

## **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/BJ8022IZ

The Operator is: VPI Immingham LLP

The Installation is: Immingham CHP Power Plant

This Variation Notice number is: EPR/BJ8022IZ/V007

#### **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 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 response to the regulation 60 notice requiring information. This is our decision document, which explains the reasoning for the consolidated variation notice that we have issued.

It explains how we have reviewed and considered the compliance routes and, where relevant, the emissions limits proposed by the Operator for each LCP on the installation. This review has been undertaken with reference to the:

- Chapter III and annex V of the IED
- “IED BAT 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.

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.

The site plan was updated to reflect the emission points and to clarify the extent of the installation boundary in the required format.

## **How this document is structured**

Glossary

1. Our decision
2. How we reached our decision
3. The legal framework
4. Key Issues
5. 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
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
MSUL/MSDL	Minimum start up load/minimum shut-down load
ROG	Refinery Off (Fuel) Gas

# 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 17/12/14 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.
- For gas turbines, proposed emission limits for each unit between the MSUL/MSDL and 70% load, with a justification.
- 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. Suitable further information was provided by the Operator on 29/06/15 and 04/08/15.

We considered it was in the correct form and contained sufficient information for us to begin our determination of the permit.

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 a further information request on 05/06/15. A copy of the 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.	2.3.6
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 S1.4
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 <sub>2</sub> 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	not applicable



<b>IED Article Reference</b>	<b>IED requirement</b>	<b>Permit condition</b>
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	not applicable
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 199** is changed to **LCP 188**
- **LCP 415** has been added.

### **LCP188**

This LCP consists of 2 x 700MWth GT/ 150MWth HRSG's and 2 x 300MWth auxiliary boilers which vent via multiple flues within a 90m single windshield at emission points A1, A2, A3 and A4. The units burn natural gas, refinery off-gas (ROG) and have gas oil firing capability, although this remains untested as a standby fuel on the GT/HRSG's.

Compliance Route:

The operator has proposed to operate this LCP under the ELV compliance route. In the original Regulation 60 Notice response the operator applied in error for a limited hours derogation. This was later withdrawn.

Net Rated Thermal Input:

The Applicant has stated that the Net Rated Thermal Input is 1538MWth. They have justified this figure by providing the derivation which is based on thermoflex<sup>(c)</sup> commercial software reflecting the current state of the LCP following upgrade and optimisations since the original design. This data is traceable to international standards and available for audit by the Environment Agency and is clearly substantially greater than any IED regulatory thresholds. However, this figure is inconsistent with the values given in the original application and also with data provided by the manufacturer for GE Frame 9 gas turbines. Therefore, it was deemed necessary to validate the net rated thermal input with an improvement condition.

### **LCP415**

This LCP consists of 1 x 800MWth GT/ 200MWth HRSG which vents via a single stack (windshield) at emission point A5. The unit burns natural gas and refinery off-gas (ROG) and does not have gas oil firing capability.

Compliance Route:

The operator has proposed to operate this LCP under the ELV compliance route. In the original Regulation 60 Notice response the operator applied in error for a limited hours derogation. This was later withdrawn by the operator.

**Net Rated Thermal Input:**

The Applicant has stated that the Net Rated Thermal Input is 1016MWth. They have justified this figure by providing the derivation which is based on thermoflex<sup>(c)</sup> commercial software reflecting the current state of the LCP following upgrade and optimisations since the original design. This data is traceable to international standards and available for audit by the Environment Agency and is clearly substantially greater than any IED regulatory thresholds. However, this figure is inconsistent with the values given in the original application and also with data provided by the manufacturer for GE Frame 9 gas turbines. Therefore, it was deemed necessary to validate the net rated thermal input with an improvement condition.

Table 1.3 Improvement Conditions has been updated to include a condition relating to the net rated thermal input of each LCP (IC16) and the LCPD reporting requirement for 2015 (IC17).

**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 output load and percentage of the rated output is based on the rated electrical [thermal] output from just the gas turbine.

Operating data 2014 for gas turbine Nos. 1 and 2. Data for gas turbine No. 3 was determined from April to December 2014 and January to March 2015 as the turbine was not in operation during January to April 2014. This covers a seasonal year of operation which takes into account varying air temperature, pressure and humidity, all of which affect start-up conditions of gas turbines.

The MSUL has been determined with reference to EU implementing decision 2012/249/EU Annex 1.3 specifically for gas turbines. That is the point where the combustion mode switches to fully premixed steady state combustion mode. From this point the NOx and CO emissions are within the limits for gas turbines defined in the integrated emissions directive (IED). The MSDL has been determined at the point that the combustion mode switches out of premix, known as the point of shutdown and:

The output load and percentage of the rated output is based on the rated thermal output from the boiler.

The MSUL/MSDL has been determined with reference to Implementing Decision 2012/249/EU Article 7 “Determination of start-up and shutdown periods for heat generating combustion plants using load thresholds”.

We agree with all of these definitions and have set these thresholds in table S1.4 of the permit accordingly. Standard permit condition 2.3.5 has been set to define the period of start-up and shutdown, 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.

Annex V ELVs apply to the LCP i.e. the windshield. LCP188 has four flues listed individually with their associated ELVs and monitoring requirements.

The general principle is that we should set the ELV across the windshield. However, it is acknowledged in this case, where the windshield contains combustion gases/flues from different combustion units and fuel types, setting a “dynamic” ELV across the windshield to account for these different modes of operation is not practical. Our view is that if all individual flues within a windshield are compliant with the IED requirements for that combustion process/fuel then by definition the LCP is compliant.

LCP415 is a GT/HRSG with a single stack/windshield and has independent ELVs.

**Standby Fuels:**

In the Regulation 60 Notice response, the operator stated that GT’s 1 and 2 and boilers 1 and 2 have gas oil firing capability, however, this capability has not been commissioned on GT’s 1 and 2. A decision was taken to allow stand-by operation for no more than 500 hours per calendar year beginning 1 January of each year, with a maximum period of 240 hours (10 days) at any one time.

**Refinery Off gas**

Refinery Off Gas (ROG) is Refinery Fuel Gas with the sulphur stripped out following treatment in the P66 Amine towers. The sulphur stripped gas passes through Cryogenic units to remove excess moisture prior to use in No.3 GT duct burners and in Nos.1&2 auxiliary boilers. This permit review also allows this material to be used in Nos.1&2 GT duct burners, the mass of sulphur released into the atmosphere will not increase beyond current levels. The ROG will be switched between combustion units depending on steam load required by the refineries and electricity demand of the National grid. The operator is contracted to have available two sources of steam generation at any one time. ROG will be preferably burned in the GT duct burners as this is the most efficient lead operating mode of the installation. ROG will also be switched between combustion units as driven by the availability of combustion units as a result of planned and unplanned maintenance shutdowns. ROG is available up to 15 million scf per day and has a sulphur concentration of less than 0.005% w/w max.

**Gas Turbine ELV's:**

Annex V ELVs have been set for oxides of nitrogen and carbon monoxide when firing natural gas, ROG and gas oil. These parameters are monitored continuously.

Annex V ELVs for sulphur dioxide and dust are not specified within IED. However, we have decided that BAT for natural gas and ROG firing requires a limit. A value consistent with other plant burning these fuels has been set. When firing gas oil the sulphur dioxide limit is related to the sulphur in fuels regulations (SI 2007: No.79) See Table S3.1 below.

Sulphur dioxide emissions from natural gas and refinery off-gas (ROG) firing will be continuously monitored.

These gaseous fuels are ash-free and high efficiency combustion does not generate additional dust. The fuel gases are 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 combined cycle gas turbines (CCGT's) 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.

"Low Load" Gas Turbine Emission Limits set when the load varies between MSUL/MSDL and base load during the daily reference period.

IED Annex V ELVs for GTs apply when the load is >70%. The operator has stated in his response to the Regulation 60 Notice that IED Annex V ELVs can be achieved when operating between MSUL/MSDL to base load.

**Auxiliary boiler ELV's:**

The operator in his response to the Regulation 60 Notice asked for a derogation on the emission limits values for oxides of nitrogen. This request was declined on the basis that IED does not provide for a derogation on emission limit values.

Annex V ELVs have been set for carbon monoxide when firing natural gas. There are no emission limit values specified in IED for the firing of ROG or gas oil.

Annex V ELVs have been set for sulphur dioxide under all firing modes.

Annex V ELVs have been set for dust when firing natural gas, ROG and gas oil.

Continuous monitoring is required for oxides of nitrogen, sulphur dioxide and carbon monoxide. Spot sampling for dust.

**Energy efficiency:**

A condition has been included for the operator to carry out a 4-yearly efficiency review, in line with the DEFRA Part A guidance, to report on the scope for further improvement. The installation is a combined heat and power plant whose sole purpose is to supply steam and electricity to two adjacent oil refineries and electricity to the national grid.

**Reporting efficiency:**

In order to ensure the efficiency of plant using fossil fuels or biomass is maximised and regularly recorded, condition 1.2.1(c), condition 4.2.2(b) and table S4.2 have been added to the permit.

**Monitoring & standards:**

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

**ELV related tables:**

Table 6.1.2 below is the current permit emission limits to air. Note 7 to this table contains the condition which suspends the limit for oxides of sulphur under certain operational scenarios. This condition has not been carried forward into the IED compliant permit as derogations to IED limits are not allowed. There are no limits within IED for oxides of sulphur applicable to gas turbines fired on natural gas, refinery off-gas (ROG) or gas oil.

Table 6.1.2: Emission limits into air							
Location of emission point	Emission Point						
	A1/A2 <sup>(6)</sup>		A3/A4 <sup>(6) (3)</sup>			A5 <sup>(6)</sup>	
	NG	DO	NG	RFG	DO	NG	RFG
Oxides of Nitrogen (as NO <sub>2</sub> ) mg/Nm <sup>3</sup>	60 <sup>(1)</sup>	145 <sup>(1)</sup>	180 <sup>(1)</sup>	240 <sup>(1)</sup>	240 <sup>(2)</sup>	60 <sup>(1)</sup>	145 <sup>(1)</sup>
Oxides of Sulphur (as SO <sub>2</sub> ) mg/Nm <sup>3</sup>	-	-	42 <sup>(4)</sup>	42 <sup>(1) (4)(7)</sup>	240 <sup>(4)</sup>	-	-
Particulate Mg/Nm <sup>3</sup>	-	-	7 <sup>(2)</sup>	7 <sup>(2)</sup>	39 <sup>(2) (5)</sup>	-	-
Carbon Monoxide mg/Nm <sup>3</sup>	100	100	150	150	150	100	100

Notes:

- Daily average, based on actual hourly continuous monitoring.
- Based on actual hourly spot monitoring.
- Reference conditions based on 3% O<sub>2</sub>.
- Based on calculation method to be agreed in writing with the Agency.
- The Agency shall be notified if 10,000 operational hours are exceeded.
- Plant shutdowns and start-ups are excluded.
- Limit does not apply during periods when the gas would otherwise be flared at HOR refinery. A justification for these periods of operation shall be provided based on a reporting method to be agreed in writing with the Agency.

A row has been included in table S3.1 (below) 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.

Emission point ref. & location	Parameter	Source	Limit (including unit) - these limits do not apply during start up or shut down. Natural gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Refinery Off Gas (ROG) Other gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Distillate fuel oil firing	Reference period	Monitoring frequency	Monitoring standard or method
A1 [No.1 Gas Turbine/H RSG. Point A1 on site plan in Schedule 7]	Oxides of Nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP No.188 GT/HRS G No.1	50 mg/m <sup>3</sup> 70% load and above	120 mg/m <sup>3</sup> 70% load and above	90 mg/m <sup>3</sup> 70% load and above	Monthly mean of validated hourly averages	Continuous	BS EN 14181
A1 [No.1 Gas Turbine/H RSG. Point A1 on site plan in Schedule 7]	Oxides of Nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP No.188 GT/HRS G No.1	55 mg/m <sup>3</sup> 70% load and above  55 mg/m <sup>3</sup> MSUL/MSDL to base load	132 mg/m <sup>3</sup> 70% load and above  132 mg/m <sup>3</sup> MSUL/MSDL to base load	99 mg/m <sup>3</sup> 70% load and above  99 mg/m <sup>3</sup> MSUL/MSDL to base load	Daily mean of validated hourly averages	Continuous	BS EN 14181
A1 [No.1 Gas Turbine/H RSG. Point A1 on site plan in Schedule 7]	Oxides of Nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP No.188 GT/HRS G No.1	100 mg/m <sup>3</sup> 70% load and above	240 mg/m <sup>3</sup> 70% load and above	180 mg/m <sup>3</sup> 70% load and above	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181

**Table S3.1 Point source emissions to air, emission limits and monitoring requirements for LCP emission points from GT's >100MWth and auxiliary boilers 100 to 300MWth.**

Emission point ref. & location	Parameter	Source	Limit (including unit) - these limits do not apply during start up or shut down. Natural gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Refinery Off Gas (ROG) Other gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Distillate fuel oil firing	Reference period	Monitoring frequency	Monitoring standard or method
A1 [No.1 Gas Turbine/H RSG. Point A1 on site plan in Schedule 7]	Carbon Monoxide	LCP No.188 GT/HRS G No.1	100 mg/m <sup>3</sup> 70% load and above	No ELV specified in IED	100 mg/m <sup>3</sup> 70% load and above	Monthly mean of validated hourly averages	Continuous	BS EN 14181
A1 [No.1 Gas Turbine/H RSG. Point A1 on site plan in Schedule 7]	Carbon Monoxide	LCP No.188 GT/HRS G No.1	110 mg/m <sup>3</sup> 70% load and above  110 mg/m <sup>3</sup> MSUL/MSDL to base load	No ELV specified in IED	110 mg/m <sup>3</sup> 70% load and above  110 mg/m <sup>3</sup> MSUL/MSDL to base load	Daily mean of validated hourly averages	Continuous	BS EN 14181
A1 [No.1 Gas Turbine/H RSG. Point A1 on site plan in Schedule 7]	Carbon Monoxide	LCP No.188 GT/HRS G No.1	200 mg/m <sup>3</sup> 70% load and above	No ELV specified in IED	200 mg/m <sup>3</sup> 70% load and above	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
A1 [No.1 Gas Turbine/H RSG. Point A1 on site plan in Schedule 7]	Sulphur Dioxide	LCP No.188 GT/HRS G No.1	35 mg/m <sup>3</sup> 70% load and above	35 mg/m <sup>3</sup> 70% load and above	See Note 1	Monthly mean of validated hourly averages	Continuous	BS EN 14181



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Emission point ref. & location	Parameter	Source	Limit (including unit) - these limits do not apply during start up or shut down. Natural gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Refinery Off Gas (ROG) Other gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Distillate fuel oil firing	Reference period	Monitoring frequency	Monitoring standard or method
A1 [No.1 Gas Turbine/H RSG. Point A1 on site plan in Schedule 7]	Sulphur Dioxide	LCP No.188 GT/HRS G No.1	39 mg/m <sup>3</sup> 70% load and above	39 mg/m <sup>3</sup> 70% load and above	See Note 1	Daily mean of validated hourly averages	Continuous	BS EN 14181
A1 [No.1 Gas Turbine/H RSG. Point A1 on site plan in Schedule 7]	Sulphur Dioxide	LCP No.188 GT/HRS G No.1	70 mg/m <sup>3</sup> 70% load and above	70 mg/m <sup>3</sup> 70% load and above	See Note 1	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
A1 [No.1 Gas Turbine/H RSG. Point A1 on site plan in Schedule 7]	Dust	LCP No.188 GT/HRS G No.1	No ELV specified in IED	No ELV specified in IED	No ELV specified in IED	-	-	-
A2 [No.2 Gas Turbine/H RSG. Point A2 on site plan in Schedule 7]	Oxides of Nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP No.188 GT/HRS G No.2	50 mg/m <sup>3</sup> 70% load and above	120 mg/m <sup>3</sup> 70% load and above	90 mg/m <sup>3</sup> 70% load and above	Monthly mean of validated hourly averages	Continuous	BS EN 14181

**Table S3.1 Point source emissions to air, emission limits and monitoring requirements for LCP emission points from GT's >100MWth and auxiliary boilers 100 to 300MWth.**

Emission point ref. & location	Parameter	Source	Limit (including unit) - these limits do not apply during start up or shut down. Natural gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Refinery Off Gas (ROG) Other gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Distillate fuel oil firing	Reference period	Monitoring frequency	Monitoring standard or method
A2 [No.2 Gas Turbine/H RSG. Point A2 on site plan in Schedule 7]	Oxides of Nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP No.188 GT/HRS G No.2	55 mg/m <sup>3</sup> 70% load and above  55 mg/m <sup>3</sup> MSUL/MSDL to base load	132 mg/m <sup>3</sup> 70% load and above  132 mg/m <sup>3</sup> MSUL/MSDL to base load	99 mg/m <sup>3</sup> 70% load and above  99 mg/m <sup>3</sup> MSUL/MSDL to base load	Daily mean of validated hourly averages	Continuous	BS EN 14181
A2 [No.2 Gas Turbine/H RSG. Point A2 on site plan in Schedule 7]	Oxides of Nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP No.188 GT/HRS G No.2	100 mg/m <sup>3</sup> 70% load and above	240 mg/m <sup>3</sup> 70% load and above	180 mg/m <sup>3</sup> 70% load and above	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
A2 [No.2 Gas Turbine/H RSG. Point A2 on site plan in Schedule 7]	Carbon Monoxide	LCP No.188 GT/HRS G No.2	100 mg/m <sup>3</sup> 70% load and above	No ELV specified in IED	100 mg/m <sup>3</sup> 70% load and above	Monthly mean of validated hourly averages	Continuous	BS EN 14181
A2 [No.2 Gas Turbine/H RSG. Point A2 on site plan in Schedule 7]	Carbon Monoxide	LCP No.188 GT/HRS G No.2	110 mg/m <sup>3</sup> 70% to load and above 110 mg/m <sup>3</sup> MSUL/MSDL to base load		110 mg/m <sup>3</sup> 70% to load and above 110 mg/m <sup>3</sup> MSUL/MSDL to base load	Daily mean of validated hourly averages	Continuous	BS EN 14181

**Table S3.1 Point source emissions to air, emission limits and monitoring requirements for LCP emission points from GT's >100MWth and auxiliary boilers 100 to 300MWth.**

Emission point ref. & location	Parameter	Source	Limit (including unit) - these limits do not apply during start up or shut down. Natural gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Refinery Off Gas (ROG) Other gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Distillate fuel oil firing	Reference period	Monitoring frequency	Monitoring standard or method
A2 [No.2 Gas Turbine/H RSG. Point A2 on site plan in Schedule 7]	Carbon Monoxide	LCP No.188 GT/HRS G No.2	200 mg/m <sup>3</sup> 70% load and above		200 mg/m <sup>3</sup> 70% load and above	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
A2 [No.2 Gas Turbine/H RSG. Point A2 on site plan in Schedule 7]	Sulphur Dioxide	LCP No.188 GT/HRS G No.2	35 mg/m <sup>3</sup> 70% load and above	35 mg/m <sup>3</sup> 70% load and above	See Note 1	Monthly mean of validated hourly averages	Continuous	BS EN 14181
A2 [No.2 Gas Turbine/H RSG. Point A2 on site plan in Schedule 7]	Sulphur Dioxide	LCP No.188 GT/HRS G No.2	39 mg/m <sup>3</sup> 70% load and above	39 mg/m <sup>3</sup> 70% load and above	See Note 1	Daily mean of validated hourly averages	Continuous	BS EN 14181
A2 [No.2 Gas Turbine/H RSG. Point A2 on site plan in Schedule 7]	Sulphur Dioxide	LCP No.188 GT/HRS G No.2	70 mg/m <sup>3</sup> 70% load and above	70 mg/m <sup>3</sup> 70% load and above	See Note 1	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181

**Table S3.1 Point source emissions to air, emission limits and monitoring requirements for LCP emission points from GT's >100MWth and auxiliary boilers 100 to 300MWth.**

Emission point ref. & location	Parameter	Source	Limit (including unit) - these limits do not apply during start up or shut down. Natural gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Refinery Off Gas (ROG) Other gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Distillate fuel oil firing	Reference period	Monitoring frequency	Monitoring standard or method
A2 [No.2 Gas Turbine/H RSG. Point A2 on site plan in Schedule 7]	Dust	LCP No.188 GT/HRS G No.2	No ELV specified in IED	No ELV specified in IED	No ELV specified in IED	-	-	-
A5 [No.3 Gas Turbine/H RSG. Point A5 on site plan in Schedule 7]	Oxides of Nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP No. 415 GT/HRS G No.3	50 mg/m <sup>3</sup> 70% load and above	120 mg/m <sup>3</sup> 70% load and above	No gas oil firing	Monthly mean of validated hourly averages	Continuous	BS EN 14181
A5 [No.3 Gas Turbine/H RSG. Point A5 on site plan in Schedule 7]	Oxides of Nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP No. 415 GT/HRS G No.3	55 mg/m <sup>3</sup> 70% load and above 55 mg/m <sup>3</sup> MSUL/MSDL to base load	132 mg/m <sup>3</sup> 70% load and above 132 mg/m <sup>3</sup> MSUL/MSDL to base load	No gas oil firing	Daily mean of validated hourly averages	Continuous	BS EN 14181
A5 [No.3 Gas Turbine/H RSG. Point A5 on site plan in Schedule 7]	Oxides of Nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP No. 415 GT/HRS G No.3	100 mg/m <sup>3</sup> 70% load and above	240 mg/m <sup>3</sup> 70% load and above	No gas oil firing	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181

**Table S3.1 Point source emissions to air, emission limits and monitoring requirements for LCP emission points from GT's >100MWth and auxiliary boilers 100 to 300MWth.**

Emission point ref. & location	Parameter	Source	Limit (including unit) - these limits do not apply during start up or shut down. Natural gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Refinery Off Gas (ROG) Other gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Distillate fuel oil firing	Reference period	Monitoring frequency	Monitoring standard or method
A5 [No.3 Gas Turbine/H RSG. Point A5 on site plan in Schedule 7]	Carbon Monoxide	LCP No. 415 GT/HRS G No.3	100 mg/m <sup>3</sup> 70% load and above	No ELV specified in IED	No gas oil firing	Monthly mean of validated hourly averages	Continuous	BS EN 14181
A5 [No.3 Gas Turbine/H RSG. Point A5 on site plan in Schedule 7]	Carbon Monoxide	LCP No. 415 GT/HRS G No.3	110 mg/m <sup>3</sup> 70% load and above  110mg/m <sup>3</sup> MSUL/MS DL to base load	No ELV specified in IED	No gas oil firing	Daily mean of validated hourly averages	Continuous	BS EN 14181
A5 [No.3 Gas Turbine/H RSG. Point A5 on site plan in Schedule 7]	Carbon Monoxide	LCP No. 415 GT/HRS G No.3	200 mg/m <sup>3</sup> 70% load and above	No ELV specified in IED	No gas oil firing	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
A5 [No.3 Gas Turbine/H RSG. Point A5 on site plan in Schedule 7]	Sulphur Dioxide	LCP No.415 GT/HRS G No.3	35 mg/m <sup>3</sup> 70% load and above	35 mg/m <sup>3</sup> 70% load and above	No gas oil firing	Monthly mean of validated hourly averages	Continuous	BS EN 14181

**Table S3.1 Point source emissions to air, emission limits and monitoring requirements for LCP emission points from GT's >100MWth and auxiliary boilers 100 to 300MWth.**

Emission point ref. & location	Parameter	Source	Limit (including unit) - these limits do not apply during start up or shut down. Natural gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Refinery Off Gas (ROG) Other gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Distillate fuel oil firing	Reference period	Monitoring frequency	Monitoring standard or method
A5 [No.3 Gas Turbine/H RSG. Point A5 on site plan in Schedule 7]	Sulphur Dioxide	LCP No.415 GT/HRS G No.3	39 mg/m <sup>3</sup> 70% load and above	39 mg/m <sup>3</sup> 70% load and above	No gas oil firing	Daily mean of validated hourly averages	Continuous	BS EN 14181
A5 [No.3 Gas Turbine/H RSG. Point A5 on site plan in Schedule 7]	Sulphur Dioxide	LCP No.415 GT/HRS G No.3	70 mg/m <sup>3</sup> 70% load and above	70 mg/m <sup>3</sup> 70% load and above	No gas oil firing	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
A5 [No.3 Gas Turbine/H RSG. Point A5 on site plan in Schedule 7]	Dust	LCP No. 415 GT/HRS G No.3	No ELV specified in IED	No ELV specified in IED	No gas oil firing	-	-	-
A3 [Auxiliary Boiler No.1. Point A3 on site plan in Schedule 7]	Oxides of Nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP No. 188 AB1	100 mg/m <sup>3</sup> 16% load and above	200 mg/m <sup>3</sup> 16% load and above	200 mg/m <sup>3</sup> 16% load and above	Monthly mean of validated hourly averages	Continuous	BS EN 14181

**Table S3.1 Point source emissions to air, emission limits and monitoring requirements for LCP emission points from GT's >100MWth and auxiliary boilers 100 to 300MWth.**

Emission point ref. & location	Parameter	Source	Limit (including unit) - these limits do not apply during start up or shut down. Natural gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Refinery Off Gas (ROG) Other gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Distillate fuel oil firing	Reference period	Monitoring frequency	Monitoring standard or method
A3 [Auxiliary Boiler No.1. Point A3 on site plan in Schedule 7]	Oxides of Nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP No. 188 AB1	110 mg/m <sup>3</sup> 16% load and above 110 mg/m <sup>3</sup> MSUL/MSDL to base load	220 mg/m <sup>3</sup> 16% load and above 220 mg/m <sup>3</sup> MSUL/MSDL to base load	220 mg/m <sup>3</sup> 16% load and above 220 mg/m <sup>3</sup> MSUL/MSDL to base load	Daily mean of validated hourly averages	Continuous	BS EN 14181
A3 [Auxiliary Boiler No.1. Point A3 on site plan in Schedule 7]	Oxides of Nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP No. 188 AB1	200 mg/m <sup>3</sup> 16% load and above	400 mg/m <sup>3</sup> 16% load and above	400 mg/m <sup>3</sup> 16% load and above	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
A3 [Auxiliary Boiler No.1. Point A3 on site plan in Schedule 7]	Carbon Monoxide	LCP No. 188 AB1	100 mg/m <sup>3</sup> 16% load and above	No ELV specified in IED	No ELV specified in IED	Monthly mean of validated hourly averages	Continuous	BS EN 14181
A3 [Auxiliary Boiler No.1. Point A3 on site plan in Schedule 7]	Carbon Monoxide	LCP No. 188 AB1	110 mg/m <sup>3</sup> 16% load and above  110 mg/m <sup>3</sup> MSUL/MSDL to base load	No ELV specified in IED	No ELV specified in IED	Daily mean of validated hourly averages	Continuous	BS EN 14181

**Table S3.1 Point source emissions to air, emission limits and monitoring requirements for LCP emission points from GT's >100MWth and auxiliary boilers 100 to 300MWth.**

Emission point ref. & location	Parameter	Source	Limit (including unit) - these limits do not apply during start up or shut down. Natural gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Refinery Off Gas (ROG) Other gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Distillate fuel oil firing	Reference period	Monitoring frequency	Monitoring standard or method
A3 [Auxiliary Boiler No.1. Point A3 on site plan in Schedule 7]	Carbon Monoxide	LCP No. 188 AB1	200 mg/m <sup>3</sup> 16% load and above	No ELV specified in IED	No ELV specified in IED	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
A3 [Auxiliary Boiler No.1. Point A3 on site plan in Schedule 7]	Sulphur Dioxide	LCP No. 188 AB1	35 mg/m <sup>3</sup> 16% load and above	35 mg/m <sup>3</sup> 16% load and above	250 mg/m <sup>3</sup> 16% load and above	Monthly mean of validated hourly averages	Continuous	BS EN 14181
A3 [Auxiliary Boiler No.1. Point A3 on site plan in Schedule 7]	Sulphur Dioxide	LCP No. 188 AB1	39 mg/m <sup>3</sup> 16% load and above	39 mg/m <sup>3</sup> 16% load and above	275 mg/m <sup>3</sup> 16% load and above	Daily mean of validated hourly averages	Continuous	BS EN 14181
A3 [Auxiliary Boiler No.1. Point A3 on site plan in Schedule 7]	Sulphur Dioxide	LCP No. 188 AB1	70 mg/m <sup>3</sup> 16% load and above	70 mg/m <sup>3</sup> 16% load and above	500 mg/m <sup>3</sup> 16% load and above	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181



**Table S3.1 Point source emissions to air, emission limits and monitoring requirements for LCP emission points from GT's >100MWth and auxiliary boilers 100 to 300MWth.**

Emission point ref. & location	Parameter	Source	Limit (including unit) - these limits do not apply during start up or shut down. Natural gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Refinery Off Gas (ROG) Other gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Distillate fuel oil firing	Reference period	Monitoring frequency	Monitoring standard or method
A3 [Auxiliary Boiler No.1. Point A3 on site plan in Schedule 7]	Dust	LCP No. 188 AB1	5 mg/m <sup>3</sup> 16% load and above	5 mg/m <sup>3</sup> 16% load and above	-	-	At least every 6 months	BS EN 13284-1
A3 [Auxiliary Boiler No.1. Point A3 on site plan in Schedule 7]	Dust	LCP No. 188 AB1	-	-	No more than 500 hours per calendar year with a maximum period of 240 hours	-	-	-
A4 [Auxiliary Boiler No.2. Point A4 on site plan in Schedule 7]	Oxides of Nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP No. 188 AB2	100 mg/m <sup>3</sup> 16% load and above	200 mg/m <sup>3</sup> 16% load and above	200 mg/m <sup>3</sup> 16% load and above	Monthly mean of validated hourly averages	Continuous	BS EN 14181
A4 [Auxiliary Boiler No.2. Point A4 on site plan in Schedule 7]	Oxides of Nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP No. 188 AB2	110 mg/m <sup>3</sup> 16% load and above 110 mg/m <sup>3</sup> MSUL/MSDL to base load	220 mg/m <sup>3</sup> 16% load and above 220 mg/m <sup>3</sup> MSUL/MSDL to base load	220 mg/m <sup>3</sup> 16% load and above 220 mg/m <sup>3</sup> MSUL/MSDL to base load	Daily mean of validated hourly averages	Continuous	BS EN 14181

**Table S3.1 Point source emissions to air, emission limits and monitoring requirements for LCP emission points from GT's >100MWth and auxiliary boilers 100 to 300MWth.**

Emission point ref. & location	Parameter	Source	Limit (including unit) - these limits do not apply during start up or shut down. Natural gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Refinery Off Gas (ROG) Other gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Distillate fuel oil firing	Reference period	Monitoring frequency	Monitoring standard or method
A4 [Auxiliary Boiler No.2. Point A4 on site plan in Schedule 7]	Oxides of Nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	LCP No. 188 AB2	200 mg/m <sup>3</sup> 16% load and above	400 mg/m <sup>3</sup> 16% load and above	400 mg/m <sup>3</sup> 70% load and above	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
A4 [Auxiliary Boiler No.2. Point A4 on site plan in Schedule 7]	Carbon Monoxide	LCP No. 188 AB2	100 mg/m <sup>3</sup> 16% load and above	No ELV specified in IED	No ELV specified in IED	Monthly mean of validated hourly averages	Continuous	BS EN 14181
A4 [Auxiliary Boiler No.2. Point A4 on site plan in Schedule 7]	Carbon Monoxide	LCP No. 188 AB2	110 mg/m <sup>3</sup> 16% load and above 110 mg/m <sup>3</sup> MSUL/MS DL to base load	No ELV specified in IED	No ELV specified in IED	Daily mean of validated hourly averages	Continuous	BS EN 14181
A4 [Auxiliary Boiler No.2. Point A4 on site plan in Schedule 7]	Carbon Monoxide	LCP No. 188 AB2	200 mg/m <sup>3</sup> 16% load and above	No ELV specified in IED	No ELV specified in IED	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181

**Table S3.1 Point source emissions to air, emission limits and monitoring requirements for LCP emission points from GT's >100MWth and auxiliary boilers 100 to 300MWth.**

Emission point ref. & location	Parameter	Source	Limit (including unit) - these limits do not apply during start up or shut down. Natural gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Refinery Off Gas (ROG) Other gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Distillate fuel oil firing	Reference period	Monitoring frequency	Monitoring standard or method
A4 [Auxiliary Boiler No.2. Point A4 on site plan in Schedule 7]	Sulphur Dioxide	LCP No. 188 AB2	35 mg/m <sup>3</sup> 16% load and above	35 mg/m <sup>3</sup> 16% load and above	250 mg/m <sup>3</sup> 16% load and above	Monthly mean of validated hourly averages	Continuous	BS EN 14181
A4 [Auxiliary Boiler No.2. Point A4 on site plan in Schedule 7]	Sulphur Dioxide	LCP No. 188 AB2	39 mg/m <sup>3</sup> 16% load and above	39 mg/m <sup>3</sup> 16% load and above	275 mg/m <sup>3</sup> 16% load and above	Daily mean of validated hourly averages	Continuous	BS EN 14181
A4 [Auxiliary Boiler No.2. Point A4 on site plan in Schedule 7]	Sulphur Dioxide	LCP No. 188 AB2	70 mg/m <sup>3</sup> 16% load and above	70 mg/m <sup>3</sup> 16% load and above	500 mg/m <sup>3</sup> 16% load and above	95% of validated hourly averages within a calendar year	Continuous	BS EN 14181
A4 [Auxiliary Boiler No.2. Point A4 on site plan in Schedule 7]	Dust	LCP No. 188 AB2	5 mg/m <sup>3</sup> 16% load and above	5 mg/m <sup>3</sup> 16% load and above	-	-	At least every 6 months	BS EN 13284-1

**Table S3.1 Point source emissions to air, emission limits and monitoring requirements for LCP emission points from GT's >100MWth and auxiliary boilers 100 to 300MWth.**

Emission point ref. & location	Parameter	Source	Limit (including unit) - these limits do not apply during start up or shut down. Natural gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Refinery Off Gas (ROG) Other gas firing	Limit (including unit) - these limits do not apply during start up or shut down. Distillate fuel oil firing	Reference period	Monitoring frequency	Monitoring standard or method
A4 [Auxiliary Boiler No.2. Point A4 on site plan in Schedule 7]	Dust	LCP No. 188 AB2	-	-	No more than 500 hours per calendar year with a maximum period of 240 hours	-	-	-
A1 to A5 [Points A1 to A5 on site plan in Schedule 7]	Oxygen	LCP No. 188 LCP No. 415	-	-	-	-	Continuous as appropriate to reference	BS EN 14181
A1 to A5 [Points A1 to A5 on site plan in Schedule 7]	Water Vapour	LCP No. 188 LCP No. 415	-	-	-	-	Continuous as appropriate to reference	BS EN 14181
A1 to A5 [Points A1 to A5 on site plan in Schedule 7]	Stack gas temperature	LCP No. 188 LCP No. 415	-	-	-	-	Continuous as appropriate to reference	Traceable to national standards
A1 to A5 [Points A1 to A5 on site plan in Schedule 7]	Stack gas pressure	LCP No. 188 LCP No. 415	-	-	-	-	Continuous as appropriate to reference	Traceable to national standards
A1 to A5 [Points A1 to A5 on site plan in Schedule 7]	Stack gas velocity profile	LCP No. 188 LCP No. 415	-	-	-	-	Pre-operation and when there is a significant operational change	BS EN 15259

Note 1: Emission of sulphur dioxide when firing distillate fuel oil is determined by calculation based on the limits in the sulphur in fuels regulations. (SI 2007. No.79) See Table S2.1.

**Resource efficiency metrics:**

A more comprehensive suite of reporting metrics has been added to the permit template. Table S4.2 "Resource Efficiency Metrics" has been added requiring the reporting of various resource parameters.

**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.

**Annex 1: Review and assessment of changes that are not part of the Chapter III IED derived permit review.****Releases to water.****Removal of the requirement of a dissolved oxygen limit on Emission Point M3. See Table S3.2.**

There are times for the M3 sump when all other parameters are in limit but the dissolved dips below 50% due to no water movement in the sump.

This then requires a pump to be placed into service to aerate the water before forwarding the water on to the M2 lagoon.

The M2 lagoon is large enough to be able to accept water from the M3 sump that is low in oxygen (or other parameters such as pH) without causing a significantly large change to the parameters of the M2 lagoon.

There are cases where a pump on M3 is put into service to aerate the water to raise it above 50%, e.g. to 51% or 52% which would be in limit but will have used energy to raise the dissolved oxygen.

Not having to place a pump in service will be an energy saving that will be realised without having significant adverse effect on the water discharged via the permitted Emission Point W1.