

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/NP3033RD

The Operator is: Uniper UK Limited

The Installation is: Cottam Development Centre Power Station

This Variation Notice number is: EPR/NP3033RD/V002

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 responses to the regulation 60 notices 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.

How this document is structured

Glossary

1. Our decision
2. How we reached our decision
3. The legal framework
4. Key Issues
 - Annex 1 – assessment of alternative compliance routes

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
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
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 Life Derogation
MCR	Maximum Continuous Rating
Mid merit	1500-4000 operating hours per annum
MSUL/MSDL	Minimum start up load/minimum shut-down load
OCGT	Open Cycle Gas Turbine
Peaking	500-1500 operating hours per annum
Part load operation	operation during a 24 hr period that includes loads between MSUL/MSDL and maximum continuous rating (MCR)
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 29/01/15 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.
- The proposed emission limits and how they accord with the 2014 BAT review paper.
- For higher efficiency gas turbines where they wish to apply for the NO_x emission derogation, the energy efficiency details of the LCP.
- For gas turbines, proposed emission limits for each unit between the MSUL/MSDL and 70% load, with a justification.
- For gas fired plant, whether they wish to apply for derogation from monitoring when on standby fuels.
- Any request to move from continuous to 6 monthly monitoring, or to derogate from 6 monthly monitoring, with a justification.

The Regulation 60 Notice response from the Operator was received on 27 March 2015.

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 30 June 2015.

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. Further information was provided by the operator on 2 November 2015 which was placed on our public register.

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 further information requests on 15/10/15 and 18/11/15. A copy of the further information requests and responses were 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:

Article 30(2) Annex V Part1 – ELV

Article 32 – TNP

Article 30(2) Annex V Part 1 - 1500 Limited Hours Derogation (LHD)

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 (letter dated 18/12/15). 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 S3.3
38	Monitoring of air emissions in accordance with Ann V Pt 3	3.5, 3.6
41(a)	Determination of start-up and shut-down periods	2.3.6 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	n/a
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 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	3.5.1 Schedule 3, Table S3.1

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 an updated LCP number in accordance with the most recent EIONET references. The LCP references have changed as follows:

- **LCP 154** is changed to **LCP 100**

LCP100

This LCP consists of a single gas turbine (GT) with an associated generator, heat recovery steam generator (HRSG) and steam turbine. It has a net rated thermal input of 704 MWth in closed cycle operation and 696 MWth in open cycle operation. The LCP has a Gas Turbine (GT) stack (via the HRSG), emission point A1 and a GT bypass stack, emission point A2 to allow it to run in both combined and open cycle modes.

The unit burns natural gas and distillate oil as a standby fuel.

The efficiency of the LCP is 56.1% in closed cycle operation and 38.5% in open cycle operation.

Compliance Route:

The operator has proposed to operate this LCP under the TNP compliance route. The operator confirmed this on 21/12/15. Prior to being formally informed of this we assessed all three options proposed in the initial response to the Regulation 60 Notice. The decision on the two options not brought forward into 2016 can be found in Annex 1.

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 is 704 MWth in closed cycle operation and 696 MWth in open cycle operation. This was stated in the response to the further information request sent on 04/06/15, received on 30/06/15. They have justified this figure by providing a response to the further information request dated 15/10/15, received on 02/11/15.

The performance test dated January 2010 was carried out in accordance with the Siemens Performance Test Procedure DGTRP 2008-00422 and was used in the determination. This test was used along with the following test codes after upgrades carried out in 2008:

- ASME PTC 46-1996: for CCGT module performance tests
- PTC 19.1: for CCGT module performance tests
- AAGA 3, AGA 8: for fuel gas quality
- ISO 6976-1995: calculation of fuel gas calorific value, density and relative density from composition

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 200 MW output and 50% output. The output load and percentage of the rated output is based on the rated electrical output from the LCP.

We agree with all of these definitions and have set these thresholds in table S1.4 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 9.3MW auxiliary boiler was previously listed as a DAA with ELVs. This is now considered to be part of the S1.1A(1) activity and has been included under activity reference A1 in table S1.1. The ELVs for this auxiliary boiler, have also been removed as it is < 20MW and only operates for limited hours therefore the impacts are considered insignificant.

For LCP 100 the operator proposed limits in line with annex V of the IED and the 2014 BAT review paper for <55% efficient plant. Where the operator proposed limits above the current hourly ELV (60mg/m³) the current ELV has been retained on the principle of no backsliding. We have incorporated the limits into table S3.1 of the permit.

Note, the site currently has ELVs and CEMs on the by-pass windshield, A1. These ELVs are the same as those for the main release point when operating in combined mode. When operating in open cycle mode A1 has been set to the same ELVs and monitoring requirements as for A2.

The operator requested and proposed ELVs below the 70% load of the plant (part load) based on the higher value NO_x monthly limit of 75mg/m³ specified in the IED for >55% efficient plant to be included in the permit.

The operator used this to provide a daily ELV based on the IED ratio method of 110% proposing an ELV of 83 mg/m³. The operator's response of 02/11/15, to a request for further information, included a review of the daily ELV for NO_x, emissions data for part load operation and proposed a revised part load daily ELV of 75mg/m³. The emissions data provided was limited (3 days in February 2014) and the operator did not provide a revised air impact assessment based on the ELVs being requested.

The proposed part load ELVs for NO_x have not been accepted and improvement condition IC 10 has been included in table S1.3.

IC10	The operator shall provide a report in writing to the Environment Agency. The report shall contain a proposed emission limit which applies when the load varies between MSUL/MSDL and base load during the daily reference period, for emission points A1 & A2 for oxides of nitrogen. The report shall also provide justification for this limit, and an assessment of the impacts of emissions at this limit using our H1 guidance or equivalent methodology.	31/12/16
------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------

The operator proposed the daily Annex V CO limit of 110mg/m³ for part load operation. The operator confirmed the ELVs for CO are to be on the principle of no backsliding in the email response dated 20/11/2015.

The emissions to air have been calculated as in the tables below for the TNP Compliance Route

Table 1: OCGT & CCGT stack A1 & stack A2: NO_x ELVs mg/m³

Period	Current	IED	Applied for	Given
Monthly	-	75	60	60
95%ile Daily	-	82.5	60	60
95%ile hr	60 absolute	150	120	60
MSUL/MSDL to 70%	-	-	83/75	75

Table 2: OCGT & CCGT stack A1 & stack A2: CO ELVs mg/m³

Period	Current	IED	Applied for	Given
Monthly	-	100	50	50
Daily	-	110	50	50
95%ile hr	50 absolute	200	100	50
MSUL/MSDL to 70%	-	-	110	110

The operator requested a derogation for monitoring for Sulphur dioxide emissions and dust as detailed in Annex V Part 3 of IED.

Sulphur dioxide emissions from natural gas firing will be reported 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. For dust emissions on 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.

Energy efficiency:

The installation 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 gas fuel 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 emergency use only and may only be used for periods of up to 10 days during times of interruption to the gas supply.

The operator has requested a derogation with reference to Article 30(6) to not undertake monitoring when on standby fuels where it is proposed to be used less than 240 hours (emergency use). We have agreed with this request.

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.

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 3.1.4 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.

Other changes -

The DAA activity of oil storage has been removed from Table S1.1 as it is now included in the limits of the specified activity for the Section 1.1 A(1)(a) activity.

Annex 1: Compliance routes the operator applied for but decided not to opt for post 31/12/15.

ELV Compliance Route

OCGT & CCGT stack A1 & A2: NO_x ELVs mg/m³

Period	Current	IED	Applied for	Environment Agency decision
---------------	----------------	------------	--------------------	------------------------------------

Monthly	-	75	50	50
Daily	-	82.5	55	55
95%ile hr	60 absolute	150	100	60
MSUL /MSDL to 70% load	-	-	83	IC10

OCGT & CCGT stack A1 & A2: CO ELVs mg/m³

Period	Current	IED	Applied for	Environment Agency decision
Monthly	-	100	50	50
Daily	-	110	50	50
95%ile hr	50	200	100	50
MSUL/MSDL to 70% load	-	-	110	IC10

1,500hr LHD Compliance Route

OCGT & CCGT stack A1 & stack A2: NOx ELVs mg/m³

Period	Current	IED	Applied for	Environment Agency decision
Monthly	-	150	150	60
Daily	-	165	165	60
95%ile hr	60 absolute	300	300	60
MSUL/MSDL to 70%	-	-	165	75

The operator proposed limits in line with annex V of the IED however, we do not believe these to be BAT as these are significantly higher than what is currently achievable.

The Operator has discussed this with the us via the Energy UK Regulators forum for plants entering LHD explaining that the current performance of the site cannot be relied upon to predict the future performance of a plant that opts for the LHD and BAT conditions for LHD plant will need to reflect the impact of the overall reduction in operational hours. The operator believes this has been agreed with us that plants entering LHD will not be subject to the BAT AELS for base load plant.

Given that BAT for peaking plant is yet to be determined they believe the starting point for determining IED BAT based ELV's for plant entering the LHD should be the Annex V ELVs applicable to this derogation. For gas turbines, the NOx ELV specified in Annex V is 150 mg/m³ and this is the basis of their proposal.

The operator's position was not accepted and they did not provide a revised air impact assessment based on the higher ELVs being requested.

Without a site specific BAT justification the current ELVs would have been implemented following the methodology set out in the IED BAT paper and IC11 has been given.

OCGT & CCGT stack A1 & stack A2: CO ELVs mg/m³

Period	Current	IED	Applied for	Environment Agency Decision
Monthly	-	100	-	50
Daily	-	110	-	50
95%ile hr	50 absolute	200	-	50
MSUL/MSDL to 70%	-	-	-	50

The operator did not propose any ELVs for CO. CO ELVs are not covered in the LHD hence they revert to the tighter limits in Annex V. However, the current daily CO ELV is tighter than Annex V so following the methodology set out in our IED BAT paper the above ELVs would have been granted