

## 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/EP3133DQ  
The Operator is:                         BWSC Generation Services UK Ltd  
The Installation is:                       Brigg Renewable Energy Plant  
This Variation Notice number is:   EPR/EP3133DQ/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
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- 4 Key Issues
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- 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
CV	Calorific value
DAA	Directly associated activity – Additional activities necessary to be carried out to allow the principal activity to be carried out
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 <sub>2</sub> expressed as NO <sub>2</sub> )
NPV	Net Present Value
PHE	Public Health England
SAC	Special Area of Conservation
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<sup>st</sup> 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 15/10/18.

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 11/10/19. Suitable further information was provided by the Operator on 22/10/19 and 12/12/19.

## **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)
- BAT 16 waste management
- 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 provided by the operator to demonstrate that an alternative limit was more appropriate.

The LCP on site is referenced as LCP413 and is a biomass fired boiler which has a thermal input of 114MW.

The plant was put into operation after IED came into force and therefore the existing limits in the permit are from Part 2 of IED Annex V applicable to new plant.

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

- Unlimited hours operation.

The following tables outline the limits that have been incorporated into the permit for LCP413, 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 6% select correct oxygen reference value for plant volume reference oxygen concentration if flue gases. The emission limits and monitoring requirements have been incorporated into Schedule 3 of the permit.

NO <sub>x</sub> limits (mg/Nm <sup>3</sup> )						
Averaging	IED (Annex V Part 2) - New	BREF (Table 9 BAT-c)	Expected permit limits	Basis	Limits apply	Monitoring
Annual	None	180	180	BREF	MSUL/MSDL to baseload	Continuous
Monthly	200	None	200	IED	MSUL/MSDL to baseload	
Daily	220	220	220	BREF	MSUL/MSDL to baseload	
95 <sup>th</sup> %ile of hr means	400	None	400	IED	MSUL/MSDL to baseload	

CO limits (mg/Nm <sup>3</sup> )						
Averaging	IED (Annex V Part 2) - New	BREF (after Table 9 BAT-c)	Expected permit limits	Basis	Limits apply	Monitoring
Annual	None	160	160	BREF	MSUL/MSDL to baseload	Continuous
Daily	None	None	375	Existing Permit	MSUL/MSDL to baseload	Continuous
95 <sup>th</sup> %ile of hr means	None	None	750	Existing Permit	MSUL/MSDL to baseload	Continuous

Under the no backsliding rule the Daily and Hourly limits that are currently in the permit will remain.

SO <sub>2</sub> limits (mg/Nm <sup>3</sup> )						
Averaging	IED (Annex V Part 2) - New	BREF (Table 10 BAT-c)	Expected permit limits	Basis	Limits apply	Monitoring
Annual	None	70	70	BREF	MSUL/MSDL to baseload	Continuous
Monthly	200	None	100	Existing Permit	MSUL/MSDL to baseload	
Daily	220	175	110	Existing Permit	MSUL/MSDL to baseload	
95 <sup>th</sup> %ile of hr means	400	None	200	Existing Permit	MSUL/MSDL to baseload	

Under the no backsliding rule the Monthly, Daily and Hourly limits will be 100 mg/Nm<sup>3</sup>, 110 mg/Nm<sup>3</sup> and 200 mg/Nm<sup>3</sup> respectively, as specified in the existing permit.

HCl limits (mg/Nm <sup>3</sup> )						
Averaging	IED (Annex V Part 2) - New	BREF (Table 11 BAT-c)	Expected permit limits	Basis	Limits apply	Monitoring
Annual	None	9	9	BREF	MSUL/MSDL to baseload	Continuous
Daily	None	12	12	BREF	MSUL/MSDL to baseload	

HF limits (mg/Nm <sup>3</sup> )						
Averaging	IED (Annex V Part 2) - New	BREF (Table 11 BAT-c)	Expected permit limits	Basis	Limits apply	Monitoring
Average over sampling period	None	< 1	< 1	BREF	MSUL/MSDL to baseload	Once per year

Dust limits (mg/Nm <sup>3</sup> )						
Averaging	IED (Annex V Part 2) - New	BREF (Table 12 BAT-c)	Expected permit limits	Basis	Limits apply	Monitoring
Annual	None	12	12	BREF	MSUL/MSDL to baseload	Continuous
Monthly	20	None	20	IED	MSUL/MSDL to baseload	
Daily	22	18	18	BREF	MSUL/MSDL to baseload	
95 <sup>th</sup> %ile of hr means	40	None	40	IED	MSUL/MSDL to baseload	

NH <sub>3</sub> limits (mg/Nm <sup>3</sup> )						
Averaging	IED (Annex V Part 2) - New	BREF (BAT conclusion 7)	Expected permit limits	Basis	Limits apply	Monitoring
Yearly	None	15	15	BREF	MSUL/MSDL to baseload	Continuous

Hg limits (µg/Nm <sup>3</sup> )						
Averaging	IED (Annex V Part 2) - New	BREF (BAT conclusion 27)	Expected permit limits	Basis	Limits apply	Monitoring
Average over sampling period	None	5	5	BREF	MSUL/MSDL to baseload	Once per year

## 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.

The table below sets out the BAT-AEELs specified in the LCP BAT Conclusions for the large combustion plant on the site and the energy efficiency levels confirmed through the Regulation 61 notice response. The evidence provided to demonstrate that the AEELs are met was specified in their regulation 61 notice. We consider this plant is BAT in relation to the AEELs.

BAT AEELs (%)			Plant efficiency (%)		
Net electrical efficiency	Net total fuel utilisation	Net mechanical efficiency	Net electrical efficiency	Net total fuel utilisation	Net mechanical efficiency
LCP413: Solid biomass and/or peat boiler					
28 - 38	None	None	28	NA	NA

## 4.3 Waste Management

BAT 16 requires the operator to reduce the quantity of waste sent for disposal. The operator plans to recycle waste ash as a soil conditioner or fertiliser and reuse spent catalyst generated from the hybrid SCR/SNCR system. These two techniques outlined under BAT16.

Preoperational Condition (PO) 4 is included in the permit requiring the operator to test and monitor ash samples prior to using them as described above. We have updated PO4 requiring demonstration of compliance with BAT16 in relation to the two techniques specified.

## 4.4 Fuel characterisation

BAT 9 requires the operator to carry out fuel characterisation. The commissioning of the plant had not yet been completed. As a result the fuel has not yet been characterised as required under point i) of this BAT conclusion. Criteria ii) in relation to the regular testing of fuels and iii) in relation to incorporating the fuel characterisation changes identified as a result of regular testing back into the control system to improve performance have not been developed.

We have therefore included an improvement condition (IC) in the consolidated variation notice IC6 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.

#### **4.5 Hybrid SCR/SNCR**

Following the commissioning of the SCR/SNCR system it may be necessary for start up and shut down criteria to be reviewed in addition to consideration of what CO limits will be achievable. A yearly indicative CO limit has been included in the permit in addition to the daily and hourly limit from the existing permit. As these limits are indicative they can be amended with suitable justification.

We have therefore updated improvement condition 2 (IC2) requiring the operator to submit a report outlining the proposals with suitable justification following the commissioning of the SCR/SNCR system.

## 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	S3.1, S3.1a, S3.2
Energy efficiency	1.2 and 2.3	S3.3
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
<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 operator has confirmed that an Environment Management System (EMS) is in place which is accredited to ISO 14001. The EMS addresses all points listed (i) – (xvi).

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																		
	<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.																				
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 operator has confirmed that the electrical efficiency of the plant is 28%, which meets the requirements of BAT12.																		
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="353 722 1496 946"> <thead> <tr> <th data-bbox="353 722 712 754">Stream</th> <th data-bbox="712 722 1133 754">Parameter(s)</th> <th data-bbox="1133 722 1496 754">Monitoring</th> </tr> </thead> <tbody> <tr> <td data-bbox="353 754 712 887" rowspan="3">Flue-gas</td> <td data-bbox="712 754 1133 791">Flow</td> <td data-bbox="1133 754 1496 791">Periodic or continuous determination</td> </tr> <tr> <td data-bbox="712 791 1133 855">Oxygen content, temperature, and pressure</td> <td data-bbox="1133 791 1496 855">Periodic or continuous measurement</td> </tr> <tr> <td data-bbox="712 855 1133 887">Water vapour content <sup>(2)</sup></td> <td data-bbox="1133 855 1496 887"></td> </tr> <tr> <td data-bbox="353 887 712 946">Waste water from flue-gas treatment</td> <td data-bbox="712 887 1133 946">Flow, pH, and temperature</td> <td data-bbox="1133 887 1496 946">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 <sup>(2)</sup>		Waste water from flue-gas treatment	Flow, pH, and temperature	Continuous measurement	CC	The operator has confirmed that flow, oxygen content, temperature, pressure and water vapour are all monitored at this installation.					
Stream	Parameter(s)	Monitoring																			
Flue-gas	Flow	Periodic or continuous determination																			
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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="353 1046 1496 1369"> <thead> <tr> <th data-bbox="353 1046 506 1166">Substance/Parameter</th> <th data-bbox="506 1046 813 1166">Fuel/Process/Type of combustion plant</th> <th data-bbox="813 1046 965 1166">Combustion plant total rated thermal input</th> <th data-bbox="965 1046 1137 1166">Standard(s) <sup>(4)</sup></th> <th data-bbox="1137 1046 1350 1166">Minimum monitoring frequency <sup>(5)</sup></th> <th data-bbox="1350 1046 1496 1166">Monitoring associated with</th> </tr> </thead> <tbody> <tr> <td data-bbox="353 1166 506 1230">NH<sub>3</sub></td> <td data-bbox="506 1166 813 1230">— When SCR and/or SNCR is used</td> <td data-bbox="813 1166 965 1230">All sizes</td> <td data-bbox="965 1166 1137 1230">Generic EN standards</td> <td data-bbox="1137 1166 1350 1230">Continuous <sup>(6)</sup> <sup>(7)</sup></td> <td data-bbox="1350 1166 1496 1230">BAT 7</td> </tr> <tr> <td data-bbox="353 1230 506 1369">NO<sub>x</sub></td> <td data-bbox="506 1230 813 1369">— Coal and/or lignite including waste co-incineration</td> <td data-bbox="813 1230 965 1369">All sizes</td> <td data-bbox="965 1230 1137 1369">Generic EN standards</td> <td data-bbox="1137 1230 1350 1369">Continuous <sup>(6)</sup> <sup>(8)</sup></td> <td data-bbox="1350 1230 1496 1369">BAT 20 BAT 24 BAT 28 BAT 32 BAT 37 BAT 41</td> </tr> </tbody> </table>	Substance/Parameter	Fuel/Process/Type of combustion plant	Combustion plant total rated thermal input	Standard(s) <sup>(4)</sup>	Minimum monitoring frequency <sup>(5)</sup>	Monitoring associated with	NH <sub>3</sub>	— When SCR and/or SNCR is used	All sizes	Generic EN standards	Continuous <sup>(6)</sup> <sup>(7)</sup>	BAT 7	NO <sub>x</sub>	— Coal and/or lignite including waste co-incineration	All sizes	Generic EN standards	Continuous <sup>(6)</sup> <sup>(8)</sup>	BAT 20 BAT 24 BAT 28 BAT 32 BAT 37 BAT 41	CC	<p>The following monitoring is/will be undertaken at the installation, which is in accordance with BAT 4:</p> <p>NH<sub>3</sub> – Continuous – EN 14181  NO<sub>x</sub> – Continuous – EN14181  N<sub>2</sub>O – Once every year – EN 14181  CO – Continuous –EN 14181  SO<sub>2</sub> – Continuous – EN 14181  SO<sub>3</sub> – At least once per year (if SCR is installed) – USEPA M8  HCl – Continuous – EN 14181</p>
Substance/Parameter	Fuel/Process/Type of combustion plant	Combustion plant total rated thermal input	Standard(s) <sup>(4)</sup>	Minimum monitoring frequency <sup>(5)</sup>	Monitoring associated with																
NH <sub>3</sub>	— When SCR and/or SNCR is used	All sizes	Generic EN standards	Continuous <sup>(6)</sup> <sup>(7)</sup>	BAT 7																
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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
		<ul style="list-style-type: none"> <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>				BAT 42 BAT 43 BAT 47 BAT 48 BAT 56 BAT 64 BAT 65 BAT 73	HF – At least once every year – ISO 15713 Dust – Continuous – EN 14181 Metals and Metalloids – At least once every year – EN 14385 Hg – At least once every year – EN 13211	
		<ul style="list-style-type: none"> <li>— Combustion plants on offshore platforms</li> </ul>	All sizes	EN 14792	Once every year <sup>(9)</sup>	BAT 53		
	N <sub>2</sub> O	<ul style="list-style-type: none"> <li>— Coal and/or lignite in circulating fluidised bed boilers</li> <li>— Solid biomass and/or peat in circulating fluidised bed boilers</li> </ul>	All sizes	EN 21258	Once every year <sup>(10)</sup>	BAT 20 BAT 24		
	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> </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		



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	<ul style="list-style-type: none"> <li>— Process fuels from the chemical industry</li> <li>— IGCC plants</li> </ul>							
	<ul style="list-style-type: none"> <li>— Combustion plants on offshore platforms</li> </ul>	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>(12)</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>	<ul style="list-style-type: none"> <li>— When SCR is used</li> </ul>	All sizes	No EN standard available	Once every year	—			
Gaseous chlorides, expressed as HCl	<ul style="list-style-type: none"> <li>— Coal and/or lignite</li> <li>— Process fuels from the chemical industry in boilers</li> </ul>	All sizes	EN 1911	Once every three months <sup>(6)</sup> <sup>(13)</sup> <sup>(14)</sup>	BAT 21 BAT 57			
	<ul style="list-style-type: none"> <li>— Solid biomass and/or peat</li> </ul>	All sizes	Generic EN standards	Continuous <sup>(15)</sup> <sup>(16)</sup>	BAT 25			
	<ul style="list-style-type: none"> <li>— Waste co-incineration</li> </ul>	All sizes	Generic EN standards	Continuous <sup>(6)</sup> <sup>(16)</sup>	BAT 66 BAT 67			
HF	<ul style="list-style-type: none"> <li>— Coal and/or lignite</li> <li>— Process fuels from the chemical industry in boilers</li> </ul>	All sizes	No EN standard available	Once every three months <sup>(6)</sup> <sup>(13)</sup> <sup>(14)</sup>	BAT 21 BAT 57			

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
		— Solid biomass and/or peat	All sizes	No EN standard available	Once every year	BAT 25		
		— Waste co-incineration	All sizes	Generic EN standards	Continuous <sub>(6)</sub> <sup>(16)</sup>	BAT 66 BAT 67		
	Dust	— Coal and/or lignite	All sizes	Generic EN standards and EN 13284-1 and EN 13284-2	Continuous <sub>(6)</sub> <sup>(17)</sup>	BAT 22 BAT 26 BAT 30 BAT 35 BAT 39 BAT 51 BAT 58 BAT 75		
	— 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							
	Metals and metalloids except mercury (As, Cd, Co, Cr, Cu, Mn, Ni, Pb, Sb, Se, Ti, V, Zn)	— Coal and/or lignite	All sizes	EN 14385	Once every year <sub>(18)</sub>	BAT 22 BAT 26 BAT 30		
	— Solid biomass and/or peat							
	— HFO- and/or gas-oil-fired boilers and engines							
— Waste co-incineration								
— IGCC plants								
Hg	— Coal and/or lignite including waste co-incineration	< 300 MW <sub>th</sub>	EN 13211	Once every three months <sub>(13)</sub> <sup>(20)</sup>	BAT 23			
		≥ 300 MW <sub>th</sub>	Generic EN standards and EN 14884	Continuous <sub>(16)</sub> <sup>(21)</sup>				

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												
		— Solid biomass and/or peat	All sizes	EN 13211	Once every year <sup>(22)</sup>	BAT 27														
		— Waste co-incineration with solid biomass and/or peat	All sizes	EN 13211	Once every three months <sup>(13)</sup>	BAT 70														
		— IGCC plants	≥ 100 MW <sub>th</sub>	EN 13211	Once every year <sup>(23)</sup>	BAT 75														
	TVOC	— HFO- and/or gas-oil-fired engines	All sizes	EN 12619	Once every six months <sup>(13)</sup>	BAT 33 BAT 59														
		— Process fuels from chemical industry in boilers																		
		— Waste co-incineration with coal, lignite, solid biomass and/or peat	All sizes	Generic EN standards	Continuous	BAT 71														
	Formaldehyde	— Natural-gas in spark-ignited lean-burn gas and dual fuel engines	All sizes	No EN standard available	Once every year	BAT 45														
	CH <sub>4</sub>	— Natural-gas-fired engines	All sizes	EN ISO 25139	Once every year <sup>(24)</sup>	BAT 45														
	PCDD/F	— Process fuels from chemical industry in boilers	All sizes	EN 1948-1, EN 1948-2, EN 1948-3	Once every six months <sup>(13)</sup> <sup>(25)</sup>	BAT 59 BAT 71														
		— Waste co-incineration																		
5	<p>BAT is to monitor emissions to water from flue-gas treatment 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="367 1145 1487 1362"> <thead> <tr> <th data-bbox="367 1145 692 1230">Substance/Parameter</th> <th data-bbox="692 1145 1039 1230">Standard(s)</th> <th data-bbox="1039 1145 1272 1230">Minimum monitoring frequency</th> <th data-bbox="1272 1145 1487 1230">Monitoring associated with</th> </tr> </thead> <tbody> <tr> <td data-bbox="367 1230 692 1265">Total organic carbon (TOC)<sup>(26)</sup></td> <td data-bbox="692 1230 1039 1265">EN 1484</td> <td data-bbox="1039 1230 1272 1362" rowspan="3">Once every month</td> <td data-bbox="1272 1230 1487 1362" rowspan="3">BAT 15</td> </tr> <tr> <td data-bbox="367 1265 692 1326">Chemical oxygen demand (COD)<sup>(26)</sup></td> <td data-bbox="692 1265 1039 1326">No EN standard available</td> </tr> <tr> <td data-bbox="367 1326 692 1362">Total suspended solids (TSS)</td> <td data-bbox="692 1326 1039 1362">EN 872</td> </tr> </tbody> </table>						Substance/Parameter	Standard(s)	Minimum monitoring frequency	Monitoring associated with	Total organic carbon (TOC) <sup>(26)</sup>	EN 1484	Once every month	BAT 15	Chemical oxygen demand (COD) <sup>(26)</sup>	No EN standard available	Total suspended solids (TSS)	EN 872	NA	<p>The operator has confirmed the following:</p> <p>Wet flue-gas treatment is not applied at the installation and as such there are no related emissions to water.</p> <p>We agree that this BAT Conclusion isn't applicable for the activities carried out at the installation.</p>
Substance/Parameter	Standard(s)	Minimum monitoring frequency	Monitoring associated with																	
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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"> <thead> <tr> <th>Technique</th> <th>Description</th> <th>Applicability</th> </tr> </thead> <tbody> <tr> <td>a. Fuel blending and mixing</td> <td>Ensure stable combustion conditions and/or reduce the emission of pollutants by mixing different qualities of the same fuel type</td> <td>Generally applicable</td> </tr> <tr> <td>b. Maintenance of the combustion system</td> <td>Regular planned maintenance according to suppliers' recommendations</td> <td></td> </tr> <tr> <td>c. Advanced control system</td> <td>See description in Section 8.1</td> <td>The applicability to old combustion plants may be constrained by the need to retrofit the</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	CC	<p>The Operator confirmed the following:</p> <p>That they are compliant with the requirements through a combination of techniques, as set out below:</p> <p>b) Maintenance of the combustion system – Annual maintenance of air/combustion systems.</p> <p>c) Advanced Control System – Air is controlled over 4 distinct levels</p>																																
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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<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>	CC	<p>The operator has confirmed the following:</p> <p>SNCR (hybrid SCR/SNCR system) is in place at the installation. The system is designed for low slip whilst maintaining the NO<sub>x</sub> ELV.</p> <p>We agree with the Operator's stated compliance.</p>												
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>	CC	<p>The operator has confirmed the following:</p> <p>The Integrated Management System in place at the installation covers all plant operations, which covers abatements systems.</p>												

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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> 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="353 906 1494 1361"> <thead> <tr> <th data-bbox="353 906 734 943">Fuel(s)</th> <th data-bbox="734 906 1494 943">Substances/Parameters subject to characterisation</th> </tr> </thead> <tbody> <tr> <td data-bbox="353 943 734 1150" rowspan="4">Biomass/peat</td> <td data-bbox="734 943 1494 979">— LHV</td> </tr> <tr> <td data-bbox="734 979 1494 1023">— moisture</td> </tr> <tr> <td data-bbox="734 1023 1494 1066">— Ash</td> </tr> <tr> <td data-bbox="734 1066 1494 1150">— C, Cl, F, N, S, K, Na — Metals and metalloids (As, Cd, Cr, Cu, Hg, Pb, Zn)</td> </tr> <tr> <td data-bbox="353 1150 734 1361" rowspan="4">Coal/lignite</td> <td data-bbox="734 1150 1494 1193">— LHV</td> </tr> <tr> <td data-bbox="734 1193 1494 1236">— Moisture</td> </tr> <tr> <td data-bbox="734 1236 1494 1279">— Volatiles, ash, fixed carbon, C, H, N, O, S</td> </tr> <tr> <td data-bbox="734 1279 1494 1361">— Br, Cl, F — Metals and metalloids (As, Cd, Co, Cr, Cu, Hg, Mn, Ni, Pb, Sb, Tl, V, Zn)</td> </tr> </tbody> </table>	Fuel(s)	Substances/Parameters subject to characterisation	Biomass/peat	— LHV	— moisture	— Ash	— C, Cl, F, N, S, K, Na — 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, Tl, V, Zn)	FC	<p>The operator has confirmed the following.</p> <p>Compliance with BAT9 will be achieved by July 2021. An improvement Condition has been included in the permit requiring the submission of full details with regards to compliance with BAT9.</p>
Fuel(s)	Substances/Parameters subject to characterisation														
Biomass/peat	— LHV														
	— moisture														
	— Ash														
	— C, Cl, F, N, S, K, Na — Metals and metalloids (As, Cd, Cr, Cu, Hg, Pb, Zn)														
Coal/lignite	— LHV														
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Process fuels from the chemical industry <sup>(27)</sup>	<ul style="list-style-type: none"> <li>— Br, C, Cl, F, H, N, O, S</li> <li>— Metals and metalloids (As, Cd, Co, Cr, Cu, Hg, Mn, Ni, Pb, Sb, Tl, V, Zn)</li> </ul>														
Iron and steel process gases	<ul style="list-style-type: none"> <li>— LHV, CH<sub>4</sub> (for COG), C<sub>x</sub>H<sub>y</sub> (for COG), CO<sub>2</sub>, H<sub>2</sub>, N<sub>2</sub>, total sulphur, dust, Wobbe index</li> </ul>														
Waste <sup>(28)</sup>	<ul style="list-style-type: none"> <li>— LHV</li> <li>— Moisture</li> <li>— Volatiles, ash, Br, C, Cl, F, H, N, O, S</li> <li>— Metals and metalloids (As, Cd, Co, Cr, Cu, Hg, Mn, Ni, Pb, Sb, Tl, V, Zn)</li> </ul>														
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>	CC	The operator confirmed that a management plan is in place for operation of the site during OTNOC. This is detailed in the 'Sites Aspects and Impacts Register'.												

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																												
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>	CC	The operator confirmed that a management plan is in place for operation of the site during OTNOC. This is detailed in the 'Sites Aspects and Impacts Register'.																												
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 below.</p> <table border="1" data-bbox="353 651 1494 1372"> <thead> <tr> <th data-bbox="353 651 607 687">Technique</th> <th data-bbox="607 651 1070 687">Description</th> <th data-bbox="1070 651 1494 687">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="353 687 398 794">a.</td> <td data-bbox="398 687 607 794">Combustion optimisation</td> <td data-bbox="607 687 1070 794">See description in Section 8.2. Optimising the combustion minimises the content of unburnt substances in the flue-gases and in solid combustion residues</td> <td data-bbox="1070 687 1494 794" rowspan="4">Generally applicable</td> </tr> <tr> <td data-bbox="353 794 398 930">b.</td> <td data-bbox="398 794 607 930">Optimisation of the working medium conditions</td> <td data-bbox="607 794 1070 930">Operate at the highest possible pressure and temperature of the working medium gas or steam, within the constraints associated with, for example, the control of NO<sub>x</sub> emissions or the characteristics of energy demanded</td> </tr> <tr> <td data-bbox="353 930 398 1037">c.</td> <td data-bbox="398 930 607 1037">Optimisation of the steam cycle</td> <td data-bbox="607 930 1070 1037">Operate with lower turbine exhaust pressure by utilisation of the lowest possible temperature of the condenser cooling water, within the design conditions</td> </tr> <tr> <td data-bbox="353 1037 398 1121">d.</td> <td data-bbox="398 1037 607 1121">Minimisation of energy consumption</td> <td data-bbox="607 1037 1070 1121">Minimising the internal energy consumption (e.g. greater efficiency of the feed-water pump)</td> </tr> <tr> <td data-bbox="353 1121 398 1206">e.</td> <td data-bbox="398 1121 607 1206">Preheating of combustion air</td> <td data-bbox="607 1121 1070 1206">Reuse of part of the heat recovered from the combustion flue-gas to preheat the air used in combustion</td> <td data-bbox="1070 1121 1494 1206">Generally applicable within the constraints related to the need to control NO<sub>x</sub> emissions</td> </tr> <tr> <td data-bbox="353 1206 398 1291">f.</td> <td data-bbox="398 1206 607 1291">Fuel preheating</td> <td data-bbox="607 1206 1070 1291">Preheating of fuel using recovered heat</td> <td data-bbox="1070 1206 1494 1291">Generally applicable within the constraints associated with the boiler design and the need to control NO<sub>x</sub> emissions</td> </tr> <tr> <td data-bbox="353 1291 398 1377">g.</td> <td data-bbox="398 1291 607 1377">Advanced control system</td> <td data-bbox="607 1291 1070 1377">See description in Section 8.2.</td> <td data-bbox="1070 1291 1494 1377">Generally applicable to new units. 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The applicability to old units may be constrained by the need to retrofit the	CC	<p>The operator confirmed the following:</p> <p>a) Combustion optimisation – stage air to ensure complete combustion, in addition, to automated O<sub>2</sub> control.</p> <p>b) Optimisation of the work medium conditions – Distributed Control System (DCS) control in place to ensure that site is operated at design temperature and pressure.</p> <p>c) Optimisation of the steam cycle – back pressure calculated and Air Cooled Condenser (ACC) fan speed adjusted accordingly to optimise. Regular monitoring and ACC cleaning as required.</p> <p>d) Minimise energy consumption – A works power review is ongoing and Variable Speed Drive is installed on the main prime movers.</p>
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
			Computerised control of the main combustion parameters enables the combustion efficiency to be improved	combustion system and/or control command system		<p>e) Preheating of combustion air – Air preheating undertaken but not via flue gas.</p> <p>g) Advanced control system – DCS control of O<sub>2</sub>/air. The control settings are automated.</p> <p>h) Feed-water preheating using recovered heat – condensate and feedwater preheated via turbine bleeds.</p> <p>j) CHP readiness – opportunities are reviewed on a 5 yearly basis in accordance with the requirements of the permit.</p> <p>p) Minimisation of heat losses – all surfaces are lagged/clad to minimise heat loss.</p> <p>r) Steam turbine upgrades – the turbine installed is new. No upgrades planned.</p>
h.	Feed-water preheating using recovered heat	Preheat water coming out of the steam condenser with recovered heat, before reusing it in the boiler	Only applicable to steam circuits and not to hot boilers. Applicability to existing units may be limited due to constraints associated with the plant configuration and the amount of recoverable heat			
i.	Heat recovery by cogeneration (CHP)	Recovery of heat (mainly from the steam system) for producing hot water/steam to be used in industrial processes/activities or in a public network for district heating. Additional heat recovery is possible from: <ul style="list-style-type: none"> <li>— flue-gas</li> <li>— grate cooling</li> <li>— circulating fluidised bed</li> </ul>	Applicable within the constraints associated with the local heat and power demand. The applicability may be limited in the case of gas compressors with an unpredictable operational heat profile			
j.	CHP readiness	See description in Section 8.2.	Only applicable to new units where there is a realistic potential for the future use of heat in the vicinity of the unit			
k.	Flue-gas condenser	See description in Section 8.2.	Generally applicable to CHP units provided there is enough demand for low-temperature heat			
l.	Heat accumulation	Heat accumulation storage in CHP mode	Only applicable to CHP plants. The applicability may be limited in the case of low heat load demand			
m.	Wet stack	See description in Section 8.2.	Generally applicable to new and existing units fitted with wet FGD			
n.	Cooling tower discharge	The release of emissions to air through a cooling tower and not via a dedicated stack	Only applicable to units fitted with wet FGD where reheating of the flue-gas is necessary before release, and where the unit cooling system is a cooling tower			
o.	Fuel pre-drying	The reduction of fuel moisture content before combustion to improve combustion conditions	Applicable to the combustion of biomass and/or peat within the constraints associated with spontaneous combustion			

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	
				risks (e.g. the moisture content of peat is kept above 40 % throughout the delivery chain). The retrofit of existing plants may be restricted by the extra calorific value that can be obtained from the drying operation and by the limited retrofit possibilities offered by some boiler designs or plant configurations		
	p.	Minimisation of heat losses	Minimising residual heat losses, e.g. those that occur via the slag or those that can be reduced by insulating radiating sources	Only applicable to solid-fuel-fired combustion units and to gasification/IGCC units		
	q.	Advanced materials	Use of advanced materials proven to be capable of withstanding high operating temperatures and pressures and thus to achieve increased steam/combustion process efficiencies	Only applicable to new plants		
	r.	Steam turbine upgrades	This includes techniques such as increasing the temperature and pressure of medium-pressure steam, addition of a low-pressure turbine, and modifications to the geometry of the turbine rotor blades	The applicability may be restricted by demand, steam conditions and/or limited plant lifetime		
	s.	Supercritical and ultra-supercritical steam conditions	Use of a steam circuit, including steam reheating systems, in which steam can reach pressures above 220,6 bar and temperatures above 374 °C in the case of supercritical conditions, and above 250 – 300 bar and temperatures above 580 – 600 °C in the case of ultra-supercritical conditions	Only applicable to new units of $\geq 600 \text{ MW}_{th}$ operated $> 4\,000 \text{ h/yr}$ . Not applicable when the purpose of the unit is to produce low steam temperatures and/or pressures in process industries. Not applicable to gas turbines and engines generating steam in CHP mode. For units combusting biomass, the applicability may be constrained by high-temperature corrosion in the case of certain biomasses		
13	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.			CC	The operator confirmed the following:	
	Technique	Description	Applicability			

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									
	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	a) Water recycling – The water used to quench the wet ash is recycled so the only losses incurred are evaporative/retained within the ash.									
	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										
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	<p>The operator has confirmed the following:</p> <p>All process water is captured as trade effluent and discharged to sewer as foul water via discharge point S1. Surface water and roof water from the straw barns goes via oil interceptors and is discharged to water via discharge point W1. All remaining roof water is collected as greywater.</p>									
15	<p>In order to reduce emissions to water from flue-gas treatment, BAT is to use an appropriate combination of the techniques given below, and to use secondary techniques as close as possible to the source in order to avoid dilution.</p> <table border="1" data-bbox="353 1102 1494 1310"> <thead> <tr> <th data-bbox="353 1102 734 1161">Technique</th> <th data-bbox="734 1102 1037 1161">Typical pollutants prevented/abated</th> <th data-bbox="1037 1102 1494 1161">Applicability</th> </tr> </thead> <tbody> <tr> <td colspan="3" data-bbox="353 1161 1494 1198" style="text-align: center;"><b>Primary techniques</b></td> </tr> <tr> <td data-bbox="353 1198 734 1310">a. Optimised combustion (see BAT 6) and flue-gas treatment systems (e.g. SCR/SNCR, see BAT 7)</td> <td data-bbox="734 1198 1037 1310">Organic compounds, ammonia (NH<sub>3</sub>)</td> <td data-bbox="1037 1198 1494 1310">Generally applicable</td> </tr> </tbody> </table> <p style="text-align: center;"><b>Secondary techniques<sup>[29]</sup></b></p>			Technique	Typical pollutants prevented/abated	Applicability	<b>Primary techniques</b>			a. Optimised combustion (see BAT 6) and flue-gas treatment systems (e.g. SCR/SNCR, see BAT 7)	Organic compounds, ammonia (NH <sub>3</sub> )	Generally applicable	NA	<p>The operator has confirmed the following:</p> <p>The BAT Conclusion is not applicable as wet flue-gas treatment is not applied at the installation. There are no related emissions to water.</p> <p>We agree this BAT Conclusion isn't applicable to the activities carried out at the installation.</p>
Technique	Typical pollutants prevented/abated	Applicability												
<b>Primary techniques</b>														
a. Optimised combustion (see BAT 6) and flue-gas treatment systems (e.g. SCR/SNCR, see BAT 7)	Organic compounds, ammonia (NH <sub>3</sub> )	Generally applicable												

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
	b.	Adsorption on activated carbon	Organic compounds, mercury (Hg)	Generally applicable	
	c.	Aerobic biological treatment	Biodegradable organic compounds, ammonium (NH <sub>4</sub> <sup>+</sup> )	Generally applicable for the treatment of organic compounds. Aerobic biological treatment of ammonium (NH <sub>4</sub> <sup>+</sup> ) may not be applicable in the case of high chloride concentrations (i.e. around 10 g/l)	
	d.	Anoxic/anaerobic biological treatment	Mercury (Hg), nitrate (NO <sub>3</sub> <sup>-</sup> ), nitrite (NO <sub>2</sub> <sup>-</sup> )	Generally applicable	
	e.	Coagulation and flocculation	Suspended solids	Generally applicable	
	f.	Crystallisation	Metals and metalloids, sulphate (SO <sub>4</sub> <sup>2-</sup> ), fluoride (F <sup>-</sup> )	Generally applicable	
	g.	Filtration (e.g. sand filtration, microfiltration, ultrafiltration)	Suspended solids, metals	Generally applicable	
	h.	Flotation	Suspended solids, free oil	Generally applicable	
	i.	Ion exchange	Metals	Generally applicable	
	j.	Neutralisation	Acids, alkalis	Generally applicable	
	k.	Oxidation	Sulphide (S <sup>2-</sup> ), sulphite (SO <sub>3</sub> <sup>2-</sup> )	Generally applicable	
	l.	Precipitation	Metals and metalloids, sulphate (SO <sub>4</sub> <sup>2-</sup> ), fluoride (F <sup>-</sup> )	Generally applicable	
	m.	Sedimentation	Suspended solids	Generally applicable	
	n.	Stripping	Ammonia (NH <sub>3</sub> )	Generally applicable	
	The BAT-AELs refer to direct discharges to a receiving water body at the point where the emission leaves the installation.				
	<b>BAT-AELs for direct discharges to a receiving water body from flue-gas treatment</b>				
	<b>Substance/Parameter</b>		<b>BAT-AELs</b>		
			<b>Daily average</b>		
	Total organic carbon (TOC)		20–50 mg/l <sub>(<sup>30</sup>)</sub> <sub>(<sup>31</sup>)</sub> <sub>(<sup>32</sup>)</sub>		
	Chemical oxygen demand (COD)		60–150 mg/l <sub>(<sup>30</sup>)</sub> <sub>(<sup>31</sup>)</sub> <sub>(<sup>32</sup>)</sub>		
	Total suspended solids (TSS)		10–30 mg/l		
	Fluoride (F <sup>-</sup> )		10–25 mg/l <sub>(<sup>32</sup>)</sub>		

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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> <p>(a) waste prevention, e.g. maximise the proportion of residues which arise as by-products;</p> <p>(b) waste preparation for reuse, e.g. according to the specific requested quality criteria;</p> <p>(c) waste recycling;</p> <p>(d) other waste recovery (e.g. energy recovery),</p> <p>by implementing an appropriate combination of techniques such as:</p> <table border="1"> <thead> <tr> <th>Technique</th> <th>Description</th> <th>Applicability</th> </tr> </thead> <tbody> <tr> <td>a. Generation of gypsum as a by-product</td> <td>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</td> <td>Generally applicable within the constraints associated with the required gypsum quality, the health requirements associated to each specific use, and by the market conditions</td> </tr> <tr> <td>b. Recycling or recovery of residues in the construction sector</td> <td>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)</td> <td>Generally applicable within the constraints associated with the required material quality (e.g. physical properties, content of harmful substances)</td> </tr> </tbody> </table>	Technique	Description	Applicability	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)	FC	<p>The operator has confirmed the following:</p> <p>Preoperational condition 4 is included in the permit, which requires the operator to provide details of how waste is reused at the installation. This has been updated requiring the operator to comply with the requirements of BAT16.</p>																	
Technique	Description	Applicability																											
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				<p>associated to each specific use, and by the market conditions</p> <p>Generally applicable where plants can accept waste in the fuel mix and are technically able to feed the fuels into the combustion chamber</p> <p>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</p>																
17	In order to reduce noise emissions, BAT is to use one or a combination of the techniques given below.			CC	<p>The operator has confirmed the following:</p> <p>a) Operational measures – equipment is inspected and maintained in accordance with OEM guidelines. Plant doors are closed when not in use. Trained and competent staff operate equipment. Work at night is minimised unless it is essential.</p> <p>b) Low noise-equipment – All equipment was installed in 2015 and so helps to keep noise to a minimum.</p> <p>d) Noise-control equipment – attenuation enclosures have been installed as part of the construction of the facility.</p>															
	<table border="1"> <thead> <tr> <th data-bbox="394 759 602 791">Technique</th> <th data-bbox="602 759 1099 791">Description</th> <th data-bbox="1099 759 1509 791">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="394 791 602 1110">a. Operational measures</td> <td data-bbox="602 791 1099 1110">           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> </td> <td data-bbox="1099 791 1509 1110">Generally applicable</td> </tr> <tr> <td data-bbox="394 1110 602 1166">b. Low-noise equipment</td> <td data-bbox="602 1110 1099 1166">This potentially includes compressors, pumps and disks</td> <td data-bbox="1099 1110 1509 1166">Generally applicable when the equipment is new or replaced</td> </tr> <tr> <td data-bbox="394 1166 602 1278">c. Noise attenuation</td> <td data-bbox="602 1166 1099 1278">Noise propagation can be reduced by inserting obstacles between the emitter and the receiver. Appropriate obstacles include protection walls, embankments and buildings</td> <td data-bbox="1099 1166 1509 1278">Generally applicable to new plants. In the case of existing plants, the insertion of obstacles may be restricted by lack of space</td> </tr> <tr> <td data-bbox="394 1278 602 1391">d. Noise-control equipment</td> <td data-bbox="602 1278 1099 1391">           This includes:           <ul style="list-style-type: none"> <li>— noise-reducers</li> <li>— equipment insulation</li> </ul> </td> <td data-bbox="1099 1278 1509 1391">The applicability may be restricted by lack of space</td> </tr> </tbody> </table>	Technique	Description	Applicability	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	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: <ul style="list-style-type: none"> <li>— noise-reducers</li> <li>— equipment insulation</li> </ul>	The applicability may be restricted by lack of space				
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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																		
		<ul style="list-style-type: none"> <li>— enclosure of noisy equipment</li> <li>— soundproofing of buildings</li> </ul>																						
	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																					
<b>Combustion of solid fuels only</b>																								
18 - 23	Not applicable as relate to combustion of coal or lignite																							
2.2.1 Table 8	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th data-bbox="353 687 622 791" rowspan="3">Type of combustion unit</th> <th colspan="4" data-bbox="622 687 1494 727" style="text-align: center;">BAT-AEELs <sup>(73)</sup> <sup>(74)</sup></th> </tr> <tr> <th colspan="2" data-bbox="622 727 1104 791" style="text-align: center;">Net electrical efficiency (%) <sup>(75)</sup></th> <th colspan="2" data-bbox="1104 727 1494 791" style="text-align: center;">Net total fuel utilisation (%) <sup>(76)</sup> <sup>(77)</sup></th> </tr> <tr> <th data-bbox="622 791 864 831" style="text-align: center;">New unit <sup>(78)</sup></th> <th data-bbox="864 791 1104 831" style="text-align: center;">Existing unit</th> <th data-bbox="1104 791 1301 831" style="text-align: center;">New unit</th> <th data-bbox="1301 791 1494 831" style="text-align: center;">Existing unit</th> </tr> </thead> <tbody> <tr> <td data-bbox="353 831 622 895">Solid biomass and/or peat boiler</td> <td data-bbox="622 831 864 895" style="text-align: center;">33,5–to &gt; 38</td> <td data-bbox="864 831 1104 895" style="text-align: center;">28–38</td> <td data-bbox="1104 831 1301 895" style="text-align: center;">73–99</td> <td data-bbox="1301 831 1494 895" style="text-align: center;">73–99</td> </tr> </tbody> </table>				Type of combustion unit	BAT-AEELs <sup>(73)</sup> <sup>(74)</sup>				Net electrical efficiency (%) <sup>(75)</sup>		Net total fuel utilisation (%) <sup>(76)</sup> <sup>(77)</sup>		New unit <sup>(78)</sup>	Existing unit	New unit	Existing unit	Solid biomass and/or peat boiler	33,5–to > 38	28–38	73–99	73–99	CC	The operator has confirmed that the electrical efficiency of the installation is 28%. This is within the range for an existing combustion unit of 28-38%, which applies to this installation
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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	
				For existing combustion plants, applicable within the constraints associated with the required temperature window and residence time for the injected reactants		
	g.	Selective catalytic reduction (SCR)	See description in Section 8.3. The use of high-alkali fuels (e.g. straw) may require the SCR to be installed downstream of the dust abatement system	Not applicable to combustion plants operated < 500 h/yr. There may be economic restrictions for retrofitting existing combustion plants of < 300 MW <sub>th</sub> . Not generally applicable to existing combustion plants of < 100 MW <sub>th</sub>		
<b>BAT-associated emission levels (BAT-AELs) for NO<sub>x</sub> emissions to air from the combustion of solid biomass and/or peat</b>						
<b>Combustion plant total rated thermal input (MW<sub>th</sub>)</b>		<b>BAT-AELs (mg/Nm<sup>3</sup>)</b>				
		<b>Yearly average</b>		<b>Daily average or average over the sampling period</b>		
		<b>New plant</b>	<b>Existing plant <sup>(79)</sup></b>	<b>New plant</b>	<b>Existing plant <sup>(80)</sup></b>	
50–100		70–150 <sup>(81)</sup>	70–225 <sup>(82)</sup>	120–200 <sup>(83)</sup>	120–275 <sup>(84)</sup>	
100–300		50–140	50–180	100–200	100–220	
≥ 300		40–140	40–150 <sup>(85)</sup>	65–150	95–165 <sup>(86)</sup>	
<p>As an indication, the yearly average CO emission levels will generally be:</p> <ul style="list-style-type: none"> <li>— &lt; 30–250 mg/Nm<sup>3</sup> for existing combustion plants of 50–100 MW<sub>th</sub> operated ≥ 1 500 h/yr, or new combustion plants of 50–100 MW<sub>th</sub>,</li> <li>— &lt; 30–160 mg/Nm<sup>3</sup> for existing combustion plants of 100–300 MW<sub>th</sub> operated ≥ 1 500 h/yr, or new combustion plants of 100–300 MW<sub>th</sub>,</li> <li>— &lt; 30–80 mg/Nm<sup>3</sup> for existing combustion plants of ≥ 300 MW<sub>th</sub> operated ≥ 1 500 h/yr, or new combustion plants of ≥ 300 MW<sub>th</sub>.</li> </ul>						



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																																													
25	<p>In order to prevent or reduce SO<sub>x</sub>, HCl and HF emissions to air from the combustion of solid biomass and/or peat, BAT is to use one or a combination of the techniques given below.</p> <table border="1" data-bbox="353 440 1494 1059"> <thead> <tr> <th data-bbox="353 440 389 480">Technique</th> <th data-bbox="389 440 667 480">Description</th> <th data-bbox="667 440 1494 480">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="353 480 389 544">a</td> <td data-bbox="389 480 667 544">Boiler sorbent injection (in-furnace or in-bed)</td> <td data-bbox="667 480 1494 544" rowspan="6">Generally applicable</td> </tr> <tr> <td data-bbox="353 544 389 608">b</td> <td data-bbox="389 544 667 608">Duct sorbent injection (DSI)</td> </tr> <tr> <td data-bbox="353 608 389 671">c</td> <td data-bbox="389 608 667 671">Spray dry absorber (SDA)</td> </tr> <tr> <td data-bbox="353 671 389 735">d</td> <td data-bbox="389 671 667 735">Circulating fluidised bed (CFB) dry scrubber</td> </tr> <tr> <td data-bbox="353 735 389 799">e</td> <td data-bbox="389 735 667 799">Wet scrubbing</td> </tr> <tr> <td data-bbox="353 799 389 863">f</td> <td data-bbox="389 799 667 863">Flue-gas condenser</td> </tr> <tr> <td data-bbox="353 863 389 967">g</td> <td data-bbox="389 863 667 967">Wet flue-gas desulphurisation (wet FGD)</td> <td data-bbox="667 863 1494 967">Not applicable to combustion plants operated &lt; 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</td> </tr> <tr> <td data-bbox="353 967 389 1059">h</td> <td data-bbox="389 967 667 1059">Fuel choice</td> <td data-bbox="667 967 1494 1059">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 data-bbox="353 1086 1494 1142"><b>BAT-associated emission levels (BAT-AELs) for SO<sub>2</sub> emissions to air from the combustion of solid biomass and/or peat</b></p> <table border="1" data-bbox="353 1142 1494 1390"> <thead> <tr> <th data-bbox="353 1142 741 1318" rowspan="3">Combustion plant total rated thermal input (MW<sub>th</sub>)</th> <th colspan="4" data-bbox="741 1142 1494 1182">BAT-AELs for SO<sub>2</sub> (mg/Nm<sup>3</sup>)</th> </tr> <tr> <th colspan="2" data-bbox="741 1182 1048 1246">Yearly average</th> <th colspan="2" data-bbox="1048 1182 1494 1246">Daily average or average over the sampling period</th> </tr> <tr> <th data-bbox="741 1246 853 1318">New plant</th> <th data-bbox="853 1246 1048 1318">Existing plant <sup>(87)</sup></th> <th data-bbox="1048 1246 1211 1318">New plant</th> <th data-bbox="1211 1246 1494 1318">Existing plant <sup>(88)</sup></th> </tr> </thead> <tbody> <tr> <td data-bbox="353 1318 741 1350">&lt; 100</td> <td data-bbox="741 1318 853 1350">15–70</td> <td data-bbox="853 1318 1048 1350">15–100</td> <td data-bbox="1048 1318 1211 1350">30–175</td> <td data-bbox="1211 1318 1494 1350">30–215</td> </tr> <tr> <td data-bbox="353 1350 741 1390">100–300</td> <td data-bbox="741 1350 853 1390">&lt; 10–50</td> <td data-bbox="853 1350 1048 1390">&lt; 10–70 <sup>(89)</sup></td> <td data-bbox="1048 1350 1211 1390">&lt; 20–85</td> <td data-bbox="1211 1350 1494 1390">&lt; 20–175 <sup>(90)</sup></td> </tr> </tbody> </table>	Technique	Description	Applicability	a	Boiler sorbent injection (in-furnace or in-bed)	Generally applicable	b	Duct sorbent injection (DSI)	c	Spray dry absorber (SDA)	d	Circulating fluidised bed (CFB) dry scrubber	e	Wet scrubbing	f	Flue-gas condenser	g	Wet flue-gas desulphurisation (wet FGD)	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	h	Fuel choice	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	Combustion plant total rated thermal input (MW <sub>th</sub> )	BAT-AELs for SO <sub>2</sub> (mg/Nm <sup>3</sup> )				Yearly average		Daily average or average over the sampling period		New plant	Existing plant <sup>(87)</sup>	New plant	Existing plant <sup>(88)</sup>	< 100	15–70	15–100	30–175	30–215	100–300	< 10–50	< 10–70 <sup>(89)</sup>	< 20–85	< 20–175 <sup>(90)</sup>	CC	<p>The operator has confirmed the following:</p> <p>b) Duct sorbent injector – this is installed at the installation in order to reduced SO<sub>x</sub>, HCl and HF.</p> <p>The operator has confirmed that they will be compliant with the limits for SO<sub>x</sub>, HCl and HF by 31/07/21</p>
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	f.	Dry or semi-dry FGD system	See descriptions in Section 8.5. The techniques are mainly used for SO <sub>x</sub> , HCl and/or HF control	See applicability in BAT 25	
	g	Wet flue-gas desulphurisation (wet FGD)			
28 - 75	The BAT-associated emission level (BAT-AEL) for mercury emissions to air from the combustion of solid biomass and/or peat is < 1–5 µg/Nm <sup>3</sup> as average over the sampling period.				
	Not applicable as these refer to plant with different fuel or in an inapplicable sector.				

## **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.

## 7. Emissions to Water

The consolidated permit incorporates one discharges to sewer identified as S1 and one discharge to surface water W1. There are no limits set by the existing permit.

As part of our delivery of the Water Framework Directive (WFD) requirements, we need to identify and assess the impact of sources of hazardous pollutants to surface waters from regulated industry. This is relevant to discharges to surface water and/or sewer where there are flue gas treatment activities to which BAT Conclusion 15 applies.

BAT Conclusion 15 requires a reduction in emissions to water from flue-gas treatment. The Operator confirmed that this is not applicable as there is no wet flue-gas treatment at the installation. We agree with the applicability of this BAT Conclusion, refer to Section 6 of this document.

There are no BAT AELs specified in the BAT Conclusions for this type of plant. 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 2.3.7. 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.

## 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.



Aspect considered	Decision
Changes to the permit conditions due to an Environment Agency initiated variation	We have varied the permit as stated in the variation notice.
Pre-operational conditions	<p>Based on the information in the application, we consider that we need to amend pre-operational condition 4.</p> <ul style="list-style-type: none"> <li>• This is to ensure that the amount of waste sent for disposal is minimised in accordance with BAT 16. And to provide details of how spent catalyst is reused at the installation.</li> </ul>
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"> <li>• The operator will have a plan in place to ensure that the fuel is characterised in line with BAT 9.</li> </ul> <p>We have updated improvement condition 2 to ensure that:</p> <ul style="list-style-type: none"> <li>• Any necessary revisions are made to the details of start up and shut down conditions and the CO limit following the commissioning of the hybrid SCR/SNCR system.</li> </ul>
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 S3.4 Process monitoring requirements was amended to include the requirement to monitor energy efficiency after overhauls on site in line with BAT2.</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> </ul>

Aspect considered	Decision
	<ul style="list-style-type: none"> <li>• Sulphur dioxide</li> <li>• Hydrogen Chloride</li> <li>• Hydrogen Fluoride</li> <li>• Dust</li> <li>• Mercury</li> <li>• Ammonia</li> </ul> <p>These are described in the relevant BAT Conclusions in Section 5 of this document.</p>
<b>Operator competence</b>	
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.
<b>Growth Duty</b>	
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>