

## 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/TP3338LC  
The Operator is: Leven Power Limited  
The Installation is: Leven Power Limited  
This Variation Notice number is: EPR/TP3338LC/V004

### 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 17<sup>th</sup> 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
- 2.1 Requesting information to demonstrate compliance with BAT 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 Review and assessment of derogation requests made by the operator in relation to BAT Conclusions which include an associated emission level (AEL) value
- 7 Emissions to Water
- 8 Additional IED Chapter II requirements
- 9 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
CROW	Countryside and rights of way Act 2000
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
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 2010 No. 1154)
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 <sub>2</sub> expressed as NO <sub>2</sub> )
SGN	Sector guidance note
TGN	Technical guidance note
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 1 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 17<sup>th</sup> August 2021, which will then ensure that operations meet the revised standard, or
- Justifies why standards will not be met by 17<sup>th</sup> 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 21 December 2018.

We considered that the response did not contain sufficient information for us to commence the permit review. We therefore issued a further information request to the Operator on 21 January 2019. Suitable further information was provided by the Operator on 28 January 2019.

## **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)
- Availability of NO<sub>x</sub> reduction techniques for existing gas turbines operating <500 hours per year
- BAT 9 characterisation of fuel

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 demonstrate that an alternative limit was more appropriate.

The LCP on site is one 80MWth Open Cycle Gas Turbine (OCGT) which runs on kerosene (LCP 212).

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

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

- <500 hours non emergency plant

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.

The indicative emission level for combustion of gas oil in dual fuel gas turbines operating less than 500 hours per year is 250mg/m<sup>3</sup>. This indicative emission level is not strictly applicable to LCP4, because the gas turbine within LCP4 are not dual fuel. There is no limit specifically applicable to oil fire gas turbines and therefore we have therefore set the indicative emission limit in the revised and consolidated permit notice at 350 mg/Nm<sup>3</sup> based on the emission level that the operator reported the gas turbine can achieve in a previous permit application. As this is not significantly higher than the indicative limit for dual fuel gas turbines, we consider this limit to be appropriate for this plant. We consider that setting a NOx limit for this type of plant is consistent with how we regulate smaller plant under the Specified Generator regulations.

The following table outlines the limits that have been incorporated into the permit for LCP 212, where these were derived from and the reference periods at which they apply. The emission limits and monitoring requirements have been incorporated into Schedule 3 of the permit.

<b>Plant type</b>	Open Cycle Gas Turbine
<b>Age</b>	Permitted <b>before</b> publication of the LCP BREF and <b>before</b> IED
<b>Operating Hours</b>	Less than 500 hours/year non-emergency
<b>Fuel</b>	Kerosene

NOx limits (mg/Nm <sup>3</sup> )						
Averaging	IED (Annex V Part 1) - Existing	BREF	Expected permit limits	Basis	Limits apply	Monitoring
Annual	None	None	None	NA	NA	Concentration by calculation
Monthly	None	None	None	NA	NA	
Daily	None	None	350 (achievable level within benchmark range)	350 (achievable level within benchmark range)	NA	
95 <sup>th</sup> %ile of hr means	None	None	None	NA	NA	

CO limits (mg/Nm <sup>3</sup> )						
Averaging	IED (Annex V Part 1) - Existing	BREF	Expected permit limits	Basis	Limits apply	Monitoring
Annual	None	None	None	NA	NA	

Monthly	None	None	None	NA	NA	NA
Daily	None	None	None	NA	NA	
95 <sup>th</sup> %ile of hr means	None	None	None	NA	NA	

SO <sub>2</sub> limits (mg/Nm <sup>3</sup> ) – <i>indicative limits in italics</i>						
Averaging	IED (Annex V Part 1) - Existing	BREF	Expected permit limits	Basis	Limits apply	Monitoring
Annual	None	None	None <sup>Note 1</sup>	NA	NA	Concentration by calculation
Monthly	None	None	None	NA	NA	
Daily	None	66	66	BREF	NA	
95 <sup>th</sup> %ile of hr means	None	None	None	NA	NA	

**Note 1:** The BAT Conclusions specify that the annual AELs are not applicable to plants operating <1500 hours.

Dust limits (mg/Nm <sup>3</sup> ) – <i>indicative limits in italics</i>						
Averaging	IED (Annex V Part 1) - Existing	BREF	Expected permit limits	Basis	Limits apply	Monitoring
Annual	None	None	None <sup>Note 1</sup>	NA	NA	Concentration by calculation
Monthly	None	None	None	NA	NA	
Daily	None	10	10	BREF	NA	
95 <sup>th</sup> %ile of hr means	None	None	None	NA	NA	

**Note 1:** The BAT Conclusions that the annual AELs are not applicable to plants operating <1500 hours.

#### 4.2 The energy efficiency levels associated with the Best Available Techniques Conclusions

An energy efficiency level associated with the best available techniques (BAT-AEEL) refers to the ratio between the combustion unit's net energy output(s) and the combustion unit's fuel/feedstock energy input at actual unit design. The net energy output(s) is determined at the combustion unit boundaries, including auxiliary systems (e.g. flue-gas treatment systems), and for the unit operated at full load.

Table 21 of the BAT Conclusions specifies that the AEELs for this type of plant are not applicable to plant operating less than 1500 hours per year. We have therefore not assessed this operational aspect of the plant. We have however included a process monitoring requirement in table S3.3 of the consolidated variation notice. This is required to demonstrate that efficiency levels are maintained following any significant overhauls of equipment in order to fulfil the requirement of BAT Conclusion 2. For <500 hour plant we have specified that the assessment of efficiency can be based on calculation. This

is because we will not require plant to fire up with the sole purpose of carrying out an assessment of efficiency.

#### **4.3 Availability of NOx reduction techniques for existing gas turbines operating <500 hours per year**

For the gas turbine LCP 212 the operator did not provide a BAT assessment for emissions of NOx associated with BAT Conclusion 37 which specifies that BAT is to use one or a combination of the following techniques: water/steam addition, Low-NOx burners (LNB) and selective catalytic reduction (SCR).

The BAT Conclusion specifies that SCR is not applicable to combustion plants operating less than 500 hours.

The original permit application outlined that water injection was in use but resulted in damage to the combustion chamber (Pollution Prevention and Control Application, 2006). The LCP subsequently commenced operating without water injection. The application states that although NOx concentrations from the gas turbine increased, emissions of carbon monoxide and un-burnt hydrocarbons decreased. An emissions impact assessment was carried out at the time which concluded that the operation of the gas turbine without water injection would not have a significant impact on air quality. We accept that this method of abatement was not effective for this LCP.

Subsequent additional information provided by the operator on 28 January 2019 confirmed that the dry low NOx (DLN) burners have not been retrofitted.

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 including consideration of the feasibility of retrofitting of DLN burners.

LCP 212 was installed in approximately 1994 and is a Rolls Royce SK30. The cost benefit analysis (Appendix A to the JEP document) concludes that retrofitting DLN or WLE to existing OCGTs firing gas oil, and operating for less than 500 hour per year, is not justified from a cost-benefit perspective. Meaning there is insufficient environmental benefit in reducing the already low annual mass emission, when considering the high conversion costs.

The minimum BAT requirements for these types of plant 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.

We consider that the techniques reported under BAT Conclusion 37 are not appropriate for application to LCP 212.

#### **4.4 Fuel characterisation**

BAT 9 requires the operator to carry out fuel characterisation.

We have therefore included an improvement condition in the consolidated variation notice IC9 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 17<sup>th</sup> 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	S3.1a
Energy efficiency	1.2 and 2.3	S3.3
Noise	3.4 and 2.3	S1.2
Other operating techniques	2.3	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	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
<b>General</b>			
1	<p><b>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:</b></p> <ul style="list-style-type: none"> <li>i. commitment of the management, including senior management;</li> <li>ii. definition of an environmental policy that includes the continuous improvement of the installation by the management;</li> <li>iii. planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment;</li> <li>iv. implementation of procedures <ul style="list-style-type: none"> <li>(a) Structure and responsibility</li> <li>(b) Training</li> <li>(c) Communication</li> <li>(d) Employee involvement</li> <li>(e) Documentation</li> <li>(f) Efficient process control</li> <li>(g) Maintenance programmes</li> <li>(h) Emergency preparedness and response</li> <li>(i) Safeguarding compliance with environmental legislation</li> </ul> </li> <li>v. checking performance and taking corrective action, paying particular attention to: <ul style="list-style-type: none"> <li>(a) monitoring and measurement (see also the Reference Document on the General Principles of Monitoring)</li> <li>(b) corrective and preventive action</li> <li>(c) maintenance of records</li> <li>(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;</li> </ul> </li> <li>vi. review of the EMS and its continuing suitability, adequacy and effectiveness by senior management;</li> <li>vii. following the development of cleaner technologies;</li> <li>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;</li> <li>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;</li> <li>ix. application of sectoral benchmarking on a regular basis.</li> </ul> <p>Etc - see BAT Conclusions</p>	CC	The EMS in place is certified to ISO 14001. The operator has confirmed it is compliant with the BAT Conclusion.

BAT Concn. Number	Summary of BAT Conclusion requirement	Status	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement												
	<p><b>Applicability.</b> 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.</p>														
2	<p>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.</p>	CC	<p>Calculations of efficiency were submitted with the original permit application – We have considered the efficiency in line with the BAT for Balancing Plant Guidance see section 8 for further information.</p> <p>The BAT AEELs are not applicable to plant operating &lt;1500 hours.</p> <p>A process monitoring requirement has been set in table S3.3 which requires energy efficiency monitoring after an overhaul.</p>												
3	<p><b>BAT is to monitor key process parameters relevant for emissions to air and water including those given below.</b></p> <table border="1" data-bbox="322 946 1456 1166"> <thead> <tr> <th data-bbox="322 946 676 978">Stream</th> <th data-bbox="676 946 1095 978">Parameter(s)</th> <th data-bbox="1095 946 1456 978">Monitoring</th> </tr> </thead> <tbody> <tr> <td data-bbox="322 978 676 1107" rowspan="3">Flue-gas</td> <td data-bbox="676 978 1095 1010">Flow</td> <td data-bbox="1095 978 1456 1010">Periodic or continuous determination</td> </tr> <tr> <td data-bbox="676 1010 1095 1074">Oxygen content, temperature, and pressure</td> <td data-bbox="1095 1010 1456 1074" rowspan="2">Periodic or continuous measurement</td> </tr> <tr> <td data-bbox="676 1074 1095 1107">Water vapour content (%)</td> </tr> <tr> <td data-bbox="322 1107 676 1166">Waste water from flue-gas treatment</td> <td data-bbox="676 1107 1095 1166">Flow, pH, and temperature</td> <td data-bbox="1095 1107 1456 1166">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 (%)	Waste water from flue-gas treatment	Flow, pH, and temperature	Continuous measurement	NA	<p>The indicative AELs in the permit will be monitored through concentration by calculation and therefore the parameters in BAT 3 are not required.</p>
Stream	Parameter(s)	Monitoring													
Flue-gas	Flow	Periodic or continuous determination													
	Oxygen content, temperature, and pressure	Periodic or continuous measurement													
	Water vapour content (%)														
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 1270 1456 1385"> <thead> <tr> <th data-bbox="322 1270 470 1385">Substance/Parameter</th> <th data-bbox="470 1270 777 1385">Fuel/Process/Type of combustion plant</th> <th data-bbox="777 1270 927 1385">Combustion plant total rated thermal input</th> <th data-bbox="927 1270 1099 1385">Standard(s) (1)</th> <th data-bbox="1099 1270 1312 1385">Minimum monitoring frequency (2)</th> <th data-bbox="1312 1270 1456 1385">Monitoring associated with</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Substance/Parameter	Fuel/Process/Type of combustion plant	Combustion plant total rated thermal input	Standard(s) (1)	Minimum monitoring frequency (2)	Monitoring associated with							NA	<p>Monitoring requirements for NO<sub>2</sub>, SO<sub>2</sub> and dust have been added to the permit. The indicative AELs will be calculated through concentration by calculation as the site operates &lt;500 hours and we</p>
Substance/Parameter	Fuel/Process/Type of combustion plant	Combustion plant total rated thermal input	Standard(s) (1)	Minimum monitoring frequency (2)	Monitoring associated with										

BAT Concn. Number	Summary of BAT Conclusion requirement						Status	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
	NO <sub>x</sub>	<ul style="list-style-type: none"> <li>— Coal and/or lignite including waste co-incineration</li> <li>— Solid biomass and/or peat including waste co-incineration</li> <li>— HFO- and/or gas-oil-fired boilers and engines</li> <li>— Gas-oil-fired gas turbines</li> <li>— Natural-gas-fired boilers, engines, and turbines</li> <li>— Iron and steel process gases</li> <li>— Process fuels from the chemical industry</li> <li>— IGCC plants</li> </ul>	All sizes	Generic EN standards	Continuous <sup>(6)</sup> <sup>(8)</sup>	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		<p>will not require the plant to fire up for monitoring purposes only.</p> <p>There is no SCR/SNCR on site and therefore no requirement to monitor ammonia or SO<sub>3</sub>.</p>
	— Combustion plants on offshore platforms	All sizes	EN 14792	Once every year <sup>(9)</sup>	BAT 53			
	CO	<ul style="list-style-type: none"> <li>— Coal and/or lignite including waste co-incineration</li> <li>— Solid biomass and/or peat including waste co-incineration</li> <li>— HFO- and/or gas-oil-fired boilers and engines</li> <li>— Gas-oil-fired gas turbines</li> <li>— Natural-gas-fired boilers, engines, and turbines</li> <li>— Iron and steel process gases</li> <li>— Process fuels from the chemical industry</li> <li>— IGCC plants</li> </ul>	All sizes	Generic EN standards	Continuous <sup>(6)</sup> <sup>(8)</sup>	BAT 20 BAT 24 BAT 28 BAT 33 BAT 38 BAT 44 BAT 49 BAT 56 BAT 64 BAT 65 BAT 73		



BAT Concn. Number	Summary of BAT Conclusion requirement						Status	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
		— Combustion plants on offshore platforms	All sizes	EN 15058	Once every year <sup>(9)</sup>	BAT 54		
	SO <sub>2</sub>	<ul style="list-style-type: none"> <li>— Coal and/or lignite incl waste co-incineration</li> <li>— Solid biomass and/or peat incl waste co-incineration</li> <li>— HFO- and/or gas-oil-fired boilers</li> <li>— HFO- and/or gas-oil-fired engines</li> <li>— Gas-oil-fired gas turbines</li> <li>— Iron and steel process gases</li> <li>— Process fuels from the chemical industry in boilers</li> <li>— IGCC plants</li> </ul>	All sizes	Generic EN standards and EN 14791	Continuous <sup>(6)</sup> , <sup>(11)</sup> , <sup>(13)</sup>	BAT 21 BAT 25 BAT 29 BAT 34 BAT 39 BAT 50 BAT 57 BAT 66 BAT 67 BAT 74		
	SO <sub>3</sub>	— When SCR is used	All sizes	No EN standard available	Once every year	—		
	Dust	<ul style="list-style-type: none"> <li>— Coal and/or lignite</li> <li>— Solid biomass and/or peat</li> <li>— HFO- and/or gas-oil-fired boilers</li> <li>— Iron and steel process gases</li> <li>— Process fuels from the chemical industry in boilers</li> <li>— IGCC plants</li> <li>— HFO- and/or gas-oil-fired engines</li> <li>— Gas-oil-fired gas turbines</li> </ul>	All sizes	Generic EN standards and EN 13284-1 and EN 13284-2	Continuous <sup>(6)</sup> , <sup>(17)</sup>	BAT 22 BAT 26 BAT 30 BAT 35 BAT 39 BAT 51 BAT 58 BAT 75		

BAT Concn. Number	Summary of BAT Conclusion requirement						Status	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement																		
		— 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.						NA	No process emissions to water.																		
6	<p>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.</p> <table border="1" data-bbox="331 679 1451 1356"> <thead> <tr> <th data-bbox="331 679 551 715">Technique</th> <th data-bbox="551 679 976 715">Description</th> <th data-bbox="976 679 1451 715">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="331 715 551 823">a. Fuel blending and mixing</td> <td data-bbox="551 715 976 823">Ensure stable combustion conditions and/or reduce the emission of pollutants by mixing different qualities of the same fuel type</td> <td data-bbox="976 715 1451 823">Generally applicable</td> </tr> <tr> <td data-bbox="331 823 551 906">b. Maintenance of the combustion system</td> <td data-bbox="551 823 976 906">Regular planned maintenance according to suppliers' recommendations</td> <td data-bbox="976 823 1451 906"></td> </tr> <tr> <td data-bbox="331 906 551 1015">c. Advanced control system</td> <td data-bbox="551 906 976 1015">See description in Section 8.1</td> <td data-bbox="976 906 1451 1015">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 1015 551 1098">d. Good design of the combustion equipment</td> <td data-bbox="551 1015 976 1098">Good design of furnace, combustion chambers, burners and associated devices</td> <td data-bbox="976 1015 1451 1098">Generally applicable to new combustion plants</td> </tr> <tr> <td data-bbox="331 1098 551 1356">e. Fuel choice</td> <td data-bbox="551 1098 976 1356">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="976 1098 1451 1356">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> </tbody> </table>						Technique	Description	Applicability	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	CC	<p>The plant fuelling is controlled on combustion pressure so as the pressure changes the governor moves to allow more or less fuel into the burners. This ensures that the optimum amount of fuel is burnt to maintain operation and no more.</p> <p>As the plant only operates for a very limited time the recommended maintenance hours aren't achieved during the year. Although there are plans to carry out a service during 2019.</p>
Technique	Description	Applicability																								
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BAT Concn. Number	Summary of BAT Conclusion requirement	Status	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement						
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<sub>x</sub> emissions, BAT is to optimise the design and/or operation of SCR and/or SNCR (e.g. optimised reagent to NO<sub>x</sub> ratio, homogeneous reagent distribution and optimum size of the reagent drops).</p> <p><b>BAT-associated emission levels</b></p> <p>The BAT-associated emission level (BAT-AEL) for emissions of NH<sub>3</sub> to air from the use of SCR and/or SNCR is &lt; 3–10 mg/Nm<sup>3</sup> 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/Nm<sup>3</sup>.</p>	NA	No SCR or SNCR in place on site.						
8	<p>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.</p>	NA	No emissions abatement fitted.						
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"> <li>(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;</li> <li>(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);</li> <li>(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)).</li> </ul> <p><b>Description</b></p> <p>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="320 1257 1458 1374"> <thead> <tr> <th data-bbox="320 1257 701 1294">Fuel(s)</th> <th data-bbox="701 1257 1458 1294">Substances/Parameters subject to characterisation</th> </tr> </thead> <tbody> <tr> <td data-bbox="320 1294 701 1331">HFO</td> <td data-bbox="701 1294 1458 1331">— Ash</td> </tr> <tr> <td data-bbox="320 1331 701 1374"></td> <td data-bbox="701 1331 1458 1374">— C, S, N, Ni, V</td> </tr> </tbody> </table>	Fuel(s)	Substances/Parameters subject to characterisation	HFO	— Ash		— C, S, N, Ni, V	FC	<p>Currently no fuel characterisation.</p> <p>Improvement condition IC9 has been added to the permit requiring a fuel characterisation plan to be developed.</p>
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BAT Concn. Number	Summary of BAT Conclusion requirement	Status	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement		
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Gas oil	— Ash — N, C, S				
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"> <li>— 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),</li> <li>— set-up and implementation of a specific preventive maintenance plan for these relevant systems,</li> <li>— review and recording of emissions caused by OTNOC and associated circumstances and implementation of corrective actions if necessary,</li> <li>— periodic assessment of the overall emissions during OTNOC (e.g. frequency of events, duration, emissions quantification/estimation) and implementation of corrective actions if necessary.</li> </ul>	NA	<p>The reasonably foreseeable OTNOC scenario is start-up and shut-down. Standard permit condition 2.3.7 defines the period of start up and shut down, referring to the thresholds in table S1.4 of the permit.</p>		
11	<p>BAT is to appropriately monitor emissions to air and/or to water during OTNOC.</p> <p><b>Description</b></p> <p>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>	NA	<p>The operator has confirmed that the plant does not operate in anything other than normal operating conditions.</p> <p>Monitoring of emissions to air is not applicable to OCGTs operating for &lt;500 hours which are subject to indicative daily BAT-ELVs only. The requirements described in BAT 11 should not apply where plant operation would be for the sole purpose of performing emissions measurement.</p>		
12	<p>In order to increase the energy efficiency of combustion, gasification and/or IGCC units operated <math>\geq 1\,500</math> h/yr, BAT is to use an appropriate combination of the techniques given in BAT Conclusion 12.</p>	NA	<p>Only applicable to plant operating &gt;500 hours per year.</p>		
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>	CC	<p>Very limited water, if any, used on site.</p>		

BAT Concn. Number	Summary of BAT Conclusion requirement			Status	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement												
	<table border="1"> <thead> <tr> <th data-bbox="315 384 353 416">Technique</th> <th data-bbox="353 384 517 416"></th> <th data-bbox="517 384 1048 416">Description</th> <th data-bbox="1048 384 1462 416">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="315 416 353 555">a.</td> <td data-bbox="353 416 517 555">Water recycling</td> <td data-bbox="517 416 1048 555">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="1048 416 1462 555">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="315 555 353 684">b.</td> <td data-bbox="353 555 517 684">Dry bottom ash handling</td> <td data-bbox="517 555 1048 684">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="1048 555 1462 684">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		
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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><b>Description</b> 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><b>Applicability</b> The applicability may be restricted in the case of existing plants due to the configuration of the drainage systems.</p>			CC	Very minimal process water, if any, produced on site. Not mixed with surface water.												
15	<p>In order to reduce emissions to water from flue-gas treatment, BAT is to use an appropriate combination of the techniques given in BAT Conclusion 15, and to use secondary techniques as close as possible to the source in order to avoid dilution.</p>			NA	No flue gas treatment on site.												
16	<p>In order to reduce the quantity of waste sent for disposal from the combustion and/or gasification process and abatement techniques, BAT is to organise operations so as to maximise, in order of priority and taking into account life-cycle thinking:</p> <ul style="list-style-type: none"> <li>(a) waste prevention, e.g. maximise the proportion of residues which arise as by-products;</li> <li>(b) waste preparation for reuse, e.g. according to the specific requested quality criteria;</li> <li>(c) waste recycling;</li> <li>(d) other waste recovery (e.g. energy recovery),</li> </ul> <p>by implementing an appropriate combination of techniques such as:</p> <table border="1" data-bbox="315 1313 1462 1345"> <thead> <tr> <th data-bbox="315 1313 566 1345">Technique</th> <th data-bbox="566 1313 1055 1345">Description</th> <th data-bbox="1055 1313 1462 1345">Applicability</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>			Technique	Description	Applicability				CC	Minimal waste sent for disposal as the plant only runs for limited hours and therefore creates little waste. All waste produced accounted for and removed by licensed contractors.						
Technique	Description	Applicability															

BAT Concn. Number	Summary of BAT Conclusion requirement			Status	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement	
	a.	Generation of gypsum as a by-product	Quality optimisation of the calcium-based reaction residues generated by the wet FGD so that they can be used as a substitute for mined gypsum (e.g. as raw material in the plasterboard industry). The quality of limestone used in the wet FGD influences the purity of the gypsum produced	Generally applicable within the constraints associated with the required gypsum quality, the health requirements associated to each specific use, and by the market conditions		
	b.	Recycling or recovery of residues in the construction sector	Recycling or recovery of residues (e.g. from semi-dry desulphurisation processes, fly ash, bottom ash) as a construction material (e.g. in road building, to replace sand in concrete production, or in the cement industry)	Generally applicable within the constraints associated with the required material quality (e.g. physical properties, content of harmful substances) associated to each specific use, and by the market conditions		
	c.	Energy recovery by using waste in the fuel mix	The residual energy content of carbon-rich ash and sludges generated by the combustion of coal, lignite, heavy fuel oil, peat or biomass can be recovered for example by mixing with the fuel	Generally applicable where plants can accept waste in the fuel mix and are technically able to feed the fuels into the combustion chamber		
	d.	Preparation of spent catalyst for reuse	Preparation of catalyst for reuse (e.g. up to four times for SCR catalysts) restores some or all of the original performance, extending the service life of the catalyst to several decades. Preparation of spent catalyst for reuse is integrated in a catalyst management scheme	The applicability may be limited by the mechanical condition of the catalyst and the required performance with respect to controlling NO <sub>x</sub> and NH <sub>3</sub> emissions		
17	In order to reduce noise emissions, BAT is to use one or a combination of the techniques given below.			CC	The turbine is housed in an acoustic enclosure. The site is screened on one side to reduce potential noise impact on local residents.	
a.	Operational measures	These include: <ul style="list-style-type: none"> <li>— improved inspection and maintenance of equipment</li> <li>— closing of doors and windows of enclosed areas, if possible</li> <li>— equipment operated by experienced staff</li> <li>— avoidance of noisy activities at night, if possible</li> <li>— provisions for noise control during maintenance activities</li> </ul>	Generally applicable			

BAT Concn. Number	Summary of BAT Conclusion requirement				Status	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement	
	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. Appropriate obstacles include protection walls, embankments and buildings	Generally applicable to new plants. In the case of existing plants, the insertion of obstacles may be restricted by lack of space			
	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			
Table 13	BAT-associated energy efficiency levels (BAT-AEELs) for HFO and/or gas oil combustion in boilers				NA	Not applicable to gas turbines.	
<b>Type of combustion unit</b>		<b>BAT-AEELs <sub>(<sup>99</sup>)</sub> <sub>(<sup>100</sup>)</sub></b>					
		<b>Net electrical efficiency (%)</b>		<b>Net total fuel utilisation (%) <sub>(<sup>101</sup>)</sub></b>			
		<b>New unit</b>	<b>Existing unit</b>	<b>New unit</b>	<b>Existing unit</b>		
HFO- and/or gas-oil-fired boiler		> 36,4	35,6–37,4	80–96	80–96		
28	In order to prevent or reduce NO <sub>x</sub> emissions to air while limiting CO emissions to air from the combustion of HFO and/or gas oil in boilers, BAT is to use one or a combination of the techniques given in BAT 28.				NA	Not applicable to gas turbines.	
29	In order to prevent or reduce SO <sub>x</sub> , HCl and HF emissions to air from the combustion of HFO and/or gas oil in boilers, BAT is to use one or a combination of the techniques given in BAT 29.				NA	Not applicable to gas turbines.	
30	In order to reduce dust and particulate-bound metal emissions to air from the combustion of HFO and/or gas oil in boilers, BAT is to use one or a combination of the techniques given in BAT 30.				NA	Not applicable to gas turbines.	

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31	In order to increase the energy efficiency of HFO and/or gas oil combustion in reciprocating engines, BAT is to use an appropriate combination of the techniques given in BAT 12 and those given in BAT 31.	NA	Not applicable to gas turbines.																			
32	In order to prevent or reduce NO <sub>x</sub> emissions to air from the combustion of HFO and/or gas oil in reciprocating engines, BAT is to use one or a combination of the techniques given in BAT 32.	NA	Not applicable to gas turbines.																			
33	In order to prevent or reduce emissions of CO and volatile organic compounds to air from the combustion of HFO and/or gas oil in reciprocating engines, BAT is to use one or both of the techniques given in BAT 33. — the average over the sampling period for TVOC emission levels will generally be 10–40 mg/Nm <sup>3</sup> .	NA	Not applicable to gas turbines																			
34	In order to prevent or reduce SO <sub>x</sub> , HCl and HF emissions to air from the combustion of HFO and/or gas oil in reciprocating engines, BAT is to use one or a combination of the techniques given in BAT 34.	NA	Not applicable to gas turbines.																			
35	In order to prevent or reduce dust and particulate-bound metal emissions from the combustion of HFO and/or gas oil in reciprocating engines, BAT is to use one or a combination of the techniques given in BAT 35.	NA	Not applicable to gas turbines.																			
36	<p>In order to increase the energy efficiency of gas oil combustion in gas turbines, BAT is to use an appropriate combination of the techniques given in BAT 12 and below.</p> <table border="1" data-bbox="320 839 1456 986"> <thead> <tr> <th data-bbox="320 839 353 874">Technique</th> <th data-bbox="353 839 741 874">Description</th> <th data-bbox="741 839 1456 874">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="320 874 353 932">a. Combined cycle</td> <td data-bbox="353 874 741 932">See description in Section 8.2</td> <td data-bbox="741 874 1456 986">Generally applicable to new units operated ≥ 1 500 h/yr. Applicable to existing units within the constraints associated with the steam cycle design and the space availability. Not applicable to existing units operated &lt; 1 500 h/yr</td> </tr> </tbody> </table> <p style="text-align: center;"><b>BAT-associated energy efficiency levels (BAT-AEELs) for gas-oil-fired gas turbines</b></p> <table border="1" data-bbox="320 1042 1456 1217"> <thead> <tr> <th data-bbox="320 1042 949 1077" rowspan="3">Type of combustion unit</th> <th colspan="2" data-bbox="949 1042 1456 1077">BAT-AEELs <sup>(132)</sup></th> </tr> <tr> <th colspan="2" data-bbox="949 1077 1456 1112">Net electrical efficiency (%) <sup>(133)</sup></th> </tr> <tr> <th data-bbox="949 1112 1173 1147">New unit</th> <th data-bbox="1173 1112 1456 1147">Existing unit</th> </tr> </thead> <tbody> <tr> <td data-bbox="320 1147 949 1182">Gas-oil-fired open-cycle gas turbine</td> <td data-bbox="949 1147 1173 1182">&gt; 33</td> <td data-bbox="1173 1147 1456 1182">25–35,7</td> </tr> <tr> <td data-bbox="320 1182 949 1217">Gas-oil-fired combined cycle gas turbine</td> <td data-bbox="949 1182 1173 1217">&gt; 40</td> <td data-bbox="1173 1182 1456 1217">33–44</td> </tr> </tbody> </table>	Technique	Description	Applicability	a. Combined cycle	See description in Section 8.2	Generally applicable to new units operated ≥ 1 500 h/yr. Applicable to existing units within the constraints associated with the steam cycle design and the space availability. Not applicable to existing units operated < 1 500 h/yr	Type of combustion unit	BAT-AEELs <sup>(132)</sup>		Net electrical efficiency (%) <sup>(133)</sup>		New unit	Existing unit	Gas-oil-fired open-cycle gas turbine	> 33	25–35,7	Gas-oil-fired combined cycle gas turbine	> 40	33–44	NA	<p>The plant is limited to &lt;500 hours. Combined cycle operation is not applicable to existing units &lt;1500 hours per year.</p> <p>BAT 12 is not applicable to plant which operates less than 1500 hours per year.</p> <p>A footnote to the AELs confirms that they are not applicable for &lt;1500 hour plant.</p>
Technique	Description	Applicability																				
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37	<p>In order to prevent or reduce NO<sub>x</sub> 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" data-bbox="320 1289 1456 1361"> <thead> <tr> <th data-bbox="320 1289 580 1324">Technique</th> <th data-bbox="580 1289 797 1324">Description</th> <th data-bbox="797 1289 1456 1324">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="320 1324 580 1361">a. Water/steam addition</td> <td data-bbox="580 1324 797 1361"></td> <td data-bbox="797 1324 1456 1361">The applicability may be limited due to water availability</td> </tr> </tbody> </table>	Technique	Description	Applicability	a. Water/steam addition		The applicability may be limited due to water availability	CC	See key issues section for further information.													
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BAT Concn. Number	Summary of BAT Conclusion requirement			Status	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement									
	b. Low-NO <sub>x</sub> burners (LNB)	See description in Section 8.3	Only applicable to turbine models for which low-NO <sub>x</sub> 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											
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.			CC	<p>The plant fuelling is controlled on combustion pressure so as the pressure changes the governor moves to allow more or less fuel into the burners. This ensures that the optimum amount of fuel is burnt to maintain operation and no more.</p> <p>There are no applicable indicative BAT AELs for CO for plant operating for less than 500 hours per annum.</p> <p>Although the indicative AEL is for dual fuel GTs only, we have still decided to set a NO<sub>x</sub> limit for the plant. This is based on the level the operator has confirmed that the plant can achieve and compliance with the value will be based on concentration by calculation.</p>									
<table border="1"> <thead> <tr> <th data-bbox="331 683 580 715">Technique</th> <th data-bbox="580 683 824 715">Description</th> <th data-bbox="824 683 1451 715">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="331 715 580 778">a. Combustion optimisation</td> <td data-bbox="580 715 824 778">See description in Section 8.3</td> <td data-bbox="824 715 1451 778">Generally applicable</td> </tr> <tr> <td data-bbox="331 778 580 858">b. Oxidation catalysts</td> <td data-bbox="580 778 824 858"></td> <td data-bbox="824 778 1451 858">Not applicable to combustion plants operated &lt; 500 h/yr. Retrofitting existing combustion plants may be constrained by the availability of sufficient space</td> </tr> </tbody> </table>						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
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39	In order to prevent or reduce SO <sub>x</sub> and dust emissions to air from the combustion of gas oil in gas turbines, BAT is to use the technique given below.			FC	Ultra low sulphur fuel is used. The plant has an existing restriction on sulphur content of fuel limiting it to less than 0.1% w/w sulphur content.									
<table border="1"> <thead> <tr> <th data-bbox="331 1284 472 1316">Technique</th> <th data-bbox="472 1284 696 1316">Description</th> <th data-bbox="696 1284 1451 1316">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="331 1316 472 1380">a. Fuel choice</td> <td data-bbox="472 1316 696 1380">See description in Section 8.4</td> <td data-bbox="696 1316 1451 1380">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>				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					
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BAT Concn. Number	Summary of BAT Conclusion requirement	Status	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement																		
	<p align="center"><b>BAT-associated emission levels for SO<sub>2</sub> and dust emissions to air from the combustion of gas oil in gas turbines, including dual fuel gas turbines</b></p> <table border="1" data-bbox="320 440 1458 651"> <thead> <tr> <th data-bbox="320 440 521 595" rowspan="3">Type of combustion plant</th> <th colspan="4" data-bbox="521 440 1458 475">BAT-AELs (mg/Nm<sup>3</sup>)</th> </tr> <tr> <th colspan="2" data-bbox="521 475 987 510">SO<sub>2</sub></th> <th colspan="2" data-bbox="987 475 1458 510">Dust</th> </tr> <tr> <th data-bbox="521 510 701 595">Yearly average <sup>(134)</sup></th> <th data-bbox="701 510 987 595">Daily average or average over the sampling period <sup>(135)</sup></th> <th data-bbox="987 510 1167 595">Yearly average <sup>(134)</sup></th> <th data-bbox="1167 510 1458 595">Daily average or average over the sampling period <sup>(135)</sup></th> </tr> </thead> <tbody> <tr> <td data-bbox="320 595 521 651">New and existing plants</td> <td data-bbox="521 595 701 651">35–60</td> <td data-bbox="701 595 987 651">50–66</td> <td data-bbox="987 595 1167 651">2–5</td> <td data-bbox="1167 595 1458 651">2–10</td> </tr> </tbody> </table>	Type of combustion plant	BAT-AELs (mg/Nm <sup>3</sup> )				SO <sub>2</sub>		Dust		Yearly average <sup>(134)</sup>	Daily average or average over the sampling period <sup>(135)</sup>	Yearly average <sup>(134)</sup>	Daily average or average over the sampling period <sup>(135)</sup>	New and existing plants	35–60	50–66	2–5	2–10		<p>The yearly BAT-AELs for SO<sub>2</sub> and dust are not applicable to existing plants operating for less than 1500 hours per year.</p> <p>Daily AELs for both sulphur and dust have been added to the permit in table S3.1a through the review.</p>
Type of combustion plant	BAT-AELs (mg/Nm <sup>3</sup> )																				
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## **6. Review and assessment of derogation requests made by the operator in relation to BAT Conclusions which include an associated emission level (AEL) value**

The IED enables a competent authority to allow derogations from BAT AELs stated in BAT Conclusions under specific circumstances as detailed under Article 15(4):

By way of derogation from paragraph 3, and without prejudice to Article 18, the competent authority may, in specific cases, set less strict emission limit values. Such a derogation may apply only where an assessment shows that the achievement of emission levels associated with the best available techniques as described in BAT conclusions would lead to disproportionately higher costs compared to the environmental benefits due to:

*(a) the geographical location or the local environmental conditions of the installation concerned; or*

*(b) the technical characteristics of the installation concerned.*

As part of their Regulation 61 Note response, the operator has not requested a derogation from compliance with any AEL values. Although the spreadsheet response stated that derogations were required, only indicative AELs were applicable to this site because it is <500 hours, and within further information received in relation to the review, the operator confirmed that they could meet the relevant indicative AELs.

## **7. Emissions to Water**

There are no process emissions to water from the permitted activity.

The consolidated permit incorporates the current discharge to controlled waters identified as W1.

## **8 Additional IED Chapter II requirements:**

The BAT for balancing plant guidance (Working draft version 1.0, August 2018) 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 Leven LCP falls into category B because it's NO<sub>x</sub> emissions are below 500 mg/m<sup>3</sup> and its efficiency at 30% 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
<b>Receipt of application</b>	
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.
<b>The site</b>	
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>
<b>Operating techniques</b>	
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>
<b>Permit conditions</b>	
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	We have varied the permit as stated in the variation notice.

<b>Aspect considered</b>	<b>Decision</b>
Environment Agency initiated variation	
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> <p>Fuel is characterised in accordance with BAT 9.</p> <p>We have also removed the completed improvement conditions from the permit.</p>
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 S3.3 Process monitoring requirements was amended to include the requirement to monitor energy efficiency to ensure compliance with BAT 2.</p>
Reporting	<p>We have specified reporting in the permit for the following parameters:</p> <ul style="list-style-type: none"> <li>• Nitrogen dioxide</li> <li>• Carbon monoxide</li> <li>• Sulphur dioxide</li> <li>• Dust</li> </ul> <p>These are described in the relevant BAT Conclusions in Section 5 of this document.</p>
<b>Operator competence</b>	
Management system	<p>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.</p>
<b>Growth Duty</b>	

Aspect considered	Decision
<p>Section 108 Deregulation Act 2015 – Growth duty</p>	<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>