

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/BV3006IN
The Operator is: Seabank Power Limited
The Installation is: Seabank Power Station
This Variation Notice number is: EPR/BV3006IN/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 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 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 31/03/15

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.

In addition to the response to our information request, we received additional information during the determination from the operator by e mail on 30/06/15 which provided a clearer definition for the site boundary shown in schedule 7 of the permit.

Further information was also received on 10/10/15 relating to the operation of the proposed new build black start facility in which the operator confirmed their intention to retain this facility on the installation and also confirmed that the design and operation for this new plant had yet to be finalised.

As the design and operation of the black start facility has not been finalised provision has been made in the permit for operation and notifications of abatement failure should this be applied to the black start generator this provision has been set through permit conditions 2.3.9, 4.2.2 and 4.3.1(d).

Pre operational conditions PO1, PO2 and PO3 have also been set in the permit to ensure that the operation of the new build black start facility will not commence until the operator has confirmed and receive approval from the

Environment Agency that its operation will conform to the requirements of chapter III of the IED.

We have made a copies of this information available to the public in the same way as the response to our information request.

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.

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.	2.3.9 4.2.2 4.3.1d
38	Monitoring of air emissions in accordance with Ann V Pt 3	3.5, 3.6
40	Multi-fuel firing	Schedule 3, Table 3.1
41(a)	Determination of start-up and shut-down periods	2.3.5 Schedule 1 Table S1.5
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 O ₂ 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	2.3.6, 4.2.2d
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

IED Article Reference	IED requirement	Permit condition
AnnV Pt 3(2, 3, 5)	Monitoring derogations	Not Applicable
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 updated LCP numbers in accordance with the most recent DEFRA LCP reference numbers. The LCP references have changed as follows:

- **LCP 265** is changed to **LCP 313**
- **LCP 266** is changed to **LCP 314**
- **LCP 267** is changed to **LCP 315**
- LCP 409 an OCGT new build plant is proposed for the installation, Pre-operational conditions PO1, and PO 2 have been set in the permit to ensure the details of the requirements of the IED will be supplied and delivered, this data will be supplied to the Environment Agency when the design of the plant has been finalised and before the new plant operates.
PO3 has been set to provide flexibility of operation for the new build plant and to ensure any proposed operation remains compliant with the requirements laid out in chapter III of the IED.

LCP 313, LCP 314, LCP 315

LCP 313

This is GT 11 in module 1, this has a thermal input of 658 MWth and is CCGT which is only fired on natural gas and vents to its own windshield emission point A1.

LCP 314

This is GT 11 in module 1, this has a thermal input of 658 MWth and is CCGT which is only fired on natural gas and vents to its own windshield emission point A2.

LCP 315

This is the GT in module 2, this has a thermal input of 673 MWth and is CCGT which is only fired on natural gas and vents to its own windshield emission point A3.

Compliance Route:

The operator has proposed to operate the listed LCPs (numbers. 313, 314 and 315) under the ELV compliance route listed in Annex V of the Integrated Emissions Directive.

The OCGT plant compliance route will be advised under the pre operational conditions that have been set in the permit.

Net Rated Thermal Input:

The Applicant has stated that the Net Thermal Input for each is LCP IS

LCP 313:- 658 MWth

LCP 314:- 658 MWth

LCP 315:- 673MWth.

LCP 409 :- to be advised under the pre operational condition PO1.

They have justified this figure by providing an extract from the performance report conducted in 2008 by the turbine supplier Siemens; the report is available on site for inspection if required.

The OCGT plant details will be advised under the pre operational condition PO1.

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’s in their response to question 6 of the Reg 60, in terms of three criteria composed of process variables and 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. One of these refers to the condition of the signal received from the ignition flame which will be met in all cases so provides a fallback position that will always be made.

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

The OCGT plant details will be advised under the pre operational conditions.

Emission limits:

The operator has proposed limits in line with annex V of the IED and the 2014 BAT review paper for a plant that is greater than 55% efficient.

However the existing permit has limits which are tighter than the annex V limits , under the principle of no backsliding regarding the setting of ELV’s the methodology outlined in Appendix 1 was used to derive the ELV’s which have been set in Table 3.1

Periodic monitoring for NOx and CO have been added to table S3.1 for clarity. The measurement of SOx and dust is by calculation based on agreed factors with the operator and these will reference the JEP protocol, again for clarity these requirements have been added to table S3.1

Sulphur dioxide emissions from natural gas firing 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. We have not required any reporting for dust 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 CCGTs, when the load is >70%. This has been interpreted as 70% of the rated output load.

The response to question 9 in the Regulation 60 request received on 16/03/15 did not request any additional ELVs to be set in the period after start-up to 70% load and from 70% load to shutdown hence no additional ELV's have been set for these periods.

The OCGT plant ELV details will be advised and agreed under the pre - operational conditions.

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. 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.

Reporting efficiency:

In order to ensure the efficiency of plant using fossil fuels or 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.

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. This section has been retained in the permit as it may become relevant when the proposed new build black start facility is put into operation.

Permit condition 2.3.9 makes it clear that the breakdown or malfunction of abatement equipment only refers to the OCGT black start facility.

Monitoring & standards:

Standards for assessment of the monitoring location and for measurement of SOx and NOx and oxygen, water vapour, temperature, pressure and periodic monitoring for NOx and CO 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 3.1.4 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.

Appendix 1

Method used to derive ELV’s set in table S3.1

Principles followed

- 1 no backsliding so do not set limits > present permit unless justified by operator.
- 2 back calculate using present permit limits and annex v ELV ratios
- 3 do not set tighter than annex v limits unless site specific requirement
- 4 if present permit tighter than annex v set to annex v unless option 3 applies
- 5 under TNP or < 1500 hrs set to permit limit calculation , round down to sensible number

CCGT	NOx Natural Gas firing				CO Natural Gas			
	hourly	daily	yearly limit for all hourly averages as 95% ile	monthly	hourly	daily	yearly limit for all hourly averages as 95% ile	monthly
> 55% efficiency								
Annex V	150	82.5		75	200	110		100
% of annex v monthly	200%	110%		100%	200%	110%		100%
in present permit	not set	60	60	not set	not set	100	100	not set
permit values by calc	109.09091			54.545455	181.8182			90.909091

Seabank proposal % of annex V	73%	73%	75 73%	as permit 91%	as permit 91%	91%
proposed limits	109	60	54	180	100	90
	Tighter than annex V set to permit limits			Tighter than annex V set to permit limits		
	hourly at permit limits as calculated			hourly at permit calc level rounded down to a sensible Number		
	daily at permit limits			daily at permit limits		
	monthly at permit limit as calculated truncated to integer			monthly at permit calc level truncated to integer		

NOTE

Operator requested Annex v limits which were more relaxed than present limits
 IC 9 has been set which enables operator to justify that request,
 so ELV's can be reassessed following a suitable submission
 from the operator,
 efficiency can be
 verified