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/EP3133RZ
The Operator is: Uniper UK Limited
The Installation is: Ratcliffe on Soar Power Station
This Variation Notice number is: EPR/EP3133RZ/VOO2

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 includes an administrative variation to update the PFA handling activity to the new activity (5.4 (b) (iii)

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
BREF	best avalable 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
FGD	flue gas desulphurisation
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
Part load operation	operation during a 24 hr period that includes loads between MSUL/MSDL and maximum continuous rating (MCR)
SCR	selective catalytic reduction
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 31/10/15 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.
- For coal fired power stations entering into the TNP or LLD, confirmation of whether they will follow the sector approach in the 2014 BAT review paper for the setting of emission limits, or if not propose emission limits with a justification based on the principles outlined in the 2014 BAT review paper.
- 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 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. Suitable further information was provided by the Operator on 20/08/15.

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 requested further information on 23/10/2015. (request for clarification on net rated thermal input Gross or

net). A copy of (the/each) further information request(s) (was/were) placed on our public register.

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:

For the four coal fired boilers included in LCP116, TNP, ELV and LHD.
For the two OCGTs included in LCP 380, <500 hours emergency operation.

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 08/10/15. The confirmed routes were:

For the four coal fired boilers included in LCP116, TNP.
For the two OCGTs included in LCP 380, <500 hours emergency operation.

This is what is considered in this decision document.

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.	3.1.5 Schedule 3, Table S3.3
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.	2.3.7 4.2.6 4.3.1d
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	2.3.6 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	2.3.5, 4.2.2d
Ann V Pt 1(6(1))	Definition of natural gas	Not applicable
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	3.5.1 Schedule 3, Table S3.2

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	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	Not applicable
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 167** is changed to **LCP 116 (4 coal fired boilers)**
- **LCP (unallocated)** is changed to **LCP 380 (2 OCGT)**

LCP116 Four coal fired boilers exhausting through separate flues in one windshield.

This LCP consists of 4 x 1326 MWth boilers which vent via multiple flues within a single windshield at emission point A1, A2, A3 and A4. The units burn coal, petcoke and biomass with processed fuel oil (PFO) and light fuel oil (LFO) for start up and support.

Compliance Route:
The operator has proposed to operate this LCP 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.

Net Rated Thermal Input:
The Applicant has stated that the Net Thermal Input is 5,272 MWth. They have justified this figure by providing;

a) Performance test results during contractual guarantee testing at commissioning,

b) Manufacturer's contractual guarantee value,

c) Design data, nameplate rating of the boilers and

d) Operational efficiency data as verified and used for heat accountancy purposes.

We consider this information to be adequate for the justification of the declared rated thermal input.

Minimum start up load and Minimum shut-down load:
The Operator has defined the “minimum start up load” (MSUL) and “minimum shut-down load” (MSDL) for the LCP in their response to question 6 of the Reg 60, in terms of:
the output load (i.e. electricity) (MW); and this output load as a percentage of the rated output of the combustion plant (%)

The output load and percentage of the rated output is based on the rated electrical output from each unit.

The operator has justified the MSUL and MSDL for each boiler in accordance with Appendix C of the Joint Environmental Programme’s Electricity Supply Industry – IED Compliance Protocol for Utility Boilers and Gas Turbines (which incorporates the requirements of implementing decision 2012/249/EU) with reference to the following considerations:

- Status of the oil burners
- Flue gas desulphurisation damper position
- Boiler feedpump stability
- Number of coal mills in operation.

We agree with all of these definitions and have set these thresholds in table S1.5 of the permit accordingly. Standard permit condition 2.3.6 has been set to define the period of start up and shut down, referring to the thresholds in this table.

Emission limits:

The LCP will be subject to TNP compliance regime and the operator has confirmed that they will comply with the sector approach in the 2014 BAT review paper. The permit allows them to operate the SCR plant in a flexible manner, to either minimise NO_x emissions and trade the resulting difference under the TNP, or to reduce the operation of the SCR plant and meet the TNP limits. Consequently we have set the emission limits for this LCP in line with the BAT paper in table S3.1, we have also set the standard annual emission target in table S3.3

The existing and new ELVs are as follows:

Parameter	Existing mg/m^3	Reference Period	New Permit limit mg/m^3
Particulate matter	55	97% 48 hour means	-
Particulate matter	25	Monthly average	20
Particulate matter	-	95% daily means	35
SO_2	400	Monthly average	350
SO_2	440	97% 48 hour means	-
SO_2	-	95% daily means	440
Oxides of nitrogen	500	Monthly average	450
Oxides of nitrogen	550	97% 48 hour means	-
Oxides of nitrogen	-	95% daily means	550

We have reviewed the new ELVs and concluded that they will not result in increased emissions from the site. A copy of the review carried out by our Air Quality Modelling & Assessment Unit has been placed on the public register (reference C1333-RP01).

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

Notifications:
Schedule 5, Part C, takes account of the malfunction and breakdown requirements. A breach of permit condition is NOT implicit in notification under Part C.

Monitoring & standards:
Standards for assessment of the monitoring location and for measurement of oxygen, water vapour, temperature and pressure have been added to the permit template for clarity.

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 3.1.6 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.

LCP380 Two OCGT exhausting through separate flues in a single windshield

This LCP consists of 2 x 75 MWth OCGT's which vent via multiple flues within a single windshield at emission points A13 and A15. The units burn gas oil and provide a black start facility for the station and for the supply of electricity to the grid..

Compliance Route:
The operator has proposed to operate this LCP under the <500 hours per year compliance route. The ELVs for LCP 380 reflect the requested derogation for <500 hrs operation.

Net Rated Thermal Input:
The Applicant has stated that the Net Thermal Input is 75 MWth. They have justified this figure by providing
a) Manufacturer's contractual guarantee value,

b) Design data, nameplate rating of the gas turbines and

c) fuel consumption records.

We consider this information to be adequate for the justification of the declared rated thermal input.

Minimum start up load and Minimum shut-down load:

The Operator has not defined the "minimum start up load" and "minimum shut-down load" for the LCP in their response to question 6 of the Reg 60 and this information is not required for the purposes of demonstrating compliance with ELVs as none have been set. However, for the purposes of recording operational hours for the LCP, we have set these thresholds in table S1.5 of the permit which define MSUL as being as soon as gas turbine start-up is initiated, and shut down as being as soon as the gas turbine is completely off-load. Standard permit condition 2.3.6 has been set to define the period of start up and shut down, referring to the thresholds in this table.

Emission limits:

The operator has proposed limits in line with annex V of the IED and the 2014 BAT review paper. Consequently we have accepted the proposed limits and incorporated them into table 3.1 of the permit. As the units are limited to less than 500 hours operation per year no values have been set.

Gas Turbines:

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

Notifications:
Schedule 5, Part C, takes account of the malfunction and breakdown requirements. A breach of permit condition is NOT implicit in notification under Part C.

Monitoring & standards:
Standards for assessment of the monitoring location and for measurement of oxygen, water vapour, temperature and pressure have been added to the permit template for clarity.

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 3.1.6 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.

Selective Catalytic Reduction commissioning

The operator has installed SCR on all four boilers in accordance with a variation notice dated 24/04/09 and has carried out some commissioning work and is preparing commissioning reports.
The existing permit includes an improvement condition (IC14) requiring a post commissioning one year trial of the SCR to be carried out.
The operator has requested that the requirement for the 1 year trial should be removed on the grounds that the use of SCR is considered to be BAT.
We agree that this proposal is reasonable and have included in the consolidated permit a revised Improvement measure (IC19) which will require the operator to submit a commissioning report to us. The report will include data on the NOx abatement performance of the SCR unit, an assessment of the environmental impact of any changes to emissions, with particular regard to ammonia and the impact of the SCR operation on the overall operating energy efficiency of the station. Operation of the SCR unit will not be permitted until written approval has been given by us following receipt of the commissioning report. At this stage no ELV has been set for ammonia which is monitored at the SCR unit exhaust and any ammonia slippage will be absorbed in the FGD plant.

Air quality management plan

It has been a requirement of the permits for coal-fired power stations to carry out ambient air quality monitoring and modelling to demonstrate that compliance with the National Air Quality Strategy (NAQS) is being achieved. In order to demonstrate this, the power stations set up six air quality monitoring sites at locations where the maximum ground level concentrations were calculated to be.

Reporting has shown that compliance with all of the National Air Quality Standards has been met at all of the sites in each year since 2001. It is now considered enough data has been collected to demonstrate that, with the applicable controls on the installation in place in their environmental permits, ongoing monitoring and modelling is no longer necessary. The requirement to carry out air quality monitoring in the North Trent Valley will therefore cease at the end of 2015, and conditions in Section 3.8 have been removed from the permit. We have included an improvement condition (IC20) requiring the operator to submit a copy of the air quality monitoring and modelling results for 2015.

Biodiversity, Heritage, Landscape and Nature Conservation

The activities being carried out are within the relevant distance criteria of a site of heritage, landscape or nature conservation, and protected species or habitats. A full assessment of the activities and their potential to affect the sites, species and habitats has been carried out as part of the permitting

process via an Appropriate Assessment which is available on the public register. We consider that the activities will not affect the features of the sites, species and habitats.

Formal consultation has been carried out with Natural England. The consultation response (Annex 2) was taken into account in the permitting decision.

Newly prescribed activities

The current permit includes a Section 3.5 Part B(f) activity under Schedule 1 of the Environmental Permitting regulations for pulverised fuel ash (PFA) handling and storage. Treatment of PFA is now covered under Section 5.4 Part A(1)(b)(iii) of Schedule 1 and is known as a "newly prescribed activity" (NPA) following new requirements introduced by the IED.

As a result of these changes the operator submitted an administrative variation on 04/08/14 to operate the following newly prescribed activities:

- Classifying PFA

We are satisfied that our original assessment of these activities when they were part of the Section 3.5 Part B(f) activity remains valid and that the change is administrative in nature only, with no actual changes have taken place to the way in which PFA is processed at the installation, and have therefore included the 5.4 Part A(1)(b)(iii) activity within Table S1.1

Annex 2: Consultation responses

Summary of responses to consultation and the way in which we have taken these into account in the determination process.

Response received from
Natural England via email on 08/10/15
Brief summary of issues raised
As there have been no substantial changes to the appropriate assessment, Natural England's advice remains the same as when last consulted in 2007.
Summary of actions taken or show how this has been covered
The improvement condition (IC6) to implement a plan to minimise SO_2 emissions and ensure that total SO_2 emissions from coal-fired power stations in England and Wales do not exceed 70 kt/y by 2020 will be retained in the permit.