

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/AP3630LG
The Operator is: RWE Generation UK Plc
The Installation is: Little Barford Power Station
This Variation Notice number is: EPR/AP3630LG/V005

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 derogations.

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 operators response 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.

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.

The requirement to sample Cadmium and Mercury on an annual basis has been removed.

These changes have been initiated by the Environment Agency, but with the operators agreement.

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.

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
BREF	best available techniques reference document
CCGT	combined cycle gas turbine
Derogation	as set out in Article 15(4) of the IED
Emergency use	<500 operating hours per annum
ELV	emission limit value set out in either IED or LCPD
GT	gas turbine
IED	Industrial Emissions Directive 2010/75/EC
LCP	large combustion plant – combustion plant subject to Chapter III of IED
MCR	Maximum Continuous Rating
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 option to operate on gas oil for 1080 hrs each in LCP 272 and 273 has been removed from the permit as requested by the operator who now only run commercially on natural gas. Condition 2.3.5 *‘For the following activities referenced in schedule 1, table S1.1: LCP 272 and LCP 273. Standby fuel gas oil may be used for periods of up to 10 days during times of interruption to the gas supply’* has been included to allow its use as a standby fuel. A requirement to monitor concentration by calculation every 4380 operational hours or 2 years whichever sooner, and using a method agreed in writing for NO_x, CO, SO₂ and dust has been added. In table S4.3, a requirement to report Operating hours for each LCP, using standby fuel during interruptions to the natural gas supply” has been added

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 31/10/14 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 all LCPs, the proposed emission limits and how they accord with the 2014 BAT review paper,
- For gas turbines, proposed emission limits for each unit between the MSUL/MSDL and 70% load, with a justification.

The Regulation 60 Notice response from the Operator was received on 21/04/15.

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 the 17/06/15 and 26/06/15.

We considered it was in the correct form and contained sufficient information for us to begin our determination of the permit review.

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 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 as follows:

The Operator has chosen to operate the LCP 272 and 273 under the Transitional National Plan (TNP) compliance route for Oxides of Nitrogen and the Annex V for other substances.

LCP 394 Article 30(2) Annex V Part 1 – 500 hour emergency operation.

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 routes they wanted in the variation notice on 21.12.15. 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.	2.3.5
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.	3.1.3 Schedule 3, Table S3.4
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.	Not applicable
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 S1.4
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	2.3.6, 4.2.2d
Ann V Pt 1(6(1))	Definition of natural gas	Schedule 6, Interpretation
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
AnnV Pt3(4)	Measurement of total mercury	Not applicable

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	3.6.1 Schedule 3, Table S3.1
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.

In the Operator's response to the Reg 60 Notice they had not decided which compliance route to take. The Operator is not required to decide at this stage whether to take the TNP/LLD compliance route or an alternative. We therefore considered all the proposed compliance routes and drafted the associated permits until the Operator informed us of their final decision on 22/12/15.

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

- **LCP 249** is changed to **LCP 272**
- **LCP 426** is changed to **LCP 273**

The 58mWth OCGT on site has been allocated a new LCP number of LCP 394 as per Annex V requirements for plant above 80mWth.

LCP 272 and 273 are 644 MWth engines, operating as a single CCGT module, each venting its waste gases to its own dedicated stack at emission point A1 and A2. The units burn natural gas and gas oil as a standby fuel.

LCP 394 is a 58 MWth OCGT module, venting its waste gases to an individual stack at emission point A3. The unit burns gas oil for black start and short term operation reserve to the grid.

Compliance Route:

The operator has proposed to operate LCP 272 and LCP 273 under the TNP compliance route for Oxides of Nitrogen and the Annex V for other substances and LCP 394 under the <500 hrs operation. The ELVs for LCP 272 and 273 reflect the use of natural gas and standby oil.

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.

The operator's current proposals to achieve the stricter ELVs by 30 June 2020, are through the application of the necessary pollution abatement techniques and closure of any plants which it is decided cannot comply. This information is not in any way binding upon the operator and may change.

Net Rated Thermal Input:

The Applicant has stated that the Net Thermal Input is 644 MWth for LCP 272 and 273 and 58 MWth for LCP 394. They have justified this figure by indicating that the results are based on a contractual performance test to standard PTC-46 1996 carried out in March 2013 following the power station upgrade. The performance test report is TECH/JTE/2004/13.

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, both in terms of the output load (i.e. electricity, heat or power generated) (MW); and this output load as a percentage of the rated thermal output of the combustion plant (%)

They have also defined it as three criteria that suit the technical characteristics of the plant, which can be met at the end of start-up or start of shut-down.

We agree with all of these definitions and have set these thresholds in the Permit in table S1.4 accordingly

Emission limits:

For TNP:

The operator has proposed limits in line with annex V of the IED and the 2014 BAT review paper. Consequently we have accepted the proposed limits and incorporated them into table S3.1 of the permit.

Natural Gas limits for LCP 272 and 273

NO_x (mg/m³) Natural Gas	Reference Period		
	Monthly average	Daily average	Hourly average
Existing permit	-	50	-
Annex V	50	55	100
New permit limit	50	50	100

CO (mg/m³)	Reference Period		
	Monthly average	Daily average	Hourly average
Existing permit	-	100	-
Annex V	100	110	200(95%ile)
New permit limit	100	100	200

The current permit sets natural gas NO_x values for LCP 272 and 273 at 50mg/m³ of the daily mean of validated hourly averages, based on Annex V and the IED BAT Review which introduces the concept of 'no backsliding' the

50mg/m³ has been retained with the monthly and hourly averages being derived from this limit.

The CO limit has been set in line with the Annex V limits for LCP 272 and 273 for natural gas.

No ELV's have been proposed for LCP 394 as it operates under Article 30(2) Annex V Part 1 – 500 hour emergency operation which states the operator shall record the operating hours of the plant only.

The option to operate on gas oil for 1080 hrs each in LCP 272 and 273 has been removed from the permit as requested by the operator who now only run commercially on natural gas. Condition 2.3.5 *'For the following activities referenced in schedule 1, table S1.1: LCP 272 and LCP 273. Standby fuel gas oil may be used for periods of up to 10 days during times of interruption to the gas supply'* has been included to allow its use as a standby fuel. A requirement to monitor concentration by calculation every 4380 operational hours or 2 years whichever sooner, and using a method agreed in writing for NO_x, CO, SO₂ and dust has been added. In table S4.3, a requirement to report Operating hours for each LCP, using standby fuel during interruptions to the natural gas supply" has been added

Gas fired plant:

Sulphur dioxide emissions from natural gas firing of gas turbines and boilers will be reported as six monthly concentrations on the basis of the fuel sulphur content without continuous or periodic monitoring since only trace quantities of sulphur are present in UK natural gas. Dust emissions for natural gas fired boilers will, likewise, be reported on the basis of emission factors without continuous or periodic monitoring. For gas turbines we have not required any reporting as the dust emissions will always be reported as zero. This is because natural gas is an ash-free fuel and high efficiency combustion in the gas turbine does not generate additional particulate matter. The fuel gas is always filtered and, in the case of gas turbines, the inlet air is also filtered resulting in a lower dust concentration in the flue than in the surrounding air.

The IED Annex V ELVs for oxides of nitrogen and carbon monoxide apply to OCGTs, CCGTs and mechanical drive gas turbines when the load is >70%. This has been interpreted as 70% of the rated output load. The rated output load used here is the same as that used for calculating the percentage load when specifying the end of start-up and beginning of shut-down.

Oil fired gas turbines:

Sulphur dioxide emissions from oil firing of gas turbines and boilers will be reported as six monthly concentrations on the basis of the known fuel sulphur content without continuous or periodic monitoring.

Energy efficiency:

The installation uses fossil fuels but does not have CHP. In line with the DEFRA Part A guidance, to report on the scope for further improvement, a condition has been included for the operator to carry out a 4-yearly efficiency review.

Standby fuels:

The operator normally uses natural gas and has applied to use gas oil as a standby fuel. Since it is BAT to use the cleaner gas fuel, gas oil use is limited to 10 days per year for each LCP (272 and 273).

Reporting efficiency:

Condition 1.2.1(c) requires maximisation of the efficiency of generating plant and regular recording.

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.

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.

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

As per current guidance the below directly associated activity in Table S1.1 of EPR/AP3630LG/V002 has been removed as the steam turbine function is now included within section A1.

A3	Directly associated activity	Steam turbine operation	From input of stream from heat recovery steam generator 1A and 1B for the generation of electricity for export to the national grid.
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Annex 1: Review and assessment of changes that are not part of the Chapter III IED derived permit review.

Table S3.3 within V002 of the permit requires the annual limits of Cadmium and Mercury to be monitored, this requirement has been removed within the current permit as the sampling requirement is covered with Tables S2.1, S3.2 and S4.1 under short term concentration monitoring of monthly spot samples.

All of the above changes have been initiated by the Environment Agency, but with the operators agreement.