This Variation Notice number is: EPR/VP3337SR/V009

What this document is about

All Environmental permits which permit the operation of large combustion plant (LCP), as defined by articles 28 and 29 of the Industrial Emissions Directive (IED), need to be varied to implement the special provisions for LCP given in the IED, by the 1 January 2016 (Article 82(3)). The IED makes special provisions for LCP under Chapter III, introducing new Emission Limit Values (ELVs) applicable to LCP, referred to in Article 30(2) and set out in Annex V.

The IED provides a period of transition towards the new ELVs via Article 32, the Transitional National Plan (TNP). It also makes provision for plant that wish to be exempted from compliance with the new ELVs in Article 33, the Limited Life Derogation (LLD). Other derogations include limited operating hour regimes for sites using 500 hr or 1500 hr derogations. There are also options for exemption from emission limits based on operating hours.

The operator has submitted a response to our notice requiring information, issued under regulation 60(1) of the Environmental Permitting Regulations (EPR), which has provided us with information on which compliance route they wish to follow for each LCP. The response also includes specific details relating to each LCP, necessary for accurate implementation the IED requirements. A copy of the regulation 60 notice and the operator's response is available on the public register.

We have reviewed the permit for this installation, including all variations since the last permit consolidation, and referred to the operator's response(s) to the regulation 60 notice requiring information. This is our decision document, which explains the reasoning for the consolidated variation notice that we have issued.

It explains how we have reviewed and considered the compliance routes and, where relevant, the emissions limits proposed by the Operator for each LCP on the installation. This review has been undertaken with reference to the:

- Chapter III and annex V of the IED
- “IED BAT ESI Review Paper, 28 October 2014” produced by the Environment Agency (referred to as the “2014 ESI BAT review paper” in this document)
- “Electricity Supply Industry – IED compliance protocol for Utility Boilers and Gas Turbines”, published by the Joint Environmental Programme.

It is our record of our decision-making process and shows how we have taken into account all relevant factors in reaching our position. It also provides a justification for the inclusion of any specific conditions in the permit that are in addition to those included in our generic permit template.

As well as implementing the chapter III IED compliance of the installation, the consolidated variation notice takes into account and brings together in a single document all previous variations that relate to the original permit issue. It also modernises the entire permit to reflect the conditions contained in our current generic permit template.

The introduction of new template conditions makes the Permit consistent with our current general approach and philosophy and with other permits issued to installations in this sector. Although the wording of some conditions has changed, while others have been deleted because of the new regulatory approach, it does not reduce the level of environmental protection achieved by the Permit in any way. In this document we therefore address only our determination of substantive issues relating to chapter III review and any other changes to the operation of the installation (see annex 1).

How this document is structured

Glossary

1. Our decision
2. How we reached our decision
3. The legal framework
4. Key Issues

Annex 1 – Review and assessment of changes that are not part of the Chapter III IED derived permit review.

Annex 2 – consultation response from Natural England

GLOSSARY

Baseload	means: (i) as a mode of operation, operating for >4000hrs per annum; and (ii) as a load, the maximum load under ISO conditions that can be sustained continuously, i.e. maximum continuous rating
BAT	best available techniques
BOFA	boosted over fire air
BREF	best available techniques reference document
Emergency use	<500 operating hours per annum
ELV	emission limit value set out in either IED or LCPD
FGD	flue gas desulphurisation
GT	gas turbine
IED	Industrial Emissions Directive 2010/75/EC
LCP	large combustion plant – combustion plant subject to Chapter III of IED
LCPD	Large Combustion Plant Directive 2001/80/EC
LHD	Limited hours derogation, i.e. operational hours limited to 1500 hours per year as a rolling average over a 5 year period
LLD	Limited Life Derogation
Mid merit	1500-4000 operating hours per annum
MSUL/MSDL	Minimum start up load/minimum shut-down load
OCGT	Open Cycle Gas Turbine
TNP	Transitional National Plan

1 Our decision

We have decided to issue the Variation Notice to the Operator. This will allow it to continue to operate the Installation, subject to the conditions in the Consolidated Variation Notice.

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

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

The Consolidated Variation Notice also gives effect to our decisions following the identification of the Operator as undertaking a “newly prescribed activity” (NPA) under the Industrial Emissions Directive (IED);

2 How we reached our decision

2.1 Requesting information relating to the requirements of Chapter III of and Annex V to the IED

We issued a Notice under Regulation 60(1) of the Environmental Permitting (England and Wales) Regulations 2010 (a Regulation 60 Notice) on 08/12/14 requiring the Operator to provide information for each LCP they operate, including:

- The type of plant, size and configuration.
- The proposed compliance routes.
- Minimum start up and shut down loads.
- For coal fired power stations entering into the TNP or LLD, confirmation of whether they will follow the sector approach in the 2014 BAT review paper for the setting of emission limits, or if not propose emission limits with a justification based on the principles outlined in the 2014 BAT review paper.
- The proposed emission limits and how they accord with the 2014 BAT review paper.

The Regulation 60 Notice response from the Operator was received on 27/03/15.

We considered that the response did not contain sufficient information for us to commence determination of the permit review. We therefore issued a further information request to the Operator. Suitable further information was provided by the Operator on 27/05/15.

We considered it was in the correct form and contained sufficient information for us to begin our determination of the permit review but not that it necessarily contained all the information we would need to complete that determination.

The Operator made no claim for commercial confidentiality. We have not received any information in relation to the Regulation 60 Notice response that appears to be confidential in relation to any party.

2.2 Requests for Further Information during determination

Although we were able to consider the Regulation 60 Notice response generally satisfactory at receipt, we did in fact need more information in order to complete our permit review assessment, and issued a further information request on 13/11/15. A copy of the further information request was placed on our public register.

In addition to the responses to our further information request, we received additional information during the determination from the operator on 1 June 2015 confirming that Unit 4 will not return to operational service. We made a copy of this information available to the public in the same way as the responses to our information requests.

2.3 Alternative compliance routes

In their Regulation 60 Notice response, the operator initially requested multiple compliance routes be considered for their LCP because at that point they had not decided which route they wanted to apply. The routes originally requested were: TNP, LLD and LHD (the request for LHD option was then withdrawn via an email from the operator on 11/08/15).

We were only able to issue the variation notice for single compliance routes per LCP (other than TNP which can apply by pollutant), and the operator confirmed which route they wanted in the variation notice by email dated 21/12/15. The confirmed route was LLD.

This is what is considered in this decision document.

3 The legal framework

The Consolidated Variation Notice will be issued under Regulations 18 and 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:

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

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

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

Meeting the requirements of the IED

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

IED Article Reference	IED requirement	Permit condition
30(6)	If there is an interruption in the supply of gas, an alternative fuel may be used and the permit emission limits deferred for a period of up to 10 days, except where there is an overriding need to maintain energy supplies. The EA shall be notified immediately.	Not applicable
32(4)	For installations that have applied to derogate from the IED Annex V emission limits by means of the transitional national plan, the monitoring and reporting requirements set by UK Government shall be complied with.	Not applicable
33(1)b	For installations that have applied to derogate from the IED Annex V emission limits by means of the Limited Life Derogation, the operator shall submit annually a record of the number of operating hours since 1 January 2016;	2.3.6 4.2.2e
37	Provisions for malfunction and breakdown of abatement equipment including notifying the EA.	2.3.8 4.2.6 4.3.1d
38	Monitoring of air emissions in accordance with Ann V Pt 3	3.5, 3.6
40	Multi-fuel firing	Not applicable
41(a)	Determination of start-up and shut-down periods	2.3.7 Schedule 1 Table S1.5
Ann V Pt 1(1)	All emission limit values shall be calculated at a temperature of 273,15 K, a pressure of 101,3 kPa and after correction for the water vapour content of the waste gases and at a standardised O2 content of 6 % for solid fuels, 3 % for combustion plants, other than gas turbines and gas engines using liquid and gaseous fuels and 15 % for gas turbines and gas engines.	Schedule 6, Interpretation
Ann V Pt 1	Emission limit values	3.1.2 Schedule 3, Table S3.1
Ann V Pt 1	For plants operating less than 500 hours per year, record the used operating hours	2.3.5, 4.2.2d
Ann V Pt 1(6(1))	Definition of natural gas	Not applicable
Ann V Pt 2	Emission limit values	3.1.2 Schedule 3, Table S3.1
AnnV Pt 3(1)	Continuous monitoring for >100MWth for specified substances	3.5, 3.6 Schedule 3, Table S3.1
AnnV Pt 3(2, 3, 5)	Monitoring derogations	3.5.1 Schedule 3, Table S3.1

IED Article Reference	IED requirement	Permit condition
AnnV Pt3(4)	Measurement of total mercury	3.5.1 Schedule 3, Table S3.1
AnnV Pt3(6)	EA informed of significant changes in fuel type or in mode of operation so can check Pt3 (1-4) still apply	2.3.1 Schedule 1, Table S1.2
AnnV Pt3(7)	Monitoring requirements	3.5.1 Schedule 3, Table S3.1
AnnV Part 3(8,9,10)	Monitoring methods	3.5, 3.6
AnnV Pt 4	Monthly, daily, 95%ile hourly emission limit value compliance	Not applicable
AnnV Pt7	Refinery multi-fuel firing SO2 derogation	Not applicable

4. Key Issues

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

Where relevant and appropriate, we have incorporated the techniques described by the Operator in their Regulation 60 Notice response as specific operating techniques required by the permit, through their inclusion in Table S1.2 of the Consolidated Variation Notice.

The variation notice uses new LCP numbers in accordance with the most recent Defra LCP reference numbers. The LCP references have changed as follows:

- LCP256 is changed to LCP307;
- LCP257 is changed to LCP308;
- GT5 (no LCP reference previously) is now LCP386; and
- GT8 (no LCP reference previously) is now LCP458

LCP307

The permit also lists LCP307 which opted out of the LCPD and ceased operation in March 2014. LCP307 has been retained in the permit as the activities associated with it cannot yet be surrendered, but is not allowed to operate under the current permit (see pre-operational condition PO1 in Table S1.4A). If the operator wished to operate this LCP in the future they would have to submit a permit variation demonstrating how the LCP will comply with Chapter III of the IED.

LCP308

This LCP consists of 2 x 1355 MWth boilers which vent via multiple flues within a single windshield at emission point A1. The boilers burn coal with the ability to co-fire biomass.

Compliance Route:

The operator has proposed to operate this LCP under the LLD compliance route.

Net Rated Thermal Input:

The Applicant has stated that the Net Thermal Input is 2710 MWth. They have justified this figure as being based on the design efficiency with adjustments made following steam turbine modifications in 2008 and subsequent tests carried out to BS EN 60953-1 1996 and BS 752: 1978. We accept this figure as it has been calculated using a recognised methodology and takes into account the upgrade made to the steam turbine.

Minimum start up load and Minimum shut-down load:

The Operator has defined the “minimum start up load” and “minimum shut-down load” for the LCP in their response to question 6 of the Reg 60, in terms of the output load (i.e. electricity generated) (MW); and this output load as a percentage of the rated output of the combustion plant (%).

The output load and percentage of the rated output is based on the rated electrical output from each unit.

The operator has justified the MSUL and MSDL in accordance with Appendix C of the Joint Environmental Programme’s Electricity Supply Industry – IED Compliance Protocol for Utility Boilers and Gas Turbines (which incorporates the requirements of implementing decision 2012/249/EU) with reference to the following considerations:

- Status of the oil burners
- Flue gas damper position
- BOFA status
- Number of mills in service

We agree with all of these definitions and have set these thresholds in table S1.5 of the permit accordingly. Standard permit condition 2.3.7 has been set to define the period of start up and shut down, referring to the thresholds in this table.

Emission limits:

The LCP will be subject to LLD compliance regime and the operator originally confirmed that they will comply with the sector approach in the 2014 BAT review paper, with the exception of dust.

Following a fire in 2014, the FGD absorber serving Unit 4 cannot be used. The operator originally intended to rebuild the absorber and requested in the Regulation 60 response that the existing monthly ELV for dust from the LCP (see table below) be temporarily retained to allow Units 3 and 4 to run together with Unit 4 temporarily unabated until the absorber was rebuilt by June 2016.

The operator has since confirmed in a letter dated 27/05/2015 that they do not intend to rebuild the Unit 4 absorber (as the station is set to close at the end of March 2016) and that Unit 4 will not return to operational service. We have therefore set a monthly ELV for dust of 20 mg/m³ in line with the sector approach. This means that the operator will only be able to operate Unit 3 in order to meet the ELVs and unabated operation of Unit 4 will not be allowed.

We have set all the other emission limits for this LCP in line with the BAT paper in table S3.1.

The existing and new ELVs are as follows:

LLD mid-merit operation

Parameter	Existing mg/m ³	Reference Period	New Permit limit mg/m ³
Dust	55	97% 48 hour means	-
Dust	25	Monthly average	20
Dust	50*	Monthly average	-
Dust	-	95% daily means	35
SO ₂	400	Monthly average	350
SO ₂	440	97% 48 hour means	-
SO ₂	-	95% daily means	440
Oxides of nitrogen	500	Monthly average	450
Oxides of nitrogen	550	97% 48 hour means	-
Oxides of nitrogen	-	95% daily means	550

*Without FGD operating (not applicable to new permit)

LLD baseload operation

Parameter	Existing mg/m ³	Reference Period	New Permit limit mg/m ³
Dust	55	97% 48 hour means	-
Dust	25	Monthly average	20
Dust	50*	Monthly average	-
Dust	-	95% daily means	35
SO ₂	400	Monthly average	300
SO ₂	440	97% 48 hour means	-
SO ₂	-	95% daily means	400
Oxides of nitrogen	500	Monthly average	400
Oxides of nitrogen	550	97% 48 hour means	-
Oxides of nitrogen	-	95% daily means	460

*Without FGD operating (not applicable to new permit)

We have reviewed the new ELVs and concluded that they will not result in increased emissions from the site. A copy of the review carried out by our Air Quality Modelling & Assessment Unit (reference AQMAU C1333-RP01) has been placed on the public register.

LCP386 and LCP458

These LCPs each consist of a 58 MWth black-start OCGT, GT5 and GT8, which vent via separate stacks at emission points A4 and A5 respectively. The units burn gas oil.

Compliance Route:

The operator has proposed to operate these LCPs under the ELV compliance route. No ELVs have been set for LCP386 and LCP458 as per the requested derogation for <500 hrs operation per year.

Net Rated Thermal Input:

The Applicant has stated that the Net Thermal Input of each OCGT is 58 MWth (the introductory note previously incorrectly gave the thermal input as 73 MW). They have justified this figure by quoting the documented output and thermal efficiency of the units. We have accepted the operator's justification without requiring further information as these LCPs are usually only run for 10s of hours per year for testing or in emergencies, and the configuration of the units is unlikely to have changed since they were first installed.

Minimum start up load and Minimum shut-down load:

The Operator has not defined the "minimum start up load" and "minimum shut-down load" for the LCP in their response to question 6 of the Reg 60 and this information is not required for the purposes of demonstrating compliance with ELVs as none have been set. However, for the purposes of recording operational hours for the LCP, we have set these thresholds in table S1.5 of the permit which define MSUL as being as soon as gas turbine start-up is initiated, and shut down as being as soon as the gas turbine is completely off-load.

Standard permit condition 2.3.6 has been set to define the period of start up and shut down, referring to the thresholds in this table.

Emission limits:

No ELVs will be set in line with annex V of the IED for gas turbines for emergency use that operate less than 500 hours per year.

Reporting efficiency:

In order to ensure the efficiency of plant using fossil fuels or biomass is maximised and regularly recorded, condition 1.2.1(c), condition 4.2.2(b) and table S4.2 have been added to the permit.

Notifications:

Schedule 5, Part C, takes account of the malfunction and breakdown requirements. A breach of permit condition is NOT implicit in notification under Part C.

Monitoring & standards:

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

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

Resource efficiency metrics:

A more comprehensive suite of reporting metrics has been added to the permit template for ESI plant. Table S4.2 "Resource Efficiency Metrics" has

been added requiring the reporting of various resource parameters, as this is an Electrical Supply Industry (ESI) power plant. This table is being used for all ESI plant.

Additional IED Chapter II requirements:

Condition 3.1.6 relating to protection of soil, groundwater and groundwater monitoring, has been added in compliance with IED requirements.

Conditions 4.3.1 and 4.3.2 relating to notifications have been amended in compliance with IED requirements.

Annex 1: Review and assessment of changes that are not part of the Chapter III IED derived permit review

Air quality management plan

It has been a requirement of the permits for coal-fired power stations to carry out ambient air quality monitoring and modelling to demonstrate that compliance with the National Air Quality Strategy (NAQS) is being achieved. In order to demonstrate this, the power stations set up six air quality monitoring sites at locations where the maximum ground level concentrations were calculated to be.

Reporting has shown that compliance with all of the National Air Quality Standards has been met at all of the sites in each year since 2001. It is now considered enough data has been collected to demonstrate that, with the applicable controls on the installation in place in their environmental permits, ongoing monitoring and modelling is no longer necessary. The requirement to carry out air quality monitoring in the Aire Valley will therefore cease at the end of 2015, and conditions in Section 3.8 have been removed from the permit. We have included an improvement condition (IC30FB) requiring the operator to submit a copy of the air quality monitoring and modelling results for 2015.

Biodiversity, Heritage, Landscape and Nature Conservation

The activities being carried out are within the relevant distance criteria of a site of heritage, landscape or nature conservation, and protected species or habitats. A full assessment of the activities and their potential to affect the sites, species and habitats has been carried out as part of the permitting process via an Appropriate Assessment which is available on the public register. We consider that the activities will not affect the features of the sites, species and habitats.

Formal consultation has been carried out with Natural England. The consultation response (Annex 2) was taken into account in the permitting decision.

Cessation of monitoring programme for Natura 2000 sites

We have decided that we will no longer require the operator to monitor the effects of emissions from the installation at Natura 2000 sites (improvement condition IC7FB in the current permit).

The aim of the monitoring programme was to provide data to increase confidence in the Environment Agency's 2006 permitting conclusion and address Statutory Nature Conservation Body concerns. The monitoring data provides information on pollutant levels and current conditions at each Natura

2000 site and indicates that the sites may be compromised by poor air quality as total acid and nitrogen deposition is higher than the critical load at all the monitored sites. The monitoring data does not provide a means of source attribution. Confounding factors make it difficult to extrapolate signals from the monitoring data and the most useful information is likely to come from modelling.

Additional monitoring carried out by the Environment Agency indicates that while Electrical Supply Industry (ESI) sites contribute to atmospheric pollutant concentrations and deposition, there are large impacts, particularly from nitrogen deposition, from other non-ESI sources.

Little real change was evident between the two vegetation surveys, and conditions at the monitored sites were found to be similar to those of other sites across the country. There is no evidence of recent deterioration in site condition. This is not unexpected as vegetation response time to air pollution impacts is slow, and can take several years; the timescale reported here is not long enough to pick out any real changes. There is some evidence that pH is recovering but it is difficult to say whether or not this represents historical or more current reductions in sulphur emissions. Plant species at the sites will be influenced by changes in both acidity and nutrient and it is hard to tease the causes apart.

We recognise that the concentration, deposition and vegetation monitoring has been (and would continue to be) a very useful scientific exercise for reporting on site condition. In terms of reporting on potential impacts of ESI emissions on the Natura 2000 sites involved in the monitoring programme, continued monitoring is unlikely to provide any further insight. The monitoring to date has provided the necessary confidence in, and validation of, the modelling approaches used. On that basis further monitoring is difficult to justify. Natural England is comfortable with this conclusion (though the monitoring data does not address all of the issues raised by Natural England in 2006; these issues will be addressed separately).

The date of IC7FB has been changed to 31/12/16 in order to require the operator to submit the monitoring data collected for 2015, but no further monitoring will be required.

Table 3.2 Point source emissions to water

A number of errors have been corrected in from the original permit and W7 has replaced W3 in this table following re-siting of the purge pit outfall discharge point.

Annex 2: Consultation responses

Summary of responses to consultation and the way in which we have taken these into account in the determination process.

Response received from
Natural England via email on 08/10/15
Brief summary of issues raised
As there have been no substantial changes to the appropriate assessment, Natural England's advice remains the same as when last consulted in 2007.
Summary of actions taken or show how this has been covered
The improvement condition (IC6FB) to implement a plan to minimise SO ₂ emissions and ensure that total SO ₂ emissions from coal-fired power stations in England and Wales do not exceed 70 kt/y by 2020 will be retained in the permit.