

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/EPR/NP3833RC

The Operator is: Uniper UK Limited

The Installation is: Enfield Power Station

This Variation Notice number is: EPR/EPR/NP3833RC/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 notices 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 notices and the operator's response are 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 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 and any changes to the operation of the installation (see Annex 1).

We try to explain our decision as accurately, comprehensively and plainly as possible. Achieving all three objectives is not always easy, and we would welcome any feedback as to how we might improve our decision documents in future.

How this document is structured

Glossary

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

GLOSSARY

Baseload	>4000 operating hours per annum
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
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
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
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
LHD	Limited Hours Derogation (1500 hours)

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,
- 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,
- 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 26/03/15.

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 30/06/15.

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.

2.3 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 initially requested were: Annex V ELVs, LHD and TNP.

We were only able to issue the variation notice for single compliance routes (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 the TNP route. 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.	3.1.3 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 Annex V Pt 3	3.5, 3.6
40	Multi-fuel firing	Not applicable
41(a)	Determination of start-up and shut-down periods	2.3.5 Schedule 1 Table S1.5
Annex 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 O ₂ 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
Annex V Pt 1	Emission limit values	3.1.2 Schedule 3, Table S3.1
Annex V Pt 1	For plants operating less than 500 hours per year, record the used operating hours	Not applicable
Annex V Pt 1(6(1))	Definition of natural gas	Schedule 6, Interpretation
Annex V Pt 2	Emission limit values	3.1.2 Schedule 3, Table S3.1
Annex V Pt 3(1)	Continuous monitoring for >100MWth for specified substances	3.5, 3.6 Schedule 3, Table S3.1
Annex V Pt 3(2, 3, 5)	Monitoring derogations	3.5.1 Schedule 3, Table S3.1
Annex V Pt 3(4)	Measurement of total mercury	Not applicable

Annex V Pt3(6)	EA informed of significant changes in fuel type or in mode of operation so can check Pt3 (1-4) still apply	Not applicable
Annex V Pt3(7)	Monitoring requirements	3.5.1 Schedule 3, Table S3.1
Annex V Part 3(8,9,10)	Monitoring methods	3.5, 3.6
Annex V Pt 4	Monthly, daily, 95%ile hourly emission limit value compliance	3.5.1 Schedule 3, Table S3.1
Annex V 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 an updated LCP number in accordance with the most recent DEFRA LCP references. The LCP reference has changed as follows:

- **LCP 155** is changed to **LCP101**

LCP101

Net rated Input MW

This LCP consists of one 706 MWth CCGT which vents via single flue within a single windshield at emission point A1. The unit currently burns natural gas only. The site satisfactorily confirmed the figure net rated thermal input figure with an analysis of their 2002 original equipment manufacturer OEM (ABB) test (correcting for ISO conditions).

Compliance Route Overview

The operator has proposed to operate this LCP under the ELV, TNP and LHD compliance routes. The ELVs for LCP101 reflect the requested route.

Under the TNP or ELV route it is possible for the site to transfer to the LHD later; this requires a review of the ELVs. For this reason under TNP and ELV options IC101 has been included to provide an "assessment of the proposed ELVs for Oxides of Nitrogen for the IED Chapter III '1,500 hours derogation' compliance route".

The CCGT plant is currently operating to tighter ELVs than the IED Annex V tables require. On the basis of 'no backsliding' (whereby ELVs are not set higher than what the plant is already achieving) limits were not increase as outlined in the method given in IED BAT ESI Review paper 28 October 2014. The site retains its original ELVs (with an additional averaging period) under the option TNP.

The operator requested a higher set of ELVs under the future LHD option but did not provided a detailed justification as to the reason for this potential increase in emissions. For this reason of 'no backsliding' outlined in the IED BAT ESI Review paper 28 October 2014, the site retains its original ELVs (with an additional averaging period) for the LHD option. However an

improvement condition has been added for a report to be provided to justify ELV changes in the future.

The setting of ELVs below the 70% load of the plant (called 'part load') based on the higher value NO_x monthly limit of 75mg/m³ specified in the IED for >70% plant was accepted. This is used to provide only a daily ELV based on the IED ratio method of 110% hence 82.5mg/m³. We are required by the IED not to round this figure up to 83mg/m³ (being the figure as requested by the operator).

The TNP option replaces the ELV and LHD 'daily mean of validated hourly averages' with our template requirement of '95% of validated daily means within a calendar year'

The option finally selected and justified below is TNP.

The site provided no technical justification as to why the plant when entering the TNP would deteriorate its emissions from compliance with an ELV of 60mg/m³ monthly average to the proposed 100mg/m³. BAT would still be a requirement to maintain the GTs combustion controls even within the TNP option.

The TNP requires some additional reporting these resulted in some additional permit conditions.

The operator has removed the gas oil tanks which enabled standby fuel firing of the GTs; and have not made a Reg60 request for alternative fuels. The associated pre-operational condition has been kept for completeness. The original references to oil fired ELVs in the relevant ELV table have been removed.

The plant is only burning natural gas, the issue for monitoring dust and SO₂ periodically is discounted (and applies across all similar gas fired GT permits within the UK LCP). The operator is only required to calculate the mass emissions based on standard parameters.

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.

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 used this load as one criteria that suits 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 S1.5 accordingly.

Standby fuels:

The operator did historically have standby fuels. This was not requested under the IED response, and the fuel tanks are not practically fitted currently. This potential operation has been removed from the permit ELVs and activities.

Open cycle operation (OCGT):

The site has not requested 500 emergency hours operation under the Reg60 response. The operator has confirmed that OCGT is not operated for commercial electricity generation; but may be used in unique circumstances like ‘mapping after outage’. These would be considered abnormal operations for compliance purposes within the permit.

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.

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.

There is a requirement to continue to report for 2015 in the transition from LCPD to IED LCP Reporting process annual emissions of dust, sulphur dioxide and oxides of nitrogen including energy usage for the year 01/01/2015 to 31/12/2015. For this reason an Improvement condition has been added to table S1.3.

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.

The following is a summary table of the IED limits, current permit limits, the operator proposed limits and the finally determined limit for the permit.

Emission limits Assessment:

Parameter	Current ELVs			Annex V – ELV			TNP proposed		
	Monthly average (mg/m3)	Daily mean (mg/m3)	maximum of hourly means	Monthly average (mg/m3)	Daily mean (mg/m3)	95%ile of hourly means	Monthly average (mg/m3)	Daily mean (mg/m3)	95%ile of hourly means
NOx (>= 70% load)	40		60	50	55	100	40	55	100
CO (>= 70% load)	20		30	100	110	200	20	30	40
NOx (MSUL/MSDL to baseload)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	83	N/A
CO (MSUL/MSDL to baseload)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	110	N/A

Parameter	Current ELVs			Annex V – ELV			TNP determined		
	Monthly average (mg/m3)	Daily mean (mg/m3)	maximum of hourly means	Monthly average (mg/m3)	Daily mean (mg/m3)	95%ile of hourly means	Monthly average (mg/m3)	Daily mean (mg/m3)	95%ile of hourly means
NOx (>= 70% load)	40		60	50	55	100	40	55	60
CO (>= 70% load)	20		30	100	110	200	20	30	30
NOx (MSUL/MSDL to baseload)	N/A	N/A	N/A	N/A	75*110% = 82.5 - upper limited for >=70% load	N/A	N/A	82.5	N/A
CO (MSUL/MSDL to baseload)	N/A	N/A	N/A	N/A	100*110% = 110 - upper limited for >=70% load	N/A	N/A	110	N/A

Annex 1

The operator has removed the gas oil tanks which enabled standby fuel firing of the GTs; and have not made a Reg60 request for alternative fuels. The associated pre-operational condition has been kept for completeness. The original references to oil fired ELVs in the relevant ELV table have been removed.

For completeness the jacket boilers being two 1465kW gas fired fuel gas heaters, have been added to the permit as part of the combustion activity. They operate as duty/cycle. They are used prior to GT start up for approximately an hour. They have been present since the installation was originally built. They would have been included in the original permitting installation engineering diagrams but considered below the 3MW de minimus value of the time. It is still considered a minor associated emission.

The surface water discharge to the river Lee has been confirmed as only storm water run-off. There has been no merit since permitting in requiring temperature or pH for such a discharge. The requirement to look for oils is however retained.