

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/BX2094IJ
The Operator is: British Sugar PLC
The Installation is: Bury St Edmunds Sugar Factory
This Variation Notice number is: EPR/BX2094IJ/V008

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 responses to the regulation 60 notice 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 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.

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

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
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)
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 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 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(s),
- Minimum start up and shut down loads,
- The proposed emission limits and how they accord with the 2014 BAT review paper,
- For gas fired plant, whether they wish to apply for derogation from monitoring when on standby fuels,

The Regulation 60 Notice response from the Operator was received on 27/03/15.

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 as follows:

Request	Date Received	Comments
Regulation 60 Notice response	27/03/15	Response received from the Operator to our request dated 31/10/14.
Additional information received	29/07/15	Response to RFI dated 24/07/15 (Q41 Reg 60) Method for derivation of the net rated thermal input

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.

We requested further information as detailed below. We made a copy of this information available to the public in the same way as the responses to our information requests.

Request	Date Received	Comments
Additional information received	09/10/15	Response to email sent 06/10/15: GT stack (HRSG by-pass) Operational scenarios DFO usage
Additional information received	21/12/15	Email confirming abnormal conditions for HRSG only operation

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.	3.1.3 Schedule 4, Table S4.4
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 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 7, Interpretation

Ann V Pt 1	Emission limit values	3.1.2 Schedule 4, Table S4.1
Ann V Pt 1	For plants operating less than 500 hours per year, record the used operating hours	2.3.4 Schedule 5, Table4 S5.3
Ann V Pt 1(6(1))	Definition of natural gas	Schedule 7, Interpretation
Ann V Pt 2	Emission limit values	3.1.2 Schedule 4, Table S4.1
AnnV Pt 3(1)	Continuous monitoring for >100MWth for specified substances	3.5, 3.6 Schedule 4, Table S4.1
AnnV Pt 3(2, 3, 5)	Monitoring derogations	3.5.1 Schedule 4, Table S4.1
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	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 4, Table S4.1
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 Variation Notice.

We have also incorporated in Table S1.2 the oxygen reference conditions that apply during abnormal operation when the HRSG is operating alone.

LCP number:

The variation notice uses an updated LCP number in accordance with the most recent EIONET references. The LCP reference has changed as follows:

- **LCP 105** is changed to **LCP 37**

The LCP reference is added to Tables S1.1, S4.1 and S4.4 of the permit.

LCP Configuration:

LCP 37 consists of a Combined Heat and Power (CHP) system, burning natural gas, with distillate fuel oil (DFO) as a back-up, producing steam and electricity for the site. Excess electricity is exported to the National Grid.

GT/HRSG

The CHP comprises a gas turbine (GT), with a 102 MW thermal input and a Heat Recovery Steam Generator (HRSG) with supplementary firing (106 MW thermal input) discharging via the 60 metre HRSG stack at emission point A62.

Normal Operation

When the factory is operating, the turbine exhaust gases passes into the HRSG and supplementary fuel is added into the HRSG to maintain steam demand. The flue gases then exit the HRSG through the chimney at emission point A62.

BY-pass Operation

Emissions can vent via the GT by-pass chimney at emission point A63. The by-pass chimney is generally used for testing the GT and to bring the GT up to operations quickly.

GT

The CHP discharges via the separate 30 metre HRSG by-pass stack at emission point A63 during start-up and periods when the GT is running with the HRSG off-line for repairs or inspections or outside of the two main operating periods.

The gas turbine is run on its own in open cycle for the purpose of calibrating the combustion characteristics for emission control following maintenance and vented through a dedicated stack at emission point A63.

The operator confirmed in their response received 09/10/15 that the use of the by-pass is less than 500 hours per year which is classed as 'emergency use' under the IED. There is no requirement to set ELVs (see below); however the operating hours will be reported in accordance with Table S5.3 to ensure that this exclusion applies.

The GT can also run on its own in open cycle, exhausting through the HRSG stack at emission point A62.

HRSG

The HRSG is not normally run as an auxiliary boiler except when the gas turbine is not available; exhausting through the HRSG stack at emission point A62.

Compliance Route:

The operator has proposed to operate LCP 37 under the TNP compliance route.

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.

The operator's current proposals to achieve the stricter ELVs by 30 June 2020, are to undertake the refurbishment works necessary to comply. This information is not in any way binding upon the operator and may change.

The compliance route is incorporated into the sites operating techniques by inclusion in Table S1.2 of the permit.

We have added condition 2.3.6 which requires LCP 37 to be operated in accordance with the IED Compliance protocol.

We have added condition 4.2.5 which enables quarterly reporting of mass emissions for the TNP.

Net Rated Thermal Input:

GT/HRSG

The Applicant has stated that the net rated thermal input for the gas turbine and HRSG is 102MWth + 106MWth with supplementary firing.

GT

The Applicant has stated that the net rated thermal Input for the gas turbine is 102MWth, with no supplementary firing.

HRSG

The Applicant has stated that the net rated thermal input for the HRSG (auxiliary boiler) is 106MWth.

We asked the Applicant to provide the method by which they derived these figures. In their response they provided figures for the heat input at base load for the gas turbine dated 5th September 1996 and the boiler performance parameters dated 5th June 1997.

This data was not sufficient to justify the net rated thermal input. We have set an improvement condition in Table S1.3 to address this deficiency.

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 33 of the Reg 60. They have defined it as three 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.

For start-up they confirm the following:

These are based on the values for design data of the boiler. (From cold to full start up could take between 36 to 48 hours).

For shut-down they confirm the following:

These are based on the values for design data of the boiler. (Full shut-down would usually take about 30 minutes).

We agree with all of these definitions and have set these thresholds in the Permit in table S1.4 accordingly. We have added condition 2.3.5 which makes reference to this table.

Standby fuels:

The operator normally uses gas fuel and has applied to use DFO as a standby fuel. Since it is BAT to use the cleaner gas fuel, DFO use is limited to 45 days per year during interruption of the gas supply. The Operator provided evidence of the impact to justify the use of DFO for 45 days, in their response to us received 09/10/15. We have added condition 2.3.3 to authorise this.

Emission limits (A62):

GT/HRSG - normal operating conditions

GT/HRSG – Fired on Natural Gas

NO_x

Existing mg/m ³	Reference Period	Annex V mg/m ³	New Permit limit mg/m ³
75 (half Hourly)	95%ile of hourly averages	100	75
None	24 hourly averages	55	55
None	Monthly averages	50	50

GT/HRSG – Fired on DFO

NO_x

Existing mg/m ³	Reference Period	Annex V mg/m ³	New Permit limit mg/m ³
180 (half Hourly)	95%ile of hourly averages	180	180
None	24 hourly averages	99	99
None	Monthly averages	90	90

GT/HRSG – Fired on Natural Gas

CO

Existing mg/m ³	Reference Period	Annex V mg/m ³	New Permit limit mg/m ³
100 (half Hourly)	95%ile of hourly averages	200	100
None	24 hourly averages	110	100
None	Monthly averages	100	100

GT/HRSG – Fired on Natural DFO

CO

Existing mg/m ³	Reference Period	Annex V mg/m ³	New Permit limit mg/m ³
100 (half Hourly)	95%ile of hourly averages	200	200
None	24 hourly averages	110	110
None	Monthly averages	100	100

Emission limits (A62):

HRSG ONLY – not under normal operating conditions

HRSG – Fired on Natural Gas

NO_x

Existing mg/m ³	Reference Period	Annex V mg/m ³	New Permit limit mg/m ³
85 (half Hourly)	95%ile of hourly averages	200	85
None	24 hourly averages	110	85
None	Monthly averages	100	85

HRSG – Fired on DFO

NO_x

Existing mg/m ³	Reference Period	Annex V mg/m ³	New Permit limit mg/m ³
180 (half Hourly)	95%ile of hourly averages	400	180
None	24 hourly averages	220	180
None	Monthly averages	200	180

HRSG – Fired on Natural Gas/DFO

CO

Existing mg/m ³	Reference Period	Annex V mg/m ³	New Permit limit mg/m ³
100 (half Hourly)	95%ile of hourly averages	No limits	100
None	24 hourly averages	No limits	100
None	Monthly averages	No limits	100

We have accepted the above limits for emission point A62 as the plant will operate under the TNP and there is no deterioration from the existing permit emission limits.

Emission limits (A62):

Sulphur Dioxide (SO₂) and Dust

There are no existing limits in the permit for these parameters under any of the operational scenarios.

GT/HRSG – Fired on Natural Gas/DFO

For natural gas fired GT, monitoring by calculation is only required for SO₂.

For DFO fired GT, monitoring is required for both SO₂ and dust.

HRSB – Fired on Natural Gas/DFO

For boilers, monitoring is required for BOTH SO₂ and dust.

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.

We have set monitoring of concentration at emission point A62 by calculation as the plant will operate under the TNP and there is no deterioration from the existing permit requirements.

Emission limits (A63):

GT ONLY - not under normal operating conditions

The operator confirmed in their response received 09/10/15 that the use of the by-pass at emission point A63 is less than 500 hours per year which is classed as 'emergency use' under the IED. There is no requirement to set ELVs; however the operating hours will be recorded to ensure that this exclusion applies.

We have also added condition 2.3.4 which limits operation in open cycle mode to 500 hours.

We have accepted the limits set out in the tables above as the plant will operate under the TNP and there is no deterioration from the existing permit emission limits.

We have included these limits in Table S4.1 of the permit, and set the other limits in line with the guidance in line with the non-ESI 2014 BAT review paper.

We removed emission limits for the operation of the Sulzer boilers which have been decommissioned.

Annual limits (A62/63):

Table S4.4 is amended to include the TNP limits for LCP 37. This applies to LCPs within the scope of the TNP.

This table refers to a TNP register. We have added a definition to Section 7 Interpretation.

We added condition 3.1.3 which makes reference to Table S4.4 which was not in the current permit.

We added an improvement condition requiring submission of emissions of particulate matter, sulphur dioxide and oxides of nitrogen for LCP 37 for the period 01/01/15 to 31/12/15. This is required for all LCPs.

Monitoring & Standards:

We added the standard for assessment of the monitoring location and for the measurement of oxygen and water vapour for clarity.

We removed the monitoring for the Sulzer boilers (A66/A67) which have been decommissioned.

We amended condition 3.6.1 to implement the monitoring requirements in Annex V of the IED.

We amended Table S5.3 to include parameters for LCP 37 and to remove the reference to Sulzer boilers.

Reporting efficiency:

In order to ensure the efficiency of plant (using fossil fuels) is maximised and regularly recorded, condition 1.3.2 has been added to the permit.

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

Industrial Emissions Directive (IED):

We add/amend the following conditions to implement the requirements of Chapter II of the IED.

Condition 3.1.4

Condition amended to implement the protection of soil and groundwater monitoring.

Conditions 4.3.1 and 4.3.2

Conditions relating to notifications have been amended.