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/BS8192IV
The Operator is: Keadby Generation Limited
The Installation is: Fiddler's Ferry Power Station
This Variation Notice number is: EPR/BS8192IV/V006

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

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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

BAT	best available techniques
BREF	best avalable 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
LLD	Limited Lifetime Derogation
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.

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 09/12/14 requiring the Operator to provide information for each LCP they operate, including:

- The type of plant, size and configuration.
- The proposed compliance route(s).
- 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 30/03/15.

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 12/06/15.

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 21/10/15. A copy of the further information request was placed on our public register.

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 requested were: TNP and 1500 hours ELVs.

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(s) they wanted in the variation notice by email dated 22/12/15. The confirmed route was TNP.

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.	3.1.4 Schedule 3, Table S3.3
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;	Not applicable
37	Provisions for malfunction and breakdown of abatement equipment including notifying the EA.	2.3.7 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	2.3.6 Schedule 1 Table S1.5
Ann V Pt 1(1)	All emission limit values shall be calculated at a temperature of 273,15 K, a pressure of 101,3 kPa and after correction for the water vapour content of the waste gases and at a standardised O2 content of 6 % for solid fuels, 3 % for combustion plants, other than gas turbines and gas engines using liquid and gaseous fuels and 15 % for gas turbines and gas engines.	Schedule 6, Interpretation
Ann V Pt 1	Emission limit values	3.1.2 Schedule 3, Table S3.1
Ann V Pt 1	For plants operating less than 500 hours per year, record the used operating hours	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 SO_2 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 updated LCP numbers in accordance with the most recent DEFRA LCP reference numbers. The LCP references have been changed as follows:

- LCP258 is changed to LCP309
- LCP259 is changed to LCP310.

LCP309

LCP309 consists of 4 boilers with a total net thermal input of 5122 MWth which vent via multiple flues within a single windshield at emission point A1. The units burn coal with the ability to co-fire biomass.

Compliance Route:
The operator has proposed to operate this LCP under the TNP compliance route.

For plant operating under the TNP, ELVs are set which have been derived for the period 2016 – 30 June 2020 (the duration of the TNP). At the end of this period it is expected that both Annex V and the revised LCP BREF will become applicable, in which case Annex V or the BAT conclusions must be achieved (whichever is stricter), or operators must have applied for a derogation from the BAT conclusion (if that is stricter: Annex V will apply in any event). The operator will apply, at the appropriate time, to vary the permit again to reflect this.

Net Rated Thermal Input:
The Applicant has stated that the Net Thermal Input for the LCP is 5121.9 MWth. This has been calculated on a per unit basis using data from heat tests performed to CEGB site test code no. 2 "Steam turbine generator heat rate tests" IEC 60953-3 and BS572 which have been carried out at various times over the last 7 years. We accept the operator's justification for the net rated thermal input figures provided as the tests have been carried out using recognised methods and are the most recent data available.

Minimum start up load and Minimum shut-down load:
The Operator has defined the “minimum start up load” and “minimum shut-down load” for each 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
- Number of coal 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 2.3.6 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 TNP compliance regime and the operator has confirmed that they will comply with the sector approach in the 2014 BAT review paper, with the exception of SO_2 when Unit 1 (unabated) is operating with one other unit. Consequently we have set the emission limits for this LCP in line with the BAT paper in table S3.1 for NOx and dust, and a site specific ELV for SO_2 (see below). We have also set the standard annual emission target in table S3.1

The existing and new ELVs are as follows:

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 Note 1 400 Note 2
SO_2	440	97% 48 hour means	-
SO_2	-	95% daily means	440 Note 1 490 Note 2
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)

Note 1: Limit applies when Unit 1 is non-operational or is operating with two or more other units (Operational mode A)
Note 2: Limit applies when Unit 1 (no FGD fitted) is operating with one other unit (Operational mode B)

The justification for these ELVs is as follows:

Operational mode A:
All operational modes except for two unit operation with mixed technique will comply with the BAT Review paper ELV's for TNP operation. Therefore the sector BAT ELVs will apply for Operational mode A.

Operational mode B:

- In the scenario where the operational mode is with two units with mixed techniques, the Operator will comply with the NOx and dust ELVs as described within the sector BAT Review paper.
- The sector BAT Review paper made provision (p3) for coal stations having unique characteristics where the sector ELV cannot be met. Such sites may be granted site specific limits where the operator has demonstrated BAT and optimum performance under principles specified in the BAT Review document.
- In the scenario where the operational mode is with two units with mixed techniques, the operator requested a daily ELV of 550mg/m^3 and a monthly ELV of 400mg/Nm^3 for SO^2 due to operational factors when operating under this scenario. The Operator submitted full details of these operational factors within the Reg 60 response, Note 3, Q8 Supporting Document dated 04/03/15.
- Following a review of the submissions, we have decided to set a daily average ELV of 490mg/Nm^3 and a monthly ELV of 400mg/Nm^3 for the operational mode of two unit operation under mixed technique.
- The monthly ELV of 400mg/Nm^3 is based on the existing LCPD limit.
- The daily average limit of 490mg/Nm^3 is based on the existing LCPD 48 hourly emission limit 440mg/Nm^3 x 110%.
- The Operator has also proposed to maintain the current 48hr limit of 440mg/Nm^3 for 2 unit operation with mixed techniques for SO_2. Whilst we have not set a 48ht limit in the permit, this information could be subject to subsequent review following periods of two-unit operation with mixed technique.
- The Operator has identified that operational mode B will occur during planned outage periods. The Operator has provided details of the planned periods of outage during the TNP in their response dated 12/06/15. This summarises approximately 100 potential occasions where the Operational Mode B limits may be required during the TNP period (2016-2020).
- The introduction of these site specific emission limits will demonstrate no deterioration and current performance will be maintained during periods of operation mode B (as per Article 32(2) of the IED).

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 has been placed on the public register (reference AQMAU_C1356_RP01).

LCP310

This LCP consists of two 73 MWth black-start OCGTs, GT1 and GT2, which vent via separate flues within a common windshield at emission point A2/A3. The units burn gas oil.

Compliance Route:

The operator has proposed to operate this LCP under the ELV compliance route. No ELVs have been set for LCP310 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 73 MWth. They have justified this figure by quoting data from the original commissioning of the GTs carried out to BS 350. We accept the operator's justification as the configuration of the units is unlikely to have changed since this time.

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 permit for the station to carry out monitoring and modelling to demonstrate compliance with the National Air Quality Strategy (NAQS). In order to demonstrate this, the power stations are required to collect data from air quality monitoring stations at locations upstream and downstream of the station, the downstream location being located where the maximum ground level concentration is likely to be. In the case of Fiddlers Ferry reporting this has previously been located at Sacred Heart's R.C. School on Selby Street, Warrington.

The station has always submitted the necessary reports and data required by their permits under the current EPR, and Integrated Pollution Control prior to the introduction of the EP Regulations. The reports have shown compliance with the National Air Quality Standards, as required, during this period. It is now considered that sufficient data has been collected to demonstrate that, with the applicable operational and monitoring controls in their current environmental permits, ongoing air quality monitoring and modelling will no longer necessary. The requirement to carry out air quality monitoring 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 (IC19FF) 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 IC7FF 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 IC7FF 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.

Emissions to water

We have added a requirement to monitor flow from WS1 and WS2. This requirement was included in the original draft V001 permit but then omitted in error in the final permit. Despite this original omission, the operator has been monitoring flow (MCERTS) in accordance with the draft requirements.

Process monitoring requirements

To ensure the Operator demonstrates the effective operation of the FGD waste water treatment plant (WWTP) with regard to metals removal, three determinants have been identified and added to Table S3.4 (cadmium, nickel and zinc at the inlet to the FGD WWTP) which, by measurement and reporting of the metal concentration at the inlet to and outlet from the FGD WWTP will demonstrate BAT operation.

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 (IC6FF) 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.