

Environment Agency

Review of an Environmental Permit for an Installation subject to Chapter II of the Industrial Emissions Directive under the Environmental Permitting (England & Wales) Regulations 2016

Decision document recording our decision-making process following review of a permit

The Permit number is: EPR/ZP3130LJ
The Operator is: SSEPG (Operations) Limited
The Installation is: Burghfield Power Station
This Variation Notice number is: EPR/ZP3130LJ/V003

What this document is about

Article 21(3) of the Industrial Emissions Directive (IED) requires the Environment Agency to review conditions in permits that it has issued and to ensure that the permit delivers compliance with relevant standards, within four years of the publication of updated decisions on best available techniques (BAT) conclusions.

We have reviewed the permit for this installation against the revised BAT Conclusions for large combustion plant published on 17th August 2017. This is our decision document, which explains the reasoning for the consolidated variation notice that we are issuing.

It explains how we have reviewed and considered the techniques used by the Operator in the operation and control of the plant and activities of the installation. This review has been undertaken with reference to the decision made by the European Commission establishing best available techniques (BAT) conclusions ('BAT Conclusions') for large combustion plant as detailed in document reference IEDC-7-1. 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 considering the review of the operating techniques used by the Operator for the operation of the plant and activities 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

issued. 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 removed 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 the new BAT Conclusions.

This is our record of our decision-making process and shows how we have taken into account all relevant factors in reaching our position.

Throughout this document we will use a number of expressions. These are as referred to in the glossary and have the same meaning as described in “Schedule 6 Interpretation” of the Permit.

We try to explain our decision as accurately, comprehensively and plainly as possible. We would welcome any feedback as to how we might improve our decision documents in future. A lot of technical terms and acronyms are inevitable in a document of this nature: we provide a glossary of acronyms near the front of the document, for ease of reference.

How this document is structured

Glossary of terms

- 1 Our decision
- 2 How we reached our decision
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Conclusions for Large Combustion Plant
- 2.2 Review of our own information in respect to the capability of the
installation to meet revised standards included in the BAT Conclusions
document
- 3 The legal framework
- 4 Key Issues
- 5 Decision checklist regarding relevant BAT Conclusions
- 6 Emissions to Water
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- 8 Review and assessment of changes that are not part of the BAT
Conclusions derived permit review.

Glossary of acronyms used in this document

(Please note that this glossary is standard for our decision documents and therefore not all these acronyms are necessarily used in this document.)

APC	Air Pollution Control
BAT	Best Available Technique(s)
BAT-AEEL	BAT Associated Energy Efficiency Level
BAT-AEL	BAT Associated Emission Level
BATc	BAT conclusion
BREF	Best available techniques reference document
CEM	Continuous emissions monitor
CHP	Combined heat and power
CV	Calorific value
DAA	Directly associated activity – Additional activities necessary to be carried out to allow the principal activity to be carried out
DLN	Dry Low NOx burners
DLN-E	Dry Low NOx effective
EIONET	European environment information and observation network is a partnership network of the European Environment Agency
ELV	Emission limit value derived under BAT or an emission limit value set out in IED
EMS	Environmental Management System
EPR	Environmental Permitting (England and Wales) Regulations 2016 (SI 2016 No. 1154)
EWC	European waste catalogue
FSA	Food Standards Agency
IC	Improvement Condition
IED	Industrial Emissions Directive (2010/75/EU)
IPPCD	Integrated Pollution Prevention and Control Directive (2008/1/EC) – now superseded by IED
LCP	Large Combustion Plant subject to Chapter III of IED
MSUL/MSDL	Minimum start up load/minimum shut-down load
NOx	Oxides of nitrogen (NO plus NO ₂ expressed as NO ₂)
NPV	Net Present Value
OCGT	Open Cycle Gas Turbine
PHE	Public Health England
SAC	Special Area of Conservation
SGN	Sector guidance note
TGN	Technical guidance note
TNP	Transitional National Plan
TOC	Total Organic Carbon
WFD	Water Framework Directive (2000/60/EC)

1 Our decision

We have decided to issue the consolidated 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 to demonstrate compliance with BAT Conclusions for Large Combustion Plant

We issued a Notice under Regulation 61(1) of the Environmental Permitting (England and Wales) Regulations 2016 (a Regulation 61 Notice) on 1st May 2018 requiring the Operator to provide information to demonstrate how the operation of their installation currently meets, or will subsequently meet, the revised standards described in the large combustion plant BAT Conclusions document. The Notice also required that where the revised standards are not currently met, the operator should provide information that:

- Describes the techniques that will be implemented before 17th August 2021, which will then ensure that operations meet the revised standard, or
- Justifies why standards will not be met by 17th August 2021, and confirmation of the date when the operation of those processes will cease within the installation or an explanation of why the revised BAT standard is not applicable to those processes, or
- Justifies why an alternative technique will achieve the same level of environmental protection equivalent to the revised standard described in the BAT Conclusions.

Where the Operator proposed that they were not intending to meet a BAT standard that also included a BAT Associated Emission Level (BAT AEL) described in the BAT Conclusions Document, the Regulation 61 Notice requested that the Operator make a formal request for derogation from compliance with that AEL (as provisioned by Article 15(4) of IED). In this circumstance, the Notice identified that any such request for derogation must be supported and justified by sufficient technical and commercial information that would enable us to determine acceptability of the derogation request.

The Regulation 61 Notice response from the Operator was received on 01/11/2018 and by email on 06/02/2020 requesting specific operating modes, <1500hours/year burning natural gas and <500hours/year burning gas oil.

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

2.2 Review of our own information in respect to the capability of the installation to meet revised standards included in the BAT Conclusions document

Based on our records and previous regulatory activities with the facility we have no reason to consider that the operator will not be able to comply with the conditions that we include in the permit.

3 The legal framework

The consolidated variation notice will be issued, under Regulation 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, the consolidated variation notice 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.

4 The key issues

The key issues arising during this permit review are:

- Emissions to air and the emission limits applied to the plant.
- The energy efficiency levels associated with the Best Available Techniques (BAT-AEELs)
- The review and assessment of the availability of BAT for gas turbines operating <500 hours per year
- BAT 9 characterisation of fuel IC11
- Inclusion of black start condition and associated Improvement condition IC12
- IC13 Definition of Effective Dry Low NOx value.
- IC14 Inspection of Distillate Fuel Oil tank, prior to re-use

We therefore describe how we determined these issues in most detail in the relevant sections of this document.

4.1 Emissions to air and the emission limits applied to the plant

A number of general principles were applied during the permit review. These included:

- The upper value of the BAT AELs ranges specified were used unless use of the tighter limit was justified.
- The principle of no backsliding where if existing limits in the permit were already tighter than those specified in the BREF, the existing permit limits were retained.
- Where a limit was specified in both IED Annex V and the BAT Conclusions for a particular reference period, the tighter limit was applied and in the majority of cases this was from the BAT Conclusions.
- Where AELs are indicative in the BAT Conclusions, these were applied unless adequate justification was provided by the operator to demonstrate that an alternative limit was more appropriate.
- For gas turbines where the IED specified that limits applied over 70% load and the BAT Conclusions specified that AELs applied when dry low NOx is effective (DLN-E), we have used DLN-E as a default across all monitoring requirements for NOx and CO.

The LCP296 consists of one 134MWth, Open Cycle Gas Turbine burning both natural gas <1500hr/yr or burning gas oil <500hrs/yr as standby fuel only.

The plant was put into operation in 1997 before IED came into force and therefore the existing limits in the permit are from Part 1 of IED Annex V

applicable to existing plant. The plant was operational before 27 November 2003.

The ELVs and AELs are based on the following operating regime:

- <500 hours non-emergency plant burning gas oil
- <1500 hours operation burning natural gas

The following tables outline the limits that have been incorporated into the permit for LCP296, where these were derived from and the reference periods at which they apply. The emission limits refer to concentrations, expressed as mass of emitted substance per volume of flue-gas under the following standard conditions: dry gas at a temperature of 273,15 K, pressure of 101,3 kPa and 15% volume reference oxygen concentration if flue gases. The emission limits and monitoring requirements have been incorporated into Schedule 3 of the permit.

An additional daily limit from start up/shut down to baseload has been added to the post TNP limits in table S3.1a. Although this is not a regulatory requirement, it was requested by the Emissions Methodology Working Group of the Joint Environmental Protocol to ensure consistency across the sites.

For plant <500 hours gas turbines non-emergency:

Under Chapter III gas turbines and gas engines operating for less than 500 hours per year were considered to be emergency plant and therefore were not covered by the emission limits set out in IED Annex V. However, for the purposes of the LCP BAT review, plants operated for emergency use may only be defined as plants which operate for the sole purpose of providing power at a site during an onsite emergency and/or during a black start and which do not provide balancing services or demand side response services. As this site runs commercially on an intermittent basis to support the Grid, it is not considered emergency plant and therefore indicative BAT applies.

We have set the indicative limits requiring validation through emission factors based on the principle that we will not require plant to fire up with the sole purpose of performing an emission measurement, as set out the UK Regulators Interpretation Document.

Standby fuel

Where a natural gas fired plant uses gas oil as a standby fuel for less than 10 days, we have not assessed the site against the BAT Conclusions applicable to that fuel as the use is not considered significant. We expect the site to have demonstrated that the site will be operated in a manner such that use of the standby fuel is minimised.

Transitional National Plan

By the end of the TNP on 30 June 2020, as a minimum plant must meet the limits set out in Annex V of the Industrial Emission Directive subject to BAT

assessment and the principle of no backsliding. From the implementation date of the BAT Conclusion in 2021 the relevant AELs will also apply.

LCP296

The tables below reflect the limits set out in the BREF to be applied from 17/08/2021.

Type Open Cycle Gas Turbine
 Age Permitted before publication of the LCP BREF and operational no later than 27 November 2003
 Operating hours <1500 hours
 Fuel Natural gas

NOx limits (mg/Nm ³)						
Averaging	IED (Annex V Part 1) – Existing	BREF (Table 24 BAT-c)	Expected permit limits	Basis	Limits apply	Monitoring
Annual	None	None	None	BREF	E-DLN	Continuous
Monthly	150	None	55 ^{Note1}	Existing limit	E-DLN	
Daily	165	80	60 ^{Note1}	Existing limit	E-DLN	
95 th %ile of hr means	300	None	110 ^{Note1}	Existing limit	E-DLN	

Note 1 Limits currently in permit, no backsliding principal applied.

CO limits (mg/Nm ³)						
Averaging	IED (Annex V Part 1) – Existing	BREF (Table 24 BAT-c)	Expected permit limits	Basis	Limits apply	Monitoring
Annual	None	None	None	-	E-DLN	Continuous
Monthly	100	None	100	IED	E-DLN	
Daily	110	None	110	IED	E-DLN	
95 th %ile of hr means	200	None	200	IED	E-DLN	

Type Open Cycle Gas Turbine
 Age Permitted before publication of the LCP BREF
 Operating hours <500 hours, non emergency
 Fuel Gas oil

NOx limits (mg/Nm ³)						
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Averaging	IED (Annex V Part 1) – Existing	BREF (Table 24 BAT-c)	Expected permit limits	Basis	Limits apply	Monitoring
Annual	None	None	None	-	-	Continuous Note 1
Monthly	None	None	110 ^{Note 2}	Existing limit	E-DLN	
Daily	None	145-250	125 ^{Note2}	Existing limit	E-DLN	
95 th %ile of hr means	None	None	225 ^{Note2}	Existing limit	E-DLN	

Note 1: Continuous monitoring is already specified for this mode of operation in the permit so it is retained under the principle of 'no backsliding'.

Note 2: Limits currently in permit, no backsliding principal applied.

CO limits (mg/Nm ³)						
Averaging	IED (Annex V Part 1) – Existing	BREF (Table 24 BAT-c)	Expected permit limits	Basis	Limits apply	Monitoring
Annual	None	None	None	-	-	Continuous Note1
Monthly	None	None	135 ^{Note 2}	IED	E-DLN	
Daily	None	None	150 ^{Note 2}	IED	E-DLN	
95 th %ile of hr means	None	None	270 ^{Note2}	IED	E-DLN	

Note 1: Continuous monitoring is already specified for this mode of operation in the permit so it is retained under the principle of 'no backsliding'.

Note 2: Limits currently in permit, no backsliding principal applied.

Sulphur limits (mg/Nm ³) – <i>indicative limits in italics</i>						
Averaging	IED (Annex V Part 1) – Existing	BREF (Table 22 BAT-c)	Expected permit limits	Basis	Limits apply	Monitoring
Annual	None	None	None	-	-	Concentration by calculation
Monthly	None	None	None	-	-	
Daily	None	66	None ^{Note 1}	BREF	-	
95 th %ile of hr means	None	None	None	-	-	

Note 1: the plant will be maintained through normal operations burning natural gas and by ensuring low sulphur fuel oil is used. Continuous monitoring is not in place on the site for sulphur dioxide and we would not require this to be introduced for operation on a fuel which is for <500 hours.

Dust limits (mg/Nm ³) – <i>indicative limits in italics</i>						
Averaging	IED (Annex V Part 1) – Existing	BREF (Table 22 BAT-c)	Expected permit limits	Basis	Limits apply	Monitoring
Annual	None	None	None	-	-	Concentration by calculation
Monthly	None	None	None	-	-	
Daily	None	10	None ^{Note1}	BREF	-	

95 th %ile of hr means	None	None	None	-	-	
Note 1: the plant will be maintained through normal operations burning natural gas.. Continuous monitoring is not in place on the site for dust and we would not require this to be introduced for operation on a fuel which is for <500 hours.						

4.2 Any additional key issues e.g. the review and assessment of BAT for gas turbines operating < 500 hours per year on gas oil.

Joint Environmental Programme (JEP) produced a document 'BAT Assessment for Existing Gas and Liquid Fuel Fired OCGTs, CCGTs and Dual-fuel GTs with a Thermal Input Rating of 50MWth or Greater Operating <500 Hours Per Year' dated October 2018. The content of this document has been agreed in principle by the Environment Agency and we have therefore taken the document into account during our determination of this variation.

This site is restricted to <500hrs/yr only when burning gas oil, BAT 37 In order to prevent or reduce NO_x emissions to air from the combustion of gas oil in gas turbines, BAT is to use one or a combination of the techniques,

BAT 37. In order to prevent or reduce NO_x emissions to air from the combustion of gas oil in gas turbines, BAT is to use one or a combination of the techniques given below.

Technique	Description	Applicability
a. Water/steam addition	See description in Section 8.3	The applicability may be limited due to water availability
b. Low-NO _x burners (LNB)		Only applicable to turbine models for which low-NO _x burners are available on the market
c. Selective catalytic reduction (SCR)		Not applicable to combustion plants operated < 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants operated between 500 h/yr and 1 500 h/yr. Retrofitting existing combustion plants may be constrained by the availability of sufficient space

Water injection is used on site.

BAT 38. In order to prevent or reduce CO emissions to air from the combustion of gas oil in gas turbines, BAT is to use one or a combination of the techniques given below.

Technique		Description	Applicability
a.	Combustion optimisation	See description in Section 8.3	Generally applicable
b.	Oxidation catalysts		Not applicable to combustion plants operated < 500 h/yr. Retrofitting existing combustion plants may be constrained by the availability of sufficient space

Combustion optimisation is used on site.

As an indication, the emission level for NOX emissions to air from the combustion of gas oil in dual fuel gas turbines for emergency use operated <500 h/yr will generally be 145–250 mg/Nm³ as a daily average or average over the sampling period. The operator already had a limit of 125mg/m³ Daily mean of validated hourly averages and in keeping with the no back sliding principal this has been retained in the reviewed permit.

BAT 39. In order to prevent or reduce SO_x and dust emissions to air from the combustion of gas oil in gas turbines, BAT is to use the technique given below.

Technique		Description	Applicability
a.	Fuel choice	See description in Section 8.4	Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State

The below table places a restriction on the type of fuel to be used on site.

Table S2.1 Raw materials and fuels	
Raw materials and fuel description	Specification
Natural Gas	-
Distillate fuel oil	Not exceeding 0.1% w/w sulphur content

Table 22

BAT-associated emission levels for SO₂ and dust emissions to air from the combustion of gas oil in gas turbines, including dual fuel gas turbines

Type of combustion plant	BAT-AELs (mg/Nm ³)			
	SO ₂		Dust	
	Yearly average ⁽¹⁾	Daily average or average over the sampling period ⁽²⁾	Yearly average ⁽¹⁾	Daily average or average over the sampling period ⁽²⁾
New and existing plants	35–60	50–66	2–5	2–10

⁽¹⁾ These BAT-AELs do not apply to existing plants operated < 1 500 h/yr.

⁽²⁾ For existing plants operated < 500 h/yr, these levels are indicative.

We have applied top of the range AEL's in line with BAT guidance.

In all cases, the minimum BAT requirements are considered to be: i) the continued compliance with any permit requirements already in place to protect air quality and ii) the demonstration of an appropriate maintenance regime to maintain plant emissions performance.

4.4 Any additional key issues e.g. fuel characterisation

BAT 9 requires the operator to carry out fuel characterisation.

We consider that for plants which burn natural gas from the National Grid as a fuel that it is not necessary for the operator to replicate the testing carried out by the National Grid however this needs to be carried out for standby fuel.

We have therefore included an improvement condition in the consolidated variation notice IC11 requiring the operator to submit a plan outlining how this will be carried out for approval prior to the implementation date for the BAT Conclusions.

5 Decision checklist regarding relevant BAT Conclusions

BAT Conclusions for large combustion plant, were published by the European Commission on 17th August 2017. There are 75 BAT Conclusions. Only the BAT Conclusions relevant to the particular fuel type used on site have been replicated below.

This annex provides a record of decisions made in relation to each relevant BAT Conclusion applicable to the installation. This annex should be read in conjunction with the Consolidated Variation Notice.

The conditions in the permit through which the relevant BAT Conclusions are implemented include but are not limited to the following:

BAT Conclusion requirement topic	Permit condition(s)	Permit table(s)
Environmental Management System	1.1.1	S1.2
BAT AELs	3.1.1 and 3.5.1	S3.1a
Monitoring	2.3, 3.5 and 3.6	S1.4, S1.5, S3.1, S3.1a
Energy efficiency	1.2 and 2.3	S3.5
Noise	3.4 and 2.3	S2.1
Other operating techniques	1.2	S1.2

The overall status of compliance with the BAT conclusion is indicated in the table as:

- NA Not Applicable
- CC Currently Compliant
- FC Compliant in the future (within 4 years of publication of BAT conclusions)
- NC Not Compliant
- PC Partially Compliant

BAT Concn. Number	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
General			
1	<p>In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features:</p> <ul style="list-style-type: none"> i. commitment of the management, including senior management; ii. definition of an environmental policy that includes the continuous improvement of the installation by the management; iii. planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment; iv. implementation of procedures <ul style="list-style-type: none"> (a) Structure and responsibility (b) Training (c) Communication (d) Employee involvement (e) Documentation (f) Efficient process control (g) Maintenance programmes (h) Emergency preparedness and response (i) Safeguarding compliance with environmental legislation v. checking performance and taking corrective action, paying particular attention to: <ul style="list-style-type: none"> (a) monitoring and measurement (see also the Reference Document on the General Principles of Monitoring) (b) corrective and preventive action (c) maintenance of records (d) independent (where practicable) internal and external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained; vi. review of the EMS and its continuing suitability, adequacy and effectiveness by senior management; vii. following the development of cleaner technologies; viii. consideration for the environmental impacts from the eventual decommissioning of the installation at the stage of designing a new plant, and throughout its operating life; viii. consideration for the environmental impacts from the eventual decommissioning of the installation at the stage of designing a new plant, and throughout its operating life; ix. application of sectoral benchmarking on a regular basis. <p>Etc - see BAT Conclusions</p>	CC	<p>Burghfield Power Station, as part of CHP and Embedded Generation, operates an EMS which is fully integrated and certified to ISO14001: 2015 Certificate No: GB17/873624.02 The EMS incorporates all the features described in BAT1 (i to Xiii), and the site has site specific procedures and systems in place to address relevant topics listed in BAT 1 x to xvi were relevant and practicable to do so. In relation to xi, & xvi we would note the following:</p> <p>1) BAT 1 xvi - It is not considered necessary to have an odour management plan as the station does not combust or use malodorous substances, therefore this is not considered to be an environmental risk. However, there are procedures in place to review any complaints received which could include those related to odour.</p> <p>2) BAT 1 xi. - see response to BAT 10 & 11.</p>

BAT Concn. Number	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement													
	Applicability. The scope (e.g. level of detail) and nature of the EMS (e.g. standardised or non-standardised) will generally be related to the nature, scale and complexity of the installation, and the range of environmental impacts it may have.															
2	BAT is to determine the net electrical efficiency and/or the net total fuel utilisation and/or the net mechanical energy efficiency of the gasification, IGCC and/or combustion units by carrying out a performance test at full load (1), according to EN standards, after the commissioning of the unit and after each modification that could significantly affect the net electrical efficiency and/or the net total fuel utilisation and/or the net mechanical energy efficiency of the unit. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	CC	The net rated thermal input figure of 134 MWth was calculated from actual performance and plant running data in 2005 (details supplied during revision of permit in 2015). This study was undertaken by URS in 2005 using NET CV basis efficiency calculations, and this demonstrated an efficiency of 34.6% against a design capacity of 36.1%. The MWth figure is therefore based on the MWe of the Gas Turbine.													
3	<p>BAT is to monitor key process parameters relevant for emissions to air and water including those given below.</p> <table border="1" data-bbox="322 970 1491 1145"> <thead> <tr> <th data-bbox="322 970 689 1007">Stream</th> <th data-bbox="689 970 1122 1007">Parameter(s)</th> <th data-bbox="1122 970 1491 1007">Monitoring</th> </tr> </thead> <tbody> <tr> <td data-bbox="322 1007 689 1114" rowspan="3">Flue-gas</td> <td data-bbox="689 1007 1122 1043">Flow</td> <td data-bbox="1122 1007 1491 1043">Periodic or continuous determination</td> </tr> <tr> <td data-bbox="689 1043 1122 1080">Oxygen content, temperature, and pressure</td> <td data-bbox="1122 1043 1491 1080">Periodic or continuous measurement</td> </tr> <tr> <td data-bbox="689 1080 1122 1114">Water vapour content⁽²⁾</td> <td data-bbox="1122 1080 1491 1114"></td> </tr> <tr> <td data-bbox="322 1114 689 1145">Waste water from flue-gas treatment</td> <td data-bbox="689 1114 1122 1145">Flow, pH, and temperature</td> <td data-bbox="1122 1114 1491 1145">Continuous measurement</td> </tr> </tbody> </table>	Stream	Parameter(s)	Monitoring	Flue-gas	Flow	Periodic or continuous determination	Oxygen content, temperature, and pressure	Periodic or continuous measurement	Water vapour content ⁽²⁾		Waste water from flue-gas treatment	Flow, pH, and temperature	Continuous measurement	CC	Burghfield has installed a CEMS system for flue gas emissions. The sampled flue gas is dried before analysis.
Stream	Parameter(s)	Monitoring														
Flue-gas	Flow	Periodic or continuous determination														
	Oxygen content, temperature, and pressure	Periodic or continuous measurement														
	Water vapour content ⁽²⁾															
Waste water from flue-gas treatment	Flow, pH, and temperature	Continuous measurement														
4	<p>BAT is to monitor emissions to air with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.</p> <table border="1" data-bbox="322 1246 1491 1366"> <thead> <tr> <th data-bbox="322 1246 474 1366">Substance/Parameter</th> <th data-bbox="474 1246 790 1366">Fuel/Process/Type of combustion plant</th> <th data-bbox="790 1246 947 1366">Combustion plant total rated thermal input</th> <th data-bbox="947 1246 1126 1366">Standard(s)⁽⁴⁾</th> <th data-bbox="1126 1246 1346 1366">Minimum monitoring frequency⁽⁵⁾</th> <th data-bbox="1346 1246 1491 1366">Monitoring associated with</th> </tr> </thead> <tbody> <tr> <td data-bbox="322 1366 474 1393"></td> <td data-bbox="474 1366 790 1393"></td> <td data-bbox="790 1366 947 1393"></td> <td data-bbox="947 1366 1126 1393"></td> <td data-bbox="1126 1366 1346 1393"></td> <td data-bbox="1346 1366 1491 1393"></td> </tr> </tbody> </table>	Substance/Parameter	Fuel/Process/Type of combustion plant	Combustion plant total rated thermal input	Standard(s) ⁽⁴⁾	Minimum monitoring frequency ⁽⁵⁾	Monitoring associated with							FC	Emissions of NOx and CO to air are measured continuously as required by BAT 3 in accordance with BS EN 15058 and BS EN14792. Equipment and test contractors meet MCERTS requirements. This is for both natural gas and distillate oil firing.	
Substance/Parameter	Fuel/Process/Type of combustion plant	Combustion plant total rated thermal input	Standard(s) ⁽⁴⁾	Minimum monitoring frequency ⁽⁵⁾	Monitoring associated with											

BAT Concn. Number	Summary of BAT Conclusion requirement						Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
	NH ₃	— When SCR and/or SNCR is used	All sizes	Generic EN standards	Continuous ⁽⁶⁾ (7)	BAT 7	<p>NOx: BAT 32, 37, 42 - CO: BAT 33, 38, 44. The site monitors CO and NOX as required by BAT 4 for dual fired turbines. Monitoring is carried out continuously in accordance with EN14181, Local site procedures give specific details of the monitors used.</p> <p>IED Annex V Part 3 (2) (1) Continues monitoring of SO₂ is not required for plants firing Natural gas and for unabated plants firing oil with a known sulphur content. Gas oil not to exceed 0.1% w/w sulphur content. SO₂ concentration by calculation as agreed in writing with the Environment Agency.</p> <p>The site has no emissions monitoring for Dust when utilising gas oil. The site would install continuous dust monitoring equipment to EN13284-1 & EN13284-2 by 31/07/2021</p>	
NO _x	<ul style="list-style-type: none"> — Coal and/or lignite including waste co-incineration — Solid biomass and/or peat including waste co-incineration — HFO- and/or gas-oil-fired boilers and engines — Gas-oil-fired gas turbines — Natural-gas-fired boilers, engines, and turbines — Iron and steel process gases — Process fuels from the chemical industry — IGCC plants 	All sizes	Generic EN standards	Continuous ⁽⁶⁾ (8)	BAT 20 BAT 24 BAT 28 BAT 32 BAT 37 BAT 41 BAT 42 BAT 43 BAT 47 BAT 48 BAT 56 BAT 64 BAT 65 BAT 73			
	— Combustion plants on offshore platforms	All sizes	EN 14792	Once every year ⁽⁹⁾	BAT 53			
N ₂ O	<ul style="list-style-type: none"> — Coal and/or lignite in circulating fluidised bed boilers — Solid biomass and/or peat in circulating fluidised bed boilers 	All sizes	EN 21258	Once every year ⁽¹⁰⁾	BAT 20 BAT 24			
CO	<ul style="list-style-type: none"> — Coal and/or lignite including waste co-incineration — Solid biomass and/or peat including waste co-incineration — HFO- and/or gas-oil-fired boilers and engines — Gas-oil-fired gas turbines 	All sizes	Generic EN standards	Continuous ⁽⁶⁾ (8)	BAT 20 BAT 24 BAT 28 BAT 33 BAT 38 BAT 44 BAT 49 BAT 56 BAT 64 BAT 65 BAT 73			

BAT Concn. Numbe r	Summary of BAT Conclusion requirement					Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
	<ul style="list-style-type: none"> — Natural-gas-fired boilers, engines, and turbines — Iron and steel process gases — Process fuels from the chemical industry — IGCC plants 						
	<ul style="list-style-type: none"> — Combustion plants on offshore platforms 	All sizes	EN 15058	Once every year ⁽⁹⁾	BAT 54		
SO ₂	<ul style="list-style-type: none"> — Coal and/or lignite incl waste co-incineration — Solid biomass and/or peat incl waste co-incineration — HFO- and/or gas-oil-fired boilers — HFO- and/or gas-oil-fired engines — Gas-oil-fired gas turbines — Iron and steel process gases — Process fuels from the chemical industry in boilers — IGCC plants 	All sizes	Generic EN standards and EN 14791	Continuous ⁽⁶⁾ ₍₁₁₎ ₍₁₂₎	BAT 21 BAT 25 BAT 29 BAT 34 BAT 39 BAT 50 BAT 57 BAT 66 BAT 67 BAT 74		
SO ₃	<ul style="list-style-type: none"> — When SCR is used 	All sizes	No EN standard available	Once every year	—		
Gaseous chlorides, expressed as HCl	<ul style="list-style-type: none"> — Coal and/or lignite — Process fuels from the chemical industry in boilers 	All sizes	EN 1911	Once every three months ⁽⁶⁾ ₍₁₃₎ ₍₁₄₎	BAT 21 BAT 57		
	<ul style="list-style-type: none"> — Solid biomass and/or peat 	All sizes	Generic EN standards	Continuous ⁽¹⁵⁾ ₍₁₆₎	BAT 25		
	<ul style="list-style-type: none"> — Waste co-incineration 	All sizes	Generic EN standards	Continuous ⁽⁶⁾ ₍₁₆₎	BAT 66 BAT 67		

BAT Concn. Number	Summary of BAT Conclusion requirement						Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement				
	HF	<ul style="list-style-type: none"> — Coal and/or lignite — Process fuels from the chemical industry in boilers 	All sizes	No EN standard available	Once every three months ⁽⁶⁾ ⁽¹³⁾ ⁽¹⁴⁾	BAT 21 BAT 57						
		— Solid biomass and/or peat	All sizes	No EN standard available	Once every year	BAT 25						
	Dust	<ul style="list-style-type: none"> — Coal and/or lignite — Solid biomass and/or peat — HFO- and/or gas-oil-fired boilers — Iron and steel process gases — Process fuels from the chemical industry in boilers — IGCC plants — HFO- and/or gas-oil-fired engines — Gas-oil-fired gas turbines 	All sizes	Generic EN standards and EN 13284-1 and EN 13284-2	Continuous ⁽⁶⁾ ⁽¹⁷⁾	BAT 22 BAT 26 BAT 30 BAT 35 BAT 39 BAT 51 BAT 58 BAT 75						
		— Waste co-incineration	All sizes	Generic EN standards and EN 13284-2	Continuous	BAT 68 BAT 69						
5	BAT is to monitor emissions to water from flue-gas treatment with at least the frequency given in BAT 5 and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.						N/A	No Flue Gas Treatment on site.				
6	In order to improve the general environmental performance of combustion plants and to reduce emissions to air of CO and unburnt substances, BAT is to ensure optimised combustion and to use an appropriate combination of the techniques given below.						CC	The combustion system is maintained according to original equipment manufacturers recommendations and fitted with an advanced computer based control system to control the				
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Technique</th> <th style="width: 45%;">Description</th> <th style="width: 30%;">Applicability</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>								Technique	Description	Applicability	
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	<table border="1"> <tr> <td data-bbox="331 387 365 475">a.</td> <td data-bbox="365 387 555 475">Fuel blending and mixing</td> <td data-bbox="555 387 994 475">Ensure stable combustion conditions and/or reduce the emission of pollutants by mixing different qualities of the same fuel type</td> <td data-bbox="994 387 1491 475" rowspan="2">Generally applicable</td> </tr> <tr> <td data-bbox="331 475 365 563">b.</td> <td data-bbox="365 475 555 563">Maintenance of the combustion system</td> <td data-bbox="555 475 994 563">Regular planned maintenance according to suppliers' recommendations</td> </tr> <tr> <td data-bbox="331 563 365 651">c.</td> <td data-bbox="365 563 555 651">Advanced control system</td> <td data-bbox="555 563 994 651">See description in Section 8.1</td> <td data-bbox="994 563 1491 651">The applicability to old combustion plants may be constrained by the need to retrofit the combustion system and/or control command system</td> </tr> <tr> <td data-bbox="331 651 365 738">d.</td> <td data-bbox="365 651 555 738">Good design of the combustion equipment</td> <td data-bbox="555 651 994 738">Good design of furnace, combustion chambers, burners and associated devices</td> <td data-bbox="994 651 1491 738">Generally applicable to new combustion plants</td> </tr> <tr> <td data-bbox="331 738 365 959">e.</td> <td data-bbox="365 738 555 959">Fuel choice</td> <td data-bbox="555 738 994 959">Select or switch totally or partially to another fuel(s) with a better environmental profile (e.g. with low sulphur and/or mercury content) amongst the available fuels, including in start-up situations or when back-up fuels are used</td> <td data-bbox="994 738 1491 959">Applicable within the constraints associated with the availability of suitable types of fuel with a better environmental profile as a whole, which may be impacted by the energy policy of the Member State, or by the integrated site's fuel balance in the case of combustion of industrial process fuels. For existing combustion plants, the type of fuel chosen may be limited by the configuration and the design of the plant</td> </tr> </table>	a.	Fuel blending and mixing	Ensure stable combustion conditions and/or reduce the emission of pollutants by mixing different qualities of the same fuel type	Generally applicable	b.	Maintenance of the combustion system	Regular planned maintenance according to suppliers' recommendations	c.	Advanced control system	See description in Section 8.1	The applicability to old combustion plants may be constrained by the need to retrofit the combustion system and/or control command system	d.	Good design of the combustion equipment	Good design of furnace, combustion chambers, burners and associated devices	Generally applicable to new combustion plants	e.	Fuel choice	Select or switch totally or partially to another fuel(s) with a better environmental profile (e.g. with low sulphur and/or mercury content) amongst the available fuels, including in start-up situations or when back-up fuels are used	Applicable within the constraints associated with the availability of suitable types of fuel with a better environmental profile as a whole, which may be impacted by the energy policy of the Member State, or by the integrated site's fuel balance in the case of combustion of industrial process fuels. For existing combustion plants, the type of fuel chosen may be limited by the configuration and the design of the plant		combustion efficiency and support the prevention and/or reduction of emissions
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7	<p>In order to reduce emissions of ammonia to air from the use of selective catalytic reduction (SCR) and/or selective non-catalytic reduction (SNCR) for the abatement of NO_x emissions, BAT is to optimise the design and/or operation of SCR and/or SNCR (e.g. optimised reagent to NO_x ratio, homogeneous reagent distribution and optimum size of the reagent drops).</p> <p>BAT-associated emission levels</p> <p>The BAT-associated emission level (BAT-AEL) for emissions of NH₃ to air from the use of SCR and/or SNCR is < 3–10 mg/Nm³ as a yearly average or average over the sampling period. The lower end of the range can be achieved when using SCR and the upper end of the range can be achieved when using SNCR without wet abatement techniques. In the case of plants combusting biomass and operating at variable loads as well as in the case of engines combusting HFO and/or gas oil, the higher end of the BAT-AEL range is 15 mg/Nm³.</p>	N/A	No abatement fitted.																			
8	In order to prevent or reduce emissions to air during normal operating conditions, BAT is to ensure, by appropriate design, operation and maintenance, that the emission abatement systems are used at optimal capacity and availability.	CC	The plant is unmanned and has the facility to be remotely started. The control systems in place will																			

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			alarm any abnormal situation (and take corrective action if appropriate, e.g. shutting down the unit) , this relayed through to trained and competent staff who have the IT facility to remotely connect into the sites control system and monitor the Air emissions and combustion conditions and such take necessary appropriate action.								
9	<p>In order to improve the general environmental performance of combustion and/or gasification plants and to reduce emissions to air, BAT is to include the following elements in the quality assurance/quality control programmes for all the fuels used, as part of the environmental management system (see BAT 1):</p> <ul style="list-style-type: none"> (i) Initial full characterisation of the fuel used including at least the parameters listed below and in accordance with EN standards. ISO, national or other international standards may be used provided they ensure the provision of data of an equivalent scientific quality; (ii) Regular testing of the fuel quality to check that it is consistent with the initial characterisation and according to the plant design specifications. The frequency of testing and the parameters chosen from the table below are based on the variability of the fuel and an assessment of the relevance of pollutant releases (e.g. concentration in fuel, flue-gas treatment employed); (iii) Subsequent adjustment of the plant settings as and when needed and practicable (e.g. integration of the fuel characterisation and control in the advanced control system (see description in Section 8.1)). <p>Description Initial characterisation and regular testing of the fuel can be performed by the operator and/or the fuel supplier. If performed by the supplier, the full results are provided to the operator in the form of a product (fuel) supplier specification and/or guarantee.</p> <table border="1" data-bbox="322 1161 1496 1361"> <thead> <tr> <th data-bbox="322 1161 712 1193">Fuel(s)</th> <th data-bbox="712 1161 1496 1193">Substances/Parameters subject to characterisation</th> </tr> </thead> <tbody> <tr> <td data-bbox="322 1193 712 1241" rowspan="2">Biomass/peat</td> <td data-bbox="712 1193 1496 1241">— LHV</td> </tr> <tr> <td data-bbox="712 1241 1496 1281">— moisture</td> </tr> <tr> <td data-bbox="322 1281 712 1321" rowspan="2"></td> <td data-bbox="712 1281 1496 1321">— Ash</td> </tr> <tr> <td data-bbox="712 1321 1496 1361">— C, Cl, F, N, S, K, Na</td> </tr> </tbody> </table>	Fuel(s)	Substances/Parameters subject to characterisation	Biomass/peat	— LHV	— moisture		— Ash	— C, Cl, F, N, S, K, Na	CC	<p>Natural gas: this is continuously tested using a gas chromatograph; composition, calorific value and Wobbe index are determined. This data, in accordance with ISO17025,ISO16976, is supplied by the gas meter owner on request from site.</p> <p>The Gas Oil supplied to site is tested by the supplier and the results provided for Ash, N, C & S in the form of supplier specification.</p> <p>See key issues section for further information on the inclusion of an improvement condition to address BAT 9.</p>
Fuel(s)	Substances/Parameters subject to characterisation										
Biomass/peat	— LHV										
	— moisture										
	— Ash										
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	<table border="1"> <tr> <td data-bbox="322 384 712 432"></td> <td data-bbox="712 384 1491 432">— Metals and metalloids (As, Cd, Cr, Cu, Hg, Pb, Zn)</td> </tr> <tr> <td data-bbox="322 432 712 647">Coal/lignite</td> <td data-bbox="712 432 1491 647"> — LHV — Moisture — Volatiles, ash, fixed carbon, C, H, N, O, S — Br, Cl, F — Metals and metalloids (As, Cd, Co, Cr, Cu, Hg, Mn, Ni, Pb, Sb, Ti, V, Zn) </td> </tr> <tr> <td data-bbox="322 647 712 727">HFO</td> <td data-bbox="712 647 1491 727"> — Ash — C, S, N, Ni, V </td> </tr> <tr> <td data-bbox="322 727 712 807">Gas oil</td> <td data-bbox="712 727 1491 807"> — Ash — N, C, S </td> </tr> <tr> <td data-bbox="322 807 712 898">Natural gas</td> <td data-bbox="712 807 1491 898"> — LHV — CH₄, C₂H₆, C₃, C₄₊, CO₂, N₂, Wobbe index </td> </tr> </table>		— Metals and metalloids (As, Cd, Cr, Cu, Hg, Pb, Zn)	Coal/lignite	— LHV — Moisture — Volatiles, ash, fixed carbon, C, H, N, O, S — Br, Cl, F — Metals and metalloids (As, Cd, Co, Cr, Cu, Hg, Mn, Ni, Pb, Sb, Ti, V, Zn)	HFO	— Ash — C, S, N, Ni, V	Gas oil	— Ash — N, C, S	Natural gas	— LHV — CH ₄ , C ₂ H ₆ , C ₃ , C ₄₊ , CO ₂ , N ₂ , Wobbe index		
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Gas oil	— Ash — N, C, S												
Natural gas	— LHV — CH ₄ , C ₂ H ₆ , C ₃ , C ₄₊ , CO ₂ , N ₂ , Wobbe index												
10	<p>In order to reduce emissions to air and/or to water during other than normal operating conditions (OTNOC), BAT is to set up and implement a management plan as part of the environmental management system (see BAT 1), commensurate with the relevance of potential pollutant releases, that includes the following elements:</p> <ul style="list-style-type: none"> — appropriate design of the systems considered relevant in causing OTNOC that may have an impact on emissions to air, water and/or soil (e.g. low-load design concepts for reducing the minimum start-up and shutdown loads for stable generation in gas turbines), — set-up and implementation of a specific preventive maintenance plan for these relevant systems, — review and recording of emissions caused by OTNOC and associated circumstances and implementation of corrective actions if necessary, — periodic assessment of the overall emissions during OTNOC (e.g. frequency of events, duration, emissions quantification/estimation) and implementation of corrective actions if necessary. 	FC	<p>Sites do not have a specific OTNOC management plan, however the EMS incorporates many of the key aspects of BAT 10 & 11. The site operates a risk based review with the EMS (Aspects and impacts) which includes a review of potential impacts of OTNOC. A) Gas Turbine is utilised as a peak lopping machine as such its operation is optimised i) ramped to full load as soon as practicably possible (start to full load in 20mins), minimising time within any start-up period. ii) enabling the NOx abatement system</p>										

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			<p>(water injection) at low loads B) All plant components are included within the site specific preventative maintenance programmes, the frequency of maintenance is dependent on operation of the site. BAT 11: Emissions during start-up and shutdown operations are monitored and reviewed to identify if corrective actions are required. Emissions to atmosphere are assessed as part of the annual environmental performance review carried out by sites. In the event of an accident or environmental incident, we would review the emissions, cause etc. as part of our incident investigation process and ensure any relevant corrective and / or preventive action is implemented. Start-up emissions are typical during plant commissioning since there is a requirement to deviate from normal gas turbine load and/or exhaust temperature profiles in order to complete essential testing and/or control system tuning activities. In such cases, commissioning plans are arranged to minimise additional emissions so far as is reasonable practicable.</p>

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11	<p>BAT is to appropriately monitor emissions to air and/or to water during OTNOC.</p> <p>Description The monitoring can be carried out by direct measurement of emissions or by monitoring of surrogate parameters if this proves to be of equal or better scientific quality than the direct measurement of emissions. Emissions during start-up and shutdown (SU/SD) may be assessed based on a detailed emission measurement carried out for a typical SU/SD procedure at least once every year, and using the results of this measurement to estimate the emissions for each and every SU/SD throughout the year.</p>	CC	The site monitors CO and NOX as required by BAT 4 for dual fired turbines. Monitoring is carried out continuously in accordance with EN14181, Local site procedures give specific details of the monitors used.									
12	In order to increase the energy efficiency of combustion, gasification and/or IGCC units operated $\geq 1\,500$ h/yr, BAT is to use an appropriate combination of the techniques given in BAT 12.	N/A	<1500hrs									
13	<p>In order to reduce water usage and the volume of contaminated waste water discharged, BAT is to use one or both of the techniques given below.</p> <table border="1" data-bbox="322 722 1496 1023"> <thead> <tr> <th data-bbox="322 722 521 759">Technique</th> <th data-bbox="521 722 1066 759">Description</th> <th data-bbox="1066 722 1496 759">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="322 759 521 890">a. Water recycling</td> <td data-bbox="521 759 1066 890">Residual aqueous streams, including run-off water, from the plant are reused for other purposes. The degree of recycling is limited by the quality requirements of the recipient water stream and the water balance of the plant</td> <td data-bbox="1066 759 1496 890">Not applicable to waste water from cooling systems when water treatment chemicals and/or high concentrations of salts from seawater are present</td> </tr> <tr> <td data-bbox="322 890 521 1023">b. Dry bottom ash handling</td> <td data-bbox="521 890 1066 1023">Dry, hot bottom ash falls from the furnace onto a mechanical conveyor system and is cooled down by ambient air. No water is used in the process.</td> <td data-bbox="1066 890 1496 1023">Only applicable to plants combusting solid fuels. There may be technical restrictions that prevent retrofitting to existing combustion plants</td> </tr> </tbody> </table>	Technique	Description	Applicability	a. Water recycling	Residual aqueous streams, including run-off water, from the plant are reused for other purposes. The degree of recycling is limited by the quality requirements of the recipient water stream and the water balance of the plant	Not applicable to waste water from cooling systems when water treatment chemicals and/or high concentrations of salts from seawater are present	b. Dry bottom ash handling	Dry, hot bottom ash falls from the furnace onto a mechanical conveyor system and is cooled down by ambient air. No water is used in the process.	Only applicable to plants combusting solid fuels. There may be technical restrictions that prevent retrofitting to existing combustion plants	CC	Water usage is minimised where plant operation allows. Water recycling is minimal due how the water is used by the Gas Turbine Wet NOx Abatement system however any surplus water is returned back to the water treatment plant.
Technique	Description	Applicability										
a. Water recycling	Residual aqueous streams, including run-off water, from the plant are reused for other purposes. The degree of recycling is limited by the quality requirements of the recipient water stream and the water balance of the plant	Not applicable to waste water from cooling systems when water treatment chemicals and/or high concentrations of salts from seawater are present										
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14	<p>In order to prevent the contamination of uncontaminated waste water and to reduce emissions to water, BAT is to segregate waste water streams and to treat them separately, depending on the pollutant content.</p> <p>Description Waste water streams that are typically segregated and treated include surface run-off water, cooling water, and waste water from flue-gas treatment.</p> <p>Applicability The applicability may be restricted in the case of existing plants due to the configuration of the drainage systems.</p>	CC	Demineralised water is produced on site by a Reverse Osmosis (RO) process. This water has two main process applications. Firstly to control NOx emissions from the LM6000 Gas Turbine by controlling the temperature of the combustion process. Secondly water is also sprayed directly into the compressor to increase the mass flow and provide additional									

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			<p>electrical output (GE Sprint system).</p> <p>The RO plant produces water at an efficiency of about 66% A third of the water is sent to waste, this discharged through the domestic fowl water system and recovered by the regional water/sewage company. However there is a opportunity on site to re-utilise this waste water but only for domestic toilets, etc. But this would be minimal due to the site not manned 24/7.</p>												
15	In order to reduce emissions to water from flue-gas treatment, BAT is to use an appropriate combination of the techniques given in BAT 15, and to use secondary techniques as close as possible to the source in order to avoid dilution.	N/A	No flue gas treatment on site.												
17	<p>In order to reduce noise emissions, BAT is to use one or a combination of the techniques given below.</p> <table border="1" data-bbox="320 916 1494 1385"> <thead> <tr> <th data-bbox="320 916 584 951">Technique</th> <th data-bbox="584 916 1099 951">Description</th> <th data-bbox="1099 916 1494 951">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="320 951 584 1270">a. Operational measures</td> <td data-bbox="584 951 1099 1270"> <p>These include:</p> <ul style="list-style-type: none"> — improved inspection and maintenance of equipment — closing of doors and windows of enclosed areas, if possible — equipment operated by experienced staff — avoidance of noisy activities at night, if possible — provisions for noise control during maintenance activities </td> <td data-bbox="1099 951 1494 1270">Generally applicable</td> </tr> <tr> <td data-bbox="320 1270 584 1326">b. Low-noise equipment</td> <td data-bbox="584 1270 1099 1326">This potentially includes compressors, pumps and disks</td> <td data-bbox="1099 1270 1494 1326">Generally applicable when the equipment is new or replaced</td> </tr> <tr> <td data-bbox="320 1326 584 1385">c. Noise attenuation</td> <td data-bbox="584 1326 1099 1385">Noise propagation can be reduced by inserting obstacles between the emitter and the receiver.</td> <td data-bbox="1099 1326 1494 1385">Generally applicable to new plants. In the case of existing plants, the insertion</td> </tr> </tbody> </table>	Technique	Description	Applicability	a. Operational measures	<p>These include:</p> <ul style="list-style-type: none"> — improved inspection and maintenance of equipment — closing of doors and windows of enclosed areas, if possible — equipment operated by experienced staff — avoidance of noisy activities at night, if possible — provisions for noise control during maintenance activities 	Generally applicable	b. Low-noise equipment	This potentially includes compressors, pumps and disks	Generally applicable when the equipment is new or replaced	c. Noise attenuation	Noise propagation can be reduced by inserting obstacles between the emitter and the receiver.	Generally applicable to new plants. In the case of existing plants, the insertion	CC	<p>The following noise control measures are currently in place at the site.</p> <p>There are preventative and reactive maintenance systems in place to ensure that plant and equipment is appropriately maintained. There is also a Safety and Environmental reporting and investigation system whereby any concerns like excessive noise are raised, investigated and actions allocated for resolution Low Noise Equipment - When equipment is replaced one consideration is sourcing low-noise alternatives where feasible.</p>
Technique	Description	Applicability													
a. Operational measures	<p>These include:</p> <ul style="list-style-type: none"> — improved inspection and maintenance of equipment — closing of doors and windows of enclosed areas, if possible — equipment operated by experienced staff — avoidance of noisy activities at night, if possible — provisions for noise control during maintenance activities 	Generally applicable													
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c. Noise attenuation	Noise propagation can be reduced by inserting obstacles between the emitter and the receiver.	Generally applicable to new plants. In the case of existing plants, the insertion													

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		Appropriate obstacles include protection walls, embankments and buildings	of obstacles may be restricted by lack of space		<ul style="list-style-type: none"> • Detailed Inspection and Maintenance regime including any plant or equipment whose deterioration may give rise to increase in noise. • Scheduled vibration monitoring to indicate potential failures, reducing potential noise sources. • The gas turbine enclosure were designed to reduce environmental noise. • All enclosure doors are high performance acoustic door sets and are kept closed except for access and egress. All ventilation openings are fitted with attenuators to reduce noise breakout from the enclosure. • Noise attenuators are fitted to the main stack. • A dedicated brick/steel building has been introduced of which encloses the sites three gas compressors. The walls are clad with sound attenuating reclaimed composite material. • Suitably trained and experienced staff are employed for plant operations. • Inspections and Maintenance activities are subject to rigorous planning where all environmental issues are considered and managed appropriately. 	
d.	Noise-control equipment	This includes: — noise-reducers — equipment insulation — enclosure of noisy equipment — soundproofing of buildings	The applicability may be restricted by lack of space			
e.	Appropriate location of equipment and buildings	Noise levels can be reduced by increasing the distance between the emitter and the receiver and by using buildings as noise screens	Generally applicable to new plant			
Combustion of liquid fuels						

BAT Concn. Number	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement																		
36	<p>BAT-associated energy efficiency levels (BAT-AEELs) for HFO and/or gas oil combustion in boilers</p> <table border="1" data-bbox="322 411 1491 647"> <thead> <tr> <th data-bbox="322 411 786 608" rowspan="3">Type of combustion unit</th> <th colspan="4" data-bbox="786 411 1491 448">BAT-AEELs ⁽⁹⁹⁾ ₍₁₀₀₎</th> </tr> <tr> <th colspan="2" data-bbox="786 448 1249 544">Net electrical efficiency (%)</th> <th colspan="2" data-bbox="1249 448 1491 544">Net total fuel utilisation (%) ⁽¹⁰¹⁾</th> </tr> <tr> <th data-bbox="786 544 1016 608">New unit</th> <th data-bbox="1016 544 1249 608">Existing unit</th> <th data-bbox="1249 544 1368 608">New unit</th> <th data-bbox="1368 544 1491 608">Existing unit</th> </tr> </thead> <tbody> <tr> <td data-bbox="322 608 786 647">HFO- and/or gas-oil-fired boiler</td> <td data-bbox="786 608 1016 647">> 36,4</td> <td data-bbox="1016 608 1249 647">35,6–37,4</td> <td data-bbox="1249 608 1368 647">80–96</td> <td data-bbox="1368 608 1491 647">80–96</td> </tr> </tbody> </table>	Type of combustion unit	BAT-AEELs ⁽⁹⁹⁾ ₍₁₀₀₎				Net electrical efficiency (%)		Net total fuel utilisation (%) ⁽¹⁰¹⁾		New unit	Existing unit	New unit	Existing unit	HFO- and/or gas-oil-fired boiler	> 36,4	35,6–37,4	80–96	80–96	N/A	OCGT burning natural gas <1500hrs/yr or OCGT burning gas oil <500hrs/yr hence BAT-AEEL's not applicable.
Type of combustion unit	BAT-AEELs ⁽⁹⁹⁾ ₍₁₀₀₎																				
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Technique	Description	Applicability																			
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38	<p>In order to prevent or reduce CO emissions to air from the combustion of gas oil in gas turbines, BAT is to use one or a combination of the techniques given below.</p> <table border="1" style="width: 100%;"> <thead> <tr> <th>Technique</th> <th>Description</th> <th>Applicability</th> </tr> </thead> <tbody> <tr> <td>a. Combustion optimisation</td> <td rowspan="2">See description in Section 8.3</td> <td>Generally applicable</td> </tr> <tr> <td>b. Oxidation catalysts</td> <td>Not applicable to combustion plants operated < 500 h/yr. Retrofitting existing combustion plants may be constrained by the availability of sufficient space</td> </tr> </tbody> </table> <p>As an indication, the emission level for NO_x emissions to air from the combustion of gas oil in dual fuel gas turbines for emergency use operated < 500 h/yr will generally be 145–250 mg/Nm³ as a daily average or average over the sampling period.</p>	Technique	Description	Applicability	a. Combustion optimisation	See description in Section 8.3	Generally applicable	b. Oxidation catalysts	Not applicable to combustion plants operated < 500 h/yr. Retrofitting existing combustion plants may be constrained by the availability of sufficient space	CC	The combustion system is maintained according to original equipment manufacturers recommendations. Retrofitting of a oxidation catalyst system is not applicable to combustion plant operated <500 h/yr																									
Technique	Description	Applicability																																		
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BAT Concn. Number	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement																										
39	<p>In order to prevent or reduce SO_x and dust emissions to air from the combustion of gas oil in gas turbines, BAT is to use the technique given below.</p> <table border="1" data-bbox="322 440 1491 536"> <thead> <tr> <th>Technique</th> <th>Description</th> <th>Applicability</th> </tr> </thead> <tbody> <tr> <td>a. Fuel choice</td> <td>See description in Section 8.4</td> <td>Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State</td> </tr> </tbody> </table> <p>BAT-associated emission levels for SO₂ and dust emissions to air from the combustion of gas oil in gas turbines, including dual fuel gas turbines</p> <table border="1" data-bbox="322 592 1491 807"> <thead> <tr> <th rowspan="3">Type of combustion plant</th> <th colspan="4">BAT-AELs (mg/Nm³)</th> </tr> <tr> <th colspan="2">SO₂</th> <th colspan="2">Dust</th> </tr> <tr> <th>Yearly average ⁽¹³⁴⁾</th> <th>Daily average or average over the sampling period ⁽¹³⁵⁾</th> <th>Yearly average ⁽¹³⁴⁾</th> <th>Daily average or average over the sampling period ⁽¹³⁵⁾</th> </tr> </thead> <tbody> <tr> <td>New and existing plants</td> <td>35–60</td> <td>50–66</td> <td>2–5</td> <td>2–10</td> </tr> </tbody> </table>	Technique	Description	Applicability	a. Fuel choice	See description in Section 8.4	Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State	Type of combustion plant	BAT-AELs (mg/Nm ³)				SO ₂		Dust		Yearly average ⁽¹³⁴⁾	Daily average or average over the sampling period ⁽¹³⁵⁾	Yearly average ⁽¹³⁴⁾	Daily average or average over the sampling period ⁽¹³⁵⁾	New and existing plants	35–60	50–66	2–5	2–10	N/A	Only utilising Gas Oil for <500 hrs/yr.		
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40	<p>In order to increase the energy efficiency of natural gas combustion, BAT is to use an appropriate combination of the techniques given in BAT 12 and below.</p> <table border="1" data-bbox="322 922 1491 1169"> <thead> <tr> <th>Technique</th> <th>Description</th> <th>Applicability</th> </tr> </thead> <tbody> <tr> <td>a. Combined cycle</td> <td>See description in Section 8.2</td> <td>Generally applicable to new gas turbines and engines except when operated < 1 500 h/yr. Applicable to existing gas turbines and engines within the constraints associated with the steam cycle design and the space availability. Not applicable to existing gas turbines and engines operated < 1 500 h/yr. Not applicable to mechanical drive gas turbines operated in discontinuous mode with extended load variations and frequent start-ups and shutdowns. Not applicable to boilers</td> </tr> </tbody> </table> <p>BAT-associated energy efficiency levels (BAT-AEELs) for the combustion of natural gas</p> <table border="1" data-bbox="322 1198 1491 1353"> <thead> <tr> <th rowspan="3">Type of combustion unit</th> <th colspan="4">BAT-AEELs ⁽¹³⁶⁾ ⁽¹³⁷⁾</th> </tr> <tr> <th colspan="2">Net electrical efficiency (%)</th> <th rowspan="2">Net total fuel utilisation (%) ⁽¹³⁸⁾ ⁽¹³⁹⁾</th> <th colspan="2">Net mechanical energy efficiency (%) ⁽¹³⁹⁾ ⁽¹⁴⁰⁾</th> </tr> <tr> <th>New unit</th> <th>Existing unit</th> <th>New unit</th> <th>Existing unit</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Technique	Description	Applicability	a. Combined cycle	See description in Section 8.2	Generally applicable to new gas turbines and engines except when operated < 1 500 h/yr. Applicable to existing gas turbines and engines within the constraints associated with the steam cycle design and the space availability. Not applicable to existing gas turbines and engines operated < 1 500 h/yr. Not applicable to mechanical drive gas turbines operated in discontinuous mode with extended load variations and frequent start-ups and shutdowns. Not applicable to boilers	Type of combustion unit	BAT-AEELs ⁽¹³⁶⁾ ⁽¹³⁷⁾				Net electrical efficiency (%)		Net total fuel utilisation (%) ⁽¹³⁸⁾ ⁽¹³⁹⁾	Net mechanical energy efficiency (%) ⁽¹³⁹⁾ ⁽¹⁴⁰⁾		New unit	Existing unit	New unit	Existing unit							N/A	Existing unit operating, <1500hrs/yr
Technique	Description	Applicability																											
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	Gas engine	39,5–44 ⁽¹⁴¹⁾	35–44 ⁽¹⁴¹⁾	56–85 ⁽¹⁴¹⁾	No BAT-AEEL.																											
	Gas-fired boiler	39–42,5	38–40	78–95	No BAT-AEEL.																											
	Open cycle gas turbine, ≥ 50 MW _{th}	36–41,5	33–41,5	No BAT-AEEL	36,5–41 33,5–41																											
	Combined cycle gas turbine (CCGT)																															
	CCGT, 50–600 MW _{th}	53–58,5	46–54	No BAT-AEEL	No BAT-AEEL																											
	CCGT, ≥ 600 MW _{th}	57–60,5	50–60	No BAT-AEEL	No BAT-AEEL																											
	CHP CCGT, 50–600 MW _{th}	53–58,5	46–54	65–95	No BAT-AEEL																											
	CHP CCGT, ≥ 600 MW _{th}	57–60,5	50–60	65–95	No BAT-AEEL																											
41	In order to prevent or reduce NO _x emissions to air from the combustion of natural gas in boilers, BAT is to use one or a combination of the techniques given below.					N/A	No LCP size boiler on site																									
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42	In order to prevent or reduce NO _x emissions to air from the combustion of natural gas in gas turbines, BAT is to use one or a combination of the techniques given below.			CC	<p>NO_x emissions are controlled by the direct injection of demineralised water into the combustion system as a diluent for reducing combustion temperature. The control system derives the water injection rates as a function fuel flow. To accommodate small seasonal changes in atmospheric changes and changes in fuel quality, as well as the addition of further water as part of the power augmentation system, the control system will trim the water injection rates so as to control the emissions within our ELV's.</p> <p>The water injection system starts to admit water at around 19MW (42%). Ensuring that the units current emission levels are within the ELV's by the end of our defined start up period (32MW - 71% load)</p> <p>The combustion system, as with the water injection system is</p>																		
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44	<p>In order to prevent or reduce CO emissions to air from the combustion of natural gas, BAT is to ensure optimised combustion and/or to use oxidation catalysts. Description - See descriptions in Section 8.3. BAT-associated emission levels (BAT-AELs) for NO_x emissions to air from the combustion of natural gas in gas turbines</p> <table border="1"> <thead> <tr> <th data-bbox="322 1246 786 1362" rowspan="2">Type of combustion plant</th> <th data-bbox="786 1246 1028 1362" rowspan="2">Combustion plant total rated thermal input (MW_{th})</th> <th colspan="2" data-bbox="1028 1246 1496 1278">BAT-AELs (mg/Nm³) ⁽¹⁴²⁾ ⁽¹⁴³⁾</th> </tr> <tr> <th data-bbox="1028 1278 1252 1362">Yearly average ⁽¹⁴⁴⁾ ⁽¹⁴⁵⁾</th> <th data-bbox="1252 1278 1496 1362">Daily average or average over the sampling period</th> </tr> </thead> <tbody> <tr> <td data-bbox="322 1362 786 1388"></td> <td data-bbox="786 1362 1028 1388"></td> <td data-bbox="1028 1362 1252 1388"></td> <td data-bbox="1252 1362 1496 1388"></td> </tr> </tbody> </table>	Type of combustion plant	Combustion plant total rated thermal input (MW _{th})	BAT-AELs (mg/Nm ³) ⁽¹⁴²⁾ ⁽¹⁴³⁾		Yearly average ⁽¹⁴⁴⁾ ⁽¹⁴⁵⁾	Daily average or average over the sampling period					CC	Unlike NO _x , CO increases as a function of the flame temperature being cooled. For this reason, hourly CO emissions are often close to the current ELV when the plant is operating in certain atmospheric conditions and at full load (45MW). In certain circumstances the control system will try to reduce water injection				
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6. Emissions to Water

The consolidated permit incorporates the ten current discharges to controlled waters identified as W1 to W2.

There are no BAT AELs specified in the BAT Conclusions for this type of plant. There are also no additional treatment options identified as BAT for the installation. We have therefore not carried out any additional assessment of the emissions to water as part of this review.

8 Additional IED Chapter II requirements:

In the event of a black out National Grid would call on combustion plant to operate and may require them to do so outside their permitted conditions. We have dedicated black start plant and they are permitted to run as such but this scenario is relevant to the rest of the large combustion plant which could be called depending on the circumstances.

A risk assessment will be carried out by Energy UK/Joint Environmental Programme on behalf of Large Combustion Plant connected to the National Transmission System. Air emissions modelling will be based on generic black start scenarios to establish whether they have the potential to have local impact on the environment or not (on a national basis). If the modelling demonstrates that no significant impacts are likely, the plant can operate under condition 2.3.10. This conditions allows the hourly ELVs for plants operating under a black start instruction to be discounted for the purpose of reporting. We would also require there to be a procedure in place for minimisation of emissions in the case of a black start event and for reporting in the event of a black start. This modelling and the procedures have not been agreed in advance of the issue of the permit review and therefore a condition linking back to an improvement condition have been included in the permit.

The BAT for balancing plant guidance (Draft V9, 2017) sets out additional restrictions on hours for <1500 hour non-emergency plant which are low efficiency. Table 1 of the guidance sets out categories for LCP peaking plant. The LCP at Burghfield falls into category A because it's NO_x emissions are below 500mg/m³ and its efficiency at 34% is above that set out in table 2 of the guidance. Table 1 therefore confirms that there are no additional restrictions applied to the hours of operation.

9 Review and assessment of changes that are not part of the BAT Conclusions derived permit review.

This document should be read in conjunction with the application, supporting information and notice.

Aspect considered	Decision
Receipt of application	
Confidential information	A claim for commercial or industrial confidentiality has not been made.
Identifying confidential information	We have not identified information provided as part of the application that we consider to be confidential.
The site	
Extent of the site of the facility	The operator has provided a plan which we consider is satisfactory, showing the extent of the site of the facility. The plan is included in the permit.
Biodiversity, heritage, landscape and nature conservation	<p>The application is within the relevant distance criteria of a site of heritage, landscape or nature conservation, and/or protected species or habitat.</p> <p>A full assessment of the application and its potential to affect the site(s)/species/habitat has not been carried out as part of the permit review process. We consider that the review will not affect the features of the site(s)/species/habitat as the conditions will provide at least the same level of protection as those in the previous permit and in some cases will provide a higher level of protection to those in the previous permit.</p> <p>We have not consulted Natural England on the application. The decision was taken in accordance with our guidance.</p>
Operating techniques	
General operating techniques	<p>We have reviewed the techniques used by the operator where they are relevant to the BAT Conclusions and compared these with the relevant guidance notes.</p> <p>The permit conditions ensure compliance with the relevant BREF, BAT Conclusions. The ELVs deliver compliance with the BAT-AELs.</p>

Aspect considered	Decision
Permit conditions	
Updating permit conditions during consolidation	We have updated permit conditions to those in the current generic permit template as part of permit consolidation. The conditions will provide at least the same level of protection as those in the previous permit and in some cases will provide a higher level of protection to those in the previous permit.
Changes to the permit conditions due to an Environment Agency initiated variation	We have varied the permit as stated in the variation notice.
Improvement programme	<p>Based on the information on the application, we consider that we need to impose an improvement programme.</p> <p>We have imposed an improvement programme to ensure that:</p> <ul style="list-style-type: none"> • IC13, Define an output load or operational parameters and provide a written justification for when the dry low NO_x operation is effective. The report shall also include the NO_x profile through effective dry low NO_x to 70% and then to full load. • IC11, the operator will have a plan in place to ensure that the fuel is characterised in line with BAT 9. • IC12 submit an impact assessment demonstrating that there is no significant environmental risk associated with black start operations and propose a methodology for minimisation of environmental impact during such a period of operation and for reporting instances of black start operation.
Emission limits	<p>We have decided that emission limits should be set for the parameters listed in the permit.</p> <p>These are described in the relevant BAT Conclusions in Section 5 of this document.</p> <p>It is considered that the ELVs/equivalent parameters or technical measures described above will ensure that significant pollution of the environment is prevented and a high level of protection for the environment is secured.</p>
Monitoring	<p>We have decided that monitoring should be carried out for the parameters listed in the permit, using the methods detailed and to the frequencies specified.</p> <p>These are described in the relevant BAT Conclusions in Section 5 of this document.</p> <p>Table S3.5 Process monitoring requirements was amended to include the requirement to monitor energy efficiency after overhauls on site in line with BAT2.</p>

Aspect considered	Decision
	Based on the information in the application we are [not fully] satisfied that the operator's techniques, personnel and equipment have either MCERTS certification or MCERTS accreditation as appropriate.
Reporting	<p>We have specified reporting in the permit for the following parameters:</p> <ul style="list-style-type: none"> • Nitrogen dioxide • Carbon monoxide • Sulphur dioxide • Dust <p>These are described in the relevant BAT Conclusions in Section 5 of this document.</p>
Operator competence	
Management system	There is no known reason to consider that the operator will not have the management system to enable it to comply with the permit conditions.
Growth Duty	
Section 108 Deregulation Act 2015 – Growth duty	<p>We have considered our duty to have regard to the desirability of promoting economic growth set out in section 108(1) of the Deregulation Act 2015 and the guidance issued under section 110 of that Act in deciding whether to grant this permit.</p> <p>Paragraph 1.3 of the guidance says:</p> <p>“The primary role of regulators, in delivering regulation, is to achieve the regulatory outcomes for which they are responsible. For a number of regulators, these regulatory outcomes include an explicit reference to development or growth. The growth duty establishes economic growth as a factor that all specified regulators should have regard to, alongside the delivery of the protections set out in the relevant legislation.”</p> <p>We have addressed the legislative requirements and environmental standards to be set for this operation in the body of the decision document above. The guidance is clear at paragraph 1.5 that the growth duty does not legitimise non-compliance and its purpose is not to achieve or pursue economic growth at the expense of necessary protections.</p> <p>We consider the requirements and standards we have set in this permit are reasonable and necessary to avoid a risk of an unacceptable level of pollution. This also promotes growth amongst legitimate operators because the standards applied to the operator are consistent across businesses in this sector and have been set to achieve the required legislative standards.</p>