

## **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/AP3633BL  
The Operator is: Centrica Langage Limited  
The Installation is: Langage Energy Centre  
This Variation Notice number is: EPR/AP3633BL/V003

#### **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 responses 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 responses also include 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. 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 and an updated address for the operators registered office.

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

## 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
LCPD	Large Combustion Plant Directive 2001/80/EC
MCR	Maximum Continuous Rating
Mid merit	1500-4000 operating hours per annum
MSUL/MSDL	Minimum start up load/minimum shut-down load
MWe	Mega Watt electrical generation supplied to the national grid.
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 11/12/14 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 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 12/6/15.

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 on 16/6/15 and suitable further information was provided by the Operator on 21/9/15.

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

In addition to the responses to our further information requests, we received additional information during the determination from the operator who supplied supplementary information by e mail on 21/09/15 and confirmed that the installation did not require to retain the flexibility to use standby fuel oil to

fire the gas turbines. We made a copy of this information available to the public in the same way as the responses to our information requests.

### **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.

<b>IED Article Reference</b>	<b>IED requirement</b>	<b>Permit condition</b>
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.	Not Applicable
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.	
38	Monitoring of air emissions in accordance with Ann V Pt 3	Not Applicable
40	Multi-fuel firing	Not Applicable
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 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	Not Applicable
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	Not Applicable



<b>IED Article Reference</b>	<b>IED requirement</b>	<b>Permit condition</b>
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	3.5.1 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.

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

- **LCP 209** is changed to **LCP 211**

### **LCP 211**

This LCP consists of two CCGT's which are fired on natural gas and have a combined thermal input of 1570 MWth they vent via a single windshield at emission point A1.

The thermal input includes approximately 32MWth of auxiliary natural gas firing on the heat recovery steam generators, this is used to supplement the installations electrical generation during periods of peak demand.

Compliance Route:

The operator has chosen to operate this LCP under the annex V ELV compliance route.

Net Rated Thermal Input:

The Applicant has stated that the net thermal input is 1570 MWth.

The thermal input data was derived from plant performance testing conducted on 31/01/10 during performance tests performed by the turbine supplier Alstrom.

The quoted thermal input includes the thermal input capability of the supplementary gas firing on each of the two HRSGs. Copies of the performance tests and HRSG measurements are held on site and available for inspection if required.

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 MW output and % output the output electrical load generated (MW); and this output load as a percentage of the rated output of the combustion plant .

These points have been justified by the provision of emission traces on start-up and shutdown which demonstrate the stable operating envelope for the installation.

The firing of the GTs have been modified to enable low load running, the low load running period is included in the period defined by the start-up and shutdown points.

We agree with all of these definitions and have set these thresholds in table S1.4 of the permit accordingly. Standard permit condition 2.3.5 has been set to define the period of start up and shut down, referring to the thresholds in this table.

#### Emission limits:

The operator has proposed limits in line with annex V of the IED and the 2014 BAT review paper and the Environment Agency position regarding “no backsliding” where emission limits will not be relaxed above existing permit limits. Consequently we have accepted the proposed limits and incorporated them into table 3.1 of the permit.

Centrica Langage Ltd has proposed the following ELVs:

<b>GT11 &amp; GT12 Natural Gas firing</b>	<b>NOx proposal</b>	<b>Annex V NOx</b>	<b>CO proposal</b>	<b>Annex V CO</b>
Monthly average	50	50	100	100
Daily average	50 *	55	100 *	110
95%ile of hourly averages over the calendar year	100	100	200	200

\* Proposed limits tighter than Annex V

The proposed limits have been set in Table 3.1 of the permit. Additional information was received on 21/19/15 which stated that the facility to fire the gas turbines on standby fuel (fuel oil) was not required; hence no limits have been set for oil firing of the gas turbines in Table 3.1. Any period of supplementary firing on the heat recovery steam generators would be included in the limits set for gas firing on the gas turbines in Table 3.1

The operator has requested ELV's that in some cases are tighter than the Annex V limits, although the environment agency has proposed the no backsliding position on setting ELVs it recognises that in some circumstances it may be appropriate to relax the limits to those set in Annex V. Accordingly IC 8 has been set in the permit to address this circumstance. ( This LCP has

an efficiency > 55% and could thus apply for a NO<sub>x</sub> limit of 75 mg/m<sup>3</sup> higher than the 50 mg/m<sup>3</sup> limit suggested by the operator.

The low load running mode on the GTs has been tuned by the GT supplier to deliver a NO<sub>x</sub> limit of 50 to remain compliant with the permit, and this provides a low load running point of 26% of the load. Potentially a lower load running position could be achieved if the NO<sub>x</sub> limit was increased to the allowable limits under annex v, this lower load running position would mean that the GT would produce less power overnight when running in low load that would have to be placed into the market at that time when there isn't the demand for the power. The higher NO<sub>x</sub> limits thus have the potential of making the low load operating mode potentially more attractive both commercially and from an environmental perspective.)

#### Gas fired plant:

Sulphur dioxide emissions from natural gas firing of gas turbines 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 from natural gas firing will 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 emission 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 particulate concentration in the flue than in the surrounding air.

The IED Annex V ELVs for oxides of nitrogen and carbon monoxide apply to CCGTs, when the load is >70%. This has been interpreted as 70% of the rated output load.

The response to question 9 (iii) in the Regulation 60 request received on 12/06/15 stated that the proposed ELVs listed above would apply at all loads outside of the start-up and shutdown periods, hence no additional ELV's have been set for periods from MSUL to 70% load and 70 % load to MSDL.

#### Energy efficiency:

The installation does not have CHP.

#### Standby fuels:

The operator confirmed by e mail on 21/09/15 that standby fuel firing would not be required at the installation.

#### 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:

The periodic annual monitoring for the annual surveillance tests for NO<sub>x</sub> and CO have been added to Table 3.1 of the permit template for clarity.

Six monthly SO<sub>2</sub> and dust monitoring by agreement by calculation have been added to table S3.1 for clarity.

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 3.1.3 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.