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/ZP3231AE
The Operator is:	Cramlington Renewable Energy Developments Limited
The Installation is:	Cramlington Biomass CHP Plant
This Variation Notice number is:	EPR/ZP3231AE/V002

What this document is about

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

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

It explains how we have reviewed and considered the techniques used by the Operator in the operation and control of the plant and activities of the installation. This review has been undertaken with reference to the decision made by the European Commission establishing best available techniques (BAT) conclusions ('BAT Conclusions') for large combustion plant as detailed in document reference IEDC-7-1. It is our record of our decision-making process and shows how we have taken into account all relevant factors in reaching our position. It also provides a justification for the inclusion of any specific conditions in the permit that are in addition to those included in our generic permit template.

As well as considering the review of the operating techniques used by the Operator for the operation of the plant and activities of the installation, the consolidated variation notice takes into account and brings together in a

single document all previous variations that relate to the original permit issued. It also modernises the entire permit to reflect the conditions contained in our current generic permit template.

The introduction of new template conditions makes the Permit consistent with our current general approach and philosophy and with other permits issued to installations in this sector. Although the wording of some conditions has changed, while others have been removed because of the new regulatory approach, it does not reduce the level of environmental protection achieved by the Permit in any way. In this document we therefore address only our determination of substantive issues relating to the new BAT Conclusions.

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 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_2 expressed as NO_2)
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 1st May 2018 requiring the Operator to provide information to demonstrate how the operation of their installation currently meets, or will subsequently meet, the revised standards described in the large combustion plant BAT Conclusions document. The Notice also required that where the revised standards are not currently met, the operator should provide information that:

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

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

The Regulation 61 Notice response from the Operator was received on 01/11/18.

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 09/09/19. Suitable further information was provided by the Operator on 04/10/19.

We considered it was in the correct form and contained sufficient information for us to begin our determination of the permit review but not that it necessarily contained all the information we would need to complete that review: see below.

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.

In relation to BAT Conclusion(s) 1, 9 and 16 we agree with the operator in respect to their current stated capability as recorded in their Regulation 61 Notice response that improvements are required.

We have therefore included an improvement conditions IC5, IC9 and IC16 in the consolidated variation notice, which requires them to upgrade their operational techniques so that the requirements of the BAT Conclusion are delivered by 17 August 2021. This is discussed in more detail in the key issues section and/or in the decision checklist regarding relevant BAT Conclusions.

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 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 one LCP on site is referenced as LCP 649 and is a biomass fired boiler which has a thermal input of 75 MW.

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 LCP 649, 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.

NOx limits (mg/Nm^3)						
Averaging	**IED (Annex V Part 2) – New**	**BREF (Table 9 BAT-c)**	**Expected permit limits**	**Basis**	**Limits apply**	**Monitoring**
Annual	**None**	**225**	**225**	BREF	MSUL/MSDL to baseload	Continuous
Monthly	**250**	**None**	**250**	IED	MSUL/MSDL to baseload	
Daily	**275**	**275**	**275**	IED	MSUL/MSDL to baseload	
95th %ile of hr means	**500**	**None**	**500**	IED	MSUL/MSDL to baseload	

CO limits (mg/Nm^3)						
Averaging	**IED (Annex V Part 2) - New**	**BREF (Table 9 BAT-c)**	**Expected permit limits**	**Basis**	**Limits apply**	**Monitoring**
Annual	**None**	**250**	**250**	BREF	MSUL/MSDL to baseload	Continuous

SO_2 limits (mg/Nm^3)						
Averaging	**IED (Annex V Part 2) - New**	**BREF (Table 10 BAT-c)**	**Expected permit limits**	**Basis**	**Limits apply**	**Monitoring**
Annual	**None**	**100**	**100**	BREF	MSUL/MSDL to baseload	Continuous
Monthly	**200**	**None**	**100**	Existing Permit	MSUL/MSDL to baseload	
Daily	**220**	**215**	**110**	Existing Permit	MSUL/MSDL to baseload	
95th %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^3, 110 mg/Nm^3 and 200 mg/Nm^3 respectively, as specified in the existing permit.

HCl limits (mg/Nm^3)						
Averaging	**IED (Annex V Part 2) - New**	**BREF (Table 11 BAT-c)**	**Expected permit limits**	**Basis**	**Limits apply**	**Monitoring**
Annual	**None**	**15**	**15**	BREF	MSUL/MSDL to baseload	Continuous
Daily	**None**	**35**	**35**	BREF	MSUL/MSDL to baseload	

HF limits (mg/Nm^3)						
Averaging	**IED (Annex V Part 2) - New**	**BREF (Table 11 BAT-c)**	**Expected permit limits**	**Basis**	**Limits apply**	**Monitoring**
Average over sampling period	**None**	**< 1.5**	**< 1.5**	BREF	MSUL/MSDL to baseload	Once per year

Dust limits (mg/Nm^3)						
Averaging	**IED (Annex V Part 2) - New**	**BREF (Table 12 BAT-c)**	**Expected permit limits**	**Basis**	**Limits apply**	**Monitoring**
Annual	**None**	**15**	**15**	BREF	MSUL/MSDL to baseload	Continuous
Monthly	**20**	**None**	**20**	IED	MSUL/MSDL to baseload	
Daily	**22**	**22**	**22**	IED	MSUL/MSDL to baseload	
95th %ile of hr means	**40**	**None**	**40**	IED	MSUL/MSDL to baseload	

NH_3 limits (mg/Nm^3)						
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 (mg/Nm^3)						
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 response. We consider that the figure provide for the 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
LCP 649 – condensing mode: unit description from the AEEL table					
28 - 38	None	None	36.42%	NA	NA
LCP 649– heat export mode: unit description from the AEEL table					
28 - 38	None	None	34.04%	NA	NA

4.3 Environment Management System

BAT 1 requires the operator to have an environment management system (EMS) in place that addresses all relevant points (i) – (xvi) as specified under this BAT conclusion. The operator has identified that points (vii), (viii), (ix) and (xi) have not covered in the EMS.

We have therefore included an improvement condition (IC) 5 requiring the operator to update the EMS to include procedures that cover the requirements of points (vii), (viii), (ix) and (xi), as specified under BAT 1.

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 IC3 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 Waste Management

BAT 16 requires the operator to reduce the quantity of waste sent for disposal from the combustion plant by taking into account life-cycle thinking, considering measures such as waste prevention, Waste preparation for reuse, Waste recycling and waste recovery. The disposal/recovery route for fly ash and bottom ash has not yet been defined.

We have therefore included an improvement condition (IC) in the consolidated variation notice IC4 requiring the operator to submit a plan outlining how this

will be carried out for approval prior to the implementation date for the BAT Conclusions.

5 Decision checklist regarding relevant BAT Conclusions

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

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

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

BAT Conclusion requirement topic	Permit condition(s)	Permit table(s)
Environmental Management System	1.1.1	S1.2
BAT AELs	3.1.1 and 3.5.1	S3.1a
Monitoring	2.3, 3.5 and 3.6	S3.1, S3.1a, S3.2
Energy efficiency	1.2 and 2.3	S3.3
Noise	3.4 and 2.3	S1.2
Other operating techniques	1.2	S1.2

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

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

BAT Concn. Number	Summary of BAT Conclusion requirement	Status NA/ CC / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
General			
1	**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:** i. commitment of the management, including senior management; ii. definition of an environmental policy that includes the continuous improvement of the installation by the management; iii. planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment; iv. implementation of procedures (a) Structure and responsibility (b) Training (c) Communication (d) Employee involvement (e) Documentation (f) Efficient process control (g) Maintenance programmes (h) Emergency preparedness and response (i) Safeguarding compliance with environmental legislation v. checking performance and taking corrective action, paying particular attention to: (a) monitoring and measurement (see also the Reference Document on the General Principles of Monitoring) (b) corrective and preventive action (c) maintenance of records (d) independent (where practicable) internal and external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained; vi. review of the EMS and its continuing suitability, adequacy and effectiveness by senior management; vii. following the development of cleaner technologies; viii. consideration for the environmental impacts from the eventual decommissioning of the installation at the stage of designing a new plant, and throughout its operating life; viii. consideration for the environmental impacts from the eventual decommissioning of the installation at the stage of designing a new plant, and throughout its operating life; ix. application of sectoral benchmarking on a regular basis. Etc - see BAT Conclusions	FC	A site specific Environment Management System (EMS) is in place. Further information needs to be incorporated into the EMS in order for it to be in compliance. The information required relates to points (vii), (viii), (ix) and (xi). Improvement condition 5 has been included requesting that the EMS is updated to include procedures relating to these points.

<table>
<tr><th>BAT Concn. Number</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th></tr>
<tr><td></td><td>Applicability. The scope (e.g. level of detail) and nature of the EMS (e.g. standardised or non-standardised) will generally be related to the nature, scale and complexity of the installation, and the range of environmental impacts it may have.</td><td></td><td></td></tr>
<tr><td>2</td><td>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.</td><td>CC</td><td>The net electrical efficiency has been calculated by carrying out a performance test at full load in both condensing (36.42%) and heat export mode (34.04%).</td></tr>
<tr><td>3</td><td>BAT is to monitor key process parameters relevant for emissions to air and water including those given below.
<table>
<tr><th>Stream</th><th>Parameter(s)</th><th>Monitoring</th></tr>
<tr><td rowspan="3">Flue-gas</td><td>Flow</td><td>Periodic or continuous determination</td></tr>
<tr><td>Oxygen content, temperature, and pressure</td><td rowspan="2">Periodic or continuous measurement</td></tr>
<tr><td>Water vapour content (3)</td></tr>
<tr><td>Waste water from flue-gas treatment</td><td>Flow, pH, and temperature</td><td>Continuous measurement</td></tr>
</table></td><td>CC</td><td>Flow, temperature, oxygen, pressure and water vapour content are monitored continuously from the CEMS platform on the emissions stack.

Temperature is also monitored just above the secondary combustion zone to determine if wood firing is in operation.

Monitoring oxygen content allows control of air/fuel firing ratio of the firing.

Pressure is also monitored in the furnace to ensure entire flue gas pass is under negative pressure.</td></tr>
<tr><td>4</td><td>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.
<table>
<tr><th>Substance/Parameter</th><th>Fuel/Process/Type of combustion plant</th><th>Combustion plant total rated</th><th>Standard(s) (4)</th><th>Minimum monitoring frequency (5)</th><th>Monitoring associated with</th></tr>
</table></td><td>FC</td><td>The operator has confirmed the following.

Monitoring of the following parameters for emissions to air</td></tr>
</table>

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
			thermal input					apply to solid biomass combustion plant. NH_3 – Continuous – BS EN 14181 NO_x – Continuous – BS EN 14181 CO - Continuous – BS 14181 SO_2 – Continuous – BS 14181 HCl – Continuous – BS14181 HF – Continuous – BS14181 Dust – Continuous – BS14181 Metals and Metalloids – Periodic (once per year) – EN14385. The operator has confirmed that the installation will be compliant with this monitoring requirement by 31st July 2021, which is the date by which full compliance with BAT conclusions is required. Hg – Periodic (once per year) – EN 13211. The operator has confirmed that the installation will be compliant with this monitoring requirement by 31st July 2021, which is the date by which full compliance with BAT conclusions is required.
		NH_3	— When SCR and/or SNCR is used	All sizes	Generic EN standards	Continuous [6] [7]	BAT 7	
		NO_X	— Coal and/or lignite including waste co-incineration — Solid biomass and/or peat including waste co-incineration — HFO- and/or gas-oil-fired boilers and engines — Gas-oil-fired gas turbines — Natural-gas-fired boilers, engines, and turbines — Iron and steel process gases — Process fuels from the chemical industry — IGCC plants	All sizes	Generic EN standards	Continuous [6] [8]	BAT 20 BAT 24 BAT 28 BAT 32 BAT 37 BAT 41 BAT 42 BAT 43 BAT 47 BAT 48 BAT 56 BAT 64 BAT 65 BAT 73	
			— Combustion plants on offshore platforms	All sizes	EN 14792	Once every year [9]	BAT 53	
		N_2O	— Coal and/or lignite in circulating fluidised bed boilers — Solid biomass and/or peat in circulating fluidised bed boilers	All sizes	EN 21258	Once every year [10]	BAT 20 BAT 24	
		CO	— Coal and/or lignite including waste co-incineration — Solid biomass and/or peat including waste co-incineration	All sizes	Generic EN standards	Continuous [6] [8]	BAT 20 BAT 24 BAT 28 BAT 33 BAT 38 BAT 44 BAT 49	

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
		— HFO- and/or gas-oil-fired boilers and engines — Gas-oil-fired gas turbines — Natural-gas-fired boilers, engines, and turbines — Iron and steel process gases — Process fuels from the chemical industry — IGCC plants				BAT 56 BAT 64 BAT 65 BAT 73		We agree that the operator is in compliance with the monitoring requirements of this BAT conclusion.
		— Combustion plants on offshore platforms	All sizes	EN 15058	Once every year [9]	BAT 54		
	SO_2	— Coal and/or lignite incl waste co-incineration — Solid biomass and/or peat incl waste co-incineration — HFO- and/or gas-oil-fired boilers — HFO- and/or gas-oil-fired engines — Gas-oil-fired gas turbines — Iron and steel process gases — Process fuels from the chemical industry in boilers — IGCC plants	All sizes	Generic EN standards and EN 14791	Continuous [6] [11] [12]	BAT 21 BAT 25 BAT 29 BAT 34 BAT 39 BAT 50 BAT 57 BAT 66 BAT 67 BAT 74		
	SO_3	— When SCR is used	All sizes	No EN standard available	Once every year	—		
	Gaseous chlorides, expressed as HCl	— Coal and/or lignite — Process fuels from the chemical industry in boilers	All sizes	EN 1911	Once every three months [6] [13] [14]	BAT 21 BAT 57		

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	Generic EN standards	Continuous [15] [16]	BAT 25		
		— Waste co-incineration	All sizes	Generic EN standards	Continuous [6] [16]	BAT 66 BAT 67		
	HF	— Coal and/or lignite — Process fuels from the chemical industry in boilers	All sizes	No EN standard available	Once every three months [6] [13] [14]	BAT 21 BAT 57		
		— Solid biomass and/or peat	All sizes	No EN standard available	Once every year	BAT 25		
		— Waste co-incineration	All sizes	Generic EN standards	Continuous [6] [16]	BAT 66 BAT 67		
	Dust	— Coal and/or lignite — Solid biomass and/or peat — HFO- and/or gas-oil-fired boilers — Iron and steel process gases — Process fuels from the chemical industry in boilers — IGCC plants — HFO- and/or gas-oil-fired engines — Gas-oil-fired gas turbines	All sizes	Generic EN standards and EN 13284-1 and EN 13284-2	Continuous [6] [17]	BAT 22 BAT 26 BAT 30 BAT 35 BAT 39 BAT 51 BAT 58 BAT 75		
		— Waste co-incineration	All sizes	Generic EN standards and EN 13284-2	Continuous	BAT 68 BAT 69		
	Metals and metalloids except mercury (As, Cd, Co, Cr, Cu, Mn, Ni, Pb,	— Coal and/or lignite — Solid biomass and/or peat — HFO- and/or gas-oil-fired boilers and engines	All sizes	EN 14385	Once every year [18]	BAT 22 BAT 26 BAT 30		

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
	Sb, Se, Tl, V, Zn)	— Waste co-incineration	< 300 MW_{th}	EN 14385	Once every six months [13]	BAT 68 BAT 69		
			≥ 300 MW_{th}	EN 14385	Once every three months [19] [13]			
		— IGCC plants	≥ 100 MW_{th}	EN 14385	Once every year [18]	BAT 75		
	Hg	— Coal and/or lignite including waste co-incineration	< 300 MW_{th}	EN 13211	Once every three months [13] [20]	BAT 23		
			≥ 300 MW_{th}	Generic EN standards and EN 14884	Continuous [16] [21]			
		— Solid biomass and/or peat	All sizes	EN 13211	Once every year [22]	BAT 27		
		— Waste co-incineration with solid biomass and/or peat	All sizes	EN 13211	Once every three months [13]	BAT 70		
		— IGCC plants	≥ 100 MW_{th}	EN 13211	Once every year [23]	BAT 75		
	TVOC	— HFO- and/or gas-oil-fired engines — Process fuels from chemical industry in boilers	All sizes	EN 12619	Once every six months [13]	BAT 33 BAT 59		
		— 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_4	— Natural-gas-fired engines	All sizes	EN ISO 25139	Once every year [24]	BAT 45		
	PCDD/F	— Process fuels from chemical industry in boilers — Waste co-incineration	All sizes	EN 1948-1, EN 1948-2, EN 1948-3	Once every six months [13] [25]	BAT 59 BAT 71		

<table>
<tr><th>BAT Concn. Number</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th></tr>
<tr><td>5</td><td>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.
<table>
<tr><th colspan="2">Substance/Parameter</th><th>Standard(s)</th><th>Minimum monitoring frequency</th><th>Monitoring associated with</th></tr>
<tr><td colspan="2">Total organic carbon (TOC) ([26])</td><td>EN 1484</td><td rowspan="13">Once every month</td><td>BAT 15</td></tr>
<tr><td colspan="2">Chemical oxygen demand (COD) ([26])</td><td>No EN standard available</td><td></td></tr>
<tr><td colspan="2">Total suspended solids (TSS)</td><td>EN 872</td><td></td></tr>
<tr><td colspan="2">Fluoride (F^-)</td><td>EN ISO 10304-1</td><td></td></tr>
<tr><td colspan="2">Sulphate (SO_4^{2-})</td><td>EN ISO 10304-1</td><td></td></tr>
<tr><td colspan="2">Sulphide, easily released (S^{2-})</td><td>No EN standard available</td><td></td></tr>
<tr><td colspan="2">Sulphite (SO_3^{2-})</td><td>EN ISO 10304-3</td><td></td></tr>
<tr><td rowspan="8">Metals and metalloids</td><td>As</td><td rowspan="7">Various EN standards available (e.g. EN ISO 11885 or EN ISO 17294-2)</td><td rowspan="8"></td></tr>
<tr><td>Cd</td></tr>
<tr><td>Cr</td></tr>
<tr><td>Cu</td></tr>
<tr><td>Ni</td></tr>
<tr><td>Pb</td></tr>
<tr><td>Zn</td></tr>
<tr><td>Hg</td><td>Various EN standards available (e.g. EN ISO 12846 or EN ISO 17852)</td></tr>
<tr><td colspan="2">Chloride (Cl^-)</td><td>Various EN standards available (e.g. EN ISO 10304-1 or EN ISO 15682)</td><td>—</td></tr>
<tr><td colspan="2">Total nitrogen</td><td>EN 12260</td><td>—</td></tr>
</table></td><td>NA</td><td>Flue gas treatment is a dry process, therefore, no waste water is generated from the process. This BAT conclusion is thus not applicable.</td></tr>
<tr><td>6</td><td>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.</td><td>CC</td><td>The operator has confirmed the following:</td></tr>
</table>

<table>
<tr><th>BAT Concn. Number</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th></tr>
<tr>
<td></td>
<td>
<table>
<tr><th colspan="2">Technique</th><th>Description</th><th>Applicability</th></tr>
<tr><td>a.</td><td>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 rowspan="2">Generally applicable</td></tr>
<tr><td>b.</td><td>Maintenance of the combustion system</td><td>Regular planned maintenance according to suppliers' recommendations</td></tr>
<tr><td>c.</td><td>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 combustion system and/or control command system</td></tr>
<tr><td>d.</td><td>Good design of the combustion equipment</td><td>Good design of furnace, combustion chambers, burners and associated devices</td><td>Generally applicable to new combustion plants</td></tr>
<tr><td>e.</td><td>Fuel choice</td><td>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>Applicable within the constraints associated with the availability of suitable types of fuel with a better environmental profile as a whole, which may be impacted by the energy policy of the Member State, or by the integrated site's fuel balance in the case of combustion of industrial process fuels. For existing combustion plants, the type of fuel chosen may be limited by the configuration and the design of the plant</td></tr>
</table>
</td>
<td></td>
<td>That they are compliant with the requirements through a combination of techniques as set out below:

a) Fuel blending and mixing – Wood chips are blended prior to being received at the boiler.

b) Maintenance of the combustion system – Regular planned maintenance is undertaken in accordance with the manufacturer’s recommendations.

c) Advanced control system – An advanced control system is installed, which controls the process to ensure operations: maximise fuel burnout, minimise emissions, achieve a constant level of steam production and maintain operation within the specified range.

d) Good design of the combustion equipment – The furnace is new and is currently undergoing commissioning.
-The combustion unit employs staged combustion optimized for drying, combustion and burn-out. Primary air is supplied through the grate, secondary and over fire air</td>
</tr>
</table>

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
			is injected through nozzles above the grate. - The burner is a single, light fuel oil start up burner and is only used for start-up. - The system incorporates additional devices which reduce emissions such as SNCR, a bag filter and over fire air. e) Fuel Choice – The fuel has a low sulphur content (average 0.01 – 0.03%) and low chlorine content (0.01 – 0.05%)
7	In order to reduce emissions of ammonia to air from the use of selective catalytic reduction (SCR) and/or selective non-catalytic reduction (SNCR) for the abatement of NO_X emissions, BAT is to optimise the design and/or operation of SCR and/or SNCR (e.g. optimised reagent to NO_X ratio, homogeneous reagent distribution and optimum size of the reagent drops). **BAT-associated emission levels** The BAT-associated emission level (BAT-AEL) for emissions of NH_3 to air from the use of SCR and/or SNCR is < 3–10 mg/Nm^3 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^3.	CC	The operator has confirmed the following: SNCR has been installed at the installation. It will only be used if further NO_x abatement is required. A NO_x trigger point is set using the advanced control system for when SNCR would become active. Based on testing undertaken during commissioning it is expected that only intermittent operation would be necessary. We agree that the operator is in compliance with the requirements of this BAT conclusion.
8	In order to prevent or reduce emissions to air during normal operating conditions, BAT is to ensure, by appropriate design, operation and maintenance, that the emission abatement systems are used at optimal capacity and availability.	CC	The operator has confirmed that the following abatement systems are in place:

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
			- Primary NOx abatement through controlling combustion process to minimise NO_x formation. - Secondary NO_x abatement through used of SNCR as required. System is maintained in line with planned maintenance routines. - Bag filter to control particulate emissions. A dust detector is fitted to indicate when there is bag failure. An inline cleaning system is in place to periodically remove the dust cake. - CO emissions are not anticipated to be significant as the furnace has been designed to optimise combustion. - SO_2 emissions although unlikely to be significant are controlled through the use of hydrated lime. - CEMs allows for real time monitoring and problems to be identified and repaired. We agree with the Operator's stated compliance.
9	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): (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;	FC	The operator has confirmed the following: (i) Full characterisation of the fuel used including at least the parameters listed in BAT 9 and in

<table>
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<tr><td></td><td>(ii) Regular testing of the fuel quality to check that it is consistent with the initial characterisation and according to the plant design specifications. The frequency of testing and the parameters chosen from the table below are based on the variability of the fuel and an assessment of the relevance of pollutant releases (e.g. concentration in fuel, flue-gas treatment employed);
(iii) Subsequent adjustment of the plant settings as and when needed and practicable (e.g. integration of the fuel characterisation and control in the advanced control system (see description in Section 8.1)).
Description
Initial characterisation and regular testing of the fuel can be performed by the operator and/or the fuel supplier. If performed by the supplier, the full results are provided to the operator in the form of a product (fuel) supplier specification and/or guarantee.
<table>
<tr><th>Fuel(s)</th><th>Substances/Parameters subject to characterisation</th></tr>
<tr><td rowspan="2">Biomass/peat</td><td>— LHV
— moisture</td></tr>
<tr><td>— Ash
— C, Cl, F, N, S, K, Na
— Metals and metalloids (As, Cd, Cr, Cu, Hg, Pb, Zn)</td></tr>
<tr><td rowspan="3">Coal/lignite</td><td>— LHV
— Moisture
— Volatiles, ash, fixed carbon, C, H, N, O, S</td></tr>
<tr><td>— Br, Cl, F</td></tr>
<tr><td>— Metals and metalloids (As, Cd, Co, Cr, Cu, Hg, Mn, Ni, Pb, Sb, Tl, V, Zn)</td></tr>
<tr><td>HFO</td><td>— Ash
— C, S, N, Ni, V</td></tr>
<tr><td>Gas oil</td><td>— Ash
— N, C, S</td></tr>
<tr><td>Natural gas</td><td>— LHV</td></tr>
</table></td><td></td><td>accordance with EN standards – Initial fuel characterisation has been undertaken in accordance with the required standards. Full characterisation will be provided before 31st July 2021, improvement condition 3 has been included specifying this requirement.

(ii) Regular testing of the fuel quality to check that it is consistent with initial characterisation and according to the plant specification. – Full details will be provided in accordance with the requirements of improvement condition 3.

(iii) Subsequent adjustment of plant settings as and when needed and practicable - Full details will be provided in accordance with the requirements of improvement condition 3.</td></tr>
</table>

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
	<table><tr><td></td><td>— CH_4, C_2H_6, C_3, C_4+, CO_2, N_2, Wobbe index</td></tr><tr><td>Process fuels from the chemical industry (27)</td><td>— Br, C, Cl, F, H, N, O, S — Metals and metalloids (As, Cd, Co, Cr, Cu, Hg, Mn, Ni, Pb, Sb, Tl, V, Zn)</td></tr><tr><td>Iron and steel process gases</td><td>— LHV, CH_4 (for COG), C_XH_Y (for COG), CO_2, H_2, N_2, total sulphur, dust, Wobbe index</td></tr><tr><td>Waste (28)</td><td>— LHV — Moisture — Volatiles, ash, Br, C, Cl, F, H, N, O, S — Metals and metalloids (As, Cd, Co, Cr, Cu, Hg, Mn, Ni, Pb, Sb, Tl, V, Zn)</td></tr></table>		
10	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: — appropriate design of the systems considered relevant in causing OTNOC that may have an impact on emissions to air, water and/or soil (e.g. low-load design concepts for reducing the minimum start-up and shutdown loads for stable generation in gas turbines), — set-up and implementation of a specific preventive maintenance plan for these relevant systems, — review and recording of emissions caused by OTNOC and associated circumstances and implementation of corrective actions if necessary, — periodic assessment of the overall emissions during OTNOC (e.g. frequency of events, duration, emissions quantification/estimation) and implementation of corrective actions if necessary.	CC	The operator has confirmed that: Operating instructions are in place for plant start-up and shut-down which ensure plant is started up and shut down efficiently. Preventative maintenance procedures for part of the EMS including: - Plant modification procedure - Management of major outages - Adding and deleting outage work scope - Load injection leak sealing - Management of pressure system CEMS remains on line during start up and shut down which allows for reviewing of emissions in real time. Any significant events would

<table>
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<tr><td></td><td></td><td></td><td>be noted and reported to the Environment Agency.

Periodic assessment of overall emissions takes place as part of annual environmental reviews and improvements that can be made will be assessed for feasibility.

We agree with the Operator’s stated compliance.</td></tr>
<tr><td>11</td><td>BAT is to appropriately monitor emissions to air and/or to water during OTNOC.
Description
The monitoring can be carried out by direct measurement of emissions or by monitoring of surrogate parameters if this proves to be of equal or better scientific quality than the direct measurement of emissions. Emissions during start-up and shutdown (SU/SD) may be assessed based on a detailed emission measurement carried out for a typical SU/SD procedure at least once every year, and using the results of this measurement to estimate the emissions for each and every SU/SD throughout the year.</td><td>CC</td><td>The operator has confirmed the following:

CEMS remains on line during start up and shut down which allows for reviewing of emissions in real time. Any significant events would be noted and reported to the Environment Agency.

We agree with the Operator’s stated compliance.</td></tr>
<tr><td>12</td><td>In order to increase the energy efficiency of combustion, gasification and/or IGCC units operated ≥ 1 500 h/yr, BAT is to use an appropriate combination of the techniques given below.
<table>
<tr><th colspan="2">Technique</th><th>Description</th><th>Applicability</th></tr>
<tr><td>a.</td><td>Combustion optimisation</td><td>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 rowspan="2">Generally applicable</td></tr>
<tr><td>b.</td><td>Optimisation of the working medium conditions</td><td>Operate at the highest possible pressure and temperature of the working medium gas or steam, within the constraints associated with, for</td></tr>
</table></td><td></td><td>The operator has confirmed the following:

That they are compliant with the requirements through a combination of techniques as set out below:

a) Combustion optimisation – This is achieved through the use of an advanced control system that</td></tr>
</table>

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
						maximises efficiency and reduces emissions by a number of techniques, as described under BAT 6 d). b) Optimisation of the working medium conditions – super heaters are used at the installation. Temperature and pressure are increased resulting in more thermal energy in the steam which is converted by the steam turbine into electrical energy. c) Optimisation of the steam cycle – The installation uses an air cooled system. The lowest possible temperature that can be used is ambient, hence it is considered that this is being complied with. d) Minimisation of energy consumption – The start-up burner is retracted from the furnace during normal operations. Insulation is used to minimise heat loss. Energy efficient lighting is used where feasible. A high efficiency turbine used. e) Preheating of Combustion Air – Hot feed water is used to pre-heat incoming combustion air by
			example, the control of NO_X emissions or the characteristics of energy demanded			
	c.	Optimisation of the steam cycle	Operate with lower turbine exhaust pressure by utilisation of the lowest possible temperature of the condenser cooling water, within the design conditions			
	d.	Minimisation of energy consumption	Minimising the internal energy consumption (e.g. greater efficiency of the feed-water pump)			
	e.	Preheating of combustion air	Reuse of part of the heat recovered from the combustion flue-gas to preheat the air used in combustion	Generally applicable within the constraints related to the need to control NO_X emissions		
	f.	Fuel preheating	Preheating of fuel using recovered heat	Generally applicable within the constraints associated with the boiler design and the need to control NO_X emissions		
	g.	Advanced control system	See description in Section 8.2. Computerised control of the main combustion parameters enables the combustion efficiency to be improved	Generally applicable to new units. The applicability to old units may be constrained by the need to retrofit the combustion system and/or control command system		
	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: — flue-gas — grate cooling — circulating fluidised bed	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		

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
	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		flowing through a High Pressure Air Pre Heater (HPAPH). After the feed water has passed through the HPAPH and has been cooled it is heated up again using hot flue gases. g) Advanced control system - An advanced control system is used on the site to control the main combustion parameters. h) Feed-water preheating using recovered heat - The feed water is heated in the economiser using the hot flue gases. i) Heat recovery by cogeneration (CHP) – steam is exported off site to two customers. There is the capacity to export more heat if required. j) CHP readiness – a CHP system is already in place at the installation. k) Flue gas condenser – one is installed on the CHP system. p) Minimisation of heat loss – the CHP plant in insulated where appropriate, including pipework to minimise heat loss.
	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 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	The applicability may be restricted by demand, steam conditions and/or limited plant lifetime		

<table>
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<tr><td></td><td>
<table>
<tr><td></td><td></td><td>modifications to the geometry of the turbine rotor blades</td><td></td></tr>
<tr><td>s.</td><td>Supercritical and ultra-supercritical steam conditions</td><td>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</td><td>Only applicable to new units of ≥ 600 MW_{th} operated > 4 000 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</td></tr>
</table>
</td><td></td><td>q) Advanced material – the installation is still undergoing commissioning. As a new plant it is built using materials capable of withstanding high operating temperatures and pressures, allowing for increased process efficiencies.

r) Steam turbine upgrades – the installation is still undergoing commissioning as such steam turbine upgrades are not necessary at this stage. The plant incorporates ‘reheat’ within the steam cycle. This increases efficiency from approximately 30% to 35%.

We agree with the Operator’s stated compliance.</td></tr>
<tr><td>13</td><td>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.
<table>
<tr><th colspan="2">Technique</th><th>Description</th><th>Applicability</th></tr>
<tr><td>a.</td><td>Water recycling</td><td>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>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>b.</td><td>Dry bottom ash handling</td><td>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>Only applicable to plants combusting solid fuels.</td></tr>
</table>
</td><td>CC</td><td>The operator has confirmed the following:

a. Water recycling – after passing through the steam turbine the steam is condensed via the air cooled condenser and recovered water is feed back into the CHP process, reducing demineralised water usage.</td></tr>
</table>

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
	<table><tr><td></td><td></td><td></td><td>There may be technical restrictions that prevent retrofitting to existing combustion plants</td></tr></table>		Rainwater is collected and used to clean the air cooled condensers. Boiler blowdown water and effluent from the demineralisation plant are used for ash quenching and in water cannons used for boiler cleaning. b. dry bottom ash – a wet bottom ash system is used. This is not applicable to this plant. We agree with the operators stated compliance.
14	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. ***Description*** Waste water streams that are typically segregated and treated include surface run-off water, cooling water, and waste water from flue-gas treatment. ***Applicability*** The applicability may be restricted in the case of existing plants due to the configuration of the drainage systems.	CC	Surface water from roadways and roofs is discharge to the surface water sewer. Process water that cannot be reused within the CHP plant are sent to the waste water treatment plant on site prior discharge to the foul sewer. We agree with the operators stated compliance.
15	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. <table><tr><th>Technique</th><th>Typical pollutants prevented/abated</th><th>Applicability</th></tr><tr><td colspan="3">Primary techniques</td></tr></table>	NA	The flue gas treatment at the installation uses dry abatement. Therefore, BAT 15 is not 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

a.	Optimised combustion (see BAT 6) and flue-gas treatment systems (e.g. SCR/SNCR, see BAT 7)	Organic compounds, ammonia (NH_3)	Generally applicable

Secondary techniques [29]

b.	Adsorption on activated carbon	Organic compounds, mercury (Hg)	Generally applicable
c.	Aerobic biological treatment	Biodegradable organic compounds, ammonium (NH_4^+)	Generally applicable for the treatment of organic compounds. Aerobic biological treatment of ammonium (NH_4^+) 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_3^-), nitrite (NO_2^-)	Generally applicable
e.	Coagulation and flocculation	Suspended solids	Generally applicable
f.	Crystallisation	Metals and metalloids, sulphate (SO_4^{2-}), fluoride (F^-)	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^{2-}), sulphite (SO_3^{2-})	Generally applicable
l.	Precipitation	Metals and metalloids, sulphate (SO_4^{2-}), fluoride (F^-)	Generally applicable
m.	Sedimentation	Suspended solids	Generally applicable
n.	Stripping	Ammonia (NH_3)	Generally applicable

The BAT-AELs refer to direct discharges to a receiving water body at the point where the emission leaves the installation.

BAT-AELs for direct discharges to a receiving water body from flue-gas treatment

Substance/Parameter	BAT-AELs
	Daily average

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
	Total organic carbon (TOC): 20–50 mg/l (30) (31) (32) Chemical oxygen demand (COD): 60–150 mg/l (30) (31) (32) Total suspended solids (TSS): 10–30 mg/l Fluoride (F^-): 10–25 mg/l (32) Sulphate (SO_4^{2-}): 1,3–2,0 g/l (32) (33) (34) (35) Sulphide (S^{2-}), easily released: 0,1–0,2 mg/l (32) Sulphite (SO_3^{2-}): 1–20 mg/l (32) Metals and metalloids: As 10–50 µg/l; Cd 2–5 µg/l; Cr 10–50 µg/l; Cu 10–50 µg/l; Hg 0,2–3 µg/l; Ni 10–50 µg/l; Pb 10–20 µg/l; Zn 50–200 µg/l		
16	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: (a) waste prevention, e.g. maximise the proportion of residues which arise as by-products; (b) waste preparation for reuse, e.g. according to the specific requested quality criteria; (c) waste recycling; (d) other waste recovery (e.g. energy recovery), by implementing an appropriate combination of techniques such as: a. Generation of gypsum as a by-product — Description: 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 — Applicability: Generally applicable within the constraints associated with the required gypsum quality, the health requirements	FC	The operator has confirmed that the following is in place: a) Generation of gypsum as a by-product - wet flue gas treatment is not utilised at this installation and so this is not applicable. b) Recycling or recovery of residues in the construction sector – the intention for bottom ash and fly ash is for it to be reused as a fertiliser. The suitability of this material will be confirmed after commissioning once the process

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<tr><td></td><td>
<table>
<tr><td></td><td></td><td>quality of limestone used in the wet FGD influences the purity of the gypsum produced</td><td>associated to each specific use, and by the market conditions</td></tr>
<tr><td>b.</td><td>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) associated to each specific use, and by the market conditions</td></tr>
<tr><td>c.</td><td>Energy recovery by using waste in the fuel mix</td><td>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</td><td>Generally applicable where plants can accept waste in the fuel mix and are technically able to feed the fuels into the combustion chamber</td></tr>
<tr><td>d.</td><td>Preparation of spent catalyst for reuse</td><td>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</td><td>The applicability may be limited by the mechanical condition of the catalyst and the required performance with respect to controlling NO_X and NH_3 emissions</td></tr>
</table>
</td><td></td><td>is fully established. The results of testing and opportunities for the use of this material will be presented to the EA prior to 31st July 2021.

-Metals found within the incoming biomass are removed and sent for recycling.

-Empty drums and containers are collected and sent off site for recycling.

d) Preparation of spent catalyst for reuse – SNCR rather than SCR is used. Therefore, this technique is not applicable.

We agree with the operators stated compliance.</td></tr>
<tr><td>Descra dopted17</td><td>In order to reduce noise emissions, BAT is to use one or a combination of the techniques given below.
<table>
<tr><th colspan="2">Technique</th><th>Description</th><th>Applicability</th></tr>
<tr><td>a.</td><td>Operational measures</td><td>These include:
— improved inspection and maintenance of equipment
— closing of doors and windows of enclosed areas, if possible
— equipment operated by experienced staff
— avoidance of noisy activities at night, if possible</td><td>Generally applicable</td></tr>
</table>
</td><td>CC</td><td>The operator has confirmed the following:

a) Operational measures – Regular inspections and maintenance is undertaken, noisy activities are not undertaken at night, staff are appropriately trained and skilled in relation to noise minimisation.</td></tr>
</table>

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) Low noise equipment – low noise equipment has been installed wherever practicable. c) Noise attenuation – noisy equipment is housed within buildings e.g. log chopper, resizing chippers and steam turbine generator). The emergency generator is situated within an enclosed space to minimise noise. d) Noise control-equipment – The following equipment is installed: - the ID fan is equipped with a silencer and noise insulation. - Air compressors are equipped with inlet air silences. - The emergency generator is equipped with an exhaust silencer. - hogging ejectors are equipped with silencers. We agree with the operators stated compliance.

		— provisions for noise control during maintenance activities	
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

Combustion of solid fuels only

Combustion of solid fuels only
BAT Conclusions 18 to 23 applicable to coal and/or lignite
Deleted from the table as they are not applicable to the activities carried out at the installation.
100% biomass-firing.

<table>
<tr><th>BAT Concn. Number</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th></tr>
<tr><td>2.2.1
Table 8</td><td>BAT-associated energy efficiency levels (BAT-AEELs) for the combustion of solid biomass and/or peat
<table>
<tr><th rowspan="3">Type of combustion unit</th><th colspan="4">BAT-AEELs [73] [74]</th></tr>
<tr><th colspan="2">Net electrical efficiency (%) [75]</th><th colspan="2">Net total fuel utilisation (%) [76] [77]</th></tr>
<tr><th>New unit [78]</th><th>Existing unit</th><th>New unit</th><th>Existing unit</th></tr>
<tr><td>Solid biomass and/or peat boiler</td><td>33,5–to > 38</td><td>28–38</td><td>73–99</td><td>73–99</td></tr>
</table></td><td>CC</td><td>The operator confirmed the following:

The net electrical efficiency during performance tests indicates that in heat export mode the CHP plant had an electrical efficiency of 34.04%. In condensing mode It was 36.42%. Overall performance test value of 34.04%.

This is within the BAT-AEEL range of 28 – 38%.

We agree with the operators stated compliance.</td></tr>
<tr><td>24</td><td>In order to prevent or reduce NO_X emissions to air while limiting CO and N_2O 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.
<table>
<tr><th colspan="2">Technique</th><th>Description</th><th>Applicability</th></tr>
<tr><td>a.</td><td>Combustion optimisation</td><td rowspan="5">See descriptions in Section 8.3</td><td rowspan="5">Generally applicable</td></tr>
<tr><td>b.</td><td>Low-NO_X burners (LNB)</td></tr>
<tr><td>c.</td><td>Air staging</td></tr>
<tr><td>d.</td><td>Fuel staging</td></tr>
<tr><td>e.</td><td>Flue-gas recirculation</td></tr>
<tr><td>f.</td><td>Selective non-catalytic reduction (SNCR)</td><td>See description in Section 8.3.
Can be applied with ‘slip’ SCR</td><td>Not applicable to combustion plants operated < 500 h/yr with highly variable boiler loads.
The applicability may be limited in the case of combustion plants operated between 500 h/yr and 1 500 h/yr with highly variable boiler loads.
For existing combustion plants, applicable within the constraints associated with the</td></tr>
</table></td><td>FC</td><td>The operator confirmed the following:

a) combustion optimisation – an advanced control system is used to control the plant maximising energy efficiency and reducing emissions. Further details are included under BAT6.

c) Air Staging – This is used at the installation to distribute combustion air. There are five different zones to ensure proper combustion: primary air, spreader air, ignition air, secondary air and over fire air.</td></tr>
</table>

<table>
<tr><th>BAT Concn. Number</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th></tr>
<tr>
<td></td>
<td>
<table>
<tr><td></td><td></td><td></td><td>required temperature window and residence time for the injected reactants</td></tr>
<tr><td>g.</td><td>Selective catalytic reduction (SCR)</td><td>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</td><td>Not applicable to combustion plants operated < 500 h/yr.
There may be economic restrictions for retrofitting existing combustion plants of < 300 MW_{th}.
Not generally applicable to existing combustion plants of < 100 MW_{th}</td></tr>
</table>
BAT-associated emission levels (BAT-AELs) for NO_X emissions to air from the combustion of solid biomass and/or peat
<table>
<tr><th rowspan="2">Combustion plant total rated thermal input (MW_{th})</th><th colspan="4">BAT-AELs (mg/Nm^3)</th></tr>
<tr><th colspan="2">Yearly average</th><th colspan="2">Daily average or average over the sampling period</th></tr>
<tr><th>New plant</th><th>Existing plant ([79])</th><th>New plant</th><th>Existing plant ([80])</th></tr>
<tr><td>50–100</td><td>70–150 ([81])</td><td>70–225 ([82])</td><td>120–200 ([83])</td><td>120–275 ([84])</td></tr>
<tr><td>100–300</td><td>50–140</td><td>50–180</td><td>100–200</td><td>100–220</td></tr>
<tr><td>≥ 300</td><td>40–140</td><td>40–150 ([85])</td><td>65–150</td><td>95–165 ([86])</td></tr>
</table>
As an indication, the yearly average CO emission levels will generally be:

< 30–250 mg/Nm^3 for existing combustion plants of 50–100 MW_{th} operated ≥ 1 500 h/yr, or new combustion plants of 50–100 MW_{th},
< 30–160 mg/Nm^3 for existing combustion plants of 100–300 MW_{th} operated ≥ 1 500 h/yr, or new combustion plants of 100–300 MW_{th},
< 30–80 mg/Nm^3 for existing combustion plants of ≥ 300 MW_{th} operated ≥ 1 500 h/yr, or new combustion plants of ≥ 300 MW_{th}.

</td>
<td></td>
<td>f) SNCR – is used on the installation.

The relevant BAT-AELs for NO_x and CO have been incorporated into the permit.

Based upon performance tests, which have been provided with the reg61 notice, it is expected that the installation will be able to comply with the BAT-AELs.

A full years operational data is not yet available and the combustion plant has not operated on the full range of fuels. A full data set will be provided to the Environment Agency to confirm BAT-AEL compliance before 31st July 2021.</td>
</tr>
<tr>
<td>25</td>
<td>In order to prevent or reduce SO_X, 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.</td>
<td>FC</td>
<td>The operator has confirmed the following:</td>
</tr>
</table>

<table>
<tr><th>BAT Concn. Number</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th></tr>
<tr>
<td></td>
<td>
<table>
<tr><th colspan="2">Technique</th><th>Description</th><th>Applicability</th></tr>
<tr><td>a.</td><td>Boiler sorbent injection (in-furnace or in-bed)</td><td rowspan="8">See descriptions in Section 8.4</td><td rowspan="6">Generally applicable</td></tr>
<tr><td>b.</td><td>Duct sorbent injection (DSI)</td></tr>
<tr><td>c.</td><td>Spray dry absorber (SDA)</td></tr>
<tr><td>d.</td><td>Circulating fluidised bed (CFB) dry scrubber</td></tr>
<tr><td>e.</td><td>Wet scrubbing</td></tr>
<tr><td>f.</td><td>Flue-gas condenser</td></tr>
<tr><td>g.</td><td>Wet flue-gas desulphurisation (wet FGD)</td><td>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</td></tr>
<tr><td>h.</td><td>Fuel choice</td><td>Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State</td></tr>
</table>
BAT-associated emission levels (BAT-AELs) for SO_2 emissions to air from the combustion of solid biomass and/or peat
<table>
<tr><th rowspan="2">Combustion plant total rated thermal input (MW_{th})</th><th colspan="4">BAT-AELs for SO_2 (mg/Nm^3)</th></tr>
<tr><th colspan="2">Yearly average</th><th colspan="2">Daily average or average over the sampling period</th></tr>
<tr><th>New plant</th><th>Existing plant (87)</th><th>New plant</th><th>Existing plant (88)</th></tr>
<tr><td>< 100</td><td>15–70</td><td>15–100</td><td>30–175</td><td>30–215</td></tr>
<tr><td>100–300</td><td>< 10–50</td><td>< 10–70 (89)</td><td>< 20–85</td><td>< 20–175 (90)</td></tr>
<tr><td>≥ 300</td><td>< 10–35</td><td>< 10–50 (89)</td><td>< 20–70</td><td>< 20–85 (91)</td></tr>
</table>
</td>
<td></td>
<td>b) Duct Sorbent Injection (DSI) – hydrated lime is added to the flue gas upstream of the bag filter to reduce SOx and HCl.

f) Flue gas condenser (FGC) – FGC is installed in the CHP plant system. Hot feed water flows through the air pre-heater where it heats up the combustion air. The then cooled feed water passes through the FGS where it is heated up again by hot flue gases, It then passes to the economiser for further heating before entering the boiler.

h) Fuel choice – The wood biomass has a low sulphur content
(average 0.01 – 0.03%) and low chlorine content (0.01 – 0.05%).

The relevant BAT-AELs for SO2, HCl and HF have been incorporated into the permit.

Based upon performance tests, which have been provided with the reg61 notice, it is expected that the installation will be able to comply with the BAT-AELs.</td>
</tr>
</table>

<table>
<tr><th>BAT Concn. Number</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th></tr>
<tr><td></td><td>
BAT-associated emission levels (BAT-AELs) for HCl and HF emissions to air from the combustion of solid biomass and/or peat
<table>
<tr><th rowspan="3">Combustion plant total rated thermal input (MW_{th})</th><th colspan="4">BAT-AELs for HCl (mg/Nm^3) (92) (93)</th><th colspan="2">BAT-AELs for HF (mg/Nm^3)</th></tr>
<tr><th colspan="2">Yearly average or average of samples obtained during one year</th><th colspan="2">Daily average or average over the sampling period</th><th colspan="2">Average over the sampling period</th></tr>
<tr><th>New plant</th><th>Existing plant (94) (95)</th><th>New plant</th><th>Existing plant (96)</th><th>New plant</th><th>Existing plant (96)</th></tr>
<tr><td>< 100</td><td>1–7</td><td>1–15</td><td>1–12</td><td>1–35</td><td>< 1</td><td>< 1,5</td></tr>
<tr><td>100–300</td><td>1–5</td><td>1–9</td><td>1–12</td><td>1–12</td><td>< 1</td><td>< 1</td></tr>
<tr><td>≥ 300</td><td>1–5</td><td>1–5</td><td>1–12</td><td>1–12</td><td>< 1</td><td>< 1</td></tr>
</table>
</td><td></td><td>A full years operational data is not yet available and the combustion plant has not operated on the full range of fuels. A full data set will be provided to the Environment Agency to confirm BAT-AEL compliance before 31st July 2021.</td></tr>
<tr><td>26</td><td>
In order to reduce dust and particulate-bound metal 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.
<table>
<tr><th colspan="2">Technique</th><th>Description</th><th>Applicability</th></tr>
<tr><td>a.</td><td>Electrostatic precipitator (ESP)</td><td rowspan="2">See description in Section 8.5</td><td rowspan="2">Generally applicable</td></tr>
<tr><td>b.</td><td>Bag filter</td></tr>
<tr><td>c.</td><td>Dry or semi-dry FGD system</td><td rowspan="2">See descriptions in Section 8.5
The techniques are mainly used for SO_X, HCl and/or HF control</td><td>See applicability in BAT 25</td></tr>
<tr><td>d.</td><td>Wet flue-gas desulphurisation (wet FGD)</td><td></td></tr>
<tr><td>e.</td><td>Fuel choice</td><td>See description in Section 8.5</td><td>Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State</td></tr>
</table>
BAT-associated emission levels (BAT-AELs) for dust emissions to air from the combustion of solid biomass and/or peat
</td><td>FC</td><td>The operator has confirmed the following:

b) Bag filter – A bag filter is installed at the installation.

d) Fuel choice - The wood biomass has a low sulphur content
(average 0.01 – 0.03%) and low chlorine content (0.01 – 0.05%).

The relevant BAT-AELs for Dust have been incorporated into the permit.

Based upon performance tests, which have been provided with the reg61 notice, it is expected</td></tr>
</table>

<table>
<tr><th>BAT Concn. Number</th><th>Summary of BAT Conclusion requirement</th><th>Status NA/ CC / FC / NC</th><th>Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement</th></tr>
<tr><td></td><td>
<table>
<tr><th rowspan="2">Combustion plant total rated thermal input (MW_{th})</th><th colspan="4">BAT-AELs for dust (mg/Nm^3)</th></tr>
<tr><th colspan="2">Yearly average</th><th colspan="2">Daily average or average over the sampling period</th></tr>
<tr><th>New plant</th><th>Existing plant (97)</th><th>New plant</th><th>Existing plant (98)</th></tr>
<tr><td>< 100</td><td>2–5</td><td>2–15</td><td>2–10</td><td>2–22</td></tr>
<tr><td>100–300</td><td>2–5</td><td>2–12</td><td>2–10</td><td>2–18</td></tr>
<tr><td>≥ 300</td><td>2–5</td><td>2–10</td><td>2–10</td><td>2–16</td></tr>
</table>
</td><td></td><td>that the installation will be able to comply with the BAT-AELs.

A full years operational data is not yet available and the combustion plant has not operated on the full range of fuels. A full data set will be provided to the Environment Agency to confirm BAT-AEL compliance before 31st July 2021.</td></tr>
<tr><td>27</td><td>In order to prevent or reduce mercury 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.
<table>
<tr><th colspan="2">Technique</th><th>Description</th><th>Applicability</th></tr>
<tr><td colspan="4">Specific techniques to reduce mercury emissions</td></tr>
<tr><td>a.</td><td>Carbon sorbent (e.g. activated carbon or halogenated activated carbon) injection in the flue-gas</td><td rowspan="3">See descriptions in Section 8.5</td><td>Generally applicable</td></tr>
<tr><td>b.</td><td>Use of halogenated additives in the fuel or injected in the furnace</td><td>Generally applicable in the case of a low halogen content in the fuel</td></tr>
<tr><td>c.</td><td>Fuel choice</td><td>Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State</td></tr>
<tr><td colspan="4">Co-benefit from techniques primarily used to reduce emissions of other pollutants</td></tr>
<tr><td>d.</td><td>Electrostatic precipitator (ESP)</td><td rowspan="3">See descriptions in Section 8.5.
The techniques are mainly used for dust control</td><td rowspan="3">Generally applicable</td></tr>
<tr><td>e.</td><td>Bag filter</td></tr>
<tr><td>f.</td><td>Dry or semi-dry FGD system</td><td></td></tr>
</table>
</td><td>FC</td><td>The operator has confirmed the following:

c) Fuel choice - the wood biomass has a low sulphur content (average 0.01 – 0.03%) and low chlorine content (0.01 – 0.05%).

e) Bag filter – a bag filter is installed at the installation.

The relevant BAT-AEL for mercury has been incorporated into the permit,.

To date no performance testing has been undertaken in relation to mercury. However in accordance with BAT 4 testing is proposed to be undertaken.</td></tr>
</table>

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
	g. Wet flue-gas desulphurisation (wet FGD)	See descriptions in Section 8.5. The techniques are mainly used for SO_X, HCl and/or HF control	See applicability in BAT 25		
	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^3 as average over the sampling period.				

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 two current discharges to sewer identified as S1 and S2. 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.

The operator has submitted a H1 assessment of their discharge from the onsite water treatment plan to foul sewer. The treatment plant processes boiler blowdown water and water from the demineralisation plant that cannot be reused for ash-quenching. The submission of a H1 assessment was not required as part of the regulation 61 notice. All of the parameters considered screened out at either step 1 or 2 of the H1 screening. Therefore, we do not consider that the site will have a significant impact on the receiving water. No BAT-AELs apply to the discharge.

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
Receipt of application	
Confidential information	A claim for commercial or industrial confidentiality has not been made.
Identifying confidential information	We have not identified information provided as part of the application that we consider to be confidential.
The site	
Biodiversity, heritage, landscape and nature conservation	The application is within the relevant distance criteria of a site of heritage, landscape or nature conservation, and/or protected species or habitat. 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. We have not consulted Natural England on the application. The decision was taken in accordance with our guidance.
Operating techniques	
General operating techniques	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. The permit conditions ensure compliance with the relevant BREF, BAT Conclusions. The ELVs deliver compliance with the BAT-AELs.
Permit conditions	
Updating permit conditions during consolidation	We have updated permit conditions to those in the current generic permit template as part of permit consolidation. The conditions will provide at least the same level of protection as those in the previous permit and in some cases will provide a higher level of protection to those in the previous permit.

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.
Improvement programme	Based on the information on the application, we consider that we need to impose an improvement programme. We have imposed an improvement programme to ensure that: • the Environment Management System contains all procedures specified under BAT 1 • the operator will have a plan in place to ensure that the fuel is characterised in line with BAT 9. • A suitable disposal route for fly ash is in place.
Emission limits	We have decided that emission limits should be set for the parameters listed in the permit. These are described in the relevant BAT Conclusions in Section 5 of this document. 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.
Monitoring	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. These are described in the relevant BAT Conclusions in Section 5 of this document. Table S3.3 Process monitoring requirements was amended to include the requirement to monitor energy efficiency after overhauls on site in line with BAT2.
Reporting	We have specified reporting in the permit for the following parameters: • Nitrogen dioxide • Carbon monoxide • Sulphur dioxide • Hydrogen Chloride • Hydrogen Fluoride • Dust • Mercury • Ammonia

Aspect considered	Decision
	These are described in the relevant BAT Conclusions in Section 5 of this document.
Operator competence	
Management system	There is no known reason to consider that the operator will not have the management system to enable it to comply with the permit conditions.
Growth Duty	
Section 108 Deregulation Act 2015 – Growth duty	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. Paragraph 1.3 of the guidance says: "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." 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. 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.