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/RP3130LN
The Operator is: npower Cogen Limited
The Installation is: Teesside Crude Oil Stabilisation Terminal
This Variation Notice number is: EPR/RP3130LN/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 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 Non-ESI Review Paper, 28 October 2014" produced by the Environment Agency (referred to as the "2014 Non-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

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
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
MSUL/MSDL	Minimum start up load/minimum shut-down load

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 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 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 31/03/15.

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 06/07/15.

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

2.2 Alternative compliance routes

In their Regulation 60 Notice response, the operator initially requested the LLD compliance route to be considered for their LCP. However, on the 16/12/2015 the operator requested the ELV compliance route.

We were only able to issue the variation notice for single compliance routes per LCP (other than TNP which can apply pollutant), and the operator confirmed which route they wanted in the variation notice by email dated 16/12/15. The confirmed route was ELV compliance route which 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.	n/a
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.	n/a
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;	n/a
37	Provisions for malfunction and breakdown of abatement equipment including notifying the EA.	n/a
38	Monitoring of air emissions in accordance with Ann V Pt 3	3.5, 3.6
40	Multi-fuel firing	n/a
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	n/a
Ann V Pt 1(6(1))	Definition of natural gas	Schedule 6, Interpretation
Ann V Pt 2	Emission limit values	n/a
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	n/a

IED Article Reference	IED requirement	Permit condition
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 SO_2 derogation	n/a

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 reference numbers. The LCP references have changed as follows:

- **LCP 236** is changed to **LCP 270**

LCP 270

This LCP consists of one 130.28 MWth CCGT which vents via a single windshield at emission point A1. The unit burns natural gas and low pressure fuel gas.

Compliance Route:
The operator has proposed to operate this LCP under the ELV compliance route.

Net Rated Thermal Input:
The Applicant has stated that the Net Thermal Input is 130.28 MWth. They have justified this figure by providing details of the acceptance test. The thermal input was calculated from the performance test, dated 2009, reference TECH/JIB/1195/09. The testing complied to the following:

- ISO 2314:1989 – specification for gas turbine acceptance tests
- ISO 5167-1/2/3/4:2003 – measurement of fluid flow by means of pressure differential devices inserted in circular cross section running full
- AGA8 – 1994/ISO 12213-1/2/3:1997 – natural gas calculation of compression factor
- ISO 6976:1995 – calculation of calorific values, density, relative density and wobbe index 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 the output load (i.e. electricity, heat or power generated) (MW); and this output load as a percentage of the rated output of the combustion plant (%).

The LCP was designed to be able to export steam as well as electricity, however, this no longer occurs; steam from the heat recovery steam generator (HRSG) is only passed to the steam turbine for increased

generation of electricity. The MSUL and MSDL percentages have been calculated as a percentage of the electrical output from the gas turbine rather than the total electrical and thermal output of the gas turbine, steam turbine and HRSG.

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. Consequently we have accepted the proposed limits and incorporated them into table 3.1 of the permit.

The emission limits that were previously permitted are shown in table 1 below with the Annex V limits in table 2 and the new permitted limits in table 3. Note that the 95% of validated hourly averages within a calendar year for NO_x has been set at 60 mg/m^3 which is lower than the IED limit, but as they already had this 60 mg/m^3 limit we have kept it to be in line with the BAT review paper. Furthermore, the 95% of validated hourly averages within a calendar year for carbon monoxide has been set at 100 mg/m^3 which is again lower than the IED limit under the no backsliding principle.

Table 1 Previous permitted limits from RP3130LN

Emission point	**Parameter**	**Previous emission limit**	**Reference period**
A1	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	60 mg/m^3	Hourly average
	Carbon monoxide	100 mg/m^3	Hourly average

Table 2 Annex V limits

Emission point	**Parameter**	**Annex V limits**	**Reference period**
A1	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	100 mg/m^3	Monthly mean of validated hourly averages
		55 mg/m^3	Daily mean of validated hourly averages
		50 mg/m^3	95% of validated hourly averages within a calendar year
	Carbon monoxide	100 mg/m^3	Monthly mean of validated hourly averages
		110 mg/m^3	Daily mean of validated hourly averages
		200 mg/m^3	95% of validated

			hourly averages within a calendar year

Table 3 New permitted limits EPR/RP3130LN/V002

Emission point	Parameter	New emission limit	Reference period
A1	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	50 mg/m^3	Monthly mean of validated hourly averages
		55 mg/m^3	Daily mean of validated hourly averages
		60 mg/m^3	Hourly averages
	Carbon monoxide	100 mg/m^3	Monthly mean of validated hourly averages
		100 mg/m^3	Daily mean of validated hourly averages
		100 mg/m^3	Hourly averages

Note that the minimum start up load and minimum shut down load is at 75% where as the IED ELV threshold is at 70%.

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.

Other gas, los pressure fuel gas, is also utilised and therefore dust and sulphur dioxide emissions will be reported as six monthly concentrations without continuous or periodic monitoring.

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. Although this plant is not ESI, we consider that reporting of the resource efficiency data is appropriate and have included the requirement in Table S4.2. The table includes a full suite of potential parameters. The operator only needs to provide data for the parameters that apply at their installation.

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.