

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/NP3033LN

The Operator is: ConocoPhillips Petroleum Company UK Ltd

The Installation is: Teesside Crude Oil Stabilisation Terminal

This Variation Notice number is: EPR/NP3033LN/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 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 include specific details relating to the 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 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 the 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. As part of a variation request received on 18/11/15 the following updates to the permit have also been implemented:

1. Removal of LNG references within permit

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

BAT	best available techniques
Derogation	as set out in Article 15(4) of the IED
ELV	emission limit value set out in either IED or LCPD
IED	Industrial Emissions Directive 2010/75/EC
LCP	large combustion plant – combustion plant subject to Chapter III of IED
LLD	Limited Life Derogation
BREF	best available techniques reference document
CCGT	combined cycle gas turbine
GT	gas turbine
LCPD	Large Combustion Plant Directive 2001/80/EC
MSUL/MSDL	Minimum start up load/minimum shut-down load
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 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 route.
- 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 05/02/15.

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 19/05/15.

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

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 further information requests on 27th and the 30th November. A copy of each further information request was placed on our public register.

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.	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 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 S1.5
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	3.5.1 Schedule 3, Table S3.1
AnnV Pt3(4)	Measurement of total mercury	Not applicable

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	Not Applicable
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 LCP reference numbers. The LCP references have changed as follows:

- **LCP 28** is changed to **LCP 62**

LCP 62

This LCP consists of 3 gas turbines (31.2 MWth) discharging into 3 x 104 MWth steam boilers which vent into two stacks, two of the three boilers are usually online with the stacks configured, using dampers so that each online boiler exits into a dedicated stack. In some circumstances two boilers can be configured to utilise one stack at emission point A8 and A9. The units burn a mixture of methane, ethane, propane and butane derived from the stabilisation and fractionation process, natural gas is available as a back-up in the event that inadequate plant fuel is produced.

Compliance Route:

The operator has proposed to operate this LCP under the ELV.

Net Rated Thermal Input:

The Applicant has stated that the Net Thermal Input is 104MWth for each boiler. They calculated this figures through the specification for maximum fuel gas rate from the operating manual 2.31.03022/R page 8 (attached as Boiler Max Fuel Rate), NCV (GJ/Sm³) & Density (Tes/Sm³) of fuel gas (Teesside Operations ISO17015 accredited laboratory) verified in EU ETS 2014 data and the AAE1 NCV (GJ/tonne) submitted for 2014. Further information received in the RFI however has indicated that three gas turbines (31.2 MWth) feed into 3 steam boilers (104 MWth) therefore a total of 405.6MWH. Based on this IC17 has been included in the permit for the operator to provide the net rated thermal input for LCP 62 (3 x 104 MW Gas Turbines and 3 x 42 MW boilers).

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 Minimum Start-Up Load, along with superheated pressure and temperature. This response however only relates to a single boiler and not the

3 x GT and 3 x boilers configuring LCP 62, IC17 has therefore been included to request this.

We have included the figures provided by the operator for the single boiler in S1.5 however included IC18 to request the correct MSUL and MSDL limit for the 3 x GT and 3 x boilers configuring LCP 62 . 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:

For ELV plant:

The operator has proposed process gas firing limits in line with annex V of the IED and the 2014 BAT review paper. A limit of 300 mg/m³ for NO_x has been set as the boilers meet the IED derogation for facilities under 500MW which were granted a permit before 27th November 2002 (i.e NO_x of 300 instead of 200 for other gas fired boilers), this limit also includes the control of the GT emissions. A limit of 70 mg/m³ for CO has been applied as per the no back sliding rule however there is no IED CO ELV for GTs firing process gas. Consequently we have accepted the proposed limits and incorporated them into table 3.1 of the permit. The current and new permit limits are tabulated below:

Process Gas

Parameter Note 2	Existing mg/m ³	Reference Period	Annex V mg/m ³	New Permit limit mg/m ³
NO_x	300 Note 1	Hourly averages	600	300
	None	24 hourly averages	330	300
	None	Monthly averages	300	300

Note 1: Boilers at 3% O₂

Note 2: The IED sets ELVs for other gases as fuel and natural gases for GTs of 120 @15% O₂ which is 360 at 3%.

Parameter Note 2	Existing mg/m ³	Reference Period	Annex V mg/m ³	New Permit limit mg/m ³
CO	70 Note 1	Hourly averages	-	70

Note 1: Boilers at 3% O₂

Note 2: The IED sets ELVs for other gases as fuel and natural gases for GTs of 120 @15% O₂ which is 360 at 3%.

The following tables apply when LCP 62 uses natural gas as a backup fuel. These have been set in line with annex V of the IED.

Natural gas

Parameter	Existing	Reference	Annex V	New Permit
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	mg/m3	Period	mg/m3	limit mg/m3
NO_x	None	Hourly averages	100	100
	None	24 hourly averages	110	110
	None	Monthly averages	200	200

Note 1: Boilers at 3% O₂

Parameter	Existing mg/m3	Reference Period	Annex V mg/m3	New Permit limit mg/m3
CO	70 Note 1	Hourly averages	100	100
	None	24 hourly averages	110	110
	None	Monthly averages	200	200

Note 1: Boilers at 3% O₂

Emission limits for SO₂ and dust have also been included for LCP 62 operating on both process gas and natural gas as the original permit required the continuous monitoring of the parameters. As per the no backsliding rule these have been transposed into emission limits for the hourly averages, monthly mean and daily mean of validated hourly averages. See table S3.1

The 3 x GT (31.2MWth) can operate via a bypass stack referred to in Emission points A11-A13 (gas turbine standby stacks) In this configuration each GT is separate and does not comprise an LCP. NO_x and CO have been included however no limits have been set a requirement to monitor by calculation every 4380 or 2 years whichever comes soonest has been included. BAT limits may be set but this LCP review makes no change to the existing permit, in line with the rare use of the GT in this configuration

A11	Oxides of Nitrogen (NO and NO ₂ expressed as NO ₂)	Gas Turbine Standby stack fired on process gas/natural gas	No limit set Note 1	-	Concentration by calculated every 4380 hours or 2 years whichever soonest	As agreed in writing with the EA
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Emission points A22-A23 (Auxiliary boiler) and A20-A21 (GT) and their associated emission limits have been transposed from V003, these limits have not been updated as the equipment is not yet operational on site. This has been addressed by the inclusion of pre-operation condition P09 which requires the operator to submit a report in writing to the Environment Agency

for approval, demonstrating compliance with Chapter III of the Industrial Emissions Directive.

IC19 has been included in the permit to ensure that the operator provides additional emissions data for when LCP 62 operates using only natural gas, this occurs very rarely.

IC19	<p>The operator shall submit a report in writing to the Environment Agency detailing the emissions of Oxides of Nitrogen to air from the LCP when operating on 100% natural gas. The report shall include</p> <ul style="list-style-type: none"> a) Historical data, performance test data or manufacturer's data; and b) Data obtained under current operational conditions <p>The Environment Agency shall be advised at earliest opportunity should it not be possible to carry out the trialling specified under b) by the completion date.</p>	30/09/16
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Gas fired plant (Natural Gas ONLY):

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.

Reporting efficiency:

In order to ensure the efficiency of plant using fossil fuels is maximised and regularly recorded, condition 1.2.1(B), 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. For a new plant in pre-operational commissioning the same requirement applies.

Additional IED Chapter II requirements:

Condition 3.1.5 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.

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

An application to vary the permit was received on 18/11/15 (V006) current IED variation V005, the variation requested the following:

1. Removal of references to Liquefied Natural Gas (LNG) terminal
2. Reduction in stack height
3. Update of site boundary.

As part of the IED review the LNG references were removed from the permit the section below has been incorporated into the Reg 60 Notice permit consolidation. The operator also requested an amendment to reduce two stack heights and also update the site boundary both of these requests will be dealt with in V006 as they require further assessment.

Liquefied Natural Gas (LNG) terminal:

The operator has requested the removal of all references to the LNG plant included within V003. This facility was never built and the operator has no intention to pursue this option further.

Pre-operational condition PO4 has been updated to condition 1.1.1 as per the consolidation and update of the permit in V005

PO4	The Operator shall carry out a review of the accident management plan (maintained under permit condition 1.2.1 (a)) and take any appropriate measures identified by the review. A report on the review shall be submitted to the Environment Agency.	6 months prior to the start of commissioning of the CHP facilities.
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