

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/BJ7395IG
The Operator is: E.On UK CHP Limited
The Installation is: Kemsley Paper Mill CHP
This Variation Notice number is: EPR/BJ7395IG/V009

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 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 responses 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 responses 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. 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.

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.

How this document is structured

Glossary

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

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

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
LLD	Limited Life Derogation
MCR	Maximum Continuous Rating
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 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 08/12/14 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.

The Regulation 60 Notice response from the Operator was received on 27th 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 25th September 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.

2.3 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:

LCP 208	Article 30 (2) Annexe V Part 1 – ELV
	Article 32 TNP
	Article 30(2) Annex V Part 1 – 1500 Limited Hours Derogation
	Article 30 (2) Annex V Part 1 – 500 limited hours for emergency (GT Bypass Stack Emission Point A3)
LCP 206	Article 30 (2) Annexe V Part 1 – ELV
	Article 32 TNP
	Article 30(2) Annex V Part 1 – 1500 Limited Hours Derogation
LCP 207	Article 30 (2) Annexe V Part 1 – ELV
	Article 32 TNP
	Article 30(2) Annex V Part 1 – 1500 Limited Hours Derogation

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 route they wanted in the variation notice by email dated 22/12/15. The confirmed route was:

LCP 208 – Article 32 – TNP
LCP 206 – Article 32 – TNP
LCP 207 – Article 32 - TNP

This is what is considered in this decision document.

It should be noted that under the Article 30(2) Annex V Part 1 proposals for LCP 208 the applicant proposed ELV's for NOx which are significantly higher than current performance. It must be noted that abatement is not a requirement to achieve current performance. The operator also failed to provide a revised air impact assessment based on the higher ELVs being requested. Without a site specific BAT justification should this compliance route be pursued at a later date the current ELVs will be implemented following the methodology set out in the IED BAT paper.

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.	3.1.4 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 Ann 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 S1.4
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
Ann V Pt 1	Emission limit values	3.1.2 Schedule 3, Table S3.1(a)
Ann V Pt 1	For plants operating less than 500 hours per year, record the used operating hours	2.3.6, 4.2.2e
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(a)
AnnV Pt 3(1)	Continuous monitoring for >100MWth for specified substances	3.5, 3.6 Schedule 3, Table S3.1(a)

IED Article Reference	IED requirement	Permit condition
AnnV Pt 3(2, 3, 5)	Monitoring derogations	3.5.1 Schedule 3, Table S3.1(a)
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(a)
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(a)
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 updated LCP numbers in accordance with the most recent DEFRA references. The LCP references have changed as follows:

- LCP 206 is changed to LCP 208; and
- LCP 207 is changed to LCP 206; and
- LCP 208 is changed to LCP 207.

LCP208

This LCP consists of a Combined Heat and Power Plant comprising a single Gas Turbine (GT) (122.5MWth) and two Heat recovery Steam Generators (HRSG) each of 97.4MWth. Combustion emissions from the GT vent via separate flues (Emission Points A1/A2) via a common windshield. The units burn natural gas.

The flues have previously been separately permitted as emission points A1 and A2. As compliance with IED is measured across the windshield we have renamed the emission point A1/A2.

The unit has a Bypass Stack for the GT (Emission Point A3) which is used for start up and shut down, emergency operation of the GT in open cycle. The bypass stack also receives GT exhaust emissions when one HRSG is not in operation and is therefore considered to be part of the same LCP, although venting from a common windshield.

Compliance Route:

The operator has proposed to operate this LCP under the TNP compliance route. The ELVs for LCP remain the same which is in line with the 2014 BAT Review Paper.

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 317MWth. They have justified this figure by providing;

For the GT, figures from performance acceptance tests undertaken to John Brown Engineering internal performance test procedures and corrected to ISO conditions using the Performance Test Procedure(122.5MWth);

For the HRSG`s, figures from original plant specifications from Standard-Fasel Engineering, corrected to a net basis(97.4MWth each). The value was validated against the results of the 1995 performance test.

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:

“Minimum start up load”	“Minimum shut-down load”
Gas Turbine and / or Boiler(s) A or B On; Steam Flow from Boilers A and / or B is greater than 5kg/sec or; Gas Turbine Load greater than 24 MW	Gas Turbine load less than 24 MW; Steam Flow from A and / or B Boilers less than 5kg/sec Gas Turbine and / or Boilers A and B off

They have defined it as discrete processes or 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.

We agree with all of these definitions and have set these thresholds in the table S1.5 of the permit accordingly.

Emission Limit Values (ELV):

The Operator proposed to retain existing emission limits during the TNP for the GT and HRSG which would be applied across the windshield in all modes of operation. A comparison of how ELV`s have been transcribed is provided below.

Adopting a common ELV is considered appropriate at this time, although further investigation will be undertaken through IC3 to understand whether reference conditions for oxygen applied to gas turbines are appropriate for all modes of operation – in particular auxiliary fired HRSG`s.

IC 3 The Operator shall submit a report to the Environment Agency detailing the performance of the Heat Recovery Steam Generators when auxiliary fired on natural gas (Mode 3), the report shall include the following:

- A review of the emissions of NO_x and CO and stack conditions (i.e. oxygen content) during this mode.
- A comparison with the relevant emission limits of NO_x in Annexe 5 Part 1 of the Industrial Emissions Directive
- Any technical modifications which would reduce NO_x emissions from firing the HRSG in both auxiliary and supplementary fired modes.

In circumstances when only one HRSG is in use, the windshield is extended to Emission Point A3, which although a separate stack, represents the common emissions from firing LCP208.

Sulphur dioxide emissions from natural gas firing will be reported 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. Likewise, dust emissions from natural gas firing will be reported on the basis of emission factors without continuous or periodic monitoring. Natural gas is an ash-free fuel and high efficiency combustion 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.

Parameter	Existing ELV mg/m ³	Reference Period	New Permit limit mg/m ³
NO_x	90 (Monthly Average)	95 th ile of hourly averages	180
		24 hourly averages	99
		Monthly averages	90
CO	100 (Monthly Average)	95 th ile of hourly averages	200
		Daily mean of validated hourly averages	110
		Monthly averages	100

LCP 206 and 207

Each of these LCP`s consists of a set of 3 package boilers which vent via separate flues via a common windshield. The units burn natural gas.

The Boilers act a standby plant for the steam raising components of LCP208 to provide heat to the paper mill installation. LCP 206 covers boilers A,B and C whilst LCP 207 covers boilers D,E and F.

Compliance Route:

The operator has proposed to operate these LCP`s under the TNP compliance route. The ELVs for LCP remain the same which is in line with the 2014 BAT Review Paper.

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 for each set of boilers (A-C and D-F) is 71MWth. They have justified this figure by providing figures based on the original guarantee performance test report, corrected to ISO conditions, copies of which were provided.

Evidence to support this figure, in order of preference, shall be in the form of:-

Minimum start up load and Minimum shut-down load:

LCP 206 and 207 are subject to extractive sampling so MSUL and MSDL are not applicable.

Emission Limit Values:

The Operator has proposed to retain existing ELV's for LCP's 206 and 207.

Parameter	Existing ELV mg/m3	Reference Period	New Permit limit mg/m3
NO_x	200	(Spot Sample)	200
CO	300	(Spot Sample)	300

The Installation

Energy efficiency:

The operator has a condition in their existing permit to carry out a 2 yearly CHP review. The Agency and Industry have agreed that this review only needs to be carried out every 4 years, and condition 1.2.2 reflects this.

As the installation already provides CHP, this condition is intended to cover developments to which the CHP unit may viably contribute heat to, as well as developments associated with heat and power supply within the mill which may change it's operating regime. It is not expected the operator will undertake extensive reviews to lead on the provision of CHP outside the installation boundary, but contribute to any proposals for such.

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.

Annex 1

We have removed references to multi-fuel firing as the facility no longer fires on Distillate Fuel Oil, including Activity A5 in Table S1.1.

We have reviewed the operating techniques specified in Table S1.2 to remove obsolete techniques, namely

Letter dated 30 November 2005	LMI 74 FBC Operational limits procedure	02/12/05
Further information	Further information in relation to recent software developments and the automatic cessation of waste combustion.	12/12/05
Email dated 22/12/11	Environmental Management Instruction No.2 (EMI 2, replaces LMI 74 (above))	22/12/11

We have added waste code 191204 and 030310 to reflect the waste streams now being burnt in the incineration plant following the introduction of paper pulping waste treatment facilities on other permits in the Kemsley Mill Installation.

We have clarified the Operating Modes for LCP 208.

We have added the following Improvement conditions to cover changes across the installation which may have affected the operations covered under this permit, namely reduction in heat and power demand through closure of paper machines (IC4); and potential changes to heat and power supply through commissioning alternative sources of heat and power (IC5).

<p>IC 4</p>	<p>The Operator shall submit a report to the Environment Agency detailing the effects on the operation of the CHP from the reduction in paper mill operations at the Kemsley Mill Installation. The report shall include the following:</p> <ul style="list-style-type: none"> • A comparison of CHP operations now to those originally set out in the application. • Modes of operation to match heat and power demand from different production scenarios. • The performance of the CHP (e.g. CHP efficiency) under different production scenarios. • Production scenarios that result in dumping steam. <p>Production scenarios shall relate to how the variation in steam demand is met for the number of assets (e.g. paper machines) operating, rather than variation in production of different paper products.</p>	<p>Heat demand from the paper making activities has reduced. A review of the operations of the plant are required to confirm the permit covers the issues adequately.</p>
<p>IC 5</p>	<p>Prior to changes in Heat and Power supply to the Mill from the activities permitted in Environmental Permit EPR/SP3431KJ the operator, in conjunction with the other operators of the Regulated Facility (Kemsley Paper Mill), shall submit a report detailing how those changes;</p> <ul style="list-style-type: none"> • may impact on the emissions from and performance of the Kemsley Mill CHP facility; • may impact in meeting the provisions of the Industrial Emissions Directive and any published BAT Conclusions Documents relevant to those activities. 	<p>The activities permitted under EPR/SP3431KJ will impact the efficiency of the LCP's identified in this variation. The IC will require operators in this Installation to review the impact of the development on compliance with the requirements of Chapter 3 of the IED.</p>