

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/BS5371IZ
The Operator is:	E.ON UK Cogeneration Limited
The Installation is:	Sandbach Power
This Variation Notice number is:	EPR/BS5371IZ/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 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 of 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 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

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

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
LCPD	Large Combustion Plant Directive 2001/80/EC
LHD	Limited Hours 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 9 December 2014 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,

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 15 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.

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 30/09/15 by email. A copy of the email was placed on our public register. A copy of the response was received on 08/12/15 and also 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:

- The ELV route
- The TNP route and
- The ≤1500 hours 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 routes they wanted in the variation notice on 21/12/15. The confirmed routes were: TNP route for NO_x (ELV route for CO by default – there is no TNP route for CO).

And it is these routes that are 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.	NA; standby fuel not used
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 required
37	Provisions for malfunction and breakdown of abatement equipment including notifying the EA.	Not required
38	Monitoring of air emissions in accordance with Ann V Pt 3	3.5, 3.6
40	Multi-fuel firing	Not required
41(a)	Determination of start-up and shut-down periods	2.3.5, 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 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
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	Not applicable
Ann V Pt 1(6(1))	Definition of natural gas	Schedule 6, Interpretation
Ann V Pt 2	Emission limit values	Not applicable
Ann V Pt 3(1)	Continuous monitoring for >100 MWth for specified substances	3.5, 3.6, Schedule 3, Table S3.1
Ann V Pt 3(2, 3, 5)	Monitoring derogations	3.5.1, Schedule 3, Table S3.1
Ann V Pt 3(4)	Measurement of total mercury	Not applicable
Ann V Pt 3(6)	EA informed of significant changes in fuel type or in mode of operation so can check Pt 3 (1-4) still apply	2.3.1, Schedule 1, Table S1.2
Ann V Pt 3(7)	Monitoring requirements	3.5.1, Schedule 3, Table S3.1
Ann V Pt 3(8,9,10)	Monitoring methods	3.5, 3.6
Ann V Pt 4	Monthly, daily, 95%ile hourly emission limit value compliance	3.5.1, Schedule 3, Table S3.1
Ann V Pt 7	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.

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 21/12/15.

The variation notice uses an updated LCP number in accordance with the most recent Defra LCP reference numbers. The LCP reference has changed as follows:

- **LCP168** is changed to **LCP118**

This LCP was originally designed as a CHP plant to supply heat and electricity to a neighbouring chemical plant. The neighbour no longer exists and the LCP site now operates as a Combined Cycle Gas Turbine (CCGT) plant supplying electricity to the National Grid. The plant consists of an aero-derivative gas turbine (GT), an unfired heat recovery steam generator (HRSG), a condensing steam turbine and a hybrid forced draught cooling system. The LCP is rated at 102.2 MWth input and vents via a single stack at emission point A1. The unit can operate in open cycle mode (OCGT), bypassing the HRSG, when it vents via a single stack at emission point A2. Both stacks are 30 m tall. The unit burns natural gas as its fuel.

In order to distinguish the two operating modes, CCGT and OCGT, the activities table S1.1 in the permit separates them as LCP118 (CCGT mode) and LCP118 (OCGT mode).

Compliance Route

The operator has proposed to operate LCP118 under the TNP compliance route and the limits reflect the requested 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 is 102.2 MWth. They have justified this figure by providing reference to a company-held report detailing acceptance tests carried out by an external company, KEMA, in

October 1999. The original tests were carried out in accordance with specifications in the design supply contract. Values obtained in the tests were corrected to ISO reference conditions to give the 102.2 MWth rating. The plant has not been upgraded since the tests were carried out.

We are satisfied that this represents a valid method of justification.

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 the thresholds for operational parameters that suit the technical characteristics of the plant, which can be met at the end of start-up or start of shut-down.

They specified the MSUL/MSDL thresholds as 70% load and 29 MWe electrical output. The percentage is that of the rated electrical output of just the gas turbine rather than the whole LCP. 29 MWe is 52.3% of the total electrical output from the LCP in CCGT mode. This enables a single MSUL/MSDL load and percentage to be specified for both CCGT and OCGT modes. This is an option given in the compliance protocol. Consequently there is no requirement to justify different emission limits between MSUL/MSDL and 70% load (which would be required for those plants with lower MSUL/MSDL thresholds).

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

Emission limits

TNP Compliance Route

The following table summarises the operator proposed limits, (which are the same as the existing permit limits) and the limits actually incorporated into the reviewed permit:

Parameter	Existing permit mg/m ³	Reference Period	Operator proposal mg/m ³	IED Annex V mg/m ³	New Permit limit mg/m ³
NOx	60	Monthly mean of validated hourly averages	60	50	60
	60	95% of validated daily means within a calendar year	60	55	60
	90	95% of validated hourly averages within a calendar year	120	100	90

CO	50	Monthly mean of validated hourly averages	50	100	50
	50	95% of validated daily means within a calendar year	50	110	50
	75	95% of validated hourly averages within a calendar year	100	200	75

The operator has proposed limits in line with existing permit ELVs:

- NOx proposal: 60 mg/m³ and CO proposal: 50 mg/m³ for both the daily mean of validated hourly averages and 95% of validated daily means within a calendar year.

We have accepted these proposed limits and incorporated them into table S3.1 of the permit.

The operator also proposed limits for 95% of validated hourly averages within a calendar year for NOx and CO that we have not accepted:

- The operator proposed the NOx limit of 120 mg/m³ based on the IED requirement that the emissions should be not greater than 200% of the ELV.

However, in accordance with the no-backsliding principle Agency has specified the limit to be 60 x 150% = 90 mg/m³; which is the ELV in the current permit.

- Similarly for CO the comparison is 100 mg/m³ (operator proposal) against 75 mg/m³ following the no-backsliding principle (Agency).

The lower limits have consequently been incorporated into table S3.1 of the permit.

The operator did not propose limits for SO₂ or dust. We have accepted this as complying with IED but we have included a monitoring requirement for SO₂ (not dust) considered below, which has been incorporated into the permit as a requirement of IED.

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.

Energy efficiency

The installation uses fossil fuels (natural gas) but does not have CHP (the CHP facility was disabled when the adjacent chemical plant operator ceased to operate several years ago). In line with DEFRA guidance, to report on the scope for further improvement, condition 1.2.1 has been included for the operator to carry out a 4-yearly efficiency review.

Standby fuels

The operator uses natural gas as the fuel and does not use a standby fuel.

OCGT Operation

The operator has applied for operation of the LCP in OCGT mode. The existing permit contains no time constraints whilst operating in OCGT mode and we have decided to maintain this position. Should this change as a result of the sector BAT review currently in progress, the permit may be varied.

Table S3.1 shows that the ELVs via emission point A2 (the emission point when in OCGT mode) are the same as for the ELVs through A1 (CCGT mode). **When the plant operates in OCGT mode the monitoring requirements are unchanged from the existing permit; ie continuous monitoring for NOx and CO.**

Reporting efficiency

In order to ensure the efficiency of plant using fossil fuels 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

As there is no abatement plant associated with the LCP, Schedule 5 *Notification of abnormal emissions*, Part C (which takes account of abatement plant malfunction and breakdown notification requirements) is not required and has therefore not been included.

Monitoring & standards

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

Direct monitoring of sulphur dioxide and dust emissions have not been included in the monitoring regime. However:

- 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.
- For dust emissions from 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.

A row has been included in the ELV 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

As part of the modern permit template in compliance with IED Chapter II requirements, the following condition has been added: condition 3.1.4 (relating to protection of soil, groundwater and groundwater monitoring), and the following conditions have been amended: conditions 4.3.1 and 4.3.2 (relating to notifications).