

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/RP3632SF
The Operator is: Scottish Power Limited
The Installation is: Rye House Power Station
This Variation Notice number is: EPR/RP3632SF/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 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 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 responses 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 responses to the regulation 60 notices requiring information. This is our decision document, which explains the reasoning for the 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 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. 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).

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
MSUL/MSDL	Minimum start up load/minimum shut-down load
Part load operation	operation during a 24 hr period that includes loads between MSUL/MSDL and maximum continuous rating (MCR)

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 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 Variation Notice contains several conditions that concern the operation of the non-LCP part of the installation 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,

The Regulation 60 Notice response from the Operator was received on 30/03/2015.

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 24/06/2015.

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 responses the operator did not request multiple compliance routes be considered for their LCP.

3 The legal framework

The 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 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.	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.	Not applicable
38	Monitoring of air emissions in accordance with Annex V Part 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 S1.4
72b	For combustion plants which do not operate more than 1500 operating hours per year as a rolling average over a period of 5 years, the number of operating hours per year.	Not applicable
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
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 Pt3(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

1. 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 Variation Notice.

The variation notice uses updated LCP numbers in accordance with the most recent DEFRA LCP references. It was identified that under the definition for LCPs Rye House, though unchanged since commissioning, is actually comprised three LCPs one for each of the three gas turbines and their associated stacks. The LCP references have changed as follows:

- LCP263 is now fully superseded.
- LCP387 for GT11, LCP388 for GT12 and LCP389 for GT13

The activity comprises one combined cycle gas turbine (CCGT) module having a combined total thermal input of 1355 MW_{th} and capable of a net rated power output of 715MW of electricity. The module consists of three natural gas fired gas turbines (about 155 MW_{elec}) and a single steam turbine (254MW_{elec}). There are no provisions for light oil firing of the gas turbines. The hot combustion gases from each gas turbine pass into a dedicated heat recovery steam generator (HRSG). The high pressure superheated steam raised in the three HRSGs is combined together and powers a single steam turbine

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.

LCP387

This LCP consists of 1 x 456 MW_{th} GT11(part of single CCGT) which vents via a single flue within a single windshield at emission point A1. The units burn natural gas.

LCP388

This LCP consists of 1 x 448 MW_{th} GT12 (part of single CCGT) which vents via a single flue within a single windshield at emission point A2. The units burn natural gas.

LCP389

This LCP consists of 1 x 451 MW_{th} GT13 (part of single CCGT) which vents via a single flue within a single windshield at emission point A3. The units burn natural gas.

Compliance Route

The operator has proposed to operate this LCP under the IED Annex V ELV compliance route.

Parameter	Current ELVs			Annex V – ELV			ELV route proposed and accepted		
	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	Monthly average (mg/m3)	Daily mean (mg/m3)	95%ile of hourly means
NOx		60	55	50	55	100	50	55	55
CO		40		100	110	200	40	40	200

It is important to maintain ELVs where they are larger or not specified in the IED to avoid ‘backsliding’; in this way the site is not permitted to do worse than it is already achieving.

Net Rated Thermal Input

The Applicant has stated that the Net Thermal Input is 1355 MW_{th}. They have justified this figure by providing the 23/3/94 Acceptance Test report by Siemens ref WT-TGT 9/94 in accordance with ISO2314 which includes all the GTs.

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 one of criteria that suits the technical characteristics of the plant, which can be met at the end of start-up or start of shut-down.

But as the station can operate as either full module (three GTs and the steam turbine), or as part module (one or two GTs and ST) minimum start up and shut down loads have been provided for the several GT firing combinations i.e. all three together, the three different combination of pairs of GTs and the three GTs individually.

We agree with all of these definitions and have set these thresholds in the Permit in table S1.3 accordingly

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 S3.1 of the permit.

The operator has not requested a low load operation (between MSUL/MSDL and 70% load). The above ELVs will apply when plant is operating at or above the MSUL and MSDL points as specified. Operation below MSUL is not expected so no requirement has been set to report operating hours below normal MSUL/MSDL.

IED Annex V ELVs apply specifically above 70% load. To enable assessment specifically for this range the ELVs in the permit are noted as applying for GT11, GT12 and GT13 both from “MSUL/MSDL to base load” and “70% to base load”.

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 S4.4 have been added to the permit.

Energy efficiency:

The installation does not have CHP. As such we have not required the operator to carry out a 4-yearly efficiency review.

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 under Table S3.1.

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.

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 9 has been added to table S1.3.

Annex 1: Review and assessment of changes that are not part of the Chapter III IED derived permit review.

1. The 500 kW emergency generators and fire pumps were originally listed under the main activity in the permit. For consistency, because they do actually fall below our EA aggregation of 1 MWth deminimus with the 1.1A(1) activity, these have both been moved to the directly associated activities.
2. The operator requested in their covering letter to the Reg60 response that the emissions to sewer S1 and S2 was double regulation as this is already covered by a discharge consent. It was noted that the parameter was only visible oil or grease. Since this parameter is not a substance that would persist after processing at the waste water treatment works (as for example heavy metals would). This has been removed from the permit.
3. The operator has advised us that a previous condition limiting the site to 100 hours of standby fuel operation on the auxiliary boiler is not applicable as the boiler cannot use gas oil fuel. For this reason the old condition 2.3.3 has not been carried forward into this variation. The limits of specified activity has also removed gas oil as a fuel.

Additional IED Chapter II requirements

4. Condition 3.1.3 relating to protection of soil, groundwater and groundwater monitoring, has been added in compliance with IED requirements.
5. Conditions 4.3.1 and 4.3.2 relating to notifications, have been amended in compliance with IED requirements.